IBM Business Process Manager
Version 8 Release 5

IBM Business Process Manager Standard Installation Guide

IBM

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Contents

Chapter 1. Roadmap: Installing and configuring IBM Business Process Manager Standard

The IBM® Business Process Manager Standard installation and configuration programs accommodate various development and production scenarios. This roadmap guides you through the most common paths for installing and configuring IBM Business Process Manager Standard.

Alternatively, you can use the Interactive Installation and Configuration Guide to answer a series of questions about your target environment and receive installation and configuration topics that are customized to your installation needs.

The roadmap provides the most relevant links for each common installation and configuration scenario, grouped by operating system.

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Linux

To install IBM Business Process Manager on Linux, follow this roadmap.

Planning
> Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing
> Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:
> - System requirements
> - Preparing Linux systems for installation with a new DB2 Express database
> - Preparing Linux systems for installation with an existing database

Installing
> Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.
> - Installing IBM Business Process Manager using a typical installation and configuration path
> - Installing IBM Business Process Manager using a custom installation and configuration path

Configuring
> No configuration is required after the completion of a typical installation. After a custom installation, configure the software.
>
> Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:
> - Configuring profiles and creating a network deployment environment

Modifying your existing installation
> After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

AIX

To install IBM Business Process Manager on AIX, follow this roadmap.

Planning
> Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing
> Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:
> - System requirements
> - Preparing AIX systems for installation

Installing
> Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.
> - Installing IBM Business Process Manager using a typical installation and configuration path
> - Installing IBM Business Process Manager using a custom installation and configuration path

Configuring
> No configuration is required after the completion of a typical installation. After a custom installation, configure the software.
>
> Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:
> - Configuring profiles and creating a network deployment environment

Modifying your existing installation
> After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

Solaris

To install IBM Business Process Manager on Solaris, follow this roadmap.

Planning
> Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing
> Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:
> - System requirements
> - Preparing Solaris systems for installation

Installing
> Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.
> - Installing IBM Business Process Manager using a typical installation and configuration path
> - Installing IBM Business Process Manager using a custom installation and configuration path

Configuring
> No configuration is required after the completion of a typical installation. After a custom installation, configure the software.

Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:

- Configuring profiles and creating a network deployment environment

Modifying your existing installation
>After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

Windows

To install IBM Business Process Manager on Microsoft Windows, follow this roadmap.

Planning
>Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing
>Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:

- System requirements
- Preparing Windows systems for installation

Installing
>Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.

- Installing IBM Business Process Manager using a typical installation and configuration path
- Installing IBM Business Process Manager using a custom installation and configuration path

Configuring
>No configuration is required after the completion of a typical installation. After a custom installation, configure the software.

>Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:

- Configuring profiles and creating a network deployment environment

Modifying your existing installation
>After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

Chapter 2. Installation types and profiles

There is a relationship between the type of installation you perform, **Typical** or **Custom** and how profiles associated with the installation type are created for each IBM BPM configuration (Express, Standard, Advanced and Advanced: Process Server).

The following tables describe the relationships.
- "IBM BPM Advanced"
- "IBM BPM Advanced: Process Server"
- "IBM BPM Standard" on page 6
- "IBM BPM Express" on page 6

IBM BPM Advanced

Table 1. Profile configuration as part of installation: IBM Business Process Manager Advanced

Type of installation	Media	Creates deployment manager and managed-node profiles and configures a single cluster deployment environment?	Profile Management Tool optionally started?	Quick Start console optionally started?	Features available for selection from Installation Manager?
Typical using Launchpad	DVD or electronic image	Yes	No	Yes	Not Applicable
Custom	DVD or electronic image	No	Yes	No	Yes

IBM BPM Advanced: Process Server

Table 2. Profile configuration as part of installation: IBM Business Process Manager Advanced: Process Server

Type of installation	Media	Creates deployment manager and managed-node profiles and configures a single cluster deployment environment?	Profile Management Tool optionally started?	Quick Start console optionally started?	Features available for selection from Installation Manager?
Typical using Launchpad	DVD or electronic image	Yes	No	Yes	Not Applicable
Custom	DVD or electronic image	No	Yes	No	Yes

IBM BPM Standard

Table 3. Profile configuration as part of installation: IBM Business Process Manager Standard

Type of installation	Media	Creates deployment manager and managed-node profiles and configures a single cluster deployment environment	Profile Management Tool optionally started?	Quick Start console optionally started?	Features available for selection from Installation Manager?
Typical using Launchpad	DVD or electronic image	Yes	No	Yes	Not Applicable
Custom	DVD or electronic image	No	Yes	No	Yes

IBM BPM Express®

Table 4. Profile configuration as part of installation: IBM Business Process Manager Express

Type of installation	Media	Creates stand-alone profile?	Profile Management Tool optionally started?	Quick Start console optionally started?	Features available for selection from Installation Manager?
Typical using Launchpad	DVD or electronic image	Yes	No	Yes	Not Applicable
Custom	DVD or electronic image	No	Yes	No	Yes

Chapter 3. Preparing to install and configure the software

Before preparing to install and configure the software, create a plan for the deployment environment that you want to create.

Use the information listed in the following table to prepare for installing and configuring IBM Business Process Manager.

Table 5. Preparing for installation and configuration

Task	Where to find information	Result after completing the task
Review hardware and software requirements	Depending on your IBM BPM configuration, visit: • IBM Business Process Manager Advanced system requirements • IBM Business Process Manager Standard system requirements • IBM Business Process Manager Express system requirements	You understand the system requirements necessary to support your IBM Business Process Manager installation.
Prepare your operating system	**AIX** Preparing AIX systems for installation **Linux** Preparing Linux systems for installation with a new DB2 Express database or Preparing Linux systems for installation with an existing database **Solaris** Preparing Solaris systems for installation **Windows** Preparing Windows systems for installation	You have prepared the operating system of each workstation to be used.

Table 5. Preparing for installation and configuration (continued)

Task	Where to find information	Result after completing the task
Make sure you have installed your database management system.	Consult your database documentation for information about installing and administering your database management system.	Your database management system is installed. IBM Business Process Manager embeds the DB2 Express database. If you want to use DB2 Express as your database, you can select it as a feature from the installer and it is installed and configured automatically. The user must have administrative privileges (root or Administrator) to install DB2 Express. **Note:** If you already have a version of DB2 installed and you want to install DB2 Express, you must uninstall DB2 before running the IBM Business Process Manager installer. If the installer detects a version of DB2 installed and you have selected to install DB2 Express from the installer, you will receive a warning message and will not be able to install DB2 Express. **Important:** Linux If you are installing DB2 Express as a root user, you must ensure that all kernel requirements are met before the DB2 Express installation begins. See Kernel parameter requirements (Linux) for a list of the kernel requirements. You can locate the current values by parsing the output of the **ipcs -l** command. **Important:** You will not be able to properly install and use DB2 Express if the password that is specified does not meet operating system or company restrictions, because an operating system user is created on install.

Chapter 4. Planning for IBM Business Process Manager

To ensure that the system that you implement meets your needs, plan your IBM Business Process Manager before you introduce its software into your enterprise information system.

Planning your path through the installation documentation

The installation process for IBM Business Process Manager, with its various components and potential configurations, supports many scenarios and topologies, ranging from a basic proof-of concept, demonstration, or test environment, to a mature distributed high-availability production environment. You might need some help with the many installation options.

The topics that you need as you work through your installation process are not necessarily together in the navigation tree and, depending on your search query, might not be easy to pick out in the search results.

To address this situation, use the Interactive Installation and Configuration Guide to generate a set of installation and configuration topics that are customized to your precise installation needs. In the Interactive Installation and Configuration Guide form, select the options you need for your installation scenario. As you select each option, the tool automatically removes options that are ruled out by your previous selections. For example, if you indicate that you plan to install on the AIX operating system, it removes the option to install a new instance of DB2 Express as part of the installation.

After you fill out the form, the tool generates a single topic containing all of the installation and configuration instructions that apply to your scenario. You can save these instructions so that they are sharable and portable. You can also go back, change your selections, and generate a new set of instructions. Each time you need to install product components with other options, return to the form and generate a new guide, or use the tool to see what the installation and configuration process looks like when you choose different options.

This following topics describe some of the options presented in the Interactive Installation and Configuration Guide form, the factors you should consider as you plan your installation process, and what causes some options not to be available. The **Help me decide** links in the form bring you to these topics, to help you understand the decisions you make and their impact on the resulting generated instructions.

The Interactive Installation and Configuration Guide options are not exhaustive. Some types of installation, for example installing into an existing WebSphere® Application Server instance, are supported and documented, but are not paths generated by the interactive guide tool. Browse the navigation or search the information center to find topics on these subjects.

Deciding which configuration to install

IBM BPM is available in four configurations: Advanced, Advanced: Process Server, Standard, and Express, each targeting various enterprise needs. To select which configuration to install, consider your enterprise's needs in terms of the level of business process management adoption and the product features and topology support that you want.

Table 6. Deciding which IBM Business Process Manager configuration to install

How far along the path to adopting full business process management capabilities is your enterprise?	What specific capabilities and availability support do you require?	Install this configuration:
Project-level adoption: You are starting your first business process management project and are looking primarily for rapid time-to-value and improving user productivity.	• Execution compatible with WebSphere Lombardi Edition • IBM Process Designer authoring tool • Collaborative editing and immediate playback • Interactive user interfaces • ILOG-based process rules • Real-time monitoring and reporting • Performance analytics and optimizer • Performance Data Warehouse • IBM Process Center, with a shared asset repository • Up to three process authors and 200 users • Two cores for developers, four cores for the product, but no clustering • Windows and Linux on Intel support	IBM Business Process Manager Express
Multiple projects: Your enterprise is involved in multiple business process management projects and requires basic integration support.	All the capabilities of IBM BPM Express, plus the following capabilities and support: • Unlimited authors and users • Clustering support for high availability • Linux on System z, AIX, and Solaris support • Network deployment support • DB2® for z/OS® support	IBM Business Process Manager Standard
Transformative: Your enterprise requires high-volume process automation and needs additional SOA components for extensive service integration and orchestration.	All the capabilities and high-availability support of IBM BPM Standard, plus the following capabilities and support: • Execution compatible with WebSphere Process Server • IBM Integration Designer authoring (BPEL and SOA) • Built-in enterprise service bus (ESB) • Transaction support • Integration adapters • Business Space user interface	IBM Business Process Manager Advanced
Your enterprise currently uses an earlier version of Process Server alone and you want to update to the latest release; or you want to install IBM Business Process Manager for z/OS.	All the Process Server-related capabilities and high-availability support of IBM BPM Advanced. Does not include Process Designer or Process Center. Available for installing on z/OS.	IBM Business Process Manager Advanced: Process Server

Choosing an operating system

You probably know which supported operating system you plan to install the server components on. Your options might be limited by the product configuration you are installing and your project preferences and available infrastructure. Furthermore, your operating system selection somewhat constrains the options that are available for other choices you make during the installation process.

If you are planning to install IBM BPM Express, you can install the server components on Windows or Linux on Intel systems, or, if you are an IBM Master Data Management customer, AIX. For IBM BPM Standard and IBM BPM Advanced, Windows, Linux on Intel and on System z, AIX, Solaris, and z/OS are supported.

Depending on your choice of operating system, the Interactive Installation and Configuration Guide automatically constrains the options that are available for supported databases, based on probable scenarios. You can choose from the remaining options to generate a custom set of instructions that you can follow when you install and configure the product.

If you choose to install server components on Linux on System z, AIX, Solaris, or z/OS, the generated installation guide includes the instructions for configuring IBM BPM to use an existing database server. If you choose Windows or Linux on Intel, you can choose to use an existing database server, or to have the installation process install and configure DB2 Express, which is useful for proof-of-concept or simple environment installations.

Choosing the type of installation

The installation type selection determines how you interact with the installation process to provide information and select the options you want.

A typical installation is the simplest and quickest method for installing and configuring. The installation program uses default values for as many installation options as possible, and you supply values for the remaining options using a graphical interface. This is suitable for a relatively quick proof-of-concept installation and when you are not using an existing WebSphere Application Server instance.

For IBM Business Process Manager Express, using the product launchpad, the typical installation installs the software and configures a stand-alone profile. You do not need to create a profile later using the Profile Management Tool or **manageprofiles** command.

For all other IBM Business Process Manager editions, using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Windows The typical installation also installs Process Designer on your machine.

With a custom installation using a graphical interface, you can customize all installation settings.

With a custom installation using a command line, you can run a command that specifies installation settings. This is more suitable if you only require a single installation.

With a custom installation using a response file, you create a file that specifies installation settings, and run an installation command that calls it. Using a response file is a better choice if you know that you need similar installations on several systems in your enterprise.

If you are installing IBM Business Process Manager for z/OS, then there is only one type of installation available, and it is performed using commands.

For all of the custom options, the generated guide includes information about creating profiles and the deployment environment after installation.

If you are migrating business data and applications from a previous version of IBM Business Process Manager, you must use one of the custom installation types. See the topics in Migrating to IBM Business Process Manager for additional information.

Deciding what type of environment to configure

The installation process installs IBM Process Center or IBM Process Server server components based on your selection. Process Center provides a repository for process assets, a runtime environment for testing and studying the performance of processes, and a console for administering access to assets and deploying processes to development, test, staging, or production environments. Process Server is a runtime environment for process applications and a data warehouse for collecting performance data from the applications. It includes administrative consoles for managing and maintaining the runtime environments and data warehouses.

To use these server components, you must configure an environment for them. Configuring environments for both Process Server and Process Center is two separate activities: you first configure an environment for one, and then another environment for the other.

When you install (deploy) a process application snapshot to a process server, the assets of that snapshot are moved from the Process Center repository to the selected process server. The process server can be connected to a Process Center or offline. Depending on your needs and whether the process server is connected or offline, you can use the Process Center console or wsadmin commands to install the snapshot. See Installing snapshots on offline process servers.

If you choose the offline server option during typical installation, Process Center is not installed. You might choose to install an offline Process Server if you already have a Process Center installed, or if the Process Server is behind a firewall. Once Process Server is installed, you can add the offline server to a Process Center in order to deploy your process applications.

If you are installing IBM BPM Advanced: Process Server, the Process Center option is not available.

Choosing whether to install DB2 Express

You can choose to have the installation process include automatically installing an instance of IBM DB2 Express. Choose this option if you do not have an existing or planned supported database server you intend to use to store content from Process Center or Process Server. If you are installing a test or proof-of-concept environment, you would likely choose to have a new DB2 Express installed automatically, unless one already exists on the system.

Choices you make for other installation options affect what is available for this choice. If you want the generated instructions to include automatically installing DB2 Express, you must install on Windows or Linux on an Intel system. If you are installing any product configuration onto Linux on System z, AIX, Solaris, or z/OS, the installation process does not offer to install DB2 Express; you must use a database server product that you have already installed or will install.

You cannot install DB2 Express on any system that already has DB2 installed on it. Furthermore, you must install as an administrative or root user to install DB2 Express.

The configuration steps configure Process Center or Process Server to use the database of your choice, regardless of whether you automatically install a new DB2 Express instance or you are using an otherwise-installed supported database server.

Choosing how to configure profiles and deployment environments

When performing a custom installation and configuration, you can select which tool to use to configure profiles and deployment environments, depending on which product edition you are installing and which operating system you are using.

For IBM BPM Express, you will use the `BPMConfig` command to create new stand-alone profiles.

For IBM BPM Standard, IBM BPM Advanced, and IBM BPM Advanced: Process Server, you can choose to configure the profiles and deployment environment all at the same time by using the **BPMConfig** command, or separately by using the Profile Management Tool (PMT) and the Deployment Environment wizard. Using the **BPMConfig** command to configure your environment all at once is more straight-forward and easier to do. However, if you want to set up nodes and customize security settings before setting up the topology, choose PMT to create the profiles and the Deployment Environment wizard to configure the deployment environment.

For creating profiles on z/OS, you have the option of using the graphical tool zPMT, or the **zpmt.sh** command.

PMT is not supported on Solaris. If you need to create profiles separately from the deployment environment on Solaris, you must first create just the profiles using the **BPMConfig** command. The Interactive Installation and Configuration Guide will provide those instructions if you select Solaris as your operating system and PMT as your profile creation method. Although it is possible to use the **BPMConfig** command to create only profiles on all operating systems, it is not a path suggested through the interactive guide, other than for Solaris.

The interactive guide does not provide information for the path to take if you are augmenting existing profiles because your are installing into an existing WebSphere Application Server. See help topics about the **manageprofiles** command for more information on augmenting profiles.

Restriction: When you create profiles using PMT, you must use parameter values that match the values that are specified in the properties file that the **BPMConfig** command uses for the deployment environment setup. For example, if you set the value of **cellName** to `Cell1`, the properties file that **BPMConfig** uses must also use the `Cell1` value. If you omit optional parameter values, PMT creates default values that must also match the required parameter values that are used by **BPMConfig**. For more information and examples, see manageprofiles command-line utility.

Note: If your database is already created, you can choose to create the database tables during the creation of the deployment environment, using either the **BPMConfig** command or the Deployment Environment wizard. The interactive guide will include instructions on creating the databases, generating scripts, and running scripts to create the tables. You can skip those steps if you created the database tables during the configuration of the deployment environment.

Choosing what type of deployment environment to create

When you create a deployment environment by using the Deployment Environment Wizard, you can choose the type of deployment environment to create.

The deployment environment types enable different sets of function in your deployment environments:

Standard Process Center
> This type of deployment environment lets you store, test, and administer process applications and toolkits that are authored in IBM Process Designer.

Standard Process Server
> This type of deployment environment lets you run processes and services in process applications that are deployed from the Standard Process Center.

Advanced Process Center
> This type of deployment environment lets you store, test, and administer process applications and toolkits that are authored in Process Designer and IBM Integration Designer. This deployment environment type includes all of the Standard Process Center deployment environment function.

Advanced Process Server
> This type of deployment environment lets you run processes, services, and SCA modules in

process applications that are deployed from the Advanced Process Center, or run modules deployed directly. This deployment environment type includes all of the Standard Process Server deployment environment function.

Advanced-only Process Server

This type of deployment environment lets you run SCA modules only. You deploy these modules from the command line or the WebSphere administrative console. This server is the IBM BPM equivalent of WebSphere Process Server. It enables the function that is in the Advanced Process Server deployment environment, but not the function that is in the Standard Process Server deployment environment.

If you have installed IBM BPM Standard, you can select either Standard Process Center or Standard Process Server deployment environment, depending on what level of function you want to use. Usually, you will configure a deployment environment that corresponds to the component you installed. For example, configure a Standard Process Center deployment environment if you installed Process Center.

If you have installed IBM BPM Advanced, you can select any of the deployment environment types, depending on the function you want to use. Usually, you will configure a deployment environment that corresponds to the component you installed. For example, configure one of the Process Center deployment environment types if you installed Process Center.

If you have installed IBM BPM Advanced: Process Server, you can select any of the Process Server deployment environment types, depending on what level of function you want to use.

Assessing your requirements

To minimize rework and outages, take the time to study your current environment before you make installation and configuration decisions. Consider your current business requirements and design, the hardware and software already installed, and your current strengths and shortcomings. This planning could also help you minimize your financial investment.

Several factors determine your software needs. These factors can be organized into the following categories.
* Product hardware and software requirements, your own system resource constraints, and the availability of resources to administer and maintain your system
* Applications to be deployed to the runtime environment, and the intended use of the configured environment
* Products, and the versions of these products, to install to meet your requirements

To make wise choices for all these factors, you must understand the following concepts:
* The terminology as it applies to environment configuration
* The administrative architecture of the product that you will install, configure, administer, and maintain
* The available configuration options (through supplied patterns) and how to determine if a pattern addresses your intended use of the product
* The supported methods of implementation, including an understanding of the different task flows for installing the product and configuring the environment

You can use the information in this section to assess and analyze your current and future requirements to develop an environment to meet those requirements.

Important: For the latest information about platform-specific disk space requirements, supported operating systems, and supported database versions, click one of the following links. You can also find operating system fixes and patches that you must install to have a compliant operating system.
* IBM Business Process Manager Advanced system requirements

- IBM Business Process Manager Standard system requirements
- IBM Business Process Manager Express system requirements
- IBM Business Process Manager Tools and Add-Ons requirements

Process and process application considerations

Your current requirements provide the baseline on which to formulate a plan for streamlining integration of your business components. Your vision for the future of your business can provide a guideline that can help you make decisions as your business grows.

You need to know how your product or service is created and delivered. IBM Business Process Manager comes with deployment environment patterns designed to meet the requirements of both production and test environments.

Consider the following factors:
- Consider how process applications interact with existing services and back-end systems.
- Consider how process applications handle data and how data flows through your system to address a specific business need.

  Understand how data persists across retrievals, sessions, processes, and other boundaries when you are developing a solution and configuring its environment.

  Consider the following items regarding the process applications to be deployed to your environment:
  – Process application invocation patterns

    You must understand how the runtime environment handles asynchronous invocations and how the SCA runtime environment leverages the underlying message system to implement asynchronous invocations.

    Different applications have different needs. Those needs are determined by factors such as export types, component types, interactions between components, import types, resources needed such as databases or JMS resources, the need for business events, and their transmission mechanism.
  – Types of business processes that you plan to implement (transactional business processes, interruptible business processes, non-interruptible business processes)

    Non-interruptible business processes, or microflows, are short-running business processes that run in one transaction or without a transaction. Non-interruptible business processes are fast with little effect on performance. All activities within one process are processed in a single thread.

    Interruptible business processes, or macroflows, are long-running business processes that contain a set of activities, each of which is performed in its own transaction. Interruptible business processes can include activities that require human intervention or calls to remote systems or both. Asynchronous activities cause a business process to be interruptible because these activities might take minutes, hours, or even days to complete.

Resource considerations

Identify your assets to make the best use of your software and hardware resources and to make informed implementation decisions. Assess your current enterprise information system to determine whether you require any additional hardware or software to meet your business needs.

Consider the following factors:
- Familiarize yourself with current hardware and software. Prepare a list of the available assets.
- Determine the number of physical computer systems that you will use and itemize each piece of physical hardware. Record the following information:
  – Amount of installed memory
  – Number and type of installed microprocessors
  – External media

- Whether a particular unit can be upgraded
- Ensure all servers involved, both for the product and the databases, use the same network time protocol and are set to the same time.
- Itemize the currently installed software and database applications. Record the following information:
  - Function
  - Breadth of use across the company
  - Security requirements
- Prepare a list of your current IT personnel. Determine whether you have the required expertise to install and maintain IBM Business Process Manager, as well as the required expertise to manage your databases. Make sure that the appropriate users have user IDs with the authorizations to successfully install all products and files.

Development and deployment version levels

When you try to determine the version levels of IBM Business Process Manager that you need in your environment, your decision depends on the version levels that were used when your applications were developed. Generally, applications deployed in a previous version of IBM Business Process Manager can run on the next available version of IBM Business Process Manager.

The following table describes compatibility between IBM Business Process Manager V8.5, including IBM Integration Designer V8.5 (previously WebSphere Integration Developer) and IBM Process Designer V8.5, and prior releases.

Task	Supported?
Deployment from WebSphere Integration Developer version 6.2.0 or 7.0.0, IBM Integration Designer 7.5 or 8.0 to IBM Business Process Manager V8.5.	Yes. **Important:** For WebSphere Adapters V6.2.0, you must install the interim fix titled *Mandatory adapter fix for running 6.1 and 6.2 Adapters on WPS v7.0*. If you do not plan to update the WebSphere Adapter to a V7.0 level, and you plan to continue to use the application with WebSphere Adapter V6.2.0, you must apply this interim fix on the source environment. **Important:** Websphere Adapter for SAP V6.0.2, V6.1.0, V6.1.2 and V6.2.0 are not supported on IBM Business Process Manager V8.5. You must update Websphere Adapter for SAP to V7.0 before you can deploy any applications that use Websphere Adapter for SAP on IBM Business Process Manager V8.5.
Running IBM Business Process Manager V8.5 artifacts on WebSphere Process Server 6.2.0 or 7.0, or IBM Business Process Manager 7.5.	No. Applications authored with IBM Integration Designer V8.5 cannot be published to or installed on WebSphere Process Server 6.2.0, 7.0 or IBM Business Process Manager 7.5 (any prior release) servers. Applications authored with WebSphere Integration Developer 6.2.0, 7.0, or IBM Integration Designer 7.5 or 8.0 and then generated in IBM Integration Designer V8.5 cannot be published to or installed on WebSphere Process Server 6.2.0, 7.0, or IBM Business Process Manager 7.5 servers. Applications generated using `serviceDeploy` from IBM Business Process Manager V8.5 servers cannot be installed on WebSphere Process Server 6.2.0, 7.0, or IBM Business Process Manager 7.5 servers.

Consider also the following compatibility tips for IBM Process Designer and IBM Process Center before you make a decision. For more information, see *Performing a rolling upgrade* in the related tasks.

- The Process Designer and Process Center versions must match at all times. Version mismatches between the two components are not supported.
- Process applications that are deployed to an earlier version of Process Center with only a fourth digit mismatch can be deployed to Process Server by using an offline deployment mechanism. An online deployment is not supported in the case of a version mismatch.
- A later version of Process Center cannot deploy applications to an earlier version of Process Server.

Naming considerations for profiles, nodes, servers, hosts, and cells

This topic discusses reserved terms and issues you must consider when naming your profile, node, server, host, and cell (if applicable). This topic applies to distributed platforms.

Profile naming considerations

The profile name can be any unique name with the following restrictions. Do not use any of the following characters when naming your profile:

- Spaces
- Special characters that are not allowed within the name of a directory on your operating system, such as *, &, or ?.
- Slashes (/) or back slashes (\)

Double-byte characters are allowed.

Windows **Directory path considerations:** The installation directory path must be less than or equal to 60 characters. The number of characters in the *profiles_directory_path\profile_name* directory must be less than or equal to 80 characters.

Note: Use a short path naming convention when you create a profile in a Windows environment to avoid the Windows 255 character path length limitation.

Node, server, host, and cell naming considerations

Reserved names: Avoid using reserved names as field values. The use of reserved names can cause unpredictable results. The following words are reserved:

- cells
- nodes
- servers
- clusters
- applications
- deployments

Descriptions of fields on the Node and Hosts Names and Node, Host, and Cell Names pages: Use the appropriate naming guidelines when you create profiles.

- Stand-alone server profiles
- Deployment manager profiles
- Managed-node profiles

Table 7. Naming guidelines for stand-alone server profiles

Field name	Default value	Constraints	Description
Node name	**Linux** **UNIX** **Windows** *shortHostName* Node *NodeNumber* where: • *shortHost Name* is the short host name. • *NodeNumber* is a sequential number starting at 01.	Avoid using the reserved names.	Select any name you want. To help organize your installation, use a unique name if you plan to create more than one server on the system.
Server name	**Linux** **UNIX** **Windows** server1	Use a unique name for the server.	The logical name for the server.
Host name	**Linux** **UNIX** **Windows** The long form of the domain name server (DNS) name.	Use a fully qualified host name that is addressable through your network.	Use the actual DNS name or IP address of your workstation to enable communication with it. See additional information about the host name following this table.

Table 8. Naming guidelines for deployment manager profiles

Field name	Default value	Constraints	Description
Node name	**Linux** **UNIX** **Windows** *shortHostName* Cell Manager*Node Number* where: • *shortHost Name* is the short host name. • *NodeNumber* is a sequential number starting at 01.	Use a unique name for the deployment manager. Avoid using the reserved names.	The name is used for administration within the deployment manager cell.
Host name	**Linux** **UNIX** **Windows** The long form of the domain name server (DNS) name.	Use a fully qualified host name that is addressable through your network. Avoid using the reserved names.	Use the actual DNS name or IP address of your workstation to enable communication with it. See additional information about the host name following this table.

Table 8. Naming guidelines for deployment manager profiles (continued)

Field name	Default value	Constraints	Description
Cell name	Linux UNIX Windows *shortHostName* Cell *CellNumber* where: • *shortHost Name* is the short host name. • *CellNumber* is a sequential number starting at 01.	Use a unique name for the deployment manager cell. A cell name must be unique in any circumstance in which the product is running on the same physical workstation or cluster of workstations, such as a Sysplex. Additionally, a cell name must be unique in any circumstance in which network connectivity between entities is required either between the cells or from a client that must communicate with each of the cells. Cell names also must be unique if their name spaces are going to be federated. Otherwise, you might encounter symptoms such as a javax.naming.Name NotFoundException exception, in which case, you need to create uniquely named cells.	All federated nodes become members of the deployment manager cell , which you name in the Node, Host, and Cell Names page of the Profile Management Tool.

Table 9. Naming guidelines for managed-node profiles

Field name	Default value	Constraints	Description
Node name	Linux UNIX Windows *shortHostName* Node *NodeNumber* where: • *shortHost Name* is the short host name. • *NodeNumber* is a sequential number starting at 01.	Avoid using the reserved names. Use a unique name within the deployment manager cell.	The name is used for administration within the deployment manager cell to which the managed-node profile is added. Use a unique name within the deployment manager cell.
Host name	Linux UNIX Windows The long form of the domain name server (DNS) name.	Use a fully qualified host name that is addressable through your network.	Use the actual DNS name or IP address of your workstation to enable communication with it. See additional information about the host name following this table.

Host name considerations:

The host name is the network name for the physical workstation on which the node is installed. The host name must resolve to a physical network node on the server. When multiple network cards exist in the server, the host name or IP address must resolve to one of the network cards. Remote nodes use the host name to connect to and to communicate with this node.

IBM Business Process Manager is compliant to both Internet Protocol version 4 (IPv4) and version 6 (IPv6). Wherever you can enter IP addresses in the administrative console, or elsewhere, you can do so in either format. Note that if IPv6 is implemented on your system you must enter the IP address in IPv6 format, and conversely, if IPv6 is not yet available to you, enter IP addresses in IPv4 format. For more information on IPv6 refer to the following description: IPv6.

The following guidelines can help in determining the appropriate host name for your workstation:

- Select a host name that other workstations can reach within your network.
- Do not use the generic identifier, localhost, for this value.
- Do not attempt to install IBM Business Process Manager products on a server with a host name that uses characters from the double-byte character set (DBCS). DBCS characters are not supported when used in the host name.
- Avoid using the underscore (_) character in server names. Internet standards dictate that domain names conform to the host name requirements described in Internet Official Protocol Standards RFC 952 and RFC 1123. Domain names must contain only letters (upper or lower case) and digits. Domain names can also contain dash characters (-) as long as the dashes are not on the ends of the name. Underscore characters (_) are not supported in the host name. If you have installed IBM Business Process Manager on a server with an underscore character in the server name, access the server with its IP address until you rename it.

If you define coexisting nodes on the same computer with unique IP addresses, define each IP address in a domain name server (DNS) look-up table. Configuration files for servers do not provide domain name resolution for multiple IP addresses on a workstation with a single network address.

The value that you specify for the host name is used as the value of the hostName property in configuration documents. Specify the host name value in one of the following formats:

- Fully qualified domain name servers (DNS) host name string, such as xmachine.manhattan.ibm.com
- The default short DNS host name string, such as xmachine
- Numeric IP address, such as 127.1.255.3

The fully qualified DNS host name has the advantages of being totally unambiguous and flexible. You have the flexibility of changing the actual IP address for the host system without having to change the server configuration. This value for host name is particularly useful if you plan to change the IP address frequently when using Dynamic Host Configuration Protocol (DHCP) to assign IP addresses. A disadvantage of this format is being dependent on DNS. If DNS is not available, then connectivity is compromised.

The short host name is also dynamically resolvable. A short name format has the added ability of being redefined in the local hosts file so that the system can run the server even when disconnected from the network. Define the short name to 127.0.0.1 (local loopback) in the hosts file to run disconnected. A disadvantage of the short name format is being dependent on DNS for remote access. If DNS is not available, then connectivity is compromised.

A numeric IP address has the advantage of not requiring name resolution through DNS. A remote node can connect to the node you name with a numeric IP address without DNS being available. A disadvantage of this format is that the numeric IP address is fixed. You must change the setting of the hostName property in configuration documents whenever you change the workstation IP address. Therefore, do not use a numeric IP address if you use DHCP, or if you change IP addresses regularly. Another disadvantage of this format is that you cannot use the node if the host is disconnected from the network.

Preparing necessary security authorizations

Depending on your security policy, you might need a user ID and password to complete tasks such as creating files and folders and accessing the database. Prepare secure user IDs to prevent problems when the servers attempt to access protected data.

- Complete the design of your database.
- Determine the authentication system to use, for example, Lightweight Directory Access Protocol (LDAP).
- Determine what controls are in place that affect the authorizations required for your IBM Business Process Manager installation.
- Identify the systems on which you are installing the product.

The security policies for your site enables global security which indicates that you require specific authorities to install software, create databases or tables, or access databases. To successfully install and operate the product you must do these steps.

To prepare security authorizations for an IBM Business Process Manager database, complete the following steps:

- Prepare a list of user IDs and passwords that have authority to install software on the systems. You must run the installation wizards for IBM Business Process Manager user IDs that have the authority to create files and folders.
- Prepare a list of user IDs, passwords, and roles that are needed for daily operations of the system:
  - Administrative console user IDs and roles to limit capabilities. You can have user IDs for configuring, administering, or monitoring roles.
  - User IDs for each system bus to authenticate system communications.
- Prepare a list of user IDs and passwords that the system uses to access the database tables that it uses during operation.
- Optional: Prepare a list of user IDs and passwords that the system uses to create databases or database tables during installation. Your site policies might restrict this authority to the database administrator. In this case, you must provide generated scripts to the administrator to create the databases or database tables.

You can install and operate your servers in a secure environment.

Installation directories for the product and profiles

The installation directories for IBM Business Process Manager are represented by several variables. The meaning of those variables can differ for a number of factors.

For ease of access, you can use these links to view the tables for the default installation directories in the sections that follow:

- *install_root* default directory
- *profile_root* default directory
- DB2 Express default directory
- IBM Business Process Manager and WebSphere Application Server default installation directory
- Default installation directory for a profile named *profile_name*
- Process Designer default directory
- Installation Manager default installation directories
- Installation Manager default agent data directories
- IBM Business Process Manager for z/OS default installation and configuration file system directories

Variables used in the documentation

Several variables representing specific default directories are used throughout the documentation. These file paths are default locations. You can install the product and other components and create profiles in any directory for which you have write access. Multiple installations of IBM Business Process Manager products or components require multiple locations.

Here are the main variables used in the documentation:

install_root
> Installation location of IBM Business Process Manager. IBM Business Process Manager is always installed in the same location as the WebSphere Application Server Network Deployment installation with which it is associated.

profile_root
> Location of an IBM Business Process Manager profile.

How variable meanings can differ

The meaning of variables used to represent installation directories can differ based on whether you are installing the product on a clean workstation or on a workstation that has an existing installation of WebSphere Application Server or WebSphere Application Server Network Deployment. The variables can also differ depending on whether you are performing the installation as a root (Administrator on a Windows system) or nonroot user.

Limitations of nonroot installers

Root, Administrator, and nonroot users can install the product. The default directories the installation program provides differ based on whether the user has root (Administrator) privileges. Root and Administrator users can register shared products and install into system-owned directories (globally shared resources that are available to all users), while nonroot users cannot. Nonroot users can install only into directories they own.

Default directories for Typical Installation

The following tables show the default installation locations of the IBM Business Process Manager base installation and its profiles during a typical installation.

Table 10 shows the default installation root directory into which the installation program installs both IBM Business Process Manager and WebSphere Application Server Network Deployment for both root (Administrator) and nonroot users.

Table 10. install_root default directory

Default *install_root* for root or Administrator users	Default *install_root* for nonroot users
AIX `/opt/IBM/BPM/v8.5`	AIX `user_home/IBM/BPM/v8.5`
Linux `/opt/ibm/BPM/v8.5`	Linux `user_home/ibm/BPM/v8.5`
Windows `C:\IBM\BPM\v8.5`	Windows `C:\IBM\BPM\v8.5`

Table 11 on page 23 shows the default installation directory for a profile named *profile_name* for both root (Administrator) and nonroot users.

Table 11. profile_root default directory

Default *profile_root* for root or Administrator users	Default *profile_root* for nonroot users
AIX `/opt/IBM/BPM/v8.5/profiles/profile_name`	AIX `user_home/IBM/BPM/v8.5/profiles/profile_name`
Linux `/opt/ibm/BPM/v8.5/profiles/profile_name`	Linux `user_home/ibm/BPM/v8.5/profiles/profile_name`
Windows `C:\IBM\BPM\v8.5\profiles\profile_name`	Windows `C:\IBM\BPM\v8.5\profiles\profile_name`

Table 12 shows the DB2 Express installation location. DB2 Express is installed under the same directory as IBM Business Process Manager. Nonroot or non-administrator installation of DB2 Express is not supported.

Table 12. DB2 Express default directory

Default DB2 Express binary location	Database Instance location
Linux `/opt/ibm/BPM/v8.5/DB2`	Linux Database instance is created under the bpminst user. For example: `user_home/bpminst`
Windows `C:\IBM\BPM\v8.5\DB2`	Windows The BPMINST database instance is created under the root (\) of the drive where IBM Business Process Manager is installed. For example, if IBM Business Process Manager is installed under `C:\IBM\BPM\v8.5\` then you will see `C:\BPMINST`.

Default directories for Custom Installation or existing installation of WebSphere Application Server or WebSphere Application Server Network Deployment

The following tables show the default installation locations of the product and its profiles. If you choose to install IBM Business Process Manager on top of an existing supported version of WebSphere Application Server or WebSphere Application Server Network Deployment, IBM Business Process Manager is installed into the same location. Table 13 shows the default installation root directory in such a case for both root (Administrator) and nonroot users.

Table 13. IBM Business Process Manager and WebSphere Application Server default installation directory

Default *install_root* for root or Administrator users	Default *install_root* for nonroot users
AIX `/usr/IBM/WebSphere/AppServer`	AIX `user_home/IBM/WebSphere/AppServer`
Linux Solaris `/opt/IBM/WebSphere/AppServer`	Linux Solaris `user_home/IBM/WebSphere/AppServer`
Windows `C:\Program Files\IBM\WebSphere\AppServer`	Windows `user_home\IBM\WebSphere\AppServer`

Table 14. Default installation directory for a profile named profile_name

Default *profile_root* for root or Administrator users	Default *profile_root* for nonroot users
AIX `/usr/IBM/WebSphere/AppServer/profiles/profile_name`	AIX `user_home/IBM/WebSphere/AppServer/profiles/profile_name`
Linux Solaris `/opt/IBM/WebSphere/AppServer/profiles/profile_name`	Linux Solaris `user_home/IBM/WebSphere/AppServer/profiles/profile_name`
Windows `C:\Program Files\IBM\WebSphere\AppServer\profiles\profile_name`	Windows `user_home\IBM\WebSphere\AppServer\profiles\profile_name`

Table 15 shows the Process Designer installation location.

Table 15. Process Designer default directory

Default Process Designer installation location for root or Administrator users	Default Process Designer installation location for nonroot users
`Windows` `C:\IBM\ProcessDesigner\v8.5`	`Windows` `C:\IBM\ProcessDesigner\v8.5`

Default installation directories for IBM Installation Manager

The following tables show two default directories that are related to the Installation Manager tool. Values are given for both root (Administrator) and nonroot (non-administrator) users.

- The directories in Table 16 are the defaults (per operating system) into which Installation Manager is installed.

  For more information about other defaults for Installation Manager, see Installing as an administrator or non-administrator in the Installation Manager documentation.

- The agent data directories in Table 17 are the defaults (per operating system) used by Installation Manager for data associated with the application, such as the state and history of operations performed by Installation Manager.

  For more information about the agent data location, see Agent data location in the Installation Manager documentation.

Installation Manager also uses another directory to store shared program objects and cached files that are generated when you install a product. You can specify this shared resources directory when you install WebSphere Application Server and IBM Business Process Manager. This value is set the first time that a product is installed with a particular Installation Manager instance. For further information about the shared resources directory, see Overview of package groups and the shared resources directory. For information about how to locate the shared resources directory, see Backing up and restoring Installation Manager.

Table 16. Installation Manager default installation directories

Defaults for root or Administrator users	Defaults for nonroot or non-administrator users
`Linux` `/opt/IBM/InstallationManager`	`Linux` `/user_home/IBM/InstallationManager`
`UNIX` `/opt/IBM/InstallationManager`	`UNIX` `/user_home/IBM/InstallationManager`

`Windows XP Professional` `C:\Program Files\IBM\Installation Manager`
 	
`Windows Vista`, `Windows 2008`, `Windows 7`, `Windows 8`, and `Windows 2012` `C:\Program Files [(x86)]\IBM\Installation Manager`
	`Windows XP Professional` `C:\Documents and Settings\user\IBM\Installation Manager`
	
	`Windows Vista`, `Windows 2008`, `Windows 7`, `Windows 8`, and `Windows 2012` `C:\Users\user\IBM\ Installation Manager`

Table 17. Installation Manager default agent data directories

Defaults for root or Administrator users	Defaults for nonroot or non-administrator users
`Linux` `/var/ibm/InstallationManager`	`Linux` `/user_home/var/ibm/InstallationManager`
`UNIX` `/var/ibm/InstallationManager`	`UNIX` `/user_home/var/ibm/InstallationManager`

Table 17. Installation Manager default agent data directories (continued)

Defaults for root or Administrator users	Defaults for nonroot or non-administrator users
`Windows` `XP` `Professional` `C:\Documents and Settings\All Users\Application Data\IBM\Installation Manager`	`Windows` `XP` `Professional` `C:\Documents and Settings\user\Application Data\IBM\Installation Manager`
`Windows` `Vista` , `Windows` `2008` , `Windows` `7` , `Windows` `8` , and `Windows` `2012` `C:\ProgramData\IBM\ Installation Manager`	`Windows` `Vista` , `Windows` `2008` , `Windows` `7` , `Windows` `8` , and `Windows` `2012` `C:\Users\user\ AppData\Roaming\IBM\Installation Manager`

Planning your network deployment environment

Setting up a network deployment environment involves many decisions, such as the number of physical workstations and the type of pattern you choose. Each decision affects how you set up your deployment environment.

Before you plan your deployment environment complete the following tasks:

- Choose a database type
- Identify available resources
- Identify necessary security authorizations

When you plan the layout of interconnected servers, you must make some decisions. These decisions influence trade-offs that you make between the available hardware and physical connections, the complexity of the management and configuration and requirements such as performance, availability, scalability, isolation, security, and stability.

1. Identify the functional requirements of the deployment environment.
   a. Identify the features or runtime capabilities of your deployment environment.

      Consider the components that the deployment environment will support, such as the various process applications, toolkits, processes, or modules.
   b. Identify the component types that you will deploy.

      Consider the component types and the interactions between components as part of the requirements.
   c. Identify the import and export implementation types and transports.

      Consider the resources needed for the databases or Java™ Message Service (JMS) resources and the need for business events and their transmission mechanism.
   d. Identify any functional requirements that are not related to applications.

      Consider security servers, routers, and any other hardware or software requirements to handle business events.
2. Identify the capacity and performance requirements for your environment.
3. Decide on the number of physical servers that you need for each function.
4. Identify the redundancy requirements for your environment.
   a. Identify the number of servers that you need for failover.
   b. Identify the number of routers that you need.

      Your choice of router is influenced by exports of deployed modules, the types of queues you define on the service integration bus, Service Component Architecture (SCA) exports, and the type of load balancing that you want among your clusters. IBM provides an embedded router used for web services exports with Service Object Access Protocol (SOAP)/JMS transports, or JMS exports.

However, if you choose not to use this embedded router provided by IBM, you will need to determine how to balance the load among your clusters, based on the technology that you are using.

5. Design your deployment environment.

   Decide on the pattern. For IBM Business Process Manager, you can select one of two established topology patterns:

   - Single Cluster
   - Application, Remote Messaging, and Remote Support

   Note: If your configuration supports multiple IBM Business Process Manager and non-BPM products in addition to, and compatible with, IBM Business Process Manager, the patterns of those products would be available to you when you create your deployment environment.

   For more information about the patterns and the differences between them, see "Topologies of a network deployment environment" on page 28.

6. Understand the methods available to you for configuring your deployment environment.

   You can configure a standardized network deployment environment based on a topology pattern template included with the software, and you can implement it using the **BPMConfig** command or the Deployment Environment wizard.

   You can use the Deployment Environment wizard to create clusters with the Single Cluster and (if applicable) Application, Remote Messaging, and Remote Support topology patterns.

Overview: Deployment environment topologies and patterns

A network deployment environment can have many topologies, and can be created from several standard topology patterns.

What is a topology?

A topology is the physical layout of the *deployment environment* required to meet your business needs for capacity, availability, and scalability.

You can set up topologies for both the Process Center and Process Server components of IBM Business Process Manager.

Many factors affect how you design and implement your topology. For example, you must consider business and application requirements, resource requirements and constraints, the intended purpose of the environment, and the operating system.

IBM Business Process Manager includes patterns for the following topologies, which you can use to address many business scenarios, from proof-of-concept (POC) to a fully functional production environment:

- Single Cluster
- Application, Remote Messaging, and Remote Support

Each topology pattern has certain design characteristics that address a particular business need. For example, on distributed systems, the Single Cluster topology pattern is typically used for a testing or proof of concept scenario. On z/OS systems, this topology pattern is the default pattern and can be used in production environments.

The design characteristics of each topology have been captured as *topology patterns* that are supplied as configuration templates with the product.

The purpose of deployment environment patterns

A deployment environment topology pattern specifies the constraints and requirements of the components and resources involved in a deployment environment. There are IBM-supplied topology pattern for each topology layout. These topology patterns provide rules and guidelines for component interaction that are characteristic of the most commonly used BPM topology patterns. The IBM-supplied topology patterns are based on well-known and tested configuration scenarios. They contain a repeatable and automated method of creating a deployment environment. Each topology pattern is designed to meet the configuration requirements and business needs of the associated topology. Using topology patterns helps you create a deployment environment in the most straightforward way.

Because the deployment environment topology patterns represent recommended topologies with component configurations that work together, you can be sure that you are building a fully functional deployment environment. You can use the configuration rules of a deployment environment topology pattern to generate a fast path configuration. This action is possible because many design decisions are implemented in the topology pattern; for example, which components to configure, and which default parameters and resources are needed.

Each supplied deployment environment topology pattern addresses a specific set of requirements. Most requirement sets can be met when you use one of these topology patterns. To select a topology pattern, complete all of the following steps:
- Understand the requirements of the business solution that you are creating.
- Review and understand the capabilities and characteristics of the IBM-supplied topology patterns.
- Decide which topology pattern to use.

Databases and deployment environments

For a network deployment environment, you need the following databases on your database management system. The databases that you require depend on your installation.
- The Common database (CMNDB)
- The Process database (BPMDB)
- The Performance Data Warehouse database (PDWDB)

You or your database administrator might need to create and configure databases outside the installer.

For more information, see Planning your database configuration.

Functions of IBM-supplied deployment environment topology patterns

Any IBM Business Process Manager deployment contains a basic set of functions that together form a complete production environment.

To design a robust deployment environment, you must understand the functionality that each cluster can provide in an IBM-supplied topology pattern. You can allocate a specific type of function (for example, the support infrastructure function) to a particular cluster. Understanding the functions can help you choose the deployment environment topology pattern that best meets your needs.

For network deployment, clusters can collaborate to provide specific functionality to the environment. Depending on your requirements, you assign specific functions to each cluster within the deployment environment, to provide performance, failover, and capacity.

The clusters configured in a deployment environment provide the following functions.

The functions can exist in a single cluster, or can be spread across multiple clusters. Each standardized (IBM-supplied) topology pattern creates a different number of clusters to support the functions. The number of clusters in your deployment environment depends on the topology pattern that you are using.

Application deployment target

An application deployment target is the set of servers (cluster) to which you install your applications (for example, human tasks, business processes, and mediations). Depending on which deployment environment topology pattern you choose, the application deployment target might also provide messaging infrastructure and supporting infrastructure functions. Select the appropriate product depending on the type of applications that you intend to deploy.

- If the applications contain human task or business process artifacts, install an Advanced Process Server or Advanced Process Center, and then create an Advanced Process Server, Advanced Process Center, or Advanced-only Process Server patterned deployment environment.

In a Single Cluster topology pattern, the application deployment target provides the entire functionality of the deployment environment.

Supporting infrastructure

The supporting infrastructure includes the following services. These services include:

- Business rules
- Selectors
- Human tasks
- Business processes

The business rules are not tied to the Supporting infrastructure cluster. In fact, business rules can exist and work everywhere in the cell. The business rules administrative function (performed from the Business Rules Manager) can be deployed on the supporting infrastructure cluster (in a three cluster configuration). The same principle applies to the human tasks and business processes. The human tasks and business processes run on the application deployment target cluster, because that is where the human task and business process containers are configured. However, you administer processes and tasks from the Business Process Choreographer Explorer, which can reside on the supporting infrastructure cluster (in a three cluster configuration).

Messaging engine infrastructure

The messaging infrastructure is the set of servers (cluster) where the messaging engines are located. The messaging infrastructure is used to provide asynchronous messaging support for your applications and for the internal messaging needs of the IBM Business Process Manager components. The messaging engines enable communication among the nodes in the deployment environment.

For topologies in all environments, the fundamental pieces of IBM Process Server is always similar. In all IBM Process Server cells, the deployment manager is the central point of administration for the cell.

Topologies of a network deployment environment

A topology is the physical layout of the deployment environment. You can create the topology that best addresses your business needs by choosing one of the patterns provided by IBM.

Related concepts:

"Considerations for selecting a topology" on page 31
Selecting an appropriate topology for your deployment environment depends upon several factors.

"Topology patterns and supported product features" on page 33
A topology is the physical layout of the deployment environment. The product features and default usage depends on your choice of topology pattern.

Single Cluster topology pattern

The *Single Cluster* topology pattern is an IBM-supplied topology pattern. In a Single Cluster topology pattern, all the functions of the deployment environment are combined into a single cluster.

This is the default pattern for IBM Business Process Manager for z/OS.

A Single Cluster topology pattern is ideal for limited hardware. Because all the components are installed in the same cluster, fewer physical machines are required. However, because each server instance must run the supporting applications and your integration applications, you need more memory for the individual Java Virtual Machines (JVMs). In addition, one or more members of the cluster must also run the messaging engines required for asynchronous interactions. Thus, the Single Cluster topology pattern is typically used for proof of concept, development, and testing environments.

Combining all aspects of the IBM Business Process Manager environment into a single cluster has other implications aside from the increased memory requirements.

- Because asynchronous interactions (involving JMS and MQ/JMS bindings), human tasks, state machines, and long-running business processes can make extensive use of the messaging infrastructure, a single cluster environment is not ideal for applications with these components.
- Any messaging requirements must be kept to a minimum with this topology pattern (except for z/OS).
- Service Component Architecture (SCA) internal asynchronous invocations, the Java Message Service (JMS), and MQ messaging bindings do not support multiple messaging engines in the same cluster.

If necessary, choose the Application, Remote Messaging, and Remote Support topology pattern in which the messaging infrastructure is in a separate cluster from the application deployment target.

The Single Cluster topology pattern is suitable for scenarios that are focused on running applications and on synchronous invocations.

From an administrative and scalability perspective, the Single Cluster topology pattern has advantages. A single cluster where each member runs all the IBM Business Process Manager components are simpler to administer. Instead of several server instances in multiple clusters, you have a single cluster with fewer members. If the needs of your environment grow, scaling the infrastructure is a simple matter of adding additional nodes and cluster members. Thus, the process of adding capability is simple, but all components are scaled at the same rate. For example, if the messaging engines spread across server members use policies, there could be some additional administrative effort in creating and maintaining the policies.

In a Single Cluster topology pattern, all deployment environment functions and functional groups of components run on a single cluster:

- The applications:
  - Business Process Choreographer (BPC) container
  - Process Server
  - Business Rules manager
  - Business Space
  - Process Portal
  - REST API Services
- The messaging infrastructure cluster hosts a single service integration bus and single messaging engine that use the same database schema as the product database by default. Each deployment environment has its own bus. The single bus is called **BPM.*deployment_environment_name*.Bus**.
- The support infrastructure applications:
  - Performance Data Warehouse
  - Business Process Choreographer Explorer
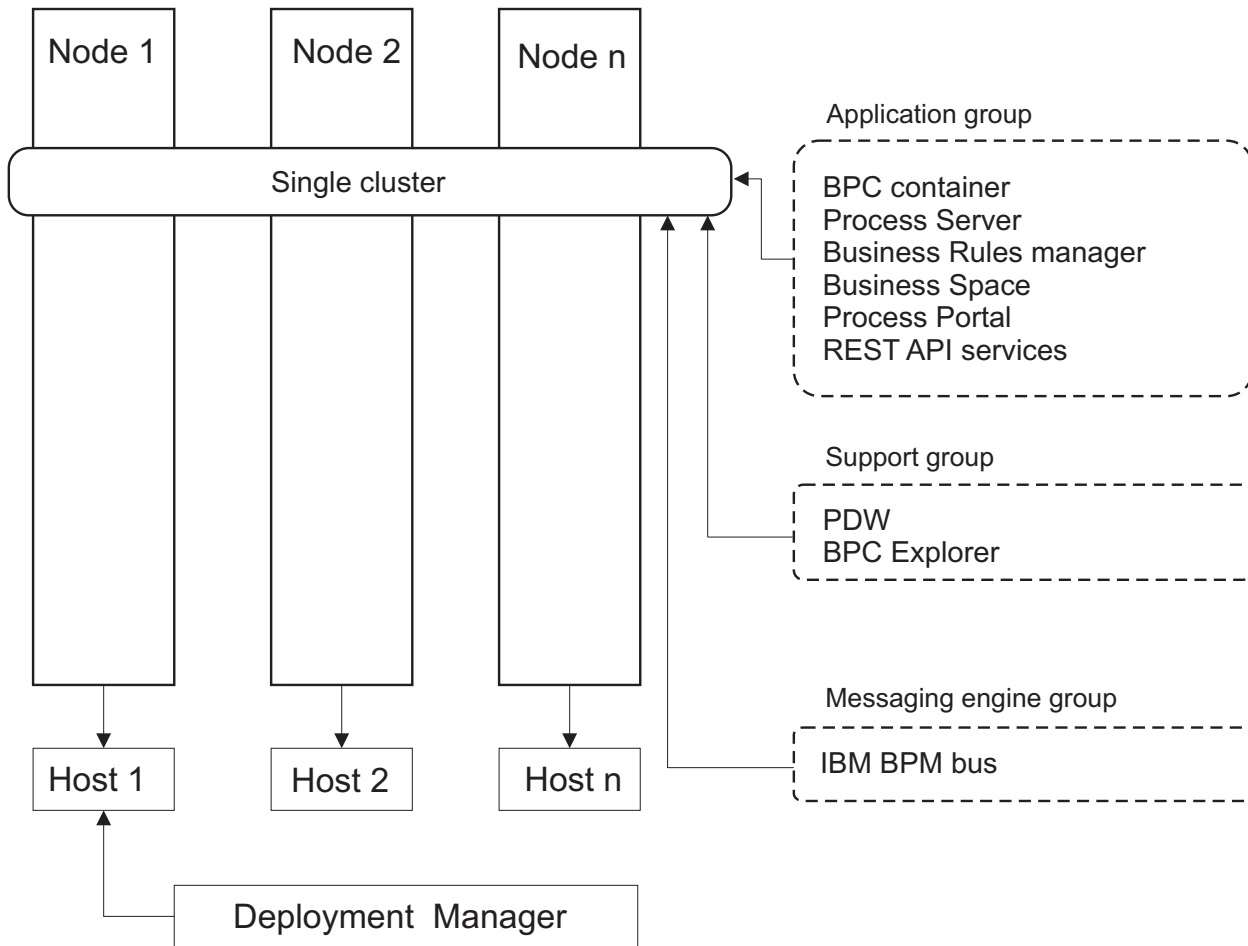
Figure 1. Single cluster topology pattern

Application, Remote Messaging, and Remote Support topology pattern

The *Application, Remote Messaging, and Remote Support* topology pattern is an IBM-supplied topology pattern. In this pattern, the deployment environment functions are divided among three separate clusters.

The Application, Remote Messaging, and Remote Support topology pattern is the preferred topology for IBM Business Process Manager Standard and IBM Business Process Manager Advanced. It is also the default for the **BPMconfig** command, except for z/OS.

The application deployment target cluster hosts the following functions:

- Business Process Choreographer (BPC) container
- Process Server
- Business Rules manager
- Business Space
- Process Portal
- REST API Services

The messaging infrastructure cluster hosts a single service integration bus and single messaging engine that use the same database schema as the product database by default. Each deployment environment has its own bus. The single bus is called **BPM.*deployment_environment_name*.Bus**.

The support infrastructure cluster hosts the following functions:
* Performance Data Warehouse
* Business Process Choreographer Explorer

In a Application, Remote Messaging, and Remote Support topology pattern, the deployment environment functions are divided among three separate clusters. One cluster is used for applications, one cluster is used for messaging functionality, and one cluster for support functionality.
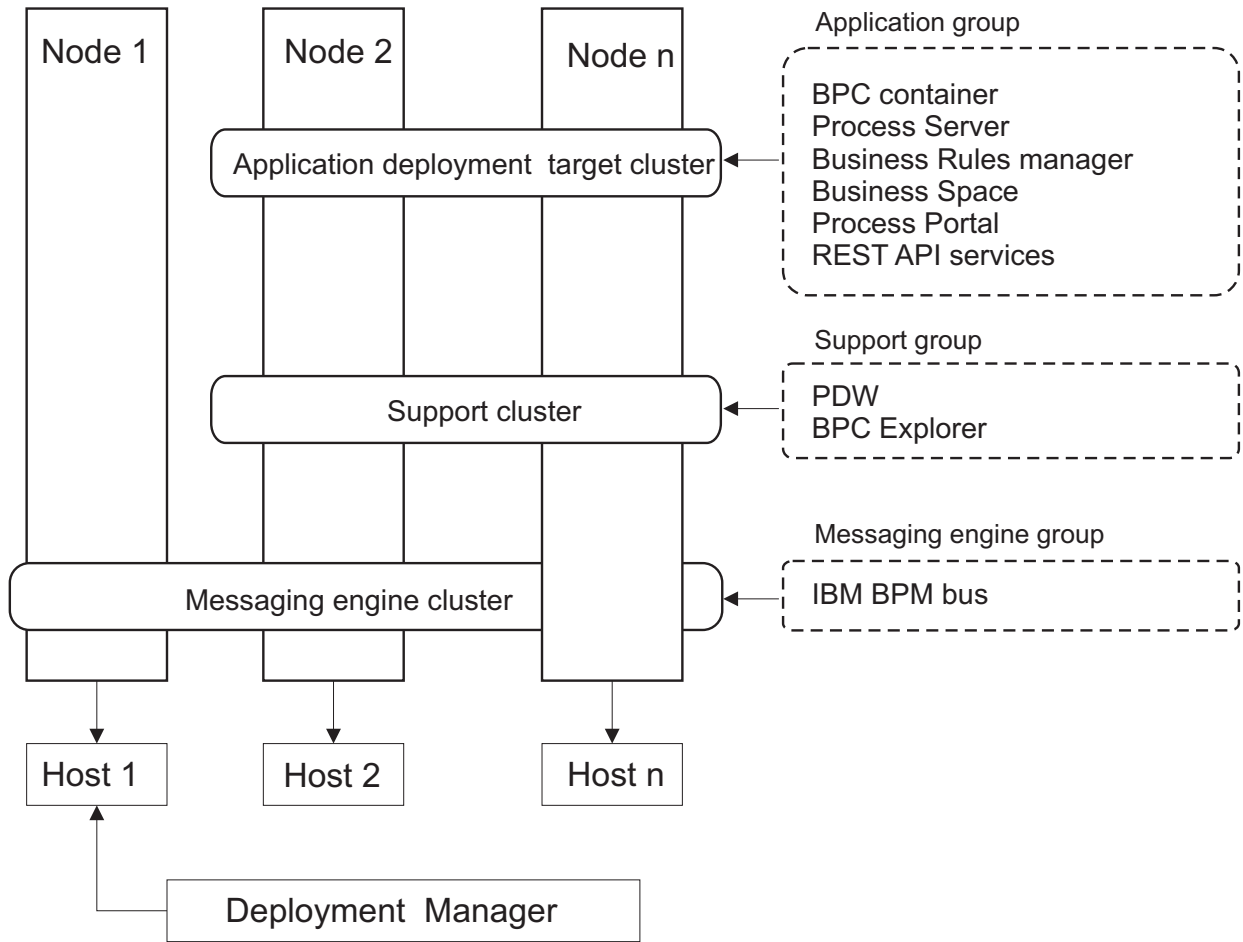
Figure 2. Application, Remote Messaging, and Remote Support pattern

Important: In this topology you must also configure a routing server such as IBM HTTP Server, WebSphere Application Server proxy server, or a reverse proxy server to ensure that requests that are intended for Process Portal are directed to the correct cluster.

Considerations for selecting a topology

Selecting an appropriate topology for your deployment environment depends upon several factors.

When you select a topology pattern, consider the following factors:
* Available hardware resources
* Application invocation patterns
* Types of business processes that you plan to implement (interruptible versus non-interruptible)
* Individual scalability requirements

- Administrative effort involved

The Application, Remote Messaging, and Remote Support topology pattern is the preferred topology for IBM Business Process Manager Standard and IBM Business Process Manager Advanced, but the choice ultimately depends upon your individual requirements.

The IBM-supplied topologies can be applied to Process Server, Advanced-only Process Server, and Process Center topologies. Therefore, your Process Center, Advanced-only Process Server, and Process Server network deployment environments can be organized in a similar way. The procedures for creating environments for Process Server, Advanced-only Process Server, and Process Center based on IBM-supplied topologies are also similar. The only difference related to IBM-supplied patterns is the recommended patterns for a production environment, and the components configured on the clusters for those patterns.

For information on the components, features, and functionality available in each of the IBM Business Process Manager configurations, see IBM Business Process Manager V8.5 configuration capabilities

Condensed topology pattern selection criteria

Consider the information listed in the following table, which is a quick guide to selecting your production topology. This table provides a condensed list of the advantages and disadvantages of each of the topology patterns.

For information about which BPM products support the supplied topology patterns, see *Topology patterns and supported BPM product features*.

Table 18. Considerations for selecting a topology for your deployment environment

	Topology Pattern	
Consideration	**Single cluster**	**Application, Remote Messaging, and Remote Support**
Number of clusters to maintain	One cluster for all components	Three clusters: One cluster for applications One cluster for support infrastructure One cluster for messaging
Hardware requirements	Can be implemented on limited hardware	Most hardware intensive
Asynchronous interactions	Use should be minimal	Ideal environment for asynchronous interactions
Long-running processes, state machines, and human tasks	Use should be minimal	Ideal environment for interruptible processes, state machines, and human tasks
Administrative burden	Relatively small	Requires most administrative effort
Scalability	All components scaled at the same rate	Easiest to scale All functions separated Messaging cluster scalability still limited (benefit comes when other BPM products are introduced)

Related concepts:
"Topology patterns and supported product features" on page 33
A topology is the physical layout of the deployment environment. The product features and default usage

depends on your choice of topology pattern.

"Topologies of a network deployment environment" on page 28
A topology is the physical layout of the deployment environment. You can create the topology that best addresses your business needs by choosing one of the patterns provided by IBM.

Topology patterns and supported product features

A topology is the physical layout of the deployment environment. The product features and default usage depends on your choice of topology pattern.

If you are using the Deployment Environment Configuration wizard on the administrative console to create the deployment environment, the availability of topology patterns on which you base your deployment environment varies depending on the following conditions and configuration decisions:

- The operating system on which you have installed IBM Business Process Manager
- The primary deployment environment feature and the complimentary feature

Table 19 and "Topology patterns and supported product features" show the relationship between the topology patterns and product features.

Table 19. Available supplied patterns and their relationship to product features

Topology pattern	Number of clusters	Description	Supported BPM products and features
Single Cluster	1	Messaging, application deployment target, and application support functions are contained in a single cluster. This topology pattern is useful for synchronous messaging, proof of concept, or application testing environments. A Single Cluster topology pattern is ideal for limited hardware. Because all of the components are installed in the same cluster, fewer physical machines are required.	Supported by the following product: • IBM Business Process Manager Advanced and Standard configurations
Application, Remote Messaging, and Remote Support	3	This topology pattern defines one cluster for application deployment, one remote cluster for the messaging infrastructure, and one remote cluster for supporting applications.	Supported by the following product: • IBM Business Process Manager Advanced and Standard configurations

Configurable components for each configuration

When you install the various configurations of IBM Business Process Manager, certain components are visible to you during the installation and configuration process. For network deployment, these components can be in one cluster or in multiple clusters.

Table 20 shows the components for each of the different configurations.

Table 20. IBM Business Process Manager components

Component	Adv	Std	Exp
Process Server	X	X	X
Performance Data Warehouse	X	X	X
Common database	X		

Table 20. IBM Business Process Manager components (continued)

Component	Adv	Std	Exp
Service Component Architecture (SCA)	X		
Business Space	X	X	X
Process Portal	X	X	X
Business Process Choreographer	X		
Business Process Choreographer Explorer	X		
IBM BPM messaging engine (service integration bus)	X	X	X

Related concepts:

"Considerations for selecting a topology" on page 31
Selecting an appropriate topology for your deployment environment depends upon several factors.

"Topologies of a network deployment environment" on page 28
A topology is the physical layout of the deployment environment. You can create the topology that best addresses your business needs by choosing one of the patterns provided by IBM.

Load balancing and failover with IBM HTTP Server

In a network deployment environment, you can configure a routing server, such as IBM HTTP Server, WebSphere Application Server proxy server, or others, as a proxy server for workload balancing and failover purposes. Instead of incoming HTTP requests going directly to an application server, they go to the proxy server, which then distributes the requests across multiple application servers that perform the work.

Tip: You do not have to use IBM HTTP Server for load balancing, you can use any other type of routing server, for example, WebSphere Application Server proxy server, any other web server, reverse proxy server, or network layer IP sprayer.

Although the specific configuration steps differ depending on your environment, the following general tasks can help you plan for and implement workload balancing and failover with IBM HTTP Server.

1. Install IBM HTTP Server.
2. Install and configure the appropriate web server plug-in.
3. Configure Secure Sockets Layer (SSL) between the deployment manager for WebSphere Application Server and the IBM HTTP Server administration server.. You must configure the Application Server to accept a self-signed certificate from IBM HTTP Server so that SSL connections are accepted and transactions are completed.
4. Customize the Process Server or Process Center cluster so that the configuration file points to the web server and communication is enabled for HTTP over SSL or HTTP Secure (HTTPs). See Customizing the Process Server or Process Center cluster to work with a web server on V8.5.0.0 or Customizing the Process Server or Process Center cluster to work with a web server on V8.5.0.1.

Expanding your topology

There are three ways to expand your topology: adding members to a cluster, adding cells, or adding deployment environments.

Adding cluster members

The easiest way to expand your infrastructure is to add more cluster members to your existing clusters. You can add cluster members to each cluster independently or in combination, depending on where you see the need for growth. In a single-cluster topology, you can expand the cluster (which provides the application, support, and messaging capabilities). In a three-cluster topology with separate application

cluster, support cluster, and messaging cluster, you can add new cluster members for any one, any two, or all three clusters. By expanding your clusters in this way, you can improve your application throughput.

Consider adding cluster members when one of the following situations occurs:
- You plan to deploy new applications to your existing environment.
- You anticipate increased volume requirements for your existing applications.
- You need more capacity for operational purposes, such as failover.

However, there are some cases where expanding existing clusters is not appropriate. Consider another solution in the following cases:
- You have applications or sets of applications that serve different business purposes and you want to keep them distinct. If you deploy these distinct applications to the same deployment environment, you might introduce dependencies between otherwise unrelated business domains. Dependencies can affect such things as maintenance schedules and application availability when, for example, unrelated applications are less reliable.
- After you analyze your performance characteristics, you realize that planned deployments might push your system beyond the limits of the current deployment target. They might introduce too many modules from new applications or new versions of applications to run in the existing memory space, or use your database tables too heavily.

Adding cells

If you decide that expanding your existing clusters is not an appropriate solution, consider creating another deployment environment in another cell. This approach gives you the most room for growth, the most flexibility for expanded functional requirements, and complete isolation for your applications.

To add another cell, you duplicate common cell-level configurations, such as global security settings. You use multiple consoles to manage your applications, such as separate administrative consoles and failed event managers.

Adding deployment environments

If the previous two options do not satisfy your requirements, there is a third alternative for expanding your topology. You can create two independent deployment environments for your applications in the same cell.

Consider adding a second deployment environment when one of the following situations occurs:
- You must expand the capacity of your environment, but adding cluster members does not satisfy your requirements.
- You want to isolate process applications into separate Java virtual machines (JVMs), associating each application group with a specific set of JVMs.
- You want to set up multiple test environments quickly without having to configure security or nodes each time.

The second deployment environment is for IBM Process Server only, not for IBM Process Center. You need one Process Center per cell, or the single repository experience is lost.

Running two deployment environments in the same cell is an advanced topology that requires research and planning.

Considerations for multiple deployment environments in the same cell
Before you implement this advanced topology, there are several important things to consider.

Maintenance considerations

Maintenance is more difficult with more than one deployment environment in the same cell.

- If there is an issue with one application in the cell, it is not possible to apply an interim fix only to the affected deployment environment. Interim fixes affect all servers, deployment environments, and clusters in the cell. Fixes for one application might have an unanticipated effect on the other applications that are running in the cell.
- Testing an interim fix from IBM is more difficult when several deployment environments are in the same cell. Separate cells help ensure that fixes do not break other applications.
- You might have to bring down all your servers to apply interim fixes for one set of clusters, resulting in downtime across all the sets of clusters using the cell. Although the exact arrangement of servers varies, a common arrangement of servers is to have one member of each cluster on each node. In such an arrangement, all servers and cluster members that share the node are affected by the steps to apply the interim fix.

Application considerations

Consider how applications are used with two different deployment environments in the same cell.

- You cannot install two instances of the same Service Component Architecture (SCA) application in the cell. You can install many SCA applications, but they must have different module names. You can use the `serviceDeploy` utility to rename them.

  As an example of this problem, if you create an environment with two deployment environments in the same cell and then try to import into both of them an IBM BPM export (.twx) file that contains BPEL processes, the second import fails because the SCA module names are the same and an SCA module name must be unique within a cell.

  There are several ways to manage this problem.

  - You can use module naming conventions that incorporate the name of the target deployment environment.
  - If you are deploying the modules as part of a process application in Process Center, you can use process app naming conventions that incorporate the name of the target deployment environment.
  - If you are deploying directly as an EAR file, you can use module versioning where the version name uses a naming convention that incorporates the name of the target deployment environment.

- For late binding to work, new versions of a BPEL business process or human task (template) must be deployed to the same deployment environment as the earlier version. The correct target to bind to must be found in the same deployment environment. Make sure that parent-child relationships between processes or between human tasks are scoped to the deployment environment. There are some relationships, like parent-child flows, that should not cross JVMs.
- Each Process Portal has one view to each deployment environment and requires unique context roots. Consider whether to use a different web server for each deployment environment. If not, you must provide different virtual hosts to ensure unique context roots for applications.

Administration considerations

Consider how administration works with more than one deployment environment in the same cell.

- Each application cluster must have a corresponding support cluster and messaging engine cluster.
- Selecting the correct failed event manager to retry events might be difficult when you have more than one deployment environment.
- You must ensure unique names for all applications that contain SCA modules such as BPEL processes, calendars, rules, selectors, and relationships.
- You must ensure unique names for IBM BPM applications as well as for customer applications.
- You must add databases and schemas for each set of clusters, which increases administration responsibilities. Each set of clusters requires databases and schemas for:

- Process database
- Performance Data Warehouse database
- Common database at the deployment environment level

You do not need separate database instances in DB2. If you use one database, you must provide separate user IDs for each Process Server and Performance Data Warehouse. These user IDs are used as the schema and keep the tables separate.

On-demand routing and dynamic cluster support

Migrating the WebSphere Virtual Enterprise technology to a WebSphere Application Server V8.5 Intelligent Management cell in IBM WebSphere Application Server V8.5 provides support for on-demand routing and dynamic clustering.

WebSphere Application Server Network Deployment V8.5 provides extended application infrastructure virtualization capabilities that include intelligent load balancing and clustering techniques. It introduces the concepts of on-demand routing and dynamic clustering, which provide an on-demand flexible infrastructure for enterprise-scalable applications.

On-demand routing
> The on-demand router (ODR) is an intelligent load balancer that receives, prioritizes, and distributes all the incoming requests across multiple servers. Unlike a regular load balancer that can route requests to an overloaded or hung server, the ODR has knowledge of the available processing capacity and health of the application servers and, based on this information, determines where the requests should be run.

> The ODR can support business goals at peak times by making smart decisions about the incoming work and by efficiently routing the different flows of requests to balance the workload.

Dynamic clusters
> Clustering improves the availability of web applications or resources by routing user requests from overloaded systems to systems that can handle the workload. Application servers can be started or stopped in the cluster to meet the current demand for applications that are deployed to the cluster.

Configuring IBM BPM for on-demand routing and dynamic clustering

To enable IBM Business Process Manager to adjust workloads during peak times, you can augment its existing cluster topology with the dynamic cluster functionality that is provided with IBM WebSphere Application Server Network Deployment V8.5 or later.

Review and meet the system requirements for IBM BPM V8.5: IBM Business Process Manager Advanced detailed system requirements.

Complete the following steps:

Note: This procedure is provided as an example. You can adjust the IBM BPM configuration steps according to your business needs. For example, you can choose to configure IBM BPM in a single-cluster topology, or you can set up a different proxy server or no proxy server at all.

1. Install the required IBM BPM and IBM WebSphere Application Server interim fixes:
   - Required interim fixes for the IBM Business Process Manager products
   - Fix list for IBM WebSphere Application Server V8.5
2. Configure the ODR as a proxy server for IBM BPM:
   a. Set up the IBM BPM with the IBM HTTP Server (IHS):
      1) Install IBM BPM V8.5 on three systems, for example, SUSE130, SUSE131, SUSE132. For more information, see the *Planning your network deployment environment* parent topic.
      2) Create one deployment manager node on SUSE130, and two custom nodes on each of the SUSE131 and SUSE132 systems.

3) Generate a three-cluster IBM BPM deployment environment on these nodes using IBM DB2 V10.1.

b. Create the ODR:

1) Create another custom node on SUSE130, which is the system that has the deployment manager, and then federate this node to the deployment manager.

2) Point your browser to `http://<dmgr_host>:<dmgr_port>/ibm/console` and log in to the administrative console.

3) Click **Servers** > **Server Types** > **On Demand Routers**, and then click **New**. Select the node that corresponds to the ODR and complete the steps in the wizard to create and save the new ODR server.

4) On the On-Demand Routers page, click **Start** to start the ODR server.

You can now log in to the `Process Admin/portal/bpc` using the host name and the port number of the ODR server.

c. Configure the ODR server to work with IHS:

Note: Ignore this step if you chose not to configure the IBM HTTP Server for IBM BPM.

1) In the administrative console, click **Servers** > **Server Types** > **On Demand Routers** > **On Demand Router Settings** > **On Demand Router Properties** > **On Demand Router Settings** > **Trusted security proxies** and add the IHS server host name to the corresponding field.

2) Click **Servers** > **Server Types** > **On Demand Routers** > **On Demand Router Settings** > **On Demand Router Properties** > **On Demand Router Settings** > **Proxy Plugin Configuration Policy** and set the plug-in scope to `Cell`.

3) Click **OK** and then click **Save**.

4) Restart the ODR server.

5) Copy the `<WAS_HOME>/profiles/ODR_profiles_name/etc/Plugin-cfg.xml` file to the `<IHS_Plugin_Location>/Plugins/config/webserver1` directory on the IHS server. If the `Plugin-cfg.xml` file already exists, replace it with the latest version.

6) Restart the IHS server.

Note: For more information about ODR configuration, see Creating and configuring ODRs. You can now log in to the `Process Admin/portal/bpc` using the host name and the port number of the IHS server.

3. Configure the IBM BPM topology with dynamic clusters as described in Creating dynamic clusters.

Tip: When configuring the dynamic clusters, to ensure that you can exploit all of the dynamic cluster features, it is recommended that you convert each static cluster to a dynamic cluster and set the **Minimum number of cluster instances** to keep one instance started at all times for each dynamic cluster. For example, in your IBM BPM configuration with a three-cluster network deployment environment, convert all three static clusters to dynamic clusters, and then set the **Minimum number of cluster instances** to keep at least one instance started at all times for each dynamic cluster.

4. To monitor the environment, configure the health management for IBM BPM V8.5. For more information, see Configuring health management.

Planning your database configuration

To plan your database configuration, you need to know which databases must be in place and configured to use the software, which components of IBM Business Process Manager you will use and their associated databases, the tasks required to administer the databases, and the security privileges of the database system that you are using.

For IBM Business Process Manager, three separate databases are required for the Process Server, the Performance Data Warehouse, and the common database components.

In IBM Business Process Manager V8.5, the common (shared) database is split into two pieces. One is cell-scoped, used for the entire cell. The other is deployment-environment-scoped, and must be configured for each deployment environment.

The Process Server and Performance Data Warehouse components do not support case-sensitive databases. These databases must *not* be case-sensitive.

For Microsoft SQL Server and Oracle databases, the following restrictions apply:
- For Microsoft SQL Server databases, components other than Process Server or Performance Data Warehouse require that their databases be case-sensitive.
- For Oracle databases, the Process Server, Performance Data Warehouse, and Common database components must use a separate schema/user. They can use the same instance.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components with DB2 and Oracle, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:
- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Supported database types and JDBC providers

Choosing a database depends on your operating system and on the features that you will use with IBM Business Process Manager.

The following database types and providers are supported with IBM Business Process Manager V8.5:

Table 21. Supported database types and JDBC providers

Database type	JDBC provider
DB2	DB2 Data Server JDBC Provider (XA)
DB2 for z/OS	DB2 Universal JDBC Provider (XA)
	DB2 Universal JDBC Provider, to use the connection pool for DB2 for z/OS
Oracle	Oracle JDBC Provider
SQLServer	Microsoft SQL Server JDBC Provider

JDBC drivers and locations

The following tables list the supported JDBC drivers. The first table contains the names and locations of the JDBC drivers that are provided with the product. The second table contains the names of the JDBC drivers that are supported but not provided with the product.

Restriction: The JDBC driver used by IBM Business Process Manager might not be the latest JDBC driver level delivered with your database product. Compare the latest version of the JDBC driver that is available from the database vendor with the JDBC driver that is delivered with IBM Business Process Manager. If a later version is available, update to that driver.

The following supported JDBC drivers are included with the product installation files.

Table 22. Supported JDBC drivers and locations that are provided with the product

Server	Driver description	Driver location
DB2	IBM DB2 Universal JDBC Driver 3.61.65	*install_root*/jdbcdrivers/DB2
	IBM Data Server Driver for JDBC and SQLJ 4.11.69	
Oracle	Oracle JDBC Driver 11g 11.2.0.1.0	*install_root*/jdbcdrivers/Oracle
SQL Server	Microsoft SQL Server JDBC Driver 4.0	*install_root*/jdbcdrivers/SQLServer

The following supported JDBC drivers are not included with the product installation files.

Table 23. Supported JDBC drivers that are not provided with the product

Server	Driver description
Oracle	Oracle JDBC Driver 11g 11.1.0.6

Database server setup options

The Set up the Database Server page in the Installation launch pad offers varying options depending on your database server back-end.

Using an existing database or installing a new database

You can choose to have the installation process include automatically installing an instance of DB2 Express. Choose this option if you do not have an existing or planned supported database server you intend to use to store content from Process Center or Process Server. If you are installing a test or proof-of-concept environment, you would likely choose to have a new DB2 Express installed automatically, unless one already exists on the system. You must be installing as an administrator to have DB2 Express installed automatically.

Applying Windows authentication

Enable this option if you want to use an existing Windows user ID and password for SQL Server authentication rather than providing a user ID and password in the database options. For more information, see the SQL Server documentation: http://technet.microsoft.com/en-us/library/ms144284.aspx.

Specifying the Oracle instance name

If you are using an Oracle database server, provide the name of the Oracle instance to be configured. You can use a single instance of Oracle for configuring IBM BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different IBM BPM databases.

Planning the number of databases

To edit the BPMConfig properties file as required, you must know the number of databases that must be set up for a shared or an unshared database environment, for either a new installation or a migration from a previous version of IBM Business Process Manager. The number of databases can be adjusted based on the configuration of your deployment environment.

- "IBM BPM Standard" on page 41
- "IBM BPM Advanced" on page 43

Databases are different from database schemas. Database schemas can share the same database. IBM BPM components such as Messaging, BusinessSpace, and ProcessServer are assigned to database schemas. When no name conflicts occur between database objects, components can share the same database. Components such as Process Server and Performance Data Warehouse (PDW) do not have database schema support; therefore, they cannot share the same database.

The default database configuration always uses as few databases as possible. For each deployment environment configuration, the following images illustrate the default database configuration.

IBM BPM Standard

The default configuration for IBM BPM Standard uses three databases, with the corresponding database schemas and assigned components.
* The SharedDB schema contains the database objects for the Messaging and BusinessSpace components.
* The ProcessServerDB schema contains the database objects for the ProcessServer and EmbeddedECM (IBM BPM document store) components.
* The PerformanceDB schema contains the database objects for the Performance Data Warehouse (PDW) component.

In the following image, the database names are shown in blue, and the database schema names are shown in green.

CMNDB (DE)
SharedDB
(Messaging,
BusinessSpace)

BPMDB
ProcessServerDB
(Process Server,
EmbeddedECM)

PDWDB
PerformanceDB
(Performance
Data Warehouse)
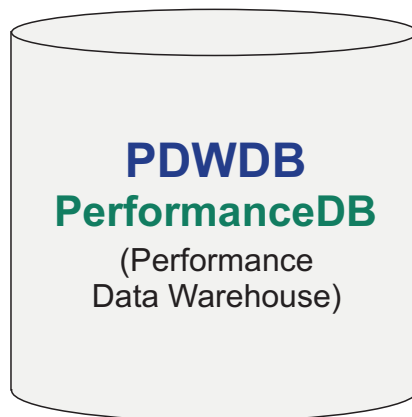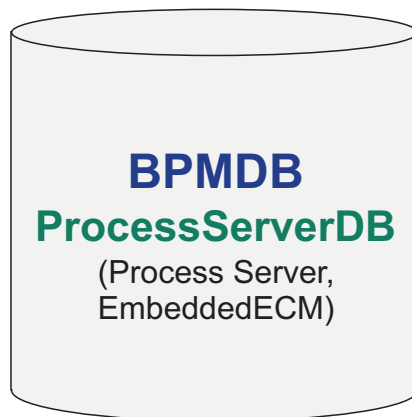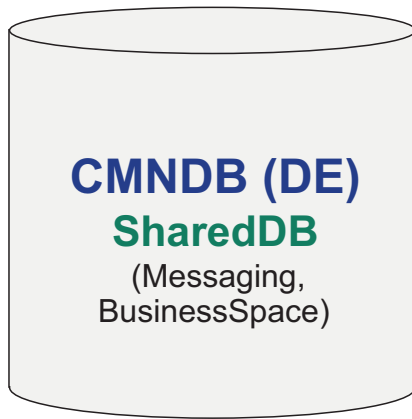
Legend

EmbeddedECM - IBM BPM document store

For example, the configuration properties file for a Standard DE configuration can have the following configuration properties:

```
bpm.de.db.2.name=ProcessServerDb
bpm.de.db.2.dbCapabilities=ProcessServer,EmbeddedECM
bpm.de.db.2.databaseName=BPMDB
```

IBM BPM Advanced

The default configuration for IBM BPM Advanced uses three databases, with the corresponding database schemas and assigned components.

- The CellOnlyDB schema exists only in the Advanced and AdvancedOnly deployment environments, and is part of the CMNDB database by default. The CellOnlyDB schema contains the database objects for the Application scheduler (AppSched), Mediations (Meds), Relationship manager (Rels), and Enterprise Service Bus Logger Mediation (ESBLogMed) components.
- The SharedDB schema, which is also a part of the CMNDB database, contains the database objects for the Messaging (MEDB), CommonDB, BusinessSpace (BSpace), and Business Process Choreographer (BPC) components.

In the following image, the database names are shown in blue, and the database schema names are shown in green.

CMNDB (DE)
SharedDB
(Messaging, CommonDB,
BusinessSpace, BPC)

CellOnlyDB
(AppSched, Meds,
Rels, ESBLogMed)

BPMDB
ProcessServerDB
(Process Server,
EmbeddedECM)

PDWDB
PerformanceDB
(Performance
Data Warehouse)
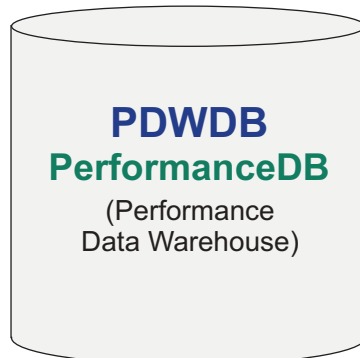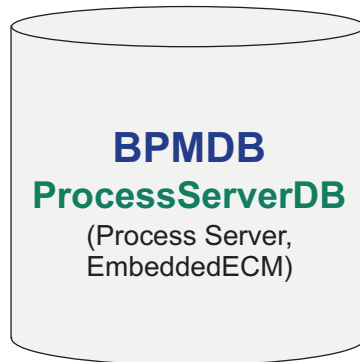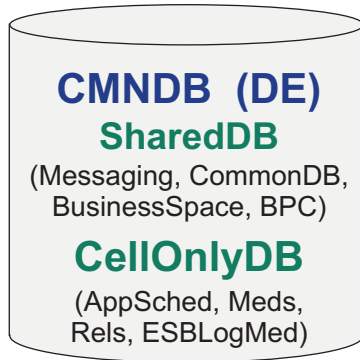
Legend

BPC - Business Process Choreographer

AppSched = Application scheduler

Meds = Mediations

Rels = Relationship manager

ESBLogMed = Enterprise Service Bus Logger Mediation

EmbeddedECM - IBM BPM document store

Important: If you configure the optional Business Process Archive Manager, which allows you to move completed BPEL process instances and human tasks from the Business Process Choreographer database to a separate archive database, then you also require the BPARCDB database.

If you configured an Advanced-only Process Server deployment environment, the default configuration uses one database, CMNDB, with the corresponding database schemas (CellOnlyDB and SharedDB) and assigned components.
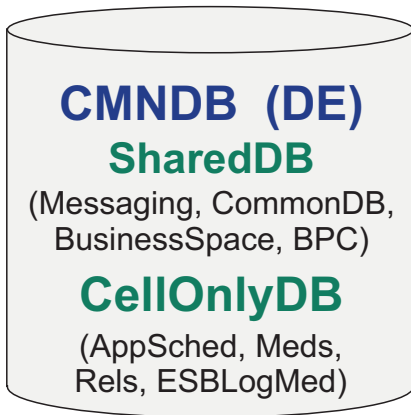
CMNDB (DE)
SharedDB
(Messaging, CommonDB,
BusinessSpace, BPC)
CellOnlyDB
(AppSched, Meds,
Rels, ESBLogMed)

Legend

BPC - Business Process Choreographer

AppSched = Application scheduler

Meds = Mediations

Rels = Relationship manager

ESBLogMed = Enterprise Service Bus Logger Mediation

EmbeddedECM - IBM BPM document store

Database time zone and character set considerations

You should not change the time zone of the database server that you use for IBM Business Process Manager. The national character set required for IBM BPM is different from the Oracle default value.

Time zone considerations

Timestamps that are stored in the database are based on the time zone that is configured for the database server. Because of this dependency on the database time zone, you should not change the time zone configuration for the database server of an existing setup if timers are already scheduled. If you change the time zone configuration of the database server, the existing timers can trigger at an unexpected time.

If you have a second database server for failover or disaster recovery reasons, both database servers should be configured for the same time zone, regardless of where they are physically located.

Character set considerations for Oracle databases

IBM BPM requires that the Oracle database be Unicode enabled. In Oracle, there are two character set parameters that influence how CHAR and NCHAR types are stored in the database:

1. For database character set (CHAR types), IBM BPM requires AL32UTF8.

2. For national character set (NCHAR types), IBM BPM requires UTF8.

Note that the national character set required for IBM BPM is different from the Oracle default value.

For a more detailed description of the character set parameters, refer to the related Oracle information.

Related information:
Oracle Database Migration Assistant for Unicode

Database privileges

Set database privileges to determine the authority that you must have to create or access your data store tables for each supported database management system.

Related reference:

⬆ Database privileges in WebSphere Application Server

DB2 database privileges

Set database privileges to determine the authority that you must have to create or access your data store tables for DB2 databases.

When you create database schemas using the typical installation or database scripts that are generated using the BPMConfig command-line utility, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 24. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID needs CREATETAB authority on the database and CREATETS to create the table space. The user ID also needs CREATEIN and DROPIN privilege on the schema. The user ID needs system privileges CREATEDBA and CREATEDBC. The user ID also needs ALTER, DELETE, INDEX, INSERT, REFERENCES, SELECT, and UPDATE privileges on the created tables.	The user ID needs SELECT, INSERT, UPDATE, and DELETE privileges on the tables. The user ID also needs EXECUTE ON PROCEDURE on stored procedures. See the following table for detailed DB2 database privileges for IBM Business Process Manager components.

The following table describes more DB2 database privileges for IBM Business Process Manager components. The installation privileges are the privileges that are required to install and configure the product. The runtime privileges are the database privileges that are required to run the product.

Table 25. Detailed DB2 database privileges

Component	Installation privileges	Runtime privileges
Common DB	CREATE TABLE, CREATE INDEXTYPE, ALTER TABLE, INSERT, CREATE SEQUENCE, CREATE USER, ALTER USER, CREATE TABLESPACE	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE, USAGE ON SEQUENCE
Business Space	CREATE TABLE, CREATE INDEXTYPE, ALTER TABLE, INSERT, CREATE SEQUENCE, CREATE USER, ALTER USER, CREATE TABLESPACE	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE

Table 25. Detailed DB2 database privileges (continued)

Component	Installation privileges	Runtime privileges
Business Process Choreographer	CREATE TABLE, ALTER TABLE, CREATE VIEW, CREATE TABLESPACE, CREATE USER, CREATE PROCEDURE	SELECT, UPDATE, DELETE, INSERT
Messaging Engines	CREATE TABLE, CREATE INDEXTYPE	SELECT, UPDATE, DELETE, INSERT, DROP ANY TABLE **Note:** Messaging Engines use the TRUNCATE TABLE SQL statement, which might require the DROP ANY TABLE privilege. See Database privileges.
Process Server or Performance Data Warehouse	Required to create the database: • CREATEDBA • CREATEDBC Required to populate the database with our schemas and stored procedures: • CREATETAB • CREATEIN • DROPIN Additional required privileges on the created tables: • ALTER • DELETE • INDEX • INSERT • REFERENCES • SELECT • UPDATE	Required privileges on the tables in the Process Server and Performance Data Warehouse databases: • DELETE • INSERT • REFERENCES • SELECT • UPDATE The runtime user must have EXECUTE ON PROCEDURE privileges on the six stored procedures in the `createProcedure_ProcessServer.sql` script. The runtime user requires all of the listed privileges on the Performance Tracking Server database as well. In addition, the user also must be able to create new tables in the Performance Tracking database, requiring the CREATETAB privilege. To read the system metadata tables, the SELECT permission is required on **syscat.tables**, **syscat.views**, **syscat.columns**, **syscat.tabconst**, and **sysibm.sysdummy1**.

Syntax for creating a database and assigning rights to a DB2 user:

```
create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
connect to @DB_NAME@;
grant dbadm on database to user @DB_USER@;
UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
connect reset;
```

In the above example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

Related reference:

Database privileges in WebSphere Application Server

DB2 for z/OS database privileges
Set database privileges to determine the authority that you must have to create or access your data store tables for DB2 for z/OS databases.

When you create database schemas using the typical installation or database scripts that are generated using the BPMConfig command-line utility, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 26. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID needs CREATETAB authority on the database and CREATETS to create the table space. The user ID also needs CREATEIN and DROPIN privilege on the schema. To create storage groups for the database, the user ID needs CREATESG, CREATEDBA, and CREATEDBC system privileges. The user ID also needs ALTER, DELETE, INDEX, INSERT, REFERENCES, SELECT, and UPDATE privileges on the created tables.	The user ID needs SELECT, INSERT, UPDATE, and DELETE privileges on the tables. The user ID also needs EXECUTE ON PROCEDURE on stored procedures. See the following table for detailed DB2 for z/OS database privileges for IBM Business Process Manager components.

The following table describes more DB2 for z/OS database privileges for IBM Business Process Manager components. The installation privileges are the privileges that are required to install and configure the product. The runtime privileges are the database privileges that are required to run the product.

Table 27. Detailed DB2 for z/OS database privileges

Component	Installation privileges	Runtime privileges
Common DB	CREATE TABLE, CREATE INDEXTYPE, ALTER TABLE, INSERT, CREATE SEQUENCE, CREATE USER, ALTER USER, CREATE TABLESPACE	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE, USAGE ON SEQUENCE, USAGE
Business Space	CREATE TABLE, CREATE INDEXTYPE, ALTER TABLE, INSERT, CREATE SEQUENCE, CREATE USER, ALTER USER, CREATE TABLESPACE	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE, USAGE ON SEQUENCE
Business Process Choreographer	CREATE TABLE, ALTER TABLE, CREATE VIEW, CREATE TABLESPACE, CREATE USER, CREATE PROCEDURE	SELECT, UPDATE, DELETE, INSERT
Messaging Engines	CREATE TABLE, CREATE INDEXTYPE	SELECT, UPDATE, DELETE, INSERT, DROP ANY TABLE **Note:** Messaging Engines use the TRUNCATE TABLE SQL statement, which might require the DROP ANY TABLE privilege. See Database privileges.

Table 27. Detailed DB2 for z/OS database privileges (continued)

Component	Installation privileges	Runtime privileges
Process Server or Performance Data Warehouse	Required to create the database: • CREATESG • CREATEDBA • CREATEDBC Required to populate the database with our schemas and stored procedures: • CREATETS • CREATETAB • CREATEIN • DROPIN Additional required privileges on the created tables: • ALTER • DELETE • INDEX • INSERT • REFERENCES • SELECT • UPDATE	Required privileges on the tables in the Process Server and Performance Data Warehouse databases: • DELETE • INSERT • REFERENCES • SELECT • UPDATE The runtime user must have EXECUTE ON PROCEDURE privileges on the six stored procedures in the `createProcedure_ProcessServer.sql` script. The runtime user requires all of the listed privileges on the Performance Tracking Server database as well. In addition, the user also must be able to create new tables in the Performance Tracking database, requiring the CREATETS and CREATETAB privileges. To read the system metadata tables, the SELECT permission is required on **sysibm.systables**, **sysibm.sysviews**, **sysibm.syscolumns**, **sysibm.syschecks**, **sysibm.sysrels**, **sysibm.systabconst**, **sysibm.systablespace**, and, **sysibm.sysdummy1**.

Related reference:

[→] Database privileges in WebSphere Application Server

Oracle database privileges

Set database privileges to determine the authority that you must have to create or access your data store tables for Oracle databases.

When you create database schemas using the typical installation or database scripts that are generated using the BPMConfig command-line utility, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 28. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID needs sufficient privilege to create relational tables and indexes in the data store schema. The database also needs a space quota in the default table space of the owner of that schema.	The user ID needs the SESSION privilege to connect to the database. If the same user ID owns both the data store schema, and the component that is connecting to the database, the user ID has sufficient privilege to manipulate the tables. Otherwise, the user ID needs SELECT, INSERT, UPDATE, ALTER, and DELETE object privileges on the tables that make up the data store, and the DROP ANY TABLE system privilege to enable the use of the TRUNCATE TABLE statement. The user ID also requires the CREATE INDEX privilege. See the following table for detailed Oracle database privileges for IBM Business Process Manager and WebSphere Enterprise Service Bus components.

The following table describes more Oracle database privileges for IBM Business Process Manager components. The installation privileges are the privileges that are required to install and configure the product. The runtime privileges are the database privileges that are required to run the product.

Important: If you configure all the following components for a single Oracle database, you can create a superset of all the privileges that are specified for each component. If you configure the four components for numerous databases, you can set different privileges for each.

Table 29. Detailed Oracle database privileges

Component	Installation privileges	Runtime privileges
Common DB	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges: CREATE USER, ALTER USER, CREATE ANY TABLE, ALTER ANY TABLE, DROP ANY TABLE, SELECT ANY TABLE, UPDATE ANY TABLE, INSERT ANY TABLE, DELETE ANY TABLE, CREATE ANY INDEX, DROP ANY INDEX, CREATE ANY VIEW, DROP ANY VIEW, CREATE ANY PROCEDURE, DROP ANY PROCEDURE, CREATE ANY SEQUENCE The following privileges are for the situation when a DBA has created a Common DB user and that user creates the database objects, owns them, and uses them at runtime: CREATE TABLE, CREATE VIEW, CREATE PROCEDURE, CREATE SEQUENCE	The following privileges are for the situation when a DBA has created a Common DB user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: CREATE PROCEDURE CREATE VIEW implicit privileges (included in the ownership of the database objects): SELECT INSERT UPDATE DELETE

Table 29. Detailed Oracle database privileges (continued)

Component	Installation privileges	Runtime privileges
Business Space	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges: CREATE USER, ALTER USER, CREATE ANY TABLE, ALTER ANY TABLE, DROP ANY TABLE, SELECT ANY TABLE, UPDATE ANY TABLE, INSERT ANY TABLE, DELETE ANY TABLE, CREATE ANY INDEX, DROP ANY INDEX, CREATE ANY VIEW, DROP ANY VIEW, CREATE ANY PROCEDURE, DROP ANY PROCEDURE The following privileges are for the situation when a DBA has created a Business Space user and that user creates the database objects, owns them, and uses them at runtime: CREATE TABLE, CREATE VIEW, CREATE PROCEDURE	The following privileges are for the situation when a DBA has created a Business Space user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: CREATE PROCEDURE CREATE VIEW implicit privileges (included in the ownership of the database objects): SELECT INSERT UPDATE DELETE
Business Process Choreographer	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges: CREATE USER, ALTER USER, CREATE TABLESPACE, CREATE ANY TABLE, ALTER ANY TABLE, DROP ANY TABLE, SELECT ANY TABLE, UPDATE ANY TABLE, INSERT ANY TABLE, DELETE ANY TABLE, CREATE ANY INDEX, DROP ANY INDEX, CREATE ANY VIEW, DROP ANY VIEW, CREATE ANY PROCEDURE, DROP ANY PROCEDURE The following privileges are for the situation when a DBA has created a Business Process Choreographer user and that user creates the database objects, owns them, and uses them at runtime: CREATE TABLE, CREATE VIEW, CREATE PROCEDURE.	The following privileges are for the situation when a DBA has created a Business Process Choreographer user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: CREATE PROCEDURE CREATE VIEW implicit privileges (included in the ownership of the database objects): SELECT INSERT UPDATE DELETE

Table 29. Detailed Oracle database privileges (continued)

Component	Installation privileges	Runtime privileges
Common Event Infrastructure (CEI)	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges: CREATE USER, ALTER USER, CREATE INDEXTYPE, ALTER ANY TABLE, ALTER SESSION, CREATE TABLESPACE, CREATE PROFILE, CREATE ROLE, CREATE TEMPORARY TABLESPACE The following privileges are for the situation when a DBA has created a Common Event Infrastructure user and that user creates the database objects, owns them, and uses them at runtime: CREATE TABLE, CREATE VIEW, CREATE PROCEDURE.	The following privileges are for the situation when a DBA has created a Common Event Infrastructure user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: CREATE PROCEDURE implicit privileges (included in the ownership of the database objects): SELECT INSERT UPDATE DELETE
Messaging Engines	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges: CREATE USER, ALTER USER, CREATE ANY TABLE, ALTER ANY TABLE, DROP ANY TABLE, SELECT ANY TABLE, UPDATE ANY TABLE, INSERT ANY TABLE, DELETE ANY TABLE, CREATE ANY INDEX, DROP ANY INDEX The following privileges are for the situation when a DBA has created a Messaging Engines user and that user creates the database objects, owns them, and uses them at runtime: CREATE TABLE	The following privileges are for the situation when a DBA has created a Messaging Engines user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: DROP ANY TABLE implicit privileges (included in the ownership of the database objects): SELECT INSERT UPDATE DELETE **Tip:** Messaging Engines use the TRUNCATE TABLE SQL statement, which might require the DROP ANY TABLE privilege. See Database privileges. If you prefer not to give the user this privilege, you can avoid it, at a performance cost, by using tuning. See Database privileges in WebSphere Application Server.

Table 29. Detailed Oracle database privileges (continued)

Component	Installation privileges	Runtime privileges

Process Server	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges:
	
	    CREATE USER
	    ALTER USER
	    CREATE TABLESPACE
	    CREATE ANY TABLE
	    ALTER ANY TABLE
	    DROP ANY TABLE
	    SELECT ANY TABLE
	    UPDATE ANY TABLE
	    INSERT ANY TABLE
	    DELETE ANY TABLE
	    LOCK ANY TABLE
	    CREATE ANY INDEX
	    DROP ANY INDEX
	    CREATE ANY VIEW
	    DROP ANY VIEW
	    CREATE ANY PROCEDURE
	    DROP ANY PROCEDURE
	    CREATE ANY SEQUENCE
	    DROP ANY SEQUENCE
	
	The following privileges are for the situation when a DBA has created a Process Server user and that user creates the database objects, owns them, and uses them at runtime.
	
	• explicit privileges:
	    CREATE TABLE
	    CREATE PROCEDURE
	    CREATE SEQUENCE
	    CREATE VIEW
	• implicit privileges (included in the ownership of the database objects):
	    INSERT
	    UPDATE
	    DELETE
	    ALTER
	    DROP
		The following privileges are for the situation when a DBA created a Process Server user and that user creates the database objects, owns them, and uses them at runtime.
		
		• explicit privileges:
		    CREATE TABLE
		    CREATE PROCEDURE
		    CREATE SEQUENCE
		    CREATE VIEW
		• implicit privileges (included in the ownership of the database objects):
		    SELECT
		    INSERT
		    UPDATE
		    DELETE

Table 29. Detailed Oracle database privileges (continued)

Component	Installation privileges	Runtime privileges
Performance Data Warehouse	The following privileges are for the situation when a DBA creates users and all the database objects for those users. The DBA requires the following privileges: CREATE USER ALTER USER CREATE TABLESPACE CREATE ANY TABLE ALTER ANY TABLE DROP ANY TABLE SELECT ANY TABLE UPDATE ANY TABLE INSERT ANY TABLE DELETE ANY TABLE LOCK ANY TABLE CREATE ANY INDEX DROP ANY INDEX CREATE ANY VIEW DROP ANY VIEW CREATE ANY PROCEDURE DROP ANY PROCEDURE CREATE ANY SEQUENCE DROP ANY SEQUENCE The following privileges are for the situation when a DBA has created a Performance Data Warehouse user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: CREATE TABLE CREATE PROCEDURE CREATE SEQUENCE CREATE VIEW implicit privileges (included in the ownership of the database objects): INSERT UPDATE DELETE	The following privileges are for the situation when a DBA created a Performance Data Warehouse user and that user creates the database objects, owns them, and uses them at runtime. explicit privileges: CREATE TABLE CREATE PROCEDURE CREATE SEQUENCE CREATE VIEW implicit privileges (included in the ownership of the database objects): SELECT INSERT UPDATE DELETE All schemas or users that are creating or migrating IBM BPM profiles must have access to the **DBMS_LOCK** package. Set the **Execute** permission on the **DBMS_LOCK** package for the Oracle user or schema that is using the performance database as shown in the following example: `GRANT execute ON DBMS_LOCK TO <schema_name>` In this example, *schema_name* is the user ID that is used for the performance database.

Syntax for assigning rights to an Oracle user:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Related reference:

⮕ Database privileges in WebSphere Application Server

SQL Server database privileges

Set database privileges to determine the authority that you must have to create or access your data store tables for SQL Server databases.

Permissions in SQL Server are assigned to roles which can be assigned to users, similar to windows user groups. There are two types of roles:

* **Server roles** provision database server related permissions such as backup, shutdown, creating new databases, managing logins, and linking to other servers.
* **Database roles** provision more traditional database permissions such as table access and those listed below.

Note: You can be a member of multiple roles such that you can combine the permissions of different fixed roles to find just the right combination for your requirements.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.
* **db_ddladmin**
* **db_datawriter**
* **db_datareader**

For information about the permissions that are provided by these roles, see documentation from Microsoft.

When you create database schemas using the typical installation or database scripts that are generated using the BPMConfig command-line utility, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The above three fixed database roles cover 80% of the requirements, the remaining permissions are:
* •CREATE INDEXTYPE: No INDEXTYPE. but **db_ddladmin** can create indexes and specify the type
* •CREATE TABLESPACE: No TABLESPACE but similar concepts are WORKLOAD GROUP, RESOURCE POOL, and PARTITION SCHEME
* •ALTER LOCK TABLE: This functionality is available through Lock hinting using the read or write commands (eg SELECT * FROM *tbl name* WHERE TABLOCKX
* •CREATE SEQUENCE: This command is in the SQL Server 2012 documentation but not 2008 R2

The following table describes the database privileges that are needed to access the data stores.

Table 30. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the following table for the detailed privileges.

The following table describes more SQL Server database privileges for IBM Business Process Manager components. The installation privileges are the privileges that are required to install and configure the product. The runtime privileges are the database privileges that are required to run the product.

Table 31. Detailed SQL Server database privileges

Component	Installation privileges	Runtime privileges
Common DB	CREATE TABLE, ALTER TABLE, INSERT, CREATE USER, ALTER USER	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE
Business Space	CREATE TABLE, ALTER TABLE, INSERT, CREATE USER, ALTER USER	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE
Business Process Choreographer	CREATE TABLE, ALTER TABLE, CREATE VIEW, CREATE USER, CREATE PROCEDURE	SELECT, UPDATE, DELETE, INSERT
Messaging Engines	CREATE TABLE	SELECT, UPDATE, DELETE, INSERT, DROP ANY TABLE **Note:** Messaging Engines use the TRUNCATE TABLE SQL statement, which might require the DROP ANY TABLE privilege. See Database privileges.
Process Server	CREATE TABLE, SELECT, INSERT, UPDATE, DELETE TABLE, DROP TABLE, CREATE INDEX, CREATE VIEW, DROP VIEW, CREATE PROCEDURE, CREATE USER, ALTER USER	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE, DROP TABLE, DROP VIEW
Performance Data Warehouse	CREATE TABLE, SELECT, INSERT, UPDATE, DELETE TABLE, DROP TABLE, CREATE INDEX, CREATE VIEW, DROP VIEW, CREATE PROCEDURE, CREATE USER, ALTER USER	SELECT, UPDATE, DELETE, INSERT, CREATE VIEW, CREATE PROCEDURE, DROP TABLE, DROP VIEW

Syntax for creating BPMDB and PDWDB databases in SQL Server is **CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;**

Syntax for creating the CommonDB database in SQL Server is **CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;**

Note:

- The BPMDB and PDWDB databases must be created as case-insensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CI_AS**, where **CI** is the **COLLATE** attribute value that is applicable for the case-insensitive databases.
- The CommonDB database must be created as case-sensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CS_AS**, where **CS** is the **COLLATE** attribute value that is applicable for the case-sensitive databases.

Syntax for creating the users and schemas for the SQL Server databases is as follows:

```
USE master
GO
CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
GO

USE @DB_NAME@
GO
CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
GO
CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
GO
EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
EXEC sp_addrolemember 'db_datareader', @DB_USER@;
EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
```

Important: For Performance Data Warehouse users, note the following restrictions:
- The user cannot be assigned to the system administrator (SYSADMIN) role.
- The user must be mapped to the master database with the SqlJDBCXA user role.

For more information, see the WebSphere Application Server page in the related reference.

Related reference:

⟡ Database privileges in WebSphere Application Server

User ID or schema name privileges

During the installation of IBM Business Process Manager, you can use the default schema name and user ID privileges to install your databases. However, your database design might require separate user ID or schema name privileges.

Review the provided scenarios to determine when and how to configure different schema names and user ID privileges when you install IBM Business Process Manager.

Scenario for a single user ID or schema name privileges

If you chose a default installation for your databases, IBM Business Process Manager requires a minimum of one user ID or schema name that can create tables and to select, insert, update, and delete rows in those tables. You can use the Profile Management Tool or the installer to create your databases.

The following table shows the default database configuration properties when you use DB2 as your database. Other databases have different default configuration properties for database configuration.

Table 32. Scenario: Single user ID or schema

Database tables	Default database name with DB2	User ID or schema name
Common database tables	CMNDB	IBM Business Process Manager provides a user ID during installation.

Table 32. Scenario: Single user ID or schema (continued)

Database tables	Default database name with DB2	User ID or schema name
Messaging tables	MEDB	IBM Business Process Manager provides a schema name during installation.

If your database design has different properties, you might need multiple user ID and schema name privileges. The following scenarios show you how to apply the configuration to achieve your design. Even if your particular design is not in the provided scenarios, you can adapt some of the ideas to implement your particular design.

Scenario 1 for multiple user ID or schema name privileges

In this scenario, you use a schema name that is the same as the user ID privileges, but you do not use the default schema name or a user ID that was specified during installation. This single user ID can access all of the database and also create all needed tables. The following examples show scenario 1 privileges:

- Schema name: dog
- Schema name for SCA.SYSTEM ME : dogSYS
- Schema name for SCA.APP ME: dogAPP
- Schema name for Event ME: dogEvent
- User ID to create schemas: dog
- User ID to select, insert, update, and delete schemas: dog

The following table contains information about how to set up the schema name and user ID privileges with DB2 as your database. If you choose a different database, see their documentation for setting up schema names and user ID privileges.

Table 33. Scenario 1: Multiple user ID or schema

Database tables	Database name with DB2	Schema name	User ID to create tables	User ID to select, insert, update, and delete rows
Common database tables	You supply this value in the • Installation wizard • Profile Management Tool • Silent install • Silent profile creation	This schema name is the same as the user ID that is used to select, insert, update, and delete rows.	This value is the same as the user ID that is used to select, insert, update, and delete rows.	You supply this value in the • Installation wizard • Profile Management Tool • Silent install • Silent profile creation

Scenario 2 for multiple user ID or schema name privileges

In this scenario, you use the same schema name and user ID to select, insert, update, and delete schemas. However, you use a different user ID to create the schemas. The following examples show scenario 2 privileges:

- Schema name: snow
- Schema name for SCA.SYSTEM ME: snowSYS
- Schema name for SCA.APP ME: snowAPP
- Schema name for Event ME: snowEvent
- User ID to create the schemas: rock
- User ID to select, insert, update, and delete schemas: snow

The following table contains information about how to set up the schema name and user ID privileges with DB2 as your database. If you choose a different database, see their documentation for setting up schema names and user ID privileges.

Table 34. Scenario 2: Multiple user ID or schema

Database tables	Database name with DB2	Schema name	User ID to create tables	User ID to select, insert, update, and delete rows
Common database tables	You supply this value twice: 1. In table creation scripts 2. During the IBM Business Process Manager configuration with one of the following tools: • Administrative console • Installation wizard • Profile Management Tool • Silent install • Silent profile creation **Restriction:** If you run the installer first, then you supply the value once because the generated scripts already contain the correct schema name and user ID values.	The table creation scripts need to be modified with the schema name that allows reading and writing rows.	The table creation script needs to be modified with the user ID that allows table creation.	You supply the user ID during profile creation through one of the following tools: • Installation wizard • Profile Management Tool • Silent install • Silent profile creation

Scenario 3 for multiple user ID or schema name privileges

In this scenario, you use the same user ID to create all schemas. However, each schema has a different user ID to select, insert, update, and delete rows. The following list shows examples of privileges for Scenario 3:

• Schema name: waterCom
• Schema name for common tables: waterCom
• Schema name for SCA.SYSTEM ME: waterSYSME
• Schema name for SCA.APP ME: waterAPPME
• Schema name for Event ME: waterEventME
• Schema name for ESBMessaging tables: waterESB
• User ID to create schemas: milk
• User ID to select, insert, update, and delete schemas:

Schema name	User ID to select, insert, update, and delete schemas
waterCom	waterCom
waterSYSME	waterSYSME

Schema name	User ID to select, insert, update, and delete schemas
waterAPPME	waterAPPME
waterEventME	waterEventME
waterESB	waterESB

The following table contains information about how to set up the schema name and user ID privileges with DB2 as your database. If you choose a different database, see their documentation for setting up schema names and user ID privileges.

Table 35. Scenario 3: Multiple user ID or schema

Database tables	Database name with DB2	Schema name	User ID to create tables	User ID to select, insert, update, and delete rows
Common database tables	You supply this value in the • Installation wizard • Profile Management Tool • Silent install • Silent profile creation	This schema name is the same as the user ID that is used to select, insert, update, and delete rows.	This value is the same as the user ID that is used to select, insert, update, and delete rows.	You supply the user ID during profile creation through one of the following tools: • Installation wizard • Profile Management Tool • Silent install • Silent profile creation
Messaging tables	You supply this value with the definition of each messaging engine.	The table creation scripts must include the schema name that is used to select, insert, update, and delete rows.	This value is the same as the user ID that is used to select, insert, update, and delete rows.	You supply this value during the creation of the messaging engine. Select the **Create Table** option during the messaging engine configuration.

Chapter 5. Installing and configuring IBM Business Process Manager Standard

IBM Business Process Manager Standard can be installed in a single node network deployment environment. If you want to achieve a highly available environment with failover support, you can use the clustering mechanism of WebSphere Application Server and distribute across multiple systems.

Roadmap: Installing and configuring IBM Business Process Manager Standard

The IBM Business Process Manager Standard installation and configuration programs accommodate various development and production scenarios. This roadmap guides you through the most common paths for installing and configuring IBM Business Process Manager Standard.

Alternatively, you can use the Interactive Installation and Configuration Guide to answer a series of questions about your target environment and receive installation and configuration topics that are customized to your installation needs.

The roadmap provides the most relevant links for each common installation and configuration scenario, grouped by operating system.

View all | View with tabs
- "Linux" on page 1
- "AIX" on page 2
- "Solaris" on page 2
- "Windows" on page 3

Linux

To install IBM Business Process Manager on Linux, follow this roadmap.

Planning
> Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing
> Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:
> - System requirements
> - Preparing Linux systems for installation with a new DB2 Express database
> - Preparing Linux systems for installation with an existing database

Installing
> Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.
> - Installing IBM Business Process Manager using a typical installation and configuration path
> - Installing IBM Business Process Manager using a custom installation and configuration path

Configuring
> No configuration is required after the completion of a typical installation. After a custom installation, configure the software.

Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:

- Configuring profiles and creating a network deployment environment

Modifying your existing installation

After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

AIX

To install IBM Business Process Manager on AIX, follow this roadmap.

Planning

Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing

Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:

- System requirements
- Preparing AIX systems for installation

Installing

Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.

- Installing IBM Business Process Manager using a typical installation and configuration path
- Installing IBM Business Process Manager using a custom installation and configuration path

Configuring

No configuration is required after the completion of a typical installation. After a custom installation, configure the software.

Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:

- Configuring profiles and creating a network deployment environment

Modifying your existing installation

After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

Solaris

To install IBM Business Process Manager on Solaris, follow this roadmap.

Planning

Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing

Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:

- System requirements
- Preparing Solaris systems for installation

Installing

Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.

- Installing IBM Business Process Manager using a typical installation and configuration path
- Installing IBM Business Process Manager using a custom installation and configuration path

Configuring

No configuration is required after the completion of a typical installation. After a custom installation, configure the software.

Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:

- Configuring profiles and creating a network deployment environment

Modifying your existing installation

After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

Windows

To install IBM Business Process Manager on Microsoft Windows, follow this roadmap.

Planning

Determine your path through the installation documentation: choose the type of installation, typical or custom, and the appropriate deployment environment for your installation. Then see Planning for IBM Business Process Manager.

Preparing

Review the hardware and software requirements, prepare the operating system for installation, and ensure that you installed the database management system:

- System requirements
- Preparing Windows systems for installation

Installing

Based on the decisions made earlier, select the installation option that is most appropriate for your deployment environment, and then complete the steps to install the software.

- Installing IBM Business Process Manager using a typical installation and configuration path
- Installing IBM Business Process Manager using a custom installation and configuration path

Configuring

No configuration is required after the completion of a typical installation. After a custom installation, configure the software.

Based on your configuration, choose the database that you want to work with, and complete the following procedure to configure the profiles and build the deployment configuration:

- Configuring profiles and creating a network deployment environment

Modifying your existing installation

After you install and configure the runtime environment on your system, follow these steps in Modifying and extending an existing installation to customize your configuration.

Preparing to install and configure the software

Before preparing to install and configure the software, create a plan for the deployment environment that you want to create.

Use the information listed in the following table to prepare for installing and configuring IBM Business Process Manager.

Table 36. Preparing for installation and configuration

Task	Where to find information	Result after completing the task
Review hardware and software requirements	Depending on your IBM BPM configuration, visit: • IBM Business Process Manager Advanced system requirements • IBM Business Process Manager Standard system requirements • IBM Business Process Manager Express system requirements	You understand the system requirements necessary to support your IBM Business Process Manager installation.
Prepare your operating system	**AIX** Preparing AIX systems for installation **Linux** Preparing Linux systems for installation with a new DB2 Express database or Preparing Linux systems for installation with an existing database **Solaris** Preparing Solaris systems for installation **Windows** Preparing Windows systems for installation	You have prepared the operating system of each workstation to be used.

Table 36. Preparing for installation and configuration (continued)

Task	Where to find information	Result after completing the task
Make sure you have installed your database management system.	Consult your database documentation for information about installing and administering your database management system.	Your database management system is installed. IBM Business Process Manager embeds the DB2 Express database. If you want to use DB2 Express as your database, you can select it as a feature from the installer and it is installed and configured automatically. The user must have administrative privileges (root or Administrator) to install DB2 Express. **Note:** If you already have a version of DB2 installed and you want to install DB2 Express, you must uninstall DB2 before running the IBM Business Process Manager installer. If the installer detects a version of DB2 installed and you have selected to install DB2 Express from the installer, you will receive a warning message and will not be able to install DB2 Express. **Important:** `Linux` If you are installing DB2 Express as a root user, you must ensure that all kernel requirements are met before the DB2 Express installation begins. See Kernel parameter requirements (Linux) for a list of the kernel requirements. You can locate the current values by parsing the output of the **ipcs -l** command. **Important:** You will not be able to properly install and use DB2 Express if the password that is specified does not meet operating system or company restrictions, because an operating system user is created on install.

System requirements

Before you install, ensure that your system meets all system requirements.

For the latest information about platform-specific disk space requirements, supported operating systems, and supported database versions, click one of the following links. You can also find operating system fixes and patches that you must install to have a compliant operating system.

- IBM Business Process Manager Standard system requirements
- IBM Business Process Manager Tools and Add-Ons Requirements

Preparing operating systems for product installation

Before you can install IBM Business Process Manager, you must prepare your operating system. The configuration depends on the type of operating system you are using.

Before preparing the installation environment, complete the following tasks:

- Disable the firewall if you have a firewall running on the system where you plan to install IBM Business Process Manager.
- Ensure that your user login provides access to your DB2 or Oracle database commands.

- Complete additional tasks specific to your operating system.

Preparing AIX systems for installation

Before you can install IBM Business Process Manager, you must prepare your AIX® operating system.

Because certain steps are specific to a version of the operating system, all steps might not apply to your environment. If no qualifier is provided for a particular step, complete the step for all versions of the operating system.

Refer to the following technote for additional preparation information for configuring Installation manager to run on 64-bit AIX systems: Installation Manager graphical environment issues on Solaris, Linux, AIX.

Complete the following steps on your AIX system before installing IBM Business Process Manager:

1. Because WebSphere Application Server is a prerequisite of IBM Business Process Manager, complete the required preparation steps in the Preparing AIX systems for installation topic in the WebSphere Application Server information center.

2. Increase the maximum number of open files. The default setting is usually not enough. You can check your current maximum number of open files by using **ulimit -n**. The following example shows the maximum number of open files being increased to 8800, which is large enough for most systems. The ulimit requirement is dynamically calculated at installation time and might need to be larger based on the options you select.

   Before installing, run the following command:

   > **ulimit -n 8800**

   Alternatively, you can use the following steps to edit the resource limits file:

   a. Open /etc/security/limits.

   b. Edit or add the **default** section and include this line:

   > **nofiles = 8800**

   c. Save and close the file.

   d. Log off from the operating system and log in again.

3. Set the **umask** value to 077 using the following command:

   > **umask 077**

   The value 077 is the most restrictive value that IBM Business Process Manager will tolerate. You can optionally choose to set a less restrictive **umask** value for the following access levels:

   - 037 for read-only access for a group of human administrators and tools
   - 027 for read and write access for a group of human administrators and tools
   - 007 for read, write, and execute access for a group of human administrators and tools

4. Ensure that you have a supported version of Mozilla Firefox installed.

5. Before starting the data movement service, increase the number of processes configured in the AIX operating system to avoid a connection reset error. You can increase the number of processing using a command, or using the AIX interface.

   - Run the command:

     ```
     chdev  -l sys0 -a maxuproc='256'
     ```

   - In the AIX interface, enter **smitty**, then select **System Environments > Change / Show Characteristics of Operating System > Number of processes allowed per user(Num.)**.

6. Complete the steps in Tuning AIX systems.

7. Ensure all servers involved are set to the same time. Use the same network time protocol for all servers on all cluster nodes, including application, support, and database clusters. A time mismatch will cause erratic behavior, including duplicate system tasks.

Related tasks:

▶ Preparing AIX systems for installation

▶ Tuning AIX systems

Preparing Linux systems for installation with a new DB2 Express database

Before you can install IBM Business Process Manager, you must prepare your Linux operating system.

Ensure that you have a supported version of Mozilla Firefox installed.

Because certain steps are specific to a version of the operating system, all steps might not apply to your environment. If no qualifier is provided for a particular step, complete the step for all versions of the operating system.

Complete the following steps on your Linux system before installing IBM Business Process Manager:

1. Because WebSphere Application Server is a prerequisite of IBM Business Process Manager, complete all the required preparation steps in the Preparing Linux systems for installation topic in the WebSphere Application Server information center.

2. Ensure that you have administrative (root) privileges. As a root user, you must also ensure that all kernel requirements are met before the DB2 Express installation begins. You can locate the current values by parsing the output of the **ipcs -l** command. To change the values, add the following lines, in the following order, to the /etc/sysctl.conf file. This example is for a computer with 16GB of RAM:

```
kernel.shmmni=4096
kernel.shmmax=17179869184
kernel.shmall=8388608
#kernel.sem=<SEMMSL><SEMMNS><SEMOPM><SEMMNI>
kernel.sem=250 256000 32 4096
kernel.msgmni=16384
kernel.msgmax=65536
kernel.msgmnb=65536
```

3. Run the following command to load the settings from the /etc/sysctl.conf file:

```
sysctl -p
```

For additional information, see Kernel parameter requirement for Linux in the DB2 information center.

4. Increase the allowable stack size, number of open files, and number of processes by adding the following lines to the end of the /etc/security/limits.conf file or changing the values if the lines already exist:

```
# - stack - max stack size (KB)
* soft stack 32768
* hard stack 32768
# - nofile - max number of open files
* soft nofile 65536
* hard nofile 65536
# - nproc - max number of processes
* soft nproc 16384
* hard nproc 16384
```

Save and close the file, and log off and log in again. You can check the current maximum number of open files by using **ulimit -n**. The **ulimit** requirement is dynamically calculated at installation time and might need to be larger based on the options you select. For more information about this setting, run **man limits.conf** or see the topic Preparing the operating system for product installation in the WebSphere Application Server information center.

5. Check for the existence of a file named /etc/security/limits.d/90-nproc.conf, which overrides the **nproc** value set in the limits.conf file. If the 90-nproc.conf file exists, edit it and set the **nproc** values that are specified in the previous step.

6. If you have previously installed and uninstalled DB2, ensure that the previous database entries in the /etc/services file have been deleted. For example, if the previous entry DB2_instance-name_suffix 50000/tcp still exists, the new installation will use the next available port, 50001, which might not work with your configuration. For more information, see Verifying port range availability in the DB2 information center.

7. Reboot the system.

8. Install the following packages for your operating system:

Option	Description
Red Hat Enterprise Linux 5	libXp-1.0.0-8 rpm-build-4.4.2-37.el5

You can also install a later release of any of these packages if there are new packages as errata. If you have additional packages that are specific to your hardware, install them.

The following command example shows how to use the default package manager on supported Linux distributions.

- **Red Hat Enterprise Linux 5:**

  ```
  yum install libXp rpm-build
  ```

9. Set the **umask** value to 077 using the following command:

   umask 077

   The value 077 is the most restrictive value that IBM Business Process Manager will tolerate. You can optionally choose to set a less restrictive **umask** value for the following access levels:

   - 037 for read-only access for a group of human administrators and tools
   - 027 for read and write access for a group of human administrators and tools
   - 007 for read, write, and execute access for a group of human administrators and tools

10. On Red Hat Enterprise Linux 5 systems, disable SELinux, or set it to a permissive mode.

11. Restart the computer.

12. Complete the steps in Tuning Linux systems.

13. Ensure all servers involved are set to the same time. Use the same network time protocol for all servers on all cluster nodes, including application, support, and database clusters. A time mismatch will cause erratic behavior, including duplicate system tasks.

Related tasks:

Preparing Linux systems for installation

Tuning Linux systems

Related reference:

Unable to install Installation Manager on RHEL 6.0 (64-bit)

Related information:

General naming rules for DB2

Preparing Linux systems for installation

Before you can install IBM Business Process Manager, you must prepare your Linux operating system.

Ensure that you have a supported version of Mozilla Firefox installed.

Because certain steps are specific to a version of the operating system, all steps might not apply to your environment. If no qualifier is provided for a particular step, complete the step for all versions of the operating system.

Complete the following steps on your Linux system before installing IBM Business Process Manager:

1. Because WebSphere Application Server is a prerequisite of IBM Business Process Manager, complete all the required preparation steps in the Preparing Linux systems for installation topic in the WebSphere Application Server information center.

2. Increase the allowable stack size, number of open files, and number of processes by adding the following lines to the end of the /etc/security/limits.conf file or changing the values if the lines already exist:

```
# - stack - max stack size (KB)
* soft stack 32768
* hard stack 32768
# - nofile - max number of open files
* soft nofile 65536
* hard nofile 65536
# - nproc - max number of processes
* soft nproc 16384
* hard nproc 16384
```

   Save and close the file, and log off and log in again. You can check the current maximum number of open files by using **ulimit -n**. The **ulimit** requirement is dynamically calculated at installation time and might need to be larger based on the options you select. For more information about this setting, run **man limits.conf** or see the topic Preparing the operating system for product installation in the WebSphere Application Server information center.

3. Check for the existence of a file named /etc/security/limits.d/90-nproc.conf, which overrides the **nproc** value set in the limits.conf file. If the 90-nproc.conf file exists, edit it and set the **nproc** values that are specified in the previous step.

4. Install the following packages for your operating system:

Option	Description
Red Hat Enterprise Linux 5	libXp-1.0.0-8
	rpm-build-4.4.2-37.el5

   You can also install a later release of any of these packages if there are new packages as errata. If you have additional packages that are specific to your hardware, install them.

   The following command example shows how to use the default package manager on supported Linux distributions.

   - **Red Hat Enterprise Linux 5:**

     ```
     yum install libXp rpm-build
     ```

5. Set the **umask** value to 077 using the following command:

   umask 077

   The value 077 is the most restrictive value that IBM Business Process Manager will tolerate. You can optionally choose to set a less restrictive **umask** value for the following access levels:

   - 037 for read-only access for a group of human administrators and tools
   - 027 for read and write access for a group of human administrators and tools
   - 007 for read, write, and execute access for a group of human administrators and tools

6. On Red Hat Enterprise Linux 5 systems, disable SELinux, or set it to a permissive mode.

7. Restart the computer.

8. Complete the steps in Tuning Linux systems.

9. Ensure all servers involved are set to the same time. Use the same network time protocol for all servers on all cluster nodes, including application, support, and database clusters. A time mismatch will cause erratic behavior, including duplicate system tasks.

10. If you are using DB2, make sure that all your DB2 parameters meet the DB2 naming rules.

Related tasks:

➥ Preparing Linux systems for installation

➥ Tuning Linux systems

Related reference:

➥ Unable to install Installation Manager on RHEL 6.0 (64-bit)

Related information:

➥ General naming rules for DB2

Preparing Solaris systems for installation

Before you can install IBM Business Process Manager, you must prepare your Solaris operating system.

Because certain steps are specific to a version of the operating system, all steps might not apply to your environment. If no qualifier is provided for a particular step, complete the step for all versions of the operating system.

Complete the following steps on your Solaris systems before installing IBM Business Process Manager:

1. Because WebSphere Application Server is a prerequisite of IBM Business Process Manager, complete the required preparation steps in the Preparing Solaris systems for installation topic in the WebSphere Application Server information center.

2. Increase the maximum number of open files. The default setting is usually not enough. You can check your current maximum number of open files by using **ulimit -n**. The following example shows the maximum number of open files being increased to 8800, which is large enough for most systems. The ulimit requirement is dynamically calculated at installation time and might need to be larger based on the options you select.

   Before installing, run the following command:

   > **ulimit -Hn 8800**

   Alternatively, you can use the following steps to edit the resource limits file:

   a. Open /etc/system

   b. Add the following line to the end of the file:

      > **set rlim_fd_max=8800**

   c. Save and close the file.

   d. Log off from the operating system and log in again.

3. Set the **umask** value to 077 using the following command:

   > **umask 077**

   The value 077 is the most restrictive value that IBM Business Process Manager will tolerate. You can optionally choose to set a less restrictive **umask** value for the following access levels:

   - 037 for read-only access for a group of human administrators and tools
   - 027 for read and write access for a group of human administrators and tools
   - 007 for read, write, and execute access for a group of human administrators and tools

4. Complete the steps in Tuning Solaris systems.

5. Ensure all servers involved are set to the same time. Use the same network time protocol for all servers on all cluster nodes, including application, support, and database clusters. A time mismatch will cause erratic behavior, including duplicate system tasks.

Related tasks:

➥ Preparing Solaris systems for installation

➥ Tuning Solaris systems

Preparing Windows systems for installation

Before you can install IBM Business Process Manager, you must prepare your Windows operating system.

If you are planning to use DB2 Express with your IBM Business Process Manager installation, the user account must have administrative privileges (Administrator) on the machine where you will perform the installation.

Because WebSphere Application Server is a prerequisite product for IBM Business Process Manager, you must complete all of the preparation tasks for WebSphere Application Server before installing IBM Business Process Manager.

Complete the following steps on your Windows system before installing IBM Business Process Manager:

1. Complete the steps in the Preparing Windows systems for installation topic in the WebSphere Application Server information center.
2. Complete the steps in Tuning Windows systems.
3. Ensure all servers involved are set to the same time. Use the same network time protocol for all servers on all cluster nodes, including application, support, and database clusters. A time mismatch will cause erratic behavior, including duplicate system tasks.
4. If you are installing on Windows 2008 R2 and you plan to install DB2 Express as part of the IBM Business Process Manager installation, ensure you have compatible Microsoft Visual C++ redistributable packages. See Errors when running the **db2start** command in the DB2 information center.
5. If you are using a Czech locale, you must change the system settings to prevent seeing corrupted characters in IBM Process Portal and IBM Process Designer. Change the Windows settings by completing the following steps:
   a. Click **Regional and Language Options**, and open the **Administrative** tab.
   b. In the **Language for non-Unicode programs** section, click **Change system locale . . .** to open the locale list.
   c. Select **Czech** from the list and click **OK**.
6. If you are using DB2, make sure that all your DB2 parameters meet the DB2 naming rules.

Related tasks:

➡ Preparing Windows systems for installation

➡ Tuning Windows systems

Related information:

➡ General naming rules for DB2

Considerations for HADR setup and configuration

Review the following considerations while you plan to set up and configure DB2 for high availability disaster recovery (HADR).
- "Verify status of databases for takeover" on page 72
- "Configure data sources for HADR" on page 72
- "Set up programmatic transaction retry properties" on page 72
- "Specify user roles for HADR" on page 73
- "Start the messaging engine after the takeover" on page 73
- "Access additional information" on page 73

Verify status of databases for takeover

When a site failure occurs, HADR enables the standby database to take over as the primary database, with full DB2 functionality. Before the takeover occurs, verify the DB2 HADR status of both the primary database and the standby database to see if the takeover is allowed or if an error is returned. Sometimes, the takeover might cause an error or might not be allowed.

To check the DB2 HADR status, use the **db2pd** command. For example, if you configured a database named MEDB9 with HADR, use the following command to check the status:
```
db2pd -hadr -db MEDB9
```

To check the status of all databases, use the following command:
```
db2pd -hadr -alldbs
```

For more information, see the TAKEOVER HADR command topic. Review the command parameters and the usage notes to determine whether to perform the takeover.

Configure data sources for HADR

Configure the DB2 data sources for HADR in the IBM Business Process Manager admin console, as described in the Configuring client reroute for applications that use DB2 databases topic.

Keep in mind the following considerations when you configure the data sources for IBM Business Process Manager products:
- In order for client side connections to be automatically rerouted to the alternate database server, you must enable automatic client reroute when setting up DB2 HADR.
- For messaging engine and cell level data sources, the *Alternate server names* and *Alternate port numbers* properties must be configured.
- The alternate port must be the external port for the DB2 server, not the HADR service port that is specified in /etc/services. For example, if the HADR service port DB2_HADR_1, specified in /etc/services, is 55001, and the DB2 server uses the external port 50000, you must specify port 50000 for the data source alternate port in the admin console.

Set up programmatic transaction retry properties

To support programmatic transaction retries, two new properties have been added to the 00static.xml file, with the following values:
```
<transaction-reroute-retries>3</transaction-reroute-retries>
<transaction-reroute-retry-delay-in-millis>10000<transaction-reroute-retry-delay-in-millis>
```

Use the 100Custom.xml configuration file to customize the changes in 00Static.xml if values other than default are required. Complete the following steps:
1. Locate 100Custom.xml configuration file:
    - For a network deployment environment, the file path is *DMGR_profile_root*\config\cells\ *cell_name*\nodes\custom_node_name\servers*server_name*\server_type\config\ 100Custom.xml.
    - For a stand-alone server environment, the file path is *standalone_profile_root*\ config\cells*cell_name*\nodes*standalone_node_name*\servers*server_name*\ server_type\config\100Custom.xml.
2. Edit the 100Custom.xml file. Edit the following section to look like this example:

```
<server merge="mergeChildren">
  <transaction-reroute-retries merge="replace">10</transaction-reroute-retries>
  <transaction-reroute-retry-delay-in-millis merge="replace">3000
<transaction-reroute-retry-delay-in-millis>
</server>
```

3. Save your changes.

Provide all the client reroute properties for all your data sources.

Specify user roles for HADR

When setting up HADR, specify appropriate user roles per platform to determine who can perform
different HADR tasks.

- For Windows, use the DB2 administrative user: db2admin
- For Linux, use the DB2 instance user, db2inst1, rather than the administrative user, dasusr1.

For example, if the DB2 instance user is specified, the db2inst1 user backs up the primary database,
copies the backup image to the standby server, and then restores or starts the standby server using this
image. If the administrative user is specified, the dasusr1 user is the owner of the copied image, which
the db2inst1 user who performs the backup and restore actions cannot access. Because the two users
belong to different groups and have different access rights to files, the HADR setup might fail.

Start the messaging engine after the takeover

If the auto restart for the messaging engine is disabled, you must manually start the messaging engine
after the database takeover occurs.

When two messaging engine servers exist in the same cluster, with messaging server 1 in an active state
and messaging engine server 2 in a joined state, you might not have a running messaging engine server
in your environment because of the following sequence of events:

1. The database that the messaging engines use has been taken over.
2. Messaging engine server 1 shut down to prevent data loss.
3. Messaging engine server 2 started all the messaging engines and is working as the active server while
   the messaging engine server 1 is still down.
4. Another takeover of the database occurred.
5. Messaging engine server 2 shut down to prevent data loss.
6. Both messaging engine servers 1 and 2 are down.

Access additional information

If more information is needed, use the following links.

- If an outage occurs in your DB2 HADR environment, see Detecting and responding to system outages
  in a high availability solution.
- After the failover occurs, if the DB2 HADR status is not peer and if some data loss occurs, configure
  the DB2 HADR status to peer as described in the following topics:
  - Performing an HADR failover operation
  - Reintegrating a database after a takeover operation

Configuring Oracle Data Guard for IBM Business Process Manager

You can configure Oracle Data Guard to be used with IBM Business Process Manager. Oracle Data Guard
provides high availability, disaster recovery, and data protection and is used to create, manage, and
monitor one or more standby databases so that production Oracle databases can survive disasters and
data corruptions.

When IBM Business Process Manager is configured to use Oracle Data Guard, you typically have one production database, which is your primary database, and several standby databases. Then Oracle Data Guard automatically maintains each standby database by transmitting redo data from the primary database and applying the redo data to the standby database. If your production database becomes unavailable because of a planned or an unplanned outage, Oracle Data Guard enables you to switch any standby database to the production role, minimizing the downtime that is associated with the outage.

Oracle Data Guard automatically maintains each standby database by transmitting redo data from the primary database and then applying the redo to the standby database.

A Typical Data Guard Configuration
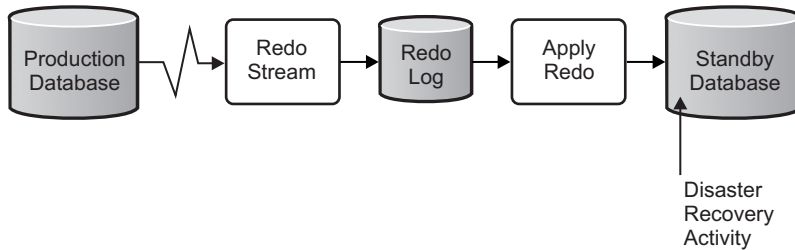
1. Set up the Oracle Data Guard environment.
2. Create a database service from the primary database:

   ```
   Exec DBMS_SERVICE.CREATE_SERVICE('BPM','BPM');
   ```
3. Create a trigger from the primary database by running the following command:

   ```
   CREATE OR REPLACE TRIGGER START_SERVICES AFTER STARTUP ON DATABASE
   DECLARE
    ROLE VARCHAR(30);
   BEGIN
    SELECT DATABASE_ROLE INTO ROLE FROM V$DATABASE;
    IF ROLE = 'PRIMARY' THEN
     DBMS_SERVICE.START_SERVICE('ORCL');  END IF;
   END;
   /
   ```

   Note: When you start a database, your primary database always starts a BPM service. Therefore, your client always connects to the primary database.
4. Restart the primary database or start the following service by running the following command:

   ```
   EXEC DBMS_SERVICE.START_SERVICE('BPM');
   ```
5. Install the IBM Business Process Manager.
6. Create profiles or a deployment environment that is similar to that of an Oracle instance database. While creating the profile, select **Oracle database** and connect to the database service that you created in step 2.

If all your primary and the standby databases are installed on the same server, the databases share the same IP address and Oracle listening port. No further configuration is required.

However, if your primary and standby databases are installed on different servers, they will have different IP addresses and the same Oracle listening port. If your primary and standby databases are on separate servers, you must modify all data sources, after which you will have a JDBC URL that resembles the following URL:

To modify the JDBC URL:

1. Log in to the IBM Business Process Manager administrative console.
2. Go to **Resources** > **JDBC** > **Data sources**.

3. Modify all data sources that connect to the Oracle database with the URLs that resemble the following URL:

```
jdbc:oracle:thin:@(DESCRIPTION=
 (ADDRESS_LIST=
 (ADDRESS=(PROTOCOL=TCP)(HOST=<host A>)(PORT=1521))
  (ADDRESS=(PROTOCOL=TCP)(HOST=<host B>)(PORT=1521))
  (ADDRESS=(PROTOCOL=TCP)(HOST=<host C>)(PORT=1521))
     (LOAD_BALANCE=off)
   (FAILOVER=on)
 )
        (CONNECT_DATA=(SERVICE_NAME=BPM))
 )
```

Installing and configuring IBM Business Process Manager Standard

You can install IBM Business Process Manager using typical, custom, or silent installation. You can configure IBM Business Process Manager in a network deployment environment.

Installing and configuring IBM Business Process Manager on Linux

Install IBM Business Process Manager on Linux and configure a network deployment environment.

Installing IBM Business Process Manager Standard using a typical installation and configuration path

The Typical installation option is the simplest and quickest method for installing and configuring IBM Business Process Manager Standard.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Installing and configuring IBM Business Process Manager Standard with a new DB2 Express database server:

The typical installation can install DB2 Express on Linux and configure the required databases for IBM Business Process Manager. Only select this path if you have administrative privileges (root user) and do not have an existing DB2 database server on the system.

Installing and configuring Process Center with a new DB2 Express database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

The typical installation installs DB2 Express and configures the required databases for IBM Business Process Manager. Only select this path if you have administrative privileges (root user) and do not have an existing DB2 database server on the system.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > */user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage®. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     > *mount_point*/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        > *extract_directory*/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:

- The installation location must either be an empty directory or a directory that does not exist and is created during installation.
- Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **No. I need one installed for me.** to install DB2 Express.

11. Specify the following DB2 administrative user names and passwords:
    - DB2 instance user
    - DB2 fenced user
    - DB2 administration server (DAS) user

    If the fenced user or administration (DAS) server user name exists, clear the **New User** check box.

    Restriction:
    - User names must not contain National Language Strings (NLS)
    - User names must be maximum eight characters in length

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⇨ Installation Manager updates

Installing and configuring Process Server with a new DB2 Express database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

The typical installation installs DB2 Express and configures the required databases for IBM Business Process Manager. Only select this path if you have administrative privileges (root user) and do not have an existing DB2 database server on the system.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > */user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     > *mount_point*/launchpad.sh

- If you are installing from images downloaded from Passport Advantage, perform the following steps:
  a. Go to the directory into which you extracted the images.
  b. Enter the following command to start the launchpad:

     extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:
   - **Hostname**: This field shows the name of your machine.
   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).
   - Environment **Type**: Select how the Process Server is used:
     – Select **Production** if the server is to be used in a production capacity.
     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     – Select **Test** if the server is to be used as a testing environment, for example, for load testing.
     – Select **Development** if the server is to be used in a development capacity.
   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.
   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.
   - Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

   Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.
- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.
- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.
- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Click **Next**.
8. Select **No. I need one installed for me.** to install DB2 Express.
9. Specify the following DB2 administrative user names and passwords:
   - DB2 instance user
   - DB2 fenced user
   - DB2 administration server (DAS) user

   If the fenced user or administration (DAS) server user name exists, clear the **New User** check box.

   Restriction:
   - User names must not contain National Language Strings (NLS)
   - User names must be maximum eight characters in length
10. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.
11. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.
12. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

↪ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with a DB2 database server:

You can install IBM Business Process Manager using an existing DB2 database server.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Installing and configuring Process Center with a DB2 database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.

- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

      /user_home_directory/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

         mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

            extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.
6. Optionally change the location information:
   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.
   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).
7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.
8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.
9. Click **Next**.
10. Select **Yes** to use an existing database.
11. Specify the required database information.

Table 37. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.
Hostname	Accept the default value of localhost or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 50000 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

12. Select **Create and initialize these databases during installation** to create databases as a part of the typical installation.

    This option is available only for DB2 databases. In order to use this option, the **Hostname** must be set to `localhost`. You must be authorized to create databases. If you are an administrative or root user, this option creates the databases. If you are a nonadministrative or nonroot user, this option adds the rights so that it can create the databases.

13. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

14. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

15. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➦ Installation Manager updates

Installing and configuring Process Server with a DB2 database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > */user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     > *mount_point*/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        > *extract_directory*/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:

- The installation location must either be an empty directory or a directory that does not exist and is created during installation.
- Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

- Environment **Type**: Select how the Process Server is used:
  - Select **Development** if the server is to be used in a development capacity.
  - Select **Production** if the server is to be used in a production capacity.
  - Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
  - Select **Test** if the server is to be used as a testing environment, for example, for load testing.
- **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

  Restriction: Do not mix production and non-production servers in the same cell.
- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.
- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.
- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.
- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.
- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Click **Next**.
8. Select **Yes** to use an existing database.
9. Specify the required database information.

Table 38. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 50000 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

10. Select **Create and initialize these databases during installation** to create databases as a part of the typical installation.

    This option is available only for DB2 databases. In order to use this option, the **Hostname** must be set to `localhost`. You must be authorized to create databases. If you are an administrative or root user, this option creates the databases. If you are a nonadministrative or nonroot user, this option adds the rights so that it can create the databases.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➜ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an Oracle database server:

You can install IBM Business Process Manager using an Oracle database server.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the `BPM_HOME`/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
`BPM_HOME`/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Installing and configuring Process Center with an Oracle database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
* The user name and password for database authentication
* The database server host name and port
* The name of the Process database.
* The name of the Performance Data Warehouse database.
* The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   `/user_home_directory/bpm_updates.properties`

   Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   • If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

   `mount_point/launchpad.sh`

   • If you are installing from images downloaded from Passport Advantage, perform the following steps:

   a. Go to the directory into which you extracted the images.

   b. Enter the following command to start the launchpad:

   `extract_directory/launchpad.sh`

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   • **Hostname**: This field shows the name of your machine.

   Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

- **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

  Note:
    - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
    - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 39. Required database configuration fields for Oracle

Field	Action needed
Instance name	Enter the name of the Oracle database instance.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • **User name**: Enter the Common database user name. • **Password**: Enter a password to authenticate with the Common database.
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⇨ Installation Manager updates

Installing and configuring Process Server with an Oracle database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > */user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     > *mount_point*/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        > *extract_directory*/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:

     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.

     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:

     – Select **Development** if the server is to be used in a development capacity.

     – Select **Production** if the server is to be used in a production capacity.

- Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
  - Select **Test** if the server is to be used as a testing environment, for example, for load testing.
- **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

  Restriction: Do not mix production and non-production servers in the same cell.

- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

  Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

  If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

  - **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  - **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

  - **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

  - **Password**: Enter the password for the Process Center user.

  You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 40. Required database configuration fields for Oracle

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Instance name	Enter the name of the Oracle database instance.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • **User name**: Enter the Common database user name. • **Password**: Enter a password to authenticate with the Common database.
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

 Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an SQL Server database server:

You can install IBM Business Process Manager using a Microsoft SQL Server database server.

Creating and configuring SQL Server databases before typical installation:

IBM Business Process Manager requires a Process database, Performance Data Warehouse database, and Common database. The Common database contains Business Space and other components. You can install and configure the required databases before you install.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**..

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

    On Windows XP and Windows Server 2003:
    a. Select **Control Panel** > **Administrative Tools** > **Component Services**.
    b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.
    c. Click the **MSDTC** tab, and then click **Security Configuration**.
    d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.
    e. Click **OK** again to close the **Properties** window, and then close **Component Services**.
    f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

    On Windows Vista, Windows 7, and Windows Server 2008 R2:
    a. Select **Control Panel** > **Administrative Tools** > **Component Services**.
    b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.
    c. Right-click **Local DTC** and then select **Properties**.
    d. Click the **Security** tab on the **Local DTC Properties** window.
    e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.
    f. Click **OK** again to close the Properties window, and then close Component Services.
    g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

    a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.
    b. If BPM is already installed, go to `bpm_install_root`/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:
        - Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/`

MSSQL10_50.MSSQLSERVER/MSSQL/Binn) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the sqljdbc_xa.dll file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the sqljdbc_xa.dll file in the x64 folder.

- Run the xa_install.sql database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by sqljdbc_xa.dll. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

- Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/ Create folder.

In the following examples, replace @*DB_NAME*@ with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql

Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;
```

If IBM Business Process Manager is not installed, run the following command from the command line:

```
sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"
```

3. Run the script to create the CommonDB database. Run the following sample script:

```
BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql
```

Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;
```

If IBM Business Process Manager is not installed, run the following command from the command line:

```
sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"
```

Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.
- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.
1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.
1. Locate the SQL scripts to run.
2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

```
BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
```

Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

```
USE master
GO
CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
GO

USE @DB_NAME@
GO
CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
GO
CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
GO
EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
EXEC sp_addrolemember 'db_datareader', @DB_USER@;
EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
```

In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 41. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Installing and configuring Process Center with an SQL Server database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   /*user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

- **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

    Note:
    – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
    – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

6. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

7. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 42. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication.
	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication.
	Enter a password to authenticate with the database.
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of localhost or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

   Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

   After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

 Installation Manager updates

Installing and configuring Process Server with an SQL Server database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all required images (three disk images for Linux systems on Intel; two disk images for other Linux systems), and extracted them to the same directory.

Restriction: Extract the installation files to a directory that does not contain spaces or special characters. The launchpad cannot be started from a directory path that contains spaces or special characters.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > */user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     > *mount_point*/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        > *extract_directory*/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:

     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.

     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:

     – Select **Development** if the server is to be used in a development capacity.

- Select **Production** if the server is to be used in a production capacity.
- Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
- Select **Test** if the server is to be used as a testing environment, for example, for load testing.
- **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

Restriction: Do not mix production and non-production servers in the same cell.

- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.
- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.
- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.
- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.
- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 43. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➡ Installation Manager updates

Installing IBM Business Process Manager Standard using a custom installation and configuration path

Use the Custom installation option to install IBM Business Process Manager Standard if you need any installation or configuration options that are not provided by the Typical installation option, if you want to install silently, or if you want to install on an existing installation of WebSphere Application Server.

Granting write permission of files and directories to nonroot users for profile creation or augmentation:

If you are not the user who installed the product, you must have write permission to selected directories within the IBM Business Process Manager installation. The product installer can grant this permission or create a group with permission to create or augment profiles.

The product installer (who can be a root or nonroot user) can grant write permission to the appropriate IBM Business Process Manager files and directories to nonroot users. The nonroot users can then create profiles. Alternatively, the product installer can create a group for users who are authorized to create profiles or give individual users the authority to create profiles.

Nonroot users create their own profiles to manage their own environments. Typically, they manage environments for development purposes.

Nonroot users must store their profiles in their private directory structure, not in the *installation_root*/profiles directory of the product.

Restrictions:
- IBM Business Process Manager does not support changing ownership of existing profiles from the product installer to nonroot users. A nonroot user cannot augment profiles owned by another user.
- Mechanisms within the Profile Management Tool that suggest unique names and port values are disabled for nonroot users. The nonroot user must change the default field values in the Profile Management Tool for the profile name, node name, cell name, and port assignments. The product installer can assign nonroot users a range of values for each of the fields, and assign responsibility to the users for adhering to their assigned value ranges and for maintaining the integrity of their own definitions.

If you already created at least one profile, certain directories and files were created. You can skip the steps in this topic that create these directories and files. If no profile was previously created, you must complete the steps to create the required directories and files.

The following example task shows how to create a group that is authorized to create profiles. The terms "installer" and "product installer" refer to the user ID that installed IBM Business Process Manager. The installer can perform the following steps to create the profilers group and give the group appropriate permissions to create a profile.

1. Log on to the IBM Business Process Manager system as the product installer. The product installer can be a root or nonroot user.
2. Using operating system commands, perform the following steps:
   a. Create a group named **profilers**, which will contain all users who can create profiles.
   b. Create a user named **user1**, who can create profiles.
   c. Add users **product_installer** and **user1** to the **profilers** group.
3. Log off and log back on as the installer to pick up the new group.
4. If no profile exists, create the following directories as the installer:
   - Create the *install_root*/**logs/manageprofiles** directory:

     mkdir *install_root*/logs/manageprofiles
   - Create the *install_root*/**properties/fsdb** directory:

```
        mkdir install_root/properties/fsdb
```
5. If no profile exists, create the `profileRegistry.xml` file as the installer. For this example, the file path is:

```
    install_root/properties/profileRegistry.xml
```

Add the following information to the `profileRegistry.xml` file. The file must be encoded as UTF-8.

```
<?xml version="1.0" encoding="UTF-8"?>
<profiles/>
```
6. As the product installer, use operating system tools to change directory and file permissions. The following example assumes that the variable **$WASHOME** is the IBM Business Process Manager root installation directory **/opt/IBM/WebSphere/AppServer**.

```
export WASHOME=/opt/IBM/WebSphere/AppServer
echo $WASHOME
echo "Performing chggrp/chmod per WAS directions..."
chgrp profilers $WASHOME/logs/manageprofiles
chmod g+wr  $WASHOME/logs/manageprofiles
chgrp profilers $WASHOME/properties
chmod g+wr  $WASHOME/properties
chgrp profilers $WASHOME/properties/fsdb
chmod g+wr  $WASHOME/properties/fsdb
chgrp profilers $WASHOME/properties/profileRegistry.xml
chmod g+wr  $WASHOME/properties/profileRegistry.xml
chgrp -R profilers $WASHOME/profileTemplates
```

Issue the following additional commands:

```
chgrp profilers $WASHOME/properties/Profiles.menu
chmod  g+wr $WASHOME/properties/Profiles.menu
```

You might have to change the permissions on additional files if the nonroot user encounters permission errors. For example, if the product installer authorizes a nonroot user to delete a profile, then the product installer might have to delete the following file:

```
    install_root/properties/profileRegistry.xml_LOCK
```

Give write access to the nonroot user for the file to authorize the user to delete the file. If the nonroot user still cannot delete the profile, then the product installer can delete the profile.

The installer created the **profilers** group and gave the group the correct permissions to the directories and files required for a nonroot user to create profiles.

The nonroot user that belongs to the **profilers** group can create profiles in a directory that the nonroot user owns and to which the nonroot user has write permission. However, the nonroot user cannot create profiles in the installation root directory of the product.

The root user and the nonroot user can use the same tasks to manage profiles.

Configuring profiles and creating a network deployment environment:

After you install the product, you must create or augment a deployment manager and one or more managed-node profiles to define the runtime environment. Before starting the deployment manager, you must have configured the databases that are to be used with IBM Business Process Manager.

Configuring profiles, databases, and deployment environments for DB2:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional `createTablespace*.sql` files that you must run before the `createSchema*.sql` files to create the tablespaces for Business Process Choreographer or Business Space. The generated `createSchema*.sql` files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and

configuration environments. The sample files are named according to the following format: *de_type*[*-environment_type*]*-topology-database_type*[*-suffix*], where:

- *de_type* can be set to **Standard** .
- *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called Standard-PC-SingleCluster-DB2.properties.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from local host to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   BPM_home/bin/BPMConfig -create -de *my_environment.properties*

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to true, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the

deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Related tasks:

"Running the generated DB2 database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - DB2
       - *CMNDB*
         - `createSchema_Standard.sql`
         - `createSchema_Messaging.sql`
       - *BPMDB*
         - `createSchema_Standard.sql`
         - `createProcedure_Standard.sql`
       - *PDWDB*
         - `createSchema_Standard.sql`

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   db2 connect to CMNDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Standard.sql
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Messaging.sql
   db2 connect reset
   ```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

```
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createDatabase.sql
db2 connect to BPMDB USER username USING password
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createSchema_Standard.sql
db2 -tdGO -vf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createProcedure_Standard.sql
db2 connect reset
```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

   ```
   db2 connect to PDWDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/PDWDB/createSchema_Standard.sql
   db2 connect reset
   ```

Related tasks:

"Generating DB2 database scripts using the BPMConfig command" on page 131
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.
   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate

- In the **Keystore type** field, select the keystore type for the certificate you are importing.
- In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
- Click **Next** to display the Security Certificate (Part 2) page

  When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower® signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

    Ports are recognized as being in use if the following conditions are satisfied:

    - The ports are assigned to a profile created under an installation performed by the current user.
    - The ports are currently in use.

    Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

    If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

    profile_root/properties/portdef.prop

    Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. If you do not have root privileges, skip to the next step. If you have root privileges, on the Service Definition page, indicate whether to use a Linux service to run IBM Business Process Manager. By default, IBM Business Process Manager is not selected to run as a Linux service.

    If the profile is configured as a Linux service, IBM Business Process Manager attempts to start Linux services for processes that are started by the **startServer** or **startManager** commands. For example, if you configure a server as a Linux service and issue the **startServer** command, the **wasservice** command starts the defined services.

    You must specify a user name under which the service runs.

    To delete a Linux service, the user must be the root user or have the required privileges for deleting the service. Otherwise, a removal script is created that the root user can run to delete the service on behalf of the user.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➔ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with a DB2 database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.

2. Shut down any servers associated with a profile you plan to augment.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.

6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

▐➔ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:
   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click `Linux_operating_system_menus_to_access_programs` > IBM > `your_product` > `Profile Management Tool`.
   - Run the command `installation_root`/bin/ProfileManagement/pmt.sh.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is `installation_root`/profiles/`profile_name`.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.
7. On the Node and Host Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.
8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.

- The deployment manager has the SOAP connector disabled
- The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
- The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
- The deployment manager does not have a JMX administrative port enabled.
- The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:

- The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.
     - In the **Password** field, enter the password for the certificate
     - In the **Keystore type** field, select the keystore type for the certificate you are importing.
     - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     - Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.

- deleted.p12: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- ltpa.jceks: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the key.p12 file or the root-key.p12 file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.
12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled

- The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
- The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
- The deployment manager does not have a JMX administrative port enabled.
- The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
- The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

➡ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the `manageprofiles` command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the `manageprofiles` command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the `installation_root`/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.
2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the `installation_root`/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.
3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the `manageprofiles` command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

```
manageprofiles.sh -augment -templatePath BPM/BpmNode
-profileName MyProfileName
-adminUsername celladmin -adminPassword celladmin
```

The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:
   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

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Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

  profile_root/bin/startManager.sh

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

   profile_root/bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

   ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

   ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username
   userID_for_authentication -password *password_for_authentication*

An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

```
ADMU0003I: Node DMNDID2Node03 has been successfully federated.
```

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

➦ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
    - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
    - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
• IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers > Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
    a. Stop the deployment environment.
    b. Stop the node agent.
    c. Stop the deployment manager.
    d. Start the deployment manager.
    e. Start the node agent.
    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.
7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number

of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

  The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

  There are four types of environments available for selection:

  Development
    Select **Development** if the server will serve in a development capacity.

  Test   Select **Test** if the server you are configuring will be used as a testing environment.

  Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

  Production
    Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

   Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

   You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install`\profiles\DmgrProfile\dbscripts\ folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
    a. Stop the deployment environment.
    b. Stop the node agent.
    c. Stop the deployment manager.
    d. Start the deployment manager.
    e. Start the node agent.
    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Generating DB2 database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
* Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  – The location of the databases.
  – The user ID and password for authenticating to the database.
* Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
* An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.

- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.

   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.

   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     In the above syntax, **MyBPMScriptDir** is the directory you specify.

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the DB2 database tables.

A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - DB2
    - *CMNDB*
      - createSchema_Standard.sql
      - createSchema_Messaging.sql
    - *BPMDB*
      - createSchema_Standard.sql
      - createProcedure_Standard.sql
    - *PDWDB*
      - createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - DB2
       - *CMNDB*
         - createSchema_Standard.sql
         - createSchema_Messaging.sql
       - *BPMDB*
         - createSchema_Standard.sql
         - createProcedure_Standard.sql
       - *PDWDB*
         - createSchema_Standard.sql

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   db2 connect to CMNDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Standard.sql
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Messaging.sql
   db2 connect reset
   ```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

   ```
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createDatabase.sql
   db2 connect to BPMDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createSchema_Standard.sql
   db2 -tdGO -vf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createProcedure_Standard.sql
   db2 connect reset
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."
5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

   ```
   db2 connect to PDWDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/PDWDB/createSchema_Standard.sql
   db2 connect reset
   ```

Configuring profiles, databases, and deployment environments for DB2 for z/OS:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Space component, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:
* run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
* run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

You must have installed the product. You must also have created all the users that you specify in the properties file.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:

- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- Generates the scripts that you can use to create the database tables.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: `BPM_home`/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a `standard` folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: `de_type[-environment_type]-topology-database_type[-suffix]`, where:

   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 for z/OS database is called `Standard-PC-SingleCluster-DB2zOS.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Additional notes for database configuration:

   - By default, the **bpm.de.deferSchemaCreation** property in the sample configuration properties file for DB2 for z/OS is set to **true**. Do not change this setting, because, for a z/OS database, you cannot create the database objects at the same time that the database scripts are generated. After the **BPMConfig** command completes, you can run the database scripts to manually create the database

objects at a time that you choose. When **bpm.de.deferSchemaCreation** is set to **true**, the bootstrap utility, which loads the Process database with system information, also must be run manually.

- Work with your DB2 for z/OS database administrator to establish good naming conventions for DB2 components such as database names, storage group names, schema qualifiers, and VSAM catalog names (VCATs).

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** will fail when it is run.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

`BPM_home/bin/BPMConfig -create -de my_environment.properties`

The database SQL scripts are generated in the `DMGR_PROFILE/dbscripts` folder by default.

- The database scripts that can be used to create the cluster-scoped database are generated in `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name`.

These subdirectories also contain a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.

Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

5. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode.

After you have created your deployment environment, you can create the product databases.

After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with Advanced or AdvancedOnly capabilities.

Related tasks:

"Creating and configuring DB2 for z/OS databases after network deployment profile creation" After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP   @STOGRP@     TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@    TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS         TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:

- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.

- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual GRANT statements or a Resource Access Control Facility (RACF®) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:

  - Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

    ```
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
    ```

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the
  WebSphere administrator ID to the RACF group. For example, you can define a RACF group named
  S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS    OWNER=ZWPS    CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)= ACCESS=  ACCESS COUNT=  UNIVERSAL ACCESS=
   WSADMIN   CONNECT   000000     NONE
    CONNECT ATTRIBUTES=NONE
     REVOKE DATE=NONE    RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this
spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10
views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is
available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create
the databases and storage groups. Additionally, the GRANT permissions that are required to authorize
the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided.
When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet,
these values are propagated to the Database worksheet, and are used to complete the CREATE and
GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create
the databases and storage groups, and to use the GRANT statements to authorize the WebSphere
administrator. For more information about using the artifacts generated from the spreadsheet, see the
accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool
usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message
in a log, but might cause problems later. It is better to resolve such problems now rather than when the
system has been handed over for use. For example, correcting storage groups and VCATs is not easy after
the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
* The **createDatabase.sh** script, which was additionally created with the database scripts
* Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script
* **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
* **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
* **createDatabase.sh** runs the SQL for each component in the correct sequence.
* **createDatabase.sh** creates database objects according to a naming convention that you define.
* **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
* **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
* **createDatabase.sh** runs in a UNIX System Services environment.
* **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools
* You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
* There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
* Some tools can be run from a z/OS environment.
* The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.
   - Specify the `DB2JccConfiguration.properties` file that defines the JDBC properties to be applied to the command line processor.

   You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

   ```
   export CLPHOME=clp_install_dir
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=clp_properties_file_path
   alias db2="java -Ddb2.jcc.propertiesFile=
   /file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

   For example:

   ```
   export CLPHOME=/shared/db2910_base
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=/wasv85config/clp.properties
   alias db2="java -Ddb2.jcc.propertiesFile=
   /wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

   For example:

   ```
   DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
   ```

   Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.

  1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases as follows:

     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

     Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

     – `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name`

     You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
     `db2 -tvf createDatabase.sql`

  2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

     a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

     b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
     `iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh`
     Also grant execute permissions to the **createDatabase.sh** script.

     c. Run the **createDatabase.sh** script by using the following syntax:
     `createDatabase.sh -DBAlias alias_name -RunSQL`

where:

-DBAlias
> Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-RunSQL
> Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

d. Review the messages that are displayed in the console, checking that no error messages are displayed.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2 system administrator (SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

  1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

  2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to   EBCDIC. For example:

     ```
     iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
     ```

     Also grant execute permissions to the **createDatabase.sh** script.

  3. Run the **createDatabase.sh** script by using the following syntax:

     ```
     createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
     ```

     where:

     -DBAlias
     > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

     -DBCreate
     > Creates the database.

     -RunSQL
     > Runs the SQL statements that create the database objects.

     For example:

     ```
     createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
     ```

     For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

  4. Review the messages that are displayed in the console, checking that no error messages are displayed.

     Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

5. Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 139
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

   a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

   - DMGR_PROFILE/dbscripts/*de_name*/DB2zOS/*cluster_database_name*

   You can copy the createDatabase.sql files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   db2 -tvf createDatabase.sql

2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the DMGR_PROFILE/

dbscripts/*de_name*/DB2zOS/*cluster_database_name* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

1) `createTablespace_Standard.sql`

2) `createSchema_Standard.sql`

3) `createSchema_Messaging.sql`

4) `createProcedure_Standard.sql`

Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 139
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.

- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.

- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.

- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:

- Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

    a. `createTablespace_Standard.sql`

    b. `createSchema_Standard.sql`

    c. `createSchema_Messaging.sql`

    d. `createProcedure_Standard.sql`

    These files are in ASCII format.

2. Assign the appropriate read permissions to the SQL files; for example:

    `chmod 644 createSchema_Standard.sql`

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:

    `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

    Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS™ data sets.

    Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

    `iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql`

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.

5. Run the SQL files by using the tool of your choice.

6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the `manageprofiles` command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the `BPMConfig` command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the `manageprofiles` command-line utility.

Creating deployment manager profiles with a DB2 for z/OS database server using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > `IBM` > *your_product* > `Profile Management Tool`.
   - Run the command *installation_root*`/bin/ProfileManagement/pmt.sh`.
2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.
5. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*`/profiles/`*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.
   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.
     - In the **Password** field, enter the password for the certificate
     - In the **Keystore type** field, select the keystore type for the certificate you are importing.
     - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     - Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the key.p12 file or the root-key.p12 file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

    Ports are recognized as being in use if the following conditions are satisfied:

    - The ports are assigned to a profile created under an installation performed by the current user.
    - The ports are currently in use.

    Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

    If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

    profile_root/properties/portdef.prop

    Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. If you do not have root privileges, skip to the next step. If you have root privileges, on the Service Definition page, indicate whether to use a Linux service to run IBM Business Process Manager. By default, IBM Business Process Manager is not selected to run as a Linux service.

    If the profile is configured as a Linux service, IBM Business Process Manager attempts to start Linux services for processes that are started by the **startServer** or **startManager** commands. For example, if you configure a server as a Linux service and issue the **startServer** command, the **wasservice** command starts the defined services.

    You must specify a user name under which the service runs.

    To delete a Linux service, the user must be the root user or have the required privileges for deleting the service. Otherwise, a removal script is created that the root user can run to delete the service on behalf of the user.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⏏ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with a DB2 for z/OS database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➜ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.
2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.

- To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
  - In the **Path** field, enter the directory path to the existing certificate.
  - In the **Password** field, enter the password for the certificate
  - In the **Keystore type** field, select the keystore type for the certificate you are importing.
  - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
  - Click **Next** to display the Security Certificate (Part 2) page

  When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the trust.p12 file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is WebAS. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the java.security file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - key.p12: Contains the default personal certificate.
    - trust.p12: Contains the signer certificate from the default root certificate.
    - root-key.p12: Contains the root signing certificate.
    - default-signers.p12: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - deleted.p12: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
    - ltpa.jceks: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

    These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the key.p12 file or the root-key.p12 file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click `Linux_operating_system_menus_to_access_programs` > IBM > `your_product` > Profile Management Tool.
   - Run the command `installation_root`/bin/ProfileManagement/pmt.sh.
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.
8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

➦ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:
   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - `bpm.dmgr.hostname=`
   - `bpm.dmgr.installPath=`

   It is also recommended that you set values for:
   - `bpm.cell.name=`
   - `bpm.dmgr.nodeName=`
   - `bpm.dmgr.profileName=`

   To create a managed node profile, you must specify the following minimum set of properties:
   - `bpm.dmgr.soapPort=`
   - `bpm.node.#.hostname=`
   - `bpm.node.#.installPath=`

   It is recommended that you also set:
   - `bpm.node.#.nodeName=`
   - `bpm.node.#.profileName=`

   The `bpm.dmgr.soapPort` property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the `bpm.dmgr.hostname` property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the `BPMConfig` command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   For more information about the available properties, read the comments in the sample files, or see the `BPMConfig` command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the `BPMConfig` command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `install_root/bin/BPMConfig -create -profile my_environment.properties`

Important: Run the `BPMConfig` command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the `federateLater` option of the `BPMConfig` command when creating the managed node profiles and then run the command with the `create de` option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:
- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root/bin/startManager.sh
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.
1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root/bin
2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username
    userID_for_authentication -password *password_for_authentication*

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

   ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

▶ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments

in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     – **User name**: Type the user name to connect to the database.
     – **Password**: Type the password for the user name.
     – **Confirm password**: Type to confirm the password for the user name.
     – **Server**: Type a server name where the database subsystem is located.
     – **Port**: Type the port number to connect to the database subsystem.
     – **Database connection location**: Type the database connection location name.
     – **Storage group**: Type the storage group name.
     – **Volume Catalog**: Type the volume catalog name.
     – **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
     – **Index buffer pool** : Type the index buffer pool name.
     – **LOB buffer pool** : Type the LOB buffer pool name.
     – **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
     – **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
     – **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
   - **Process database**
     – **Name**: Type a name for the Process Center database.
     – **Schema name**: Type the schema name for the Process database.
   - **Performance Data Warehouse database**
     – **Name**: Type a name for the Performance Data Warehouse database.
     – **Schema name**: Type the schema name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     – **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.
       - **Schema name**: Type the schema name for the messaging engine database.

   Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

   For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

   - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.

- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. Load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.

- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

- **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
- **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.
   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.
   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on

a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

There are four types of environments available for selection:

Development
> Select **Development** if the server will serve in a development capacity.

Test   Select **Test** if the server you are configuring will be used as a testing environment.

Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production
> Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database subsystem is located.
  - **Port**: Type the port number to connect to the database subsystem.
  - **Database connection location**: Type the database connection location name.
  - **Storage group**: Type the storage group name.
  - **Volume Catalog**: Type the volume catalog name.
  - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
  - **Index buffer pool** : Type the index buffer pool name.
  - **LOB buffer pool** : Type the LOB buffer pool name.
  - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
  - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
  - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
- **Process database**
  - **Name**: Type a name for the Process Center database.
  - **Schema name**: Type the schema name for the Process database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
  - **Schema name**: Type the schema name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.
    - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click

Servers > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. Load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Generating DB2 for z/OS database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

* Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  – The location of the databases.
  – The user ID and password for authenticating to the database.
* Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
* An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
* Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

   The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:
   - The database scripts that can be used to create the cluster-scoped database are generated in the following directory: *DMGR_PROFILE*/dbscripts/de_name/DB2zOS/cluster_database_name.

   This sub-folder also contains a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.
4. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sql** script as an ASCII text file, and transfer the database schema files in binary mode.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 134
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to

grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP  @STOGRP@      TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@    TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS         TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:

- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.

- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:

  - Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

    ```
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
    ```

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the
  WebSphere administrator ID to the RACF group. For example, you can define a RACF group named
  S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS   OWNER=ZWPS   CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)= ACCESS= ACCESS COUNT=  UNIVERSAL ACCESS=
   WSADMIN   CONNECT   000000     NONE
     CONNECT ATTRIBUTES=NONE
     REVOKE DATE=NONE     RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this
spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10
views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is
available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create
the databases and storage groups. Additionally, the GRANT permissions that are required to authorize
the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided.
When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet,
these values are propagated to the Database worksheet, and are used to complete the CREATE and
GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create
the databases and storage groups, and to use the GRANT statements to authorize the WebSphere
administrator. For more information about using the artifacts generated from the spreadsheet, see the
accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool
usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message
in a log, but might cause problems later. It is better to resolve such problems now rather than when the
system has been handed over for use. For example, correcting storage groups and VCATs is not easy after
the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases
for the IBM Business Process Manager components.

You can use various tools to run these database scripts:

- The **createDatabase.sh** script, which was additionally created with the database scripts
- Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script

- **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
- **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
- **createDatabase.sh** runs the SQL for each component in the correct sequence.
- **createDatabase.sh** creates database objects according to a naming convention that you define.
- **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
- **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
- **createDatabase.sh** runs in a UNIX System Services environment.
- **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools

- You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
- There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
- Some tools can be run from a z/OS environment.
- The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.

- Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
- Define the **db2** command as an alias for the command that starts the command line processor.
- Specify the DB2JccConfiguration.properties file that defines the JDBC properties to be applied to the command line processor.

You can use the following syntax to add the required entries to the .profile file of the user ID running the command:

```
export CLPHOME=clp_install_dir
export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
export CLPPROPERTIESFILE=clp_properties_file_path
alias db2="java -Ddb2.jcc.propertiesFile=
/file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
```

For example:

```
export CLPHOME=/shared/db2910_base
export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
export CLPPROPERTIESFILE=/wasv85config/clp.properties
alias db2="java -Ddb2.jcc.propertiesFile=
/wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

   For example:

   ```
   DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
   ```

   Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

"Creating DB2 for z/OS database objects using the createDatabase.sh script" on page 171
You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

"Creating DB2 for z/OS database objects using the DB2 command line processor" on page 173
You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.
  1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases as follows:
     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

     Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:
     - `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*

     You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
     `db2 -tvf createDatabase.sql`
  2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:
     a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.
     b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
     `iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh`
     Also grant execute permissions to the **createDatabase.sh** script.
     c. Run the **createDatabase.sh** script by using the following syntax:
     `createDatabase.sh -DBAlias `*alias_name*` -RunSQL`
     where:

     -DBAlias
        Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which

is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-RunSQL
     Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

  d. Review the messages that are displayed in the console, checking that no error messages are displayed.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to   EBCDIC. For example:

```
iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
```

Also grant execute permissions to the **createDatabase.sh** script.

3. Run the **createDatabase.sh** script by using the following syntax:

```
createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
```

where:

-DBAlias
     Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-DBCreate
     Creates the database.

-RunSQL
     Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

4. Review the messages that are displayed in the console, checking that no error messages are displayed.

Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

5. Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 169
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

   a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

   - DMGR_PROFILE/dbscripts/*de_name*/DB2zOS/*cluster_database_name*

   You can copy the createDatabase.sql files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   ```
   db2 -tvf createDatabase.sql
   ```

2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the DMGR_PROFILE/

dbscripts/*de_name*/DB2zOS/*cluster_database_name* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

1) `createTablespace_Standard.sql`

2) `createSchema_Standard.sql`

3) `createSchema_Messaging.sql`

4) `createProcedure_Standard.sql`

Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 169
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.

- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.

- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.

- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:

- Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
  a. `createTablespace_Standard.sql`
  b. `createSchema_Standard.sql`
  c. `createSchema_Messaging.sql`
  d. `createProcedure_Standard.sql`

  These files are in ASCII format.

2. Assign the appropriate read permissions to the SQL files; for example:

   `chmod 644 createSchema_Standard.sql`

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:

   `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

   Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

   Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

   `iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql`

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.

5. Run the SQL files by using the tool of your choice.

6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring profiles, databases, and deployment environments for Oracle:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:
- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

   Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and

configuration environments. The sample files are named according to the following format: *de_type[-environment_type]-topology-database_type[-suffix]*, where:

- *de_type* can be set to **Standard** .
- *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the

deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Related tasks:

"Running the generated Oracle database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the `dmgr_profile_name`/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*
           - `createSchema_Standard.sql`
           - `createSchema_Messaging.sql`
         - *psuser*
           - `createSchema_Standard.sql`
           - `createProcedure_Standard.sql`
         - *pdwuser*
           - `createSchema_Standard.sql`

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   `sqlplus cmnuser/cmnpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/cmn`

   `sqlplus cmnuser/cmnpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/cmn`

3. Run the scripts to apply the schema to the BPMDB.

For example, use the following commands to run the scripts manually for the Process database configuration:

```
sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuser/
sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuser/
```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlplus pdwuser/pdwpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/pdwuse
   ```

Related tasks:

"Generating Oracle database scripts using the BPMConfig command" on page 201
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.

- Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
- Run the command *installation_root*/bin/ProfileManagement/pmt.sh.

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   - In the **Host name** field, enter a name for the host or accept the default value.

   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.

   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:

     – In the **Path** field, enter the directory path to the existing certificate.

     – In the **Password** field, enter the password for the certificate

     – In the **Keystore type** field, select the keystore type for the certificate you are importing.

     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.

– Click **Next** to display the Security Certificate (Part 2) page

When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

    Ports are recognized as being in use if the following conditions are satisfied:

    - The ports are assigned to a profile created under an installation performed by the current user.
    - The ports are currently in use.

    Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

    If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

    profile_root/properties/portdef.prop

    Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. If you do not have root privileges, skip to the next step. If you have root privileges, on the Service Definition page, indicate whether to use a Linux service to run IBM Business Process Manager. By default, IBM Business Process Manager is not selected to run as a Linux service.

If the profile is configured as a Linux service, IBM Business Process Manager attempts to start Linux services for processes that are started by the **startServer** or **startManager** commands. For example, if you configure a server as a Linux service and issue the **startServer** command, the **wasservice** command starts the defined services.

You must specify a user name under which the service runs.

To delete a Linux service, the user must be the root user or have the required privileges for deleting the service. Otherwise, a removal script is created that the root user can run to delete the service on behalf of the user.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

▶ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with an Oracle database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click `Linux_operating_system_menus_to_access_programs` > IBM > `your_product` > Profile Management Tool.
   - Run the command `installation_root`/bin/ProfileManagement/pmt.sh.

2. Shut down any servers associated with a profile you plan to augment.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.

6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⮕ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click `Linux_operating_system_menus_to_access_programs` > IBM > `your_product` > Profile Management Tool.
   - Run the command `installation_root`/bin/ProfileManagement/pmt.sh.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is `installation_root`/profiles/`profile_name`.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.
7. On the Node and Host Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.
8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled

- The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
- The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
- The deployment manager does not have a JMX administrative port enabled.
- The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

  Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
  - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
  - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

  Click **Next**.
9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.
     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     – Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.
10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is WebAS. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.

- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.

2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.

3. Shut down any servers associated with a profile you plan to augment.

4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.

7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled

- The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
- The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
- The deployment manager does not have a JMX administrative port enabled.
- The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:

- The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

 Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the `manageprofiles` command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the `manageprofiles` command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.
2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.
3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the `manageprofiles` command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

```
manageprofiles.sh -augment -templatePath BPM/BpmNode
-profileName MyProfileName
-adminUsername celladmin -adminPassword celladmin
```

The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:
   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

     profile_root/bin/startManager.sh
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

     profile_root/bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

     `./addNode.sh` *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

     `./addNode.sh` *deployment_manager_host deployment_manager_SOAP_port* `-username`
     userID_for_authentication `-password` *password_for_authentication*

An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

```
ADMU0003I: Node DMNDID2Node03 has been successfully federated.
```

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

➡ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
• Installed the product
• Created the deployment manager profile and the associated nodes
• Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
• Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
• When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  – Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  – Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
• If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   • **Shared parameters**
     – **Server**: Type a server name where the database is located.
     – **Port**: Type the port number to connect to the database.
     – **Instance name**: Type the instance name for the Oracle database.
     – **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   • **Process database**
     – **User name**: Type a user name for the Process Center database.
     – **Password**: Type the password for the Process Center database user.
     – **Confirm password**: Type to confirm the password for the Process database user.
   • **Performance Data Warehouse database**
     – **User name**: Type a user name for the Performance Data Warehouse database.
     – **Password**: Type the password for the Performance Data Warehouse database user.

- **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **User name**: Type a user name for the messaging engine database.
    - **Password**: Type the password for the messaging engine database user.
    - **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:
- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
    a. Stop the deployment environment.
    b. Stop the node agent.
    c. Stop the deployment manager.
    d. Start the deployment manager.
    e. Start the node agent.
    f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
* Installed the product
* Created the deployment manager profile and the associated nodes
* Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
* Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
* When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  – Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  – Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
* If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
           Select **Development** if the server will serve in a development capacity.

     Test   Select **Test** if the server you are configuring will be used as a testing environment.

     Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production

Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Instance name**: Type the instance name for the Oracle database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

- **Process database**
  - **User name**: Type a user name for the Process Center database.
  - **Password**: Type the password for the Process Center database user.
  - **Confirm password**: Type to confirm the password for the Process database user.
- **Performance Data Warehouse database**
  - **User name**: Type a user name for the Performance Data Warehouse database.
  - **Password**: Type the password for the Performance Data Warehouse database user.
  - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **User name**: Type a user name for the messaging engine database.
    - **Password**: Type the password for the messaging engine database user.
    - **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:
- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

   a. Optional: If you want to exit without generating the configuration, click **Cancel**.

   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.
b. Stop the node agent.
c. Stop the deployment manager.
d. Start the deployment manager.
e. Start the node agent.
f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace @*DB_USER*@ with the user name that you want to use for the database and replace @*DB_PASSWD*@ with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Generating Oracle database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  – The location of the databases.
  – The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

Important: If you are using an Oracle database, you must include the database user name and password for all databases, including the optional ones.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:
1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     In the above syntax, **MyBPMScriptDir** is the directory you specify.

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:
- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a `createDatabase.sql` script, which you can use to run the database scripts to create the Oracle database tables.

A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - Oracle
    - *orcl*
      - *cmnuser*
        - `createSchema_Standard.sql`
        - `createSchema_Messaging.sql`
      - *psuser*
        - `createSchema_Standard.sql`
        - `createProcedure_Standard.sql`
      - *pdwuser*
        - `createSchema_Standard.sql`

In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 177
You can use the `BPMConfig` command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the `BPMConfig` command.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the `BPMConfig` command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*

```
            – createSchema_Standard.sql
            – createSchema_Messaging.sql
        • psuser
            – createSchema_Standard.sql
            – createProcedure_Standard.sql
        • pdwuser
            – createSchema_Standard.sql
```

In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

> **Note:** The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlplus cmnuser/cmnpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/cmn
   sqlplus cmnuser/cmnpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/cmn
   ```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuse
   sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuse
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlplus pdwuser/pdwpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/pdw
   ```

Configuring profiles, databases, and deployment environments for SQL Server:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

> **Tip:** If you are using the federated repositories as a user registry, you can ignore warnings in the systemout.log file about maximum key length: **... Warning! The maximum key length is 900 bytes ...**. If you are using the stand-alone LDAP registry, ensure that the number of characters in all the user distinguished name (DN) entries in your organization do not exceed the 131 character limit. If the number of characters in any of the user DN entries exceeds 131 characters, you must change the user account registry to the federated repositories option.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to `true`, you must create the tables by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:

```
BPMConfig.sh -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:

```
BPMConfig.sh -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory `profile_root`/dbscripts.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**.

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

    On Windows XP and Windows Server 2003:

a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

c. Click the **MSDTC** tab, and then click **Security Configuration**.

d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

On Windows Vista, Windows 7, and Windows Server 2008 R2:

a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

c. Right-click **Local DTC** and then select **Properties**.

d. Click the **Security** tab on the **Local DTC Properties** window.

e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

f. Click **OK** again to close the Properties window, and then close Component Services.

g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

b. If BPM is already installed, go to *bpm_install_root*/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

   - Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/ MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the x64 folder.

   - Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

   - Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.

2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**

3. Locate **TCP/IP** on the right-hand side.

4. Double click **TCP/IP** and enable it under the **Protocol** tab.

5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/ Create folder.

In the following examples, replace @*DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"`

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin

- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.
2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   GO
   EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
   EXEC sp_addrolemember 'db_datareader', @DB_USER@;
   EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
   ```

   In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 44. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

For your SQL Server database server, make sure that the username and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.

- If the `bpm.de.deferSchemaCreation` property is set to **true**, then the Process database is not loaded with system information and you must run the `bootstrapProcessServerData` utility manually.

Note: If SQLServer Windows Authentication is used, you must manually run the bootstrap utility to load the Process database because this step is not done automatically by **BPMConfig**.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: `BPM_home`/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a `standard` folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: `de_type[-environment_type]-topology-database_type[-suffix]`, where:

   - `de_type` can be set to **Standard** .
   - `environment_type` can be set to **PS** for Process Server or **PC** for Process Center. .
   - `topology` can be set to **SingleCluster** or **ThreeClusters**.
   - `database_type` can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - `suffix` can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home`/bin/BPMConfig -create -de `my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Related tasks:

"Running the generated SQL Server database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - SQLServer
       - *CMNDB*
         - *schema name*
           - createSchema_Standard.sql
           - createSchema_Messaging.sql
       - *BPMDB*
         - *schema name*

- – createSchema_Standard.sql
- – createProcedure_Standard.sql
- - *PDWDB*
  - • *schema name*
    - – createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/C
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/C
   ```

   In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/B
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/B
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration. For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/P
   ```

Related tasks:

"Generating SQL database scripts using the BPMConfig command" on page 246
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the `manageprofiles` command-line utility.

Creating deployment manager profiles with an SQL Server database server using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click `Linux_operating_system_menus_to_access_programs` > IBM > `your_product` > Profile Management Tool.
   - Run the command `installation_root`/bin/ProfileManagement/pmt.sh.

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is `installation_root`/profiles/`profile_name`.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

- In the **Host name** field, enter a name for the host or accept the default value.
- In the **Cell name** field, enter a name for the cell or accept the default value.

Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.
     - In the **Password** field, enter the password for the certificate
     - In the **Keystore type** field, select the keystore type for the certificate you are importing.
     - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     - Click **Next** to display the Security Certificate (Part 2) page

     When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products

and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

Ports are recognized as being in use if the following conditions are satisfied:

- The ports are assigned to a profile created under an installation performed by the current user.
- The ports are currently in use.

Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

profile_root/properties/portdef.prop

Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. If you do not have root privileges, skip to the next step. If you have root privileges, on the Service Definition page, indicate whether to use a Linux service to run IBM Business Process Manager. By default, IBM Business Process Manager is not selected to run as a Linux service.

    If the profile is configured as a Linux service, IBM Business Process Manager attempts to start Linux services for processes that are started by the **startServer** or **startManager** commands. For example, if you configure a server as a Linux service and issue the **startServer** command, the **wasservice** command starts the defined services.

    You must specify a user name under which the service runs.

    To delete a Linux service, the user must be the root user or have the required privileges for deleting the service. Otherwise, a removal script is created that the root user can run to delete the service on behalf of the user.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➡ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with an SQL Server database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.

   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.

2. Shut down any servers associated with a profile you plan to augment.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.

6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➡ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

```
manageprofiles.sh -augment -templatePath BPM/BpmDmgr
-profileName MyProfileName
-adminUsername celladmin -adminPassword celladmin
```

The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.
8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.
9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.
     - In the **Password** field, enter the password for the certificate
     - In the **Keystore type** field, select the keystore type for the certificate you are importing.
     - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     - Click **Next** to display the Security Certificate (Part 2) page

When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
    - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

    These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
    - Start the tool from the Quick Start console.
    - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
    - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
3. Shut down any servers associated with a profile you plan to augment.

4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.

7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

➡ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the `manageprofiles` command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

To create a deployment manager profile, you must specify the following minimum set of properties:

- **bpm.dmgr.hostname=**
- **bpm.dmgr.installPath=**

It is also recommended that you set values for:

- **bpm.cell.name=**
- **bpm.dmgr.nodeName=**
- **bpm.dmgr.profileName=**

To create a managed node profile, you must specify the following minimum set of properties:

- **bpm.dmgr.soapPort=**
- **bpm.node.#.hostname=**
- **bpm.node.#.installPath=**

It is recommended that you also set:

- **bpm.node.#.nodeName=**
- **bpm.node.#.profileName=**

The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.

- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root/bin/startManager.sh
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root/bin

2. Run the **addNode** command.

    Run the following command from the command line if security is not enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

    Run the following command from the command line if security is enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username
    userID_for_authentication -password *password_for_authentication*

    An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

    ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

[→] Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

SQL Server database server with Windows authentication:

Create your network deployment environment to work with an SQL Server database server using Windows authentication. The username and password you used to log on to the system would be used to connect to and access the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product

- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the

administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

   Attention: For an SQL server:
   - Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
   - IBM Process Server and IBM Performance Data Warehouse should not use the same database.
   - If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

   You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

   You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

   Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.
11. Verify the deployment environment was created properly by completing the following steps:
    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.
    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.
    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.
    f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.
    g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.
    h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.
12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
    a. Stop the deployment environment.
    b. Stop the node agent.
    c. Stop the deployment manager.
    d. Start the deployment manager.
    e. Start the node agent.
    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
* Installed the product
* Created the deployment manager profile and the associated nodes
* Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
* Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
* When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  – Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  – Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
* If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:

*   Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
*   IBM Process Server and IBM Performance Data Warehouse should not use the same database.
*   If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

    Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

    a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
    b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

        Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

    c. Enter a password for the deployment environment administrator in the **Password** field.
    d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
    *   **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
    *   **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

    Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

    Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

    By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

    A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   • **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   • **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
       Select **Development** if the server will serve in a development capacity.

     Test Select **Test** if the server you are configuring will be used as a testing environment.

     Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

     Production
       Select **Production** if the server will serve in a production capacity.

   • **Use server offline**

     Indicate whether the server you are configuring is an offline server.

     An offline server is a Process Server that is not connected to the Process Center.

Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.

   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.

   - **Select the databases that you want to separate from the Common database.**

– **Messaging**: Select this option to create a separate messaging engine database.
  - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:

- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

    e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

SQL Server database server without Windows authentication:

Create your network deployment environment to work with an SQL Server database server without Windows authentication. You will need to provide the username and passsword for accessing the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:

• Installed the product

• Created the deployment manager profile and the associated nodes

• Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.

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- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the `BPMConfig` command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.
11. Verify the deployment environment was created properly by completing the following steps:
   a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
   b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
   c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.
   d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.
   e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.
   f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.
   g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.
   h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.
12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
   a. Stop the deployment environment.
   b. Stop the node agent.
   c. Stop the deployment manager.
   d. Start the deployment manager.
   e. Start the node agent.
   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:

- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
        Select **Development** if the server will serve in a development capacity.

     Test Select **Test** if the server you are configuring will be used as a testing environment.

     Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

     Production
        Select **Production** if the server will serve in a production capacity.

   - **Use server offline**

     Indicate whether the server you are configuring is an offline server.

     An offline server is a Process Server that is not connected to the Process Center.

Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.

- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.
12. Verify the deployment environment was created properly by completing the following steps:
    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the `XXXBE##` schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to `true`, you must create the tables by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:

```
BPMConfig.sh -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:

```
BPMConfig.sh -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory *profile_root*/dbscripts.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**.

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:
   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.
   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.
   c. Click the **MSDTC** tab, and then click **Security Configuration**.
   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.
   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.
   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:
   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.
   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.
   c. Right-click **Local DTC** and then select **Properties**.
   d. Click the **Security** tab on the **Local DTC Properties** window.
   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.
   f. Click **OK** again to close the Properties window, and then close Component Services.
   g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

b. If BPM is already installed, go to *bpm_install_root*/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

   - Copy the sqljdbc_xa.dll file from the JDBC unarchived directory to the Binn directory (for a default SQL Server install, the location is C:/Program Files/Microsoft SQL Server/MSSQL10_50.MSSQLSERVER/MSSQL/Binn) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the sqljdbc_xa.dll file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the sqljdbc_xa.dll file in the x64 folder.

   - Run the xa_install.sql database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by sqljdbc_xa.dll. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

   - Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"`

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.
- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is `dbo` and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.

2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   GO
   EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
   EXEC sp_addrolemember 'db_datareader', @DB_USER@;
   EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
   ```

   In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 45. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Generating SQL database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

• Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:

- – The location of the databases.
- – The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the `dbscripts` directory of the deployment manager profile, use the following syntax:

     `BPM_HOME/bin/BPMConfig -create -sqlfiles my_environment.properties`

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     `BPM_HOME/bin/BPMConfig -create -sqlfiles my_environment.properties -outputDir /MyBPMScriptDir`

     In the above syntax, **MyBPMScriptDir** is the directory you specify.

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the SQL Server database tables.

A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - SQLServer
    - *CMNDB*
      - *schema name*
        - – createSchema_Standard.sql
        - – createSchema_Messaging.sql
    - *BPMDB*
      - *schema name*

- – createSchema_Standard.sql
- – createProcedure_Standard.sql
- *PDWDB*
  - *schema name*
    - – createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 208
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - SQLServer
       - *CMNDB*
         - *schema name*
           - – createSchema_Standard.sql
           - – createSchema_Messaging.sql
       - *BPMDB*
         - *schema name*
           - – createSchema_Standard.sql
           - – createProcedure_Standard.sql
       - *PDWDB*
         - *schema name*
           - – createSchema_Standard.sql

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

```
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/C
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/C
```

In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/B
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/B
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration. For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/P
   ```

Loading the database with system information in a network deployment environment:

If you are creating a Standard or Advanced network deployment environment, you must run the **bootstrapProcessServerData** command before you try to start or use Process Server or Process Center.

When you run the **bootstrapProcessServerData** command, configuration data for the BPM applications is loaded into the Process database. This data is required for the BPM applications to run correctly.

- Important: If you created an Advanced-only Process Server deployment environment (an environment without the capabilities included in Standard deployment environments), you can skip this task. There is no need to run the **bootstrapProcessServerData** command.
- If you created the database tables when you created the deployment environment, either by setting the parameter **bpm.de.deferSchemaCreation** to **false** for the **BPMConfig** command, or by enabling **Create Tables** in the Deployment Environment wizard, there is no need to run the **bootstrapProcessServerData** command.
- In a Standard or Advanced network deployment (ND) environment, you must run this command after a server or cluster of servers is created. For a cluster, you need to specify the cluster name. Run this command before the first server is started. You do not need to rerun the command if you add another cluster member.
- If a single WebSphere cell contains multiple application target clusters, you must run this command on each of the clusters.

Run the bootstrap utility from the command line. The bootstrap utility is found in the deployment manager profile directory. For example: `Linux` `UNIX` `BPM_HOME/profiles/`*`dmgr_profile_name`*`/bin` Run the bootstrap utility using one of the following commands:

* **bootstrapProcessServerData.sh -clusterName** *cluster_name*
* **bootstrapProcessServerData.sh -nodeName** *node_name* **-serverName** *server_name*

where:

* **-clusterName** is the name of the application target cluster. You must specify this parameter when you want the bootstrap data to run on a cluster.
* **-nodeName** is the name of the node. You must specify this parameter and the **-serverName** parameter when you want the bootstrap data to run on the server that is part of the network deployment environment and not part of the cluster.
* **-serverName** is the name of the server. You must specify either this parameter and the **-nodeName** parameter when you want the bootstrap data to run on the server that is part of the network deployment and not part of the cluster.

The parameters are case-sensitive

You have loaded the database with system information before successfully starting the IBM Business Process Manager server. The log information for the bootstrap operation is saved to the `USER_INSTALL_ROOT/`logs directory in a file called `bootstrapProcessServerData.`*`clusterName.timestamp`*`.log` or `bootstrapProcessServerData.`*`nodeName.serverName.timestamp`*`.log` depending on the target you specified. The console displays a subset of the logged information.

Bootstrap data onto a server that is part of an ND environment but not part of a cluster:

`bootstrapProcessServerData.sh -nodeName node1 -serverName myServer`

Bootstrap data onto a cluster that hosts the Process Server or Process Center:

`bootstrapProcessServerData.sh -clusterName myAppCluster`

Starting your environment and verifying the installation:

After you create the deployment environment and complete the relevant configuration tasks, you can start all the servers in a cluster or deployment environment. Then you can verify the IBM Business Process Manager installation.

1. Start the cluster or deployment environment as described in Starting and stopping your environment.
2. From the administrative console, verify that you can see **IBM Business Process Manager** on the Welcome page.
3. Check that the enterprise applications are started by clicking **Applications** > **Application Types** > **WebSphere enterprise applications**.
4. Check that the messaging engine is started by clicking **Service integration** > **Buses**. Then click the name of the bus, and under **Topology**, click **Messaging engines**.

After the cluster has started, verify that the applications are set up correctly by running a series of tests and deploying samples as detailed in the following table.

Table 46. Application verification tests

Application and description	Action
Process Admin Console Use the Process Admin Console to manage the Process Servers in your runtime environments and the Process Center server. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Log on to the Process Admin Console by using the default account for IBM Business Process Manager administrators. For information about accessing the Process Admin Console, see Accessing the Process Admin Console.
Performance Admin Console Use the Performance Admin Console tools to manage the Performance Data Warehouse queues in your environment, manage data transfer errors, and monitor overall performance. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Verify that you can access the Performance Admin Console, as described in Managing Business Performance Data Warehouses.
Process Portal Use Process Portal to interact with processes from a web browser. **Restriction:** Process Portal is not available if you created an Advanced-only Process Server deployment environment.	Process Portal is configured by default. Verify that you can access Process Portal and that the applications used by Process Portal are all accessible, as described in Verifying Process Portal.
Hiring Sample process application Use the samples that are provided with the product to further verify the installation and as tutorials to learn the product.	Run the Hiring Sample process application and tutorial in Process Designer, as described in Samples and tutorials. Additionally deploy the samples to a Process Server and then run them, as described in Installing process application snapshots.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Installing and configuring IBM Business Process Manager on AIX

Install IBM Business Process Manager on AIX and configure a network deployment environment.

Installing IBM Business Process Manager Standard using a typical installation and configuration path

The Typical installation option is the simplest and quickest method for installing and configuring IBM Business Process Manager Standard.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Installing and configuring IBM Business Process Manager Standard with a DB2 database server:

You can install IBM Business Process Manager using an existing DB2 database server.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Installing and configuring Process Center with a DB2 database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   /user_home_directory/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

- **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

    Note:
    - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
    - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 47. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of `50000` or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

▶ Installation Manager updates

Installing and configuring Process Server with a DB2 database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

Create the following file:

   /user_home_directory/bpm_updates.properties

Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

       mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

         extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:

     – Select **Development** if the server is to be used in a development capacity.

     – Select **Production** if the server is to be used in a production capacity.

     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.

     – Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

Restriction: Do not mix production and non-production servers in the same cell.

- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 48. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.

Table 48. Required database configuration fields for DB2 (continued)

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 50000 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

   Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

   Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

   After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➡ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an Oracle database server:

You can install IBM Business Process Manager using an Oracle database server.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Installing and configuring Process Center with an Oracle database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.
  1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these

upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

Create the following file:

/user_home_directory/bpm_updates.properties

Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   * If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   * If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   * **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   * **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager

components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 49. Required database configuration fields for Oracle

Field	Action needed
Instance name	Enter the name of the Oracle database instance.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • `User name`: Enter the Common database user name. • `Password`: Enter a password to authenticate with the Common database.
Process database	For the Process database, enter values for the following parameters: • `User name`: Enter the Process database user name. • `Password`: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • `User name`: Enter the Performance Data Warehouse database user name. • `Password`: Enter a password to authenticate with the Performance Data Warehouse database.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⬀ Installation Manager updates

Installing and configuring Process Server with an Oracle database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   /user_home_directory/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:
     - Select **Development** if the server is to be used in a development capacity.
     - Select **Production** if the server is to be used in a production capacity.
     - Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     - Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.

   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also

enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 50. Required database configuration fields for Oracle

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Instance name	Enter the name of the Oracle database instance.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • `User name`: Enter the Common database user name. • `Password`: Enter a password to authenticate with the Common database.

Table 50. Required database configuration fields for Oracle (continued)

Field	Action needed
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

↪ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an SQL Server database server:

You can install IBM Business Process Manager using a Microsoft SQL Server database server.

Creating and configuring SQL Server databases before typical installation:

IBM Business Process Manager requires a Process database, Performance Data Warehouse database, and Common database. The Common database contains Business Space and other components. You can install and configure the required databases before you install.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**..

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

   c. Click the **MSDTC** tab, and then click **Security Configuration**.

   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

   c. Right-click **Local DTC** and then select **Properties**.

   d. Click the **Security** tab on the **Local DTC Properties** window.

   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

   f. Click **OK** again to close the Properties window, and then close Component Services.

   g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

   a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

   b. If BPM is already installed, go to `bpm_install_root`/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

      - Copy the `sqljdbc_xa.dll` file from the JDBC unarchived directory to the Binn directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/ MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the x64 folder.

      - Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

- Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/ Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;

   If IBM Business Process Manager is not installed, run the following command from the command line:

   sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"
3. Run the script to create the CommonDB database. Run the following sample script:

   BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;

If IBM Business Process Manager is not installed, run the following command from the command line:

```
sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"
```

Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.
2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   ```

```
        GO
        EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
        EXEC sp_addrolemember 'db_datareader', @DB_USER@;
        EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
```

In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 51. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Installing and configuring Process Center with an SQL Server database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
* The user name and password for database authentication
* The database server host name and port
* The name of the Process database.
* The name of the Performance Data Warehouse database.
* The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > */user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     > *mount_point*/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        > *extract_directory*/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other

administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 52. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

 Installation Manager updates

Installing and configuring Process Server with an SQL Server database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   /user_home_directory/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:
     – Select **Development** if the server is to be used in a development capacity.
     – Select **Production** if the server is to be used in a production capacity.
     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     – Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.

   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager

components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 53. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.

Table 53. Required database configuration fields for SQL Server (continued)

Field	Action needed
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

Installation Manager updates

Installing IBM Business Process Manager Standard using a custom installation and configuration path

Use the Custom installation option to install IBM Business Process Manager Standard if you need any installation or configuration options that are not provided by the Typical installation option, if you want to install silently, or if you want to install on an existing installation of WebSphere Application Server.

Granting write permission of files and directories to nonroot users for profile creation or augmentation:

If you are not the user who installed the product, you must have write permission to selected directories within the IBM Business Process Manager installation. The product installer can grant this permission or create a group with permission to create or augment profiles.

The product installer (who can be a root or nonroot user) can grant write permission to the appropriate IBM Business Process Manager files and directories to nonroot users. The nonroot users can then create profiles. Alternatively, the product installer can create a group for users who are authorized to create profiles or give individual users the authority to create profiles.

Nonroot users create their own profiles to manage their own environments. Typically, they manage environments for development purposes.

Nonroot users must store their profiles in their private directory structure, not in the *installation_root*/profiles directory of the product.

Restrictions:
- IBM Business Process Manager does not support changing ownership of existing profiles from the product installer to nonroot users. A nonroot user cannot augment profiles owned by another user.
- Mechanisms within the Profile Management Tool that suggest unique names and port values are disabled for nonroot users. The nonroot user must change the default field values in the Profile Management Tool for the profile name, node name, cell name, and port assignments. The product installer can assign nonroot users a range of values for each of the fields, and assign responsibility to the users for adhering to their assigned value ranges and for maintaining the integrity of their own definitions.

If you already created at least one profile, certain directories and files were created. You can skip the steps in this topic that create these directories and files. If no profile was previously created, you must complete the steps to create the required directories and files.

The following example task shows how to create a group that is authorized to create profiles. The terms "installer" and "product installer" refer to the user ID that installed IBM Business Process Manager. The installer can perform the following steps to create the profilers group and give the group appropriate permissions to create a profile.

1. Log on to the IBM Business Process Manager system as the product installer. The product installer can be a root or nonroot user.
2. Using operating system commands, perform the following steps:
   a. Create a group named **profilers**, which will contain all users who can create profiles.
   b. Create a user named **user1**, who can create profiles.
   c. Add users **product_installer** and **user1** to the **profilers** group.
3. Log off and log back on as the installer to pick up the new group.
4. If no profile exists, create the following directories as the installer:
   - Create the ***install_root*/logs/manageprofiles** directory:

     mkdir *install_root*/logs/manageprofiles
   - Create the ***install_root*/properties/fsdb** directory:

     mkdir *install_root*/properties/fsdb
5. If no profile exists, create the profileRegistry.xml file as the installer. For this example, the file path is:

   install_root/properties/profileRegistry.xml

Add the following information to the `profileRegistry.xml` file. The file must be encoded as UTF-8.

```
<?xml version="1.0" encoding="UTF-8"?>
<profiles/>
```

6. As the product installer, use operating system tools to change directory and file permissions. The following example assumes that the variable **$WASHOME** is the IBM Business Process Manager root installation directory **/opt/IBM/WebSphere/AppServer**.

```
export WASHOME=/opt/IBM/WebSphere/AppServer
echo $WASHOME
echo "Performing chggrp/chmod per WAS directions..."
chgrp profilers $WASHOME/logs/manageprofiles
chmod g+wr  $WASHOME/logs/manageprofiles
chgrp profilers $WASHOME/properties
chmod g+wr  $WASHOME/properties
chgrp profilers $WASHOME/properties/fsdb
chmod g+wr  $WASHOME/properties/fsdb
chgrp profilers $WASHOME/properties/profileRegistry.xml
chmod g+wr  $WASHOME/properties/profileRegistry.xml
chgrp -R profilers $WASHOME/profileTemplates
```

Issue the following additional commands:

```
chgrp profilers $WASHOME/properties/Profiles.menu
chmod  g+wr $WASHOME/properties/Profiles.menu
```

You might have to change the permissions on additional files if the nonroot user encounters permission errors. For example, if the product installer authorizes a nonroot user to delete a profile, then the product installer might have to delete the following file:

install_root/properties/profileRegistry.xml_LOCK

Give write access to the nonroot user for the file to authorize the user to delete the file. If the nonroot user still cannot delete the profile, then the product installer can delete the profile.

The installer created the **profilers** group and gave the group the correct permissions to the directories and files required for a nonroot user to create profiles.

The nonroot user that belongs to the **profilers** group can create profiles in a directory that the nonroot user owns and to which the nonroot user has write permission. However, the nonroot user cannot create profiles in the installation root directory of the product.

The root user and the nonroot user can use the same tasks to manage profiles.

Configuring profiles and creating a network deployment environment:

After you install the product, you must create or augment a deployment manager and one or more managed-node profiles to define the runtime environment. Before starting the deployment manager, you must have configured the databases that are to be used with IBM Business Process Manager.

Configuring profiles, databases, and deployment environments for DB2:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment.

At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:

- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.

- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[-*environment_type*]-*topology*-*database_type*[-*suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .

- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to true, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with Advanced or AdvancedOnly capabilities.

Related tasks:

"Running the generated DB2 database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   • *deployment_environment_name*
     – DB2
       - *CMNDB*
         • createSchema_Standard.sql
         • createSchema_Messaging.sql
       - *BPMDB*
         • createSchema_Standard.sql
         • createProcedure_Standard.sql
       - *PDWDB*
         • createSchema_Standard.sql

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   db2 connect to CMNDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Standard.sql
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Messaging.sql
   db2 connect reset
   ```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

   ```
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createDatabase.sql
   db2 connect to BPMDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createSchema_Standard.sql
   db2 -tdGO -vf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createProcedure_Standard.sql
   db2 connect reset
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

For example:

Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

```
bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
```

Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

```
bootstrapProcessServerData.sh -clusterName myAppCluster
```

Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

```
db2 connect to PDWDB USER username USING password
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/PDWDB/createSchema_Standard.sql
db2 connect reset
```

Related tasks:

"Generating DB2 database scripts using the BPMConfig command" on page 302
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
3. On the **Profiles** tab, click **Create**.

The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:

   • In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   • In the **Host name** field, enter a name for the host or accept the default value.

   • In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   • To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.

   • To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:

     – In the **Path** field, enter the directory path to the existing certificate.

     – In the **Password** field, enter the password for the certificate

     – In the **Keystore type** field, select the keystore type for the certificate you are importing.

     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.

     – Click **Next** to display the Security Certificate (Part 2) page

     When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is WebAS. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the java.security file.

When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

- key.p12: Contains the default personal certificate.
- trust.p12: Contains the signer certificate from the default root certificate.
- root-key.p12: Contains the root signing certificate.
- default-signers.p12: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- deleted.p12: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- ltpa.jceks: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the key.p12 file or the root-key.p12 file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

   Ports are recognized as being in use if the following conditions are satisfied:

   - The ports are assigned to a profile created under an installation performed by the current user.
   - The ports are currently in use.

   Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

   If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

   profile_root/properties/portdef.prop

   Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⬆ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with a DB2 database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.
- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➩ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the `manageprofiles` command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the `installation_root`/properties/`profileRegistry.xml` file. Do not modify this file; use it only to view the templates.
2. Find the appropriate template to use for the augmentation.

Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.

- In the **Password** field, enter the password for the certificate
- In the **Keystore type** field, select the keystore type for the certificate you are importing.
- In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
- Click **Next** to display the Security Certificate (Part 2) page

When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
- `key.p12`: Contains the default personal certificate.
- `trust.p12`: Contains the signer certificate from the default root certificate.
- `root-key.p12`: Contains the root signing certificate.
- `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.
12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.

- Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.

3. Shut down any servers associated with a profile you plan to augment.

4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.

7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⮕ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

Note: Your modified properties file must use UTF-8 encoding.

To create a deployment manager profile, you must specify the following minimum set of properties:

- `bpm.dmgr.hostname=`
- `bpm.dmgr.installPath=`

It is also recommended that you set values for:

- `bpm.cell.name=`
- `bpm.dmgr.nodeName=`
- `bpm.dmgr.profileName=`

To create a managed node profile, you must specify the following minimum set of properties:

- `bpm.dmgr.soapPort=`
- `bpm.node.#.hostname=`
- `bpm.node.#.installPath=`

It is recommended that you also set:

- `bpm.node.#.nodeName=`
- `bpm.node.#.profileName=`

The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `install_root/bin/BPMConfig -create -profile my_environment.properties`

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the `manageprofiles` command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

      profile_root/bin/startManager.sh
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

       profile_root/bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

       ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

       ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username
       userID_for_authentication -password *password_for_authentication*

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

       ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

↪ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes

- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

  d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:

• Installed the product

• Created the deployment manager profile and the associated nodes

• Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.

• Make sure that you start all the local and remote nodes that you want to add in the deployment environment.

• When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

- **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
- **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.
   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.
   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on

a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

There are four types of environments available for selection:

Development
>   Select **Development** if the server will serve in a development capacity.

Test   Select **Test** if the server you are configuring will be used as a testing environment.

Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production
>   Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.
11. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

   a. Stop the deployment environment.

   b. Stop the node agent.

   c. Stop the deployment manager.

   d. Start the deployment manager.

   e. Start the node agent.

   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the `createDatabase.sql` script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script `createDatabase.sql` to run. Otherwise, use the command line option.

2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
connect to @DB_NAME@;
grant dbadm on database to user @DB_USER@;
UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
connect reset;
```

Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

If IBM Business Process Manager is not installed, run the following command from the command line:

```
db2 -tvf createDatabase.sql
```

Generating DB2 database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:
1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

In the above syntax, **MyBPMScriptDir** is the directory you specify.

Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the DB2 database tables.

A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - DB2
    - *CMNDB*
      - createSchema_Standard.sql
      - createSchema_Messaging.sql
    - *BPMDB*
      - createSchema_Standard.sql
      - createProcedure_Standard.sql
    - *PDWDB*
      - createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 278
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - DB2
    - *CMNDB*
      - `createSchema_Standard.sql`
      - `createSchema_Messaging.sql`
    - *BPMDB*
      - `createSchema_Standard.sql`
      - `createProcedure_Standard.sql`
    - *PDWDB*
      - `createSchema_Standard.sql`

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   db2 connect to CMNDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Standard.sql
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Messaging.sql
   db2 connect reset
   ```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

   ```
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createDatabase.sql
   db2 connect to BPMDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createSchema_Standard.sql
   db2 -tdGO -vf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createProcedure_Standard.sql
   db2 connect reset
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

   ```
   db2 connect to PDWDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/PDWDB/createSchema_Standard.sql
   db2 connect reset
   ```

Configuring profiles, databases, and deployment environments for DB2 for z/OS:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Space component, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:
- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

You must have installed the product. You must also have created all the users that you specify in the properties file.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- Generates the scripts that you can use to create the database tables.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: `BPM_home`/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a `standard` folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: `de_type[-environment_type]-topology-database_type[-suffix]`, where:

   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 for z/OS database is called `Standard-PC-SingleCluster-DB2zOS.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Additional notes for database configuration:

   - By default, the **bpm.de.deferSchemaCreation** property in the sample configuration properties file for DB2 for z/OS is set to **true**. Do not change this setting, because, for a z/OS database, you cannot create the database objects at the same time that the database scripts are generated. After the **BPMConfig** command completes, you can run the database scripts to manually create the database objects at a time that you choose. When **bpm.de.deferSchemaCreation** is set to **true**, the bootstrap utility, which loads the Process database with system information, also must be run manually.

   - Work with your DB2 for z/OS database administrator to establish good naming conventions for DB2 components such as database names, storage group names, schema qualifiers, and VSAM catalog names (VCATs).

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** will fail when it is run.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home`/bin/BPMConfig -create -de `my_environment.properties`

   The database SQL scripts are generated in the `DMGR_PROFILE/dbscripts` folder by default.

   - The database scripts that can be used to create the cluster-scoped database are generated in `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name`.

   These subdirectories also contain a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.

Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

5. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode.

After you have created your deployment environment, you can create the product databases.

After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with Advanced or AdvancedOnly capabilities.

Related tasks:
"Creating and configuring DB2 for z/OS databases after network deployment profile creation"
After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP   @STOGRP@    TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@   TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS        TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the
database:

- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to
  YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database
  @*DB_NAME*@ can create views for other user IDs.

- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views,
  because access is not implicitly granted to users with DBADM authority on the database. Individual
  GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access
  to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using
  either of the following methods:

  – Issue an explicit GRANT statement for each view. For example, the following sample GRANT
    statements can be issued for user ID WSADMIN:

    ```
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
    ```

  – Define a RACF group that corresponds to the schema name for the views, and connect the
    WebSphere administrator ID to the RACF group. For example, you can define a RACF group named
    S1CELL, and connect user WSADMIN to it, as follows:

    ```
    INFORMATION FOR GROUP S1CELL
     SUPERIOR GROUP=ZWPS    OWNER=ZWPS    CREATED=07.144
     INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
     NO MODEL DATA SET
     TERMUACC
    ```

```
        NO SUBGROUPS
        USER(S)=  ACCESS=  ACCESS COUNT=  UNIVERSAL ACCESS=
          WSADMIN   CONNECT   000000     NONE
          CONNECT ATTRIBUTES=NONE
          REVOKE DATE=NONE     RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10 views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create the databases and storage groups. Additionally, the GRANT permissions that are required to authorize the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided. When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet, these values are propagated to the Database worksheet, and are used to complete the CREATE and GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create the databases and storage groups, and to use the GRANT statements to authorize the WebSphere administrator. For more information about using the artifacts generated from the spreadsheet, see the accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message in a log, but might cause problems later. It is better to resolve such problems now rather than when the system has been handed over for use. For example, correcting storage groups and VCATs is not easy after the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
- The **createDatabase.sh** script, which was additionally created with the database scripts
- Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script
- **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
- **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
- **createDatabase.sh** runs the SQL for each component in the correct sequence.
- **createDatabase.sh** creates database objects according to a naming convention that you define.

- **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
- **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
- **createDatabase.sh** runs in a UNIX System Services environment.
- **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools
- You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
- There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
- Some tools can be run from a z/OS environment.
- The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:
1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.
   - Specify the `DB2JccConfiguration.properties` file that defines the JDBC properties to be applied to the command line processor.

   You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

   ```
   export CLPHOME=clp_install_dir
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=clp_properties_file_path
   alias db2="java -Ddb2.jcc.propertiesFile=
   /file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

   For example:

   ```
   export CLPHOME=/shared/db2910_base
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=/wasv85config/clp.properties
   alias db2="java -Ddb2.jcc.propertiesFile=
   /wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:

   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.

   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   `DB2ALIASNAME=URL,user_ID,password`

   For example:

   `DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1`

   Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

"Creating DB2 for z/OS database objects using the createDatabase.sh script"
You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

"Creating DB2 for z/OS database objects using the DB2 command line processor" on page 313
You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally

generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.

  1. `DB2 system administrator (SYSADM)` Create the physical databases as follows:

     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

        Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

        – `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*

        You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
        ```
        db2 -tvf createDatabase.sql
        ```

  2. `WebSphere administrator (DBADM)` Populate each database with objects as follows:

     a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

     b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
        ```
        iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
        ```
        Also grant execute permissions to the **createDatabase.sh** script.

     c. Run the **createDatabase.sh** script by using the following syntax:
        ```
        createDatabase.sh -DBAlias alias_name -RunSQL
        ```
        where:

        -DBAlias
        Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

        -RunSQL
        Runs the SQL statements that create the database objects.

        For example:
        ```
        createDatabase.sh -DBAlias DSNXWBD -RunSQL
        ```

        For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

     d. Review the messages that are displayed in the console, checking that no error messages are displayed.

        When the script has finished running, you can also review the `z_output.txt` file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

  3. `DB2 system administrator (SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

     You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

  1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.
  2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:

     ```
     iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
     ```

     Also grant execute permissions to the **createDatabase.sh** script.
  3. Run the **createDatabase.sh** script by using the following syntax:

     ```
     createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
     ```

     where:

     -DBAlias
     > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

     -DBCreate
     > Creates the database.

     -RunSQL
     > Runs the SQL statements that create the database objects.

     For example:

     ```
     createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
     ```

     For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.
  4. Review the messages that are displayed in the console, checking that no error messages are displayed.

     Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

     When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.
  5. Grant access to views to the WebSphere administrator that has DBADM authority.

     You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 310
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

   a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

   - `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*

   You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   ```
   db2 -tvf createDatabase.sql
   ```

2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the `DMGR_PROFILE/` `dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

      1) `createTablespace_Standard.sql`

      2) `createSchema_Standard.sql`

      3) `createSchema_Messaging.sql`

      4) `createProcedure_Standard.sql`

      Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name`: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2

A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:
   - Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
     a. `createTablespace_Standard.sql`
     b. `createSchema_Standard.sql`
     c. `createSchema_Messaging.sql`
     d. `createProcedure_Standard.sql`

   These files are in ASCII format.

2. Assign the appropriate read permissions to the SQL files; for example:
   `chmod 644 createSchema_Standard.sql`

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:
   `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

   Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

```
iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql
```

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.
5. Run the SQL files by using the tool of your choice.
6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles with a DB2 for z/OS database server using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.
5. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is `installation_root/profiles/profile_name`.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.
6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.
   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.
7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.

- In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
- Click **Next** to display the Security Certificate (Part 2) page

When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

    Ports are recognized as being in use if the following conditions are satisfied:

    - The ports are assigned to a profile created under an installation performed by the current user.
    - The ports are currently in use.

    Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

    If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

    profile_root/properties/portdef.prop

    Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⮕ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with a DB2 for z/OS database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***/bin/ProfileManagement/pmt.sh**.
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⮕ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

* Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.

2. Use one of the following methods to start the Profile Management Tool.
   * Start the tool from the Quick Start console.
   * Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.

6. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

   When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:

   • In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   • In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:

   • Another profile is being federated. (Node federation must be serialized.)

   • The deployment manager is not running or you are not sure if it is running.

   • The deployment manager has the SOAP connector disabled

   • The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.

   • The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.

   • The deployment manager does not have a JMX administrative port enabled.

   • The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:

- The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.
     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     – Click **Next** to display the Security Certificate (Part 2) page

     When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
    - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

    These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).

- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⬆ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:

   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:

   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:

   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:

   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any

given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:
* You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
* The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root/bin/startManager.sh
* The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
* The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
* The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.
1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root/bin
2. Run the **addNode** command.

    Run the following command from the command line if security is not enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

    Run the following command from the command line if security is enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username *userID_for_authentication* -password *password_for_authentication*

    An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

    ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.
Related information:

⬆ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the

administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database subsystem is located.
  - **Port**: Type the port number to connect to the database subsystem.
  - **Database connection location**: Type the database connection location name.
  - **Storage group**: Type the storage group name.
  - **Volume Catalog**: Type the volume catalog name.
  - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
  - **Index buffer pool** : Type the index buffer pool name.
  - **LOB buffer pool** : Type the LOB buffer pool name.
  - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
  - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
  - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
- **Process database**
  - **Name**: Type a name for the Process Center database.
  - **Schema name**: Type the schema name for the Process database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
  - **Schema name**: Type the schema name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.
    - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
10. Load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.

- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

- **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

- **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

There are four types of environments available for selection:

Development
Select **Development** if the server will serve in a development capacity.

Test Select **Test** if the server you are configuring will be used as a testing environment.

Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production
Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database subsystem is located.
  - **Port**: Type the port number to connect to the database subsystem.
  - **Database connection location**: Type the database connection location name.
  - **Storage group**: Type the storage group name.
  - **Volume Catalog**: Type the volume catalog name.
  - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
  - **Index buffer pool** : Type the index buffer pool name.
  - **LOB buffer pool** : Type the LOB buffer pool name.
  - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
  - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
  - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
- **Process database**
  - **Name**: Type a name for the Process Center database.
  - **Schema name**: Type the schema name for the Process database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
  - **Schema name**: Type the schema name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.
    - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. Load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Generating DB2 for z/OS database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.

- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

   The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:
   - The database scripts that can be used to create the cluster-scoped database are generated in the following directory: *DMGR_PROFILE*/dbscripts/de_name/DB2zOS/cluster_database_name.

   This sub-folder also contains a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.
4. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sql** script as an ASCII text file, and transfer the database schema files in binary mode.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 305
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP   @STOGRP@     TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@    TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS         TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:

- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.

- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:

  – Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
```

```
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
    GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the WebSphere administrator ID to the RACF group. For example, you can define a RACF group named S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS   OWNER=ZWPS   CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)= ACCESS= ACCESS COUNT= UNIVERSAL ACCESS=
   WSADMIN   CONNECT   000000     NONE
    CONNECT ATTRIBUTES=NONE
    REVOKE DATE=NONE    RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10 views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create the databases and storage groups. Additionally, the GRANT permissions that are required to authorize the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided. When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet, these values are propagated to the Database worksheet, and are used to complete the CREATE and GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create the databases and storage groups, and to use the GRANT statements to authorize the WebSphere administrator. For more information about using the artifacts generated from the spreadsheet, see the accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message in a log, but might cause problems later. It is better to resolve such problems now rather than when the system has been handed over for use. For example, correcting storage groups and VCATs is not easy after the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
- The **createDatabase.sh** script, which was additionally created with the database scripts
- Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script
- **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
- **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
- **createDatabase.sh** runs the SQL for each component in the correct sequence.
- **createDatabase.sh** creates database objects according to a naming convention that you define.
- **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
- **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
- **createDatabase.sh** runs in a UNIX System Services environment.
- **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools
- You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
- There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
- Some tools can be run from a z/OS environment.
- The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.
   - Specify the DB2JccConfiguration.properties file that defines the JDBC properties to be applied to the command line processor.

   You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

   ```
   export CLPHOME=clp_install_dir
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=clp_properties_file_path
   alias db2="java -Ddb2.jcc.propertiesFile=
   /file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

   For example:

   ```
   export CLPHOME=/shared/db2910_base
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=/wasv85config/clp.properties
   alias db2="java -Ddb2.jcc.propertiesFile=
   /wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

   For example:

   ```
   DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
   ```

   Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

"Creating DB2 for z/OS database objects using the DB2 command line processor" on page 343
You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.
- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:
- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.
  1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases as follows:
     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

        Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:
        – `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*

        You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
        `db2 -tvf createDatabase.sql`
  2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:
     a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.
     b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
        `iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh`
        Also grant execute permissions to the **createDatabase.sh** script.
     c. Run the **createDatabase.sh** script by using the following syntax:
        `createDatabase.sh -DBAlias `*alias_name*` -RunSQL`

where:

-DBAlias
> Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-RunSQL
> Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

d. Review the messages that are displayed in the console, checking that no error messages are displayed.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:

```
iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
```

Also grant execute permissions to the **createDatabase.sh** script.

3. Run the **createDatabase.sh** script by using the following syntax:

```
createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
```

where:

-DBAlias
> Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-DBCreate
> Creates the database.

-RunSQL
> Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

4. Review the messages that are displayed in the console, checking that no error messages are displayed.

Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

5. Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 339

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2 system administrator (SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

   a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

   - DMGR_PROFILE/dbscripts/*de_name*/DB2zOS/*cluster_database_name*

   You can copy the createDatabase.sql files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   db2 -tvf createDatabase.sql

2. `WebSphere administrator (DBADM)` Populate each database with objects as follows:

   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the DMGR_PROFILE/

dbscripts/*de_name*/DB2zOS/*cluster_database_name* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

1) `createTablespace_Standard.sql`

2) `createSchema_Standard.sql`

3) `createSchema_Messaging.sql`

4) `createProcedure_Standard.sql`

Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 339
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:

- Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
  a. `createTablespace_Standard.sql`
  b. `createSchema_Standard.sql`
  c. `createSchema_Messaging.sql`
  d. `createProcedure_Standard.sql`

  These files are in ASCII format.

2. Assign the appropriate read permissions to the SQL files; for example:

   `chmod 644 createSchema_Standard.sql`

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:

   `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

   Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

   Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

   `iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql`

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.
5. Run the SQL files by using the tool of your choice.
6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

`GRANT ALL PRIVILEGES ON TABLE`
`cell.tablename TO userid/sqlid`

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring profiles, databases, and deployment environments for Oracle:

Select which method to use to configure your profiles, databases, and network deployment environment.
You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and
deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts
that create custom tablespaces for the Business Process Choreographer and the Business Space
components, see the **usetablespaces** property as described in the Database and cell properties section of
Configuration properties for the BPMConfig command.

You can run one of the following commands:
* run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
* run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in
profile_root/dbscripts. The files include additional createTablespace*.sql files that you must run
before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or
Business Space. The generated createSchema*.sql files include the appropriate references to the
tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process,
database scripts are generated, which you must run to create the tables for the databases.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network
deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process
Server user, and the Performance Data Warehouse user. Note: The Process Server user and the
Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data
Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be
available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single
Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains
the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace @*DB_USER*@ with the user name that you want to use for the
database and replace @*DB_PASSWD*@ with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above
SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and

configuration environments. The sample files are named according to the following format: *de_type*[*-environment_type*]*-topology-database_type*[*-suffix*], where:

- *de_type* can be set to **Standard** .
- *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to true, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the

deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Related tasks:

"Running the generated Oracle database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   * *deployment_environment_name*
     - Oracle
       - *orcl*
         * *cmnuser*
           - `createSchema_Standard.sql`
           - `createSchema_Messaging.sql`
         * *psuser*
           - `createSchema_Standard.sql`
           - `createProcedure_Standard.sql`
         * *pdwuser*
           - `createSchema_Standard.sql`

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   `sqlplus *cmnuser*/*cmnpassword*@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/cmn`

   `sqlplus *cmnuser*/*cmnpassword*@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/cmn`

3. Run the scripts to apply the schema to the BPMDB.

For example, use the following commands to run the scripts manually for the Process database configuration:

```
sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuser/d
sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuser/d
```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlplus pdwuser/pdwpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/pdwuse
   ```

Related tasks:

"Generating Oracle database scripts using the BPMConfig command" on page 370
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.

- Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   - In the **Host name** field, enter a name for the host or accept the default value.

   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.

   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:

     – In the **Path** field, enter the directory path to the existing certificate.

     – In the **Password** field, enter the password for the certificate

     – In the **Keystore type** field, select the keystore type for the certificate you are importing.

     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.

     – Click **Next** to display the Security Certificate (Part 2) page

When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

    Ports are recognized as being in use if the following conditions are satisfied:

    - The ports are assigned to a profile created under an installation performed by the current user.
    - The ports are currently in use.

    Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

    If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

    profile_root/properties/portdef.prop

    Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⏎ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with an Oracle database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⏎ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the `manageprofiles` command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

You can determine the template by viewing the profile registry in the *installation_root*/properties/ `profileRegistry.xml` file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:

a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

   When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).

- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

  Click **Next**.
9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.
     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     – Click **Next** to display the Security Certificate (Part 2) page

     When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.
10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
    - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

    These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.
11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.
12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).

- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⇨ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:

   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:

   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:

   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:

   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any

given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:
- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root/bin/startManager.sh
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.
1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root/bin
2. Run the **addNode** command.

    Run the following command from the command line if security is not enabled:

       ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

    Run the following command from the command line if security is enabled:

       ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username *userID_for_authentication* -password *password_for_authentication*

    An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

    ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.
Related information:

⇨ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
* Installed the product
* Created the deployment manager profile and the associated nodes
* Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
* Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
* When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  – Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  – Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
* If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
* Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.
* IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.
 1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Instance name**: Type the instance name for the Oracle database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **User name**: Type a user name for the Process Center database.
  - **Password**: Type the password for the Process Center database user.
  - **Confirm password**: Type to confirm the password for the Process database user.
- **Performance Data Warehouse database**
  - **User name**: Type a user name for the Performance Data Warehouse database.
  - **Password**: Type the password for the Performance Data Warehouse database user.
  - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **User name**: Type a user name for the messaging engine database.
    - **Password**: Type the password for the messaging engine database user.
    - **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:

- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

   a. Optional: If you want to exit without generating the configuration, click **Cancel**.

   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

   a. Stop the deployment environment.

   b. Stop the node agent.

   c. Stop the deployment manager.

   d. Start the deployment manager.

   e. Start the node agent.

   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative

console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.

- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

  The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

  There are four types of environments available for selection:

  Development
  > Select **Development** if the server will serve in a development capacity.

  Test   Select **Test** if the server you are configuring will be used as a testing environment.

  Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

  Production
  > Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between

the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Instance name**: Type the instance name for the Oracle database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **User name**: Type a user name for the Process Center database.
     - **Password**: Type the password for the Process Center database user.
     - **Confirm password**: Type to confirm the password for the Process database user.
   - **Performance Data Warehouse database**
     - **User name**: Type a user name for the Performance Data Warehouse database.
     - **Password**: Type the password for the Performance Data Warehouse database user.
     - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **User name**: Type a user name for the messaging engine database.

- **Password**: Type the password for the messaging engine database user.
- **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:

- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Generating Oracle database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.

- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

Important: If you are using an Oracle database, you must include the database user name and password for all databases, including the optional ones.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     In the above syntax, **MyBPMScriptDir** is the directory you specify.

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the Oracle database tables.

A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - Oracle
    - *orcl*
      - *cmnuser*
        - createSchema_Standard.sql
        - createSchema_Messaging.sql
      - *psuser*
        - createSchema_Standard.sql
        - createProcedure_Standard.sql

- *pdwuser*
  - `createSchema_Standard.sql`

In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 347
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*
           - `createSchema_Standard.sql`
           - `createSchema_Messaging.sql`
         - *psuser*
           - `createSchema_Standard.sql`
           - `createProcedure_Standard.sql`
         - *pdwuser*
           - `createSchema_Standard.sql`

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

```
sqlplus cmnuser/cmnpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/cmn
sqlplus cmnuser/cmnpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/cmn
```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuse
   sqlplus psuser/pspassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/psuse
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlplus pdwuser/pdwpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/pdw
   ```

Configuring profiles, databases, and deployment environments for SQL Server:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

Tip: If you are using the federated repositories as a user registry, you can ignore warnings in the systemout.log file about maximum key length: **... Warning! The maximum key length is 900 bytes ...**. If you are using the stand-alone LDAP registry, ensure that the number of characters in all the user distinguished name (DN) entries in your organization do not exceed the 131 character limit. If the number of characters in any of the user DN entries exceeds 131 characters, you must change the user account registry to the federated repositories option.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to `true`, you must create the tables by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:

```
BPMConfig.sh -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:

```
BPMConfig.sh -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory *profile_root*/dbscripts.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**..

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

   c. Click the **MSDTC** tab, and then click **Security Configuration**.

   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

   c. Right-click **Local DTC** and then select **Properties**.

   d. Click the **Security** tab on the **Local DTC Properties** window.

e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

f. Click **OK** again to close the Properties window, and then close Component Services.

g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

b. If BPM is already installed, go to `bpm_install_root`/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

- Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/ MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the `x86` folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the `x64` folder.

- Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

- Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.

2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**

3. Locate **TCP/IP** on the right-hand side.

4. Double click **TCP/IP** and enable it under the **Protocol** tab.

5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments

- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server

- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server

- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder.

In the following examples, replace @*DB_NAME*@ with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"`

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.

4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.
2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   GO
   EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
   EXEC sp_addrolemember 'db_datareader', @DB_USER@;
   EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
   ```

   In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 54. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

For your SQL Server database server, make sure that the username and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

Note: If SQLServer Windows Authentication is used, you must manually run the bootstrap utility to load the Process database because this step is not done automatically by **BPMConfig**.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[*-environment_type*]*-topology-database_type*[*-suffix*], where:

- *de_type* can be set to **Standard** .
- *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to true, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment

environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - SQLServer
       - *CMNDB*
         - *schema name*
           - `createSchema_Standard.sql`
           - `createSchema_Messaging.sql`
       - *BPMDB*
         - *schema name*
           - `createSchema_Standard.sql`
           - `createProcedure_Standard.sql`
       - *PDWDB*
         - *schema name*
           - `createSchema_Standard.sql`

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/CMNI
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/CMNI
   ```

   In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/BPMI
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/BPMI
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration. For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/P
   ```

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles with an SQL Server database server using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:

   • In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   • In the **Host name** field, enter a name for the host or accept the default value.

   • In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   • To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.

   • To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:

     – In the **Path** field, enter the directory path to the existing certificate.

     – In the **Password** field, enter the password for the certificate

     – In the **Keystore type** field, select the keystore type for the certificate you are importing.

     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.

     – Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the trust.p12 file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is WebAS. Change the password.

The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

- `key.p12`: Contains the default personal certificate.
- `trust.p12`: Contains the signer certificate from the default root certificate.
- `root-key.p12`: Contains the root signing certificate.
- `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

   Ports are recognized as being in use if the following conditions are satisfied:

   - The ports are assigned to a profile created under an installation performed by the current user.
   - The ports are currently in use.

   Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

   If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

   profile_root/properties/portdef.prop

   Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➦ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with an SQL Server database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

↪ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*/profiles/*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.

- – In the **Password** field, enter the password for the certificate
- – In the **Keystore type** field, select the keystore type for the certificate you are importing.
- – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
- – Click **Next** to display the Security Certificate (Part 2) page

  When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
    - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

    These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.

2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.

- Run the command *installation_root*/**bin/ProfileManagement/pmt.sh**.

3. Shut down any servers associated with a profile you plan to augment.

4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.

7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⯈ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.
2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.
3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.
4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:
   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Modify your version of the properties file so that the values correspond to your own configuration.

All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

Note: Your modified properties file must use UTF-8 encoding.

To create a deployment manager profile, you must specify the following minimum set of properties:

- `bpm.dmgr.hostname=`
- `bpm.dmgr.installPath=`

It is also recommended that you set values for:

- `bpm.cell.name=`
- `bpm.dmgr.nodeName=`
- `bpm.dmgr.profileName=`

To create a managed node profile, you must specify the following minimum set of properties:

- `bpm.dmgr.soapPort=`
- `bpm.node.#.hostname=`
- `bpm.node.#.installPath=`

It is recommended that you also set:

- `bpm.node.#.nodeName=`
- `bpm.node.#.profileName=`

The `bpm.dmgr.soapPort` property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the `bpm.dmgr.hostname` property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the `BPMConfig` command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

For more information about the available properties, read the comments in the sample files, or see the `BPMConfig` command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the `BPMConfig` command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

    install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the `BPMConfig` command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the `federateLater` option of the `BPMConfig` command when creating the managed node profiles and then run the command with the `create de` option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the `addNode` command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root/bin/startManager.sh
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root/bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username *userID_for_authentication* -password *password_for_authentication*

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

    ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

➡ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

SQL Server database server with Windows authentication:

Create your network deployment environment to work with an SQL Server database server using Windows authentication. The username and password you used to log on to the system would be used to connect to and access the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments

in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click

Servers > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

   a. Optional: If you want to exit without generating the configuration, click **Cancel**.

   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

11. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.

    f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

    g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

    h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:

- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
     > Select **Development** if the server will serve in a development capacity.

     Test Select **Test** if the server you are configuring will be used as a testing environment.

     Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

     Production
     > Select **Production** if the server will serve in a production capacity.

   - **Use server offline**

     Indicate whether the server you are configuring is an offline server.

     An offline server is a Process Server that is not connected to the Process Center.

Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**

– **Messaging**: Select this option to create a separate messaging engine database.
  - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:

- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the *BPM_Install*\profiles\DmgrProfile\dbscripts\ folder. You can run the scripts from the dbscripts folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Verify the deployment environment was created properly by completing the following steps:
    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.
    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.
    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

SQL Server database server without Windows authentication:

Create your network deployment environment to work with an SQL Server database server without Windows authentication. You will need to provide the username and passsword for accessing the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.

- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     – **User name**: Type the user name to connect to the database.
     – **Password**: Type the password for the user name.
     – **Confirm password**: Type to confirm the password for the user name.
     – **Server**: Type a server name where the database is located.
     – **Port**: Type the port number to connect to the database.
     – **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     – **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     – **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     – **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

   Attention: For an SQL server:
   - Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
   - IBM Process Server and IBM Performance Data Warehouse should not use the same database.
   - If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

   You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

   You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

   Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

   a. Optional: If you want to exit without generating the configuration, click **Cancel**.

   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

11. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.

    f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

    g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

    h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:

*   Installed the product
*   Created the deployment manager profile and the associated nodes
*   Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
*   Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
*   When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
    *   Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
    *   Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
*   If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:

* Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
* IBM Process Server and IBM Performance Data Warehouse should not use the same database.
* If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   * **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   * **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

    Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

    Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

    If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

    If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

    - **Environment name**

        Enter an environment name of the Process Server.

        An environment name is the name by which this server or cluster will be known to a Process Center user.

    - **Environment type**

        From the pull-down list, select the environment type for the Process Server you are configuring.

        The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

        There are four types of environments available for selection:

        Development
        > Select **Development** if the server will serve in a development capacity.

        Test   Select **Test** if the server you are configuring will be used as a testing environment.

        Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

        Production
        > Select **Production** if the server will serve in a production capacity.

    - **Use server offline**

        Indicate whether the server you are configuring is an offline server.

        An offline server is a Process Server that is not connected to the Process Center.

Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.

- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.
11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.
12. Verify the deployment environment was created properly by completing the following steps:
    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the `XXXBE##` schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to `true`, you must create the tables by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:

```
BPMConfig.sh -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:

```
BPMConfig.sh -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory *profile_root*/dbscripts.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**.

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:
   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.
   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.
   c. Click the **MSDTC** tab, and then click **Security Configuration**.
   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.
   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.
   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:
   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.
   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.
   c. Right-click **Local DTC** and then select **Properties**.
   d. Click the **Security** tab on the **Local DTC Properties** window.
   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.
   f. Click **OK** again to close the Properties window, and then close Component Services.
   g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

b. If BPM is already installed, go to `bpm_install_root`/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

- Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the x64 folder.

- Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

- Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"`

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.

2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   GO
   EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
   EXEC sp_addrolemember 'db_datareader', @DB_USER@;
   EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
   ```

   In the above example, replace @*DB_NAME*@ with the BPM database name for which you created users and schema, @*DB_USER*@ with the database user you want to create, and @*DB_PASSWD*@ with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 55. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Generating SQL database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:

- The location of the databases.
- The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.

   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.

   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     In the above syntax, **MyBPMScriptDir** is the directory you specify.

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the SQL Server database tables.

A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - SQLServer
    - *CMNDB*
      - *schema name*
        - createSchema_Standard.sql
        - createSchema_Messaging.sql
    - *BPMDB*
      - *schema name*

- – createSchema_Standard.sql
- – createProcedure_Standard.sql
  - *PDWDB*
    - *schema name*
      - – createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 377
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - SQLServer
       - *CMNDB*
         - *schema name*
           - – createSchema_Standard.sql
           - – createSchema_Messaging.sql
       - *BPMDB*
         - *schema name*
           - – createSchema_Standard.sql
           - – createProcedure_Standard.sql
       - *PDWDB*
         - *schema name*
           - – createSchema_Standard.sql

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

```
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/CMN
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/CMN
```

In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/BPM
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/BPM
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration. For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/PDW
   ```

Loading the database with system information in a network deployment environment:

If you are creating a Standard or Advanced network deployment environment, you must run the **bootstrapProcessServerData** command before you try to start or use Process Server or Process Center.

When you run the **bootstrapProcessServerData** command, configuration data for the BPM applications is loaded into the Process database. This data is required for the BPM applications to run correctly.

- Important: If you created an Advanced-only Process Server deployment environment (an environment without the capabilities included in Standard deployment environments), you can skip this task. There is no need to run the **bootstrapProcessServerData** command.
- If you created the database tables when you created the deployment environment, either by setting the parameter **bpm.de.deferSchemaCreation** to **false** for the **BPMConfig** command, or by enabling **Create Tables** in the Deployment Environment wizard, there is no need to run the **bootstrapProcessServerData** command.
- In a Standard or Advanced network deployment (ND) environment, you must run this command after a server or cluster of servers is created. For a cluster, you need to specify the cluster name. Run this command before the first server is started. You do not need to rerun the command if you add another cluster member.
- If a single WebSphere cell contains multiple application target clusters, you must run this command on each of the clusters.

Run the bootstrap utility from the command line. The bootstrap utility is found in the deployment manager profile directory. For example: `Linux` `UNIX` `BPM_HOME/profiles/`*`dmgr_profile_name`*`/bin` Run the bootstrap utility using one of the following commands:

- **bootstrapProcessServerData.sh -clusterName** *cluster_name*
- **bootstrapProcessServerData.sh -nodeName** *node_name* **-serverName** *server_name*

where:

- **-clusterName** is the name of the application target cluster. You must specify this parameter when you want the bootstrap data to run on a cluster.
- **-nodeName** is the name of the node. You must specify this parameter and the **-serverName** parameter when you want the bootstrap data to run on the server that is part of the network deployment environment and not part of the cluster.
- **-serverName** is the name of the server. You must specify either this parameter and the **-nodeName** parameter when you want the bootstrap data to run on the server that is part of the network deployment and not part of the cluster.

The parameters are case-sensitive

You have loaded the database with system information before successfully starting the IBM Business Process Manager server. The log information for the bootstrap operation is saved to the `USER_INSTALL_ROOT/logs` directory in a file called `bootstrapProcessServerData.`*`clusterName.timestamp`*`.log` or `bootstrapProcessServerData.`*`nodeName.serverName.timestamp`*`.log` depending on the target you specified. The console displays a subset of the logged information.

Bootstrap data onto a server that is part of an ND environment but not part of a cluster:

`bootstrapProcessServerData.sh -nodeName node1 -serverName myServer`

Bootstrap data onto a cluster that hosts the Process Server or Process Center:

`bootstrapProcessServerData.sh -clusterName myAppCluster`

Starting your environment and verifying the installation:

After you create the deployment environment and complete the relevant configuration tasks, you can start all the servers in a cluster or deployment environment. Then you can verify the IBM Business Process Manager installation.

1. Start the cluster or deployment environment as described in Starting and stopping your environment.
2. From the administrative console, verify that you can see **IBM Business Process Manager** on the Welcome page.
3. Check that the enterprise applications are started by clicking **Applications** > **Application Types** > **WebSphere enterprise applications**.
4. Check that the messaging engine is started by clicking **Service integration** > **Buses**. Then click the name of the bus, and under **Topology**, click **Messaging engines**.

After the cluster has started, verify that the applications are set up correctly by running a series of tests and deploying samples as detailed in the following table.

Table 56. Application verification tests

Application and description	Action
Process Admin Console Use the Process Admin Console to manage the Process Servers in your runtime environments and the Process Center server. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Log on to the Process Admin Console by using the default account for IBM Business Process Manager administrators. For information about accessing the Process Admin Console, see Accessing the Process Admin Console.
Performance Admin Console Use the Performance Admin Console tools to manage the Performance Data Warehouse queues in your environment, manage data transfer errors, and monitor overall performance. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Verify that you can access the Performance Admin Console, as described in Managing Business Performance Data Warehouses.
Process Portal Use Process Portal to interact with processes from a web browser. **Restriction:** Process Portal is not available if you created an Advanced-only Process Server deployment environment.	Process Portal is configured by default. Verify that you can access Process Portal and that the applications used by Process Portal are all accessible, as described in Verifying Process Portal.
Hiring Sample process application Use the samples that are provided with the product to further verify the installation and as tutorials to learn the product.	Run the Hiring Sample process application and tutorial in Process Designer, as described in Samples and tutorials. Additionally deploy the samples to a Process Server and then run them, as described in Installing process application snapshots.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Installing and configuring IBM Business Process Manager on Solaris

Install IBM Business Process Manager on Solaris and configure a network deployment environment.

Installing IBM Business Process Manager Standard using a typical installation and configuration path

The Typical installation option is the simplest and quickest method for installing and configuring IBM Business Process Manager Standard.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Installing and configuring IBM Business Process Manager Standard with a DB2 database:

You can install IBM Business Process Manager using an existing DB2 database server.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.

2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Installing and configuring Process Center with a DB2 database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   /user_home_directory/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

- **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

  Note:
  - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
  - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 57. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.
Hostname	Accept the default value of localhost or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 50000 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

▶ Installation Manager updates

Installing and configuring Process Server with a DB2 database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

Create the following file:

/user_home_directory/bpm_updates.properties

Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:

     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.

     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:

     – Select **Development** if the server is to be used in a development capacity.

     – Select **Production** if the server is to be used in a production capacity.

     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.

     – Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

Restriction: Do not mix production and non-production servers in the same cell.

- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 58. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.

Table 58. Required database configuration fields for DB2 (continued)

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 50000 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⇨ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an Oracle database server:

You can install IBM Business Process Manager using an Oracle database server.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Installing and configuring Process Center with an Oracle database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.
1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these

upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

Create the following file:

/user_home_directory/bpm_updates.properties

Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:

     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.

     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager

components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 59. Required database configuration fields for Oracle

Field	Action needed
Instance name	Enter the name of the Oracle database instance.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • **User name**: Enter the Common database user name. • **Password**: Enter a password to authenticate with the Common database.
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⮕ Installation Manager updates

Installing and configuring Process Server with an Oracle database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

       /*user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:
     - Select **Development** if the server is to be used in a development capacity.
     - Select **Production** if the server is to be used in a production capacity.
     - Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     - Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.

   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also

enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.
- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.
- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.
- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 60. Required database configuration fields for Oracle

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Instance name	Enter the name of the Oracle database instance.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • **User name**: Enter the Common database user name. • **Password**: Enter a password to authenticate with the Common database.

Table 60. Required database configuration fields for Oracle (continued)

Field	Action needed
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

     Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

     The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

     Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

     After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⤷ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an SQL Server database server:

You can install IBM Business Process Manager using a Microsoft SQL Server database server.

Creating and configuring SQL Server databases before typical installation:

IBM Business Process Manager requires a Process database, Performance Data Warehouse database, and Common database. The Common database contains Business Space and other components. You can install and configure the required databases before you install.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**..

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

   c. Click the **MSDTC** tab, and then click **Security Configuration**.

   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

   c. Right-click **Local DTC** and then select **Properties**.

   d. Click the **Security** tab on the **Local DTC Properties** window.

   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

   f. Click **OK** again to close the Properties window, and then close Component Services.

   g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

   a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

   b. If BPM is already installed, go to *bpm_install_root*/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

      • Copy the sqljdbc_xa.dll file from the JDBC unarchived directory to the Binn directory (for a default SQL Server install, the location is C:/Program Files/Microsoft SQL Server/ MSSQL10_50.MSSQLSERVER/MSSQL/Binn) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the sqljdbc_xa.dll file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the sqljdbc_xa.dll file in the x64 folder.

      • Run the xa_install.sql database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by sqljdbc_xa.dll. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

- Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/ Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

If IBM Business Process Manager is not installed, run the following command from the command line:

```
sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"
```

Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.
- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.
1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.
1. Locate the SQL scripts to run.
2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   ```

```
     GO
     EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
     EXEC sp_addrolemember 'db_datareader', @DB_USER@;
     EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
```

In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 61. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Installing and configuring Process Center with an SQL Server database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded both required disk images for your operating system, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest fix pack or refresh pack level and recommended interim fixes automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

       /user_home_directory/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=/launchpad_updates
   fixpack.WAS_REP=/WAS_updates
   fixpack.BPM_REP=/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

         mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

            extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other

administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

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9. Click **Next**.

10. Select **Yes** to use an existing database.

11. Specify the required database information.

Table 62. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of localhost or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

12. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

13. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

14. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

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Related information:

 Installation Manager updates

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To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

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   Create the following file:

       /*user_home_directory*/bpm_updates.properties

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fix packs, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=/launchpad_updates
fixpack.WAS_REP=/WAS_updates
fixpack.BPM_REP=/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. Mount the disk drive if necessary. Enter the following command to start the launchpad manually:

     mount_point/launchpad.sh

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        extract_directory/launchpad.sh

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:
     – Select **Development** if the server is to be used in a development capacity.
     – Select **Production** if the server is to be used in a production capacity.
     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     – Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.

   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager

components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

8. Click **Next**.

9. Select **Yes** to use an existing database.

10. Specify the required database information.

Table 63. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.

Table 63. Required database configuration fields for SQL Server (continued)

Field	Action needed
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

Installation Manager updates

Installing IBM Business Process Manager Standard using a custom installation and configuration path

Use the Custom installation option to install IBM Business Process Manager Standard if you need any installation or configuration options that are not provided by the Typical installation option, if you want to install silently, or if you want to install on an existing installation of WebSphere Application Server.

Granting write permission of files and directories to nonroot users for profile creation or augmentation:

If you are not the user who installed the product, you must have write permission to selected directories within the IBM Business Process Manager installation. The product installer can grant this permission or create a group with permission to create or augment profiles.

The product installer (who can be a root or nonroot user) can grant write permission to the appropriate IBM Business Process Manager files and directories to nonroot users. The nonroot users can then create profiles. Alternatively, the product installer can create a group for users who are authorized to create profiles or give individual users the authority to create profiles.

Nonroot users create their own profiles to manage their own environments. Typically, they manage environments for development purposes.

Nonroot users must store their profiles in their private directory structure, not in the *installation_root*/profiles directory of the product.

Restrictions:

- IBM Business Process Manager does not support changing ownership of existing profiles from the product installer to nonroot users. A nonroot user cannot augment profiles owned by another user.
- Mechanisms within the Profile Management Tool that suggest unique names and port values are disabled for nonroot users. The nonroot user must change the default field values in the Profile Management Tool for the profile name, node name, cell name, and port assignments. The product installer can assign nonroot users a range of values for each of the fields, and assign responsibility to the users for adhering to their assigned value ranges and for maintaining the integrity of their own definitions.

If you already created at least one profile, certain directories and files were created. You can skip the steps in this topic that create these directories and files. If no profile was previously created, you must complete the steps to create the required directories and files.

The following example task shows how to create a group that is authorized to create profiles. The terms "installer" and "product installer" refer to the user ID that installed IBM Business Process Manager. The installer can perform the following steps to create the `profilers` group and give the group appropriate permissions to create a profile.

1. Log on to the IBM Business Process Manager system as the product installer. The product installer can be a root or nonroot user.
2. Using operating system commands, perform the following steps:
   a. Create a group named **profilers**, which will contain all users who can create profiles.
   b. Create a user named **user1**, who can create profiles.
   c. Add users **product_installer** and **user1** to the **profilers** group.
3. Log off and log back on as the installer to pick up the new group.
4. If no profile exists, create the following directories as the installer:
   - Create the *install_root*/**logs/manageprofiles** directory:

     `mkdir install_root/logs/manageprofiles`
   - Create the *install_root*/**properties/fsdb** directory:

     `mkdir install_root/properties/fsdb`
5. If no profile exists, create the `profileRegistry.xml` file as the installer. For this example, the file path is:

   `install_root/properties/profileRegistry.xml`

Add the following information to the `profileRegistry.xml` file. The file must be encoded as UTF-8.

```
<?xml version="1.0" encoding="UTF-8"?>
<profiles/>
```

6. As the product installer, use operating system tools to change directory and file permissions. The following example assumes that the variable **$WASHOME** is the IBM Business Process Manager root installation directory **/opt/IBM/WebSphere/AppServer**.

```
export WASHOME=/opt/IBM/WebSphere/AppServer
echo $WASHOME
echo "Performing chggrp/chmod per WAS directions..."
chgrp profilers $WASHOME/logs/manageprofiles
chmod g+wr  $WASHOME/logs/manageprofiles
chgrp profilers $WASHOME/properties
chmod g+wr  $WASHOME/properties
chgrp profilers $WASHOME/properties/fsdb
chmod g+wr  $WASHOME/properties/fsdb
chgrp profilers $WASHOME/properties/profileRegistry.xml
chmod g+wr  $WASHOME/properties/profileRegistry.xml
chgrp -R profilers $WASHOME/profileTemplates
```

Issue the following additional commands:

```
chgrp profilers $WASHOME/properties/Profiles.menu
chmod  g+wr $WASHOME/properties/Profiles.menu
```

You might have to change the permissions on additional files if the nonroot user encounters permission errors. For example, if the product installer authorizes a nonroot user to delete a profile, then the product installer might have to delete the following file:

```
install_root/properties/profileRegistry.xml_LOCK
```

Give write access to the nonroot user for the file to authorize the user to delete the file. If the nonroot user still cannot delete the profile, then the product installer can delete the profile.

The installer created the **profilers** group and gave the group the correct permissions to the directories and files required for a nonroot user to create profiles.

The nonroot user that belongs to the **profilers** group can create profiles in a directory that the nonroot user owns and to which the nonroot user has write permission. However, the nonroot user cannot create profiles in the installation root directory of the product.

The root user and the nonroot user can use the same tasks to manage profiles.

Configuring profiles and creating a network deployment environment:

After you install the product, you must create or augment a deployment manager and one or more managed-node profiles to define the runtime environment. Before starting the deployment manager, you must have configured the databases that are to be used with IBM Business Process Manager.

Configuring profiles, databases, and deployment environments for DB2:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment.

At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:

- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.

- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[*-environment_type*]*-topology-database_type*[*-suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .

- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to true, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with Advanced or AdvancedOnly capabilities.

Related tasks:

"Running the generated DB2 database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

"Generating DB2 database scripts using the BPMConfig command" on page 464
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.
1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   * *deployment_environment_name*
     – DB2
       - *CMNDB*
         • createSchema_Standard.sql
         • createSchema_Messaging.sql
       - *BPMDB*
         • createSchema_Standard.sql
         • createProcedure_Standard.sql
       - *PDWDB*
         • createSchema_Standard.sql

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.
2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:
   ```
   db2 connect to CMNDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Standard.sql
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Messaging.sql
   db2 connect reset
   ```
3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

```
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createDatabase.sql
db2 connect to BPMDB USER username USING password
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createSchema_Standard.sql
db2 -tdGO -vf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createProcedure_Standard.sql
db2 connect reset
```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

   ```
   db2 connect to PDWDB USER username USING password
   db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/PDWDB/createSchema_Standard.sql
   db2 connect reset
   ```

Related tasks:

"Generating DB2 database scripts using the BPMConfig command" on page 464
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use **BPMConfig** to create the network deployment profiles, the **manageprofiles** command-line utility to augment them, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the **BPMConfig** command-line utility, and augment them using the **manageprofiles** command-line utility.

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

    Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
    You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

    Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

    Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

    ```
    manageprofiles.sh -augment -templatePath BPM/BpmDmgr
    -profileName MyProfileName
    -adminUsername celladmin -adminPassword celladmin
    ```

    The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**

- **bpm.node.#.hostname=**
- **bpm.node.#.installPath=**

It is recommended that you also set:

- **bpm.node.#.nodeName=**
- **bpm.node.#.profileName=**

The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

   profile_root/bin/startManager.sh

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

```
profile_root/bin
```

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

   ```
   ./addNode.sh deployment_manager_host deployment_manager_SOAP_port
   ```

   Run the following command from the command line if security is enabled:

   ```
   ./addNode.sh deployment_manager_host deployment_manager_SOAP_port -username
   userID_for_authentication -password password_for_authentication
   ```

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

   ```
   ADMU0003I: Node DMNDID2Node03 has been successfully federated.
   ```

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

▶ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** >

deployment_manager_name > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

   a. Optional: If you want to exit without generating the configuration, click **Cancel**.

   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
     > Select **Development** if the server will serve in a development capacity.

     Test Select **Test** if the server you are configuring will be used as a testing environment.

     Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

     Production
     > Select **Production** if the server will serve in a production capacity.

   - **Use server offline**

     Indicate whether the server you are configuring is an offline server.

     An offline server is a Process Server that is not connected to the Process Center.

Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.

- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp`.properties. Save this file for future reference or for troubleshooting any issues.
11. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.
12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
    a. Stop the deployment environment.
    b. Stop the node agent.
    c. Stop the deployment manager.
    d. Start the deployment manager.
    e. Start the node agent.
    f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Generating DB2 database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:
1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     `BPM_HOME/bin/BPMConfig -create -sqlfiles my_environment.properties`

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     `BPM_HOME/bin/BPMConfig -create -sqlfiles my_environment.properties -outputDir /MyBPMScriptDir`

In the above syntax, **MyBPMScriptDir** is the directory you specify.

Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the DB2 database tables.

A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - DB2
    - *CMNDB*
      - createSchema_Standard.sql
      - createSchema_Messaging.sql
    - *BPMDB*
      - createSchema_Standard.sql
      - createProcedure_Standard.sql
    - *PDWDB*
      - createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 447
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*/BPM/dbscripts/DB2/Create folder.

In the following example, replace @*DB_NAME*@ with the name that you want to use for the created database and @*DB_USER*@ with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME/BPM/dbscripts/DB2/Create/createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - DB2
       - *CMNDB*
         - createSchema_Standard.sql
         - createSchema_Messaging.sql
       - *BPMDB*
         - createSchema_Standard.sql
         - createProcedure_Standard.sql
       - *PDWDB*
         - createSchema_Standard.sql

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

```
db2 connect to CMNDB USER username USING password
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Standard.sql
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/CMNDB/createSchema_Messaging.sql
db2 connect reset
```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

```
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createDatabase.sql
db2 connect to BPMDB USER username USING password
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createSchema_Standard.sql
db2 -tdGO -vf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/BPMDB/createProcedure_Standard.sql
db2 connect reset
```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

```
bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

```
bootstrapProcessServerData.sh -clusterName myAppCluster
```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

```
db2 connect to PDWDB USER username USING password
db2 -tvf profiles/DmgrProfile/dbscripts/deployment_environment_name/DB2/PDWDB/createSchema_Standard.sql
db2 connect reset
```

Configuring profiles, databases, and deployment environments for DB2 for z/OS:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Space component, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

You must have installed the product. You must also have created all the users that you specify in the properties file.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- Generates the scripts that you can use to create the database tables.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[-*environment_type*]-*topology*-*database_type*[-*suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 for z/OS database is called `Standard-PC-SingleCluster-DB2zOS.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Additional notes for database configuration:

   • By default, the **bpm.de.deferSchemaCreation** property in the sample configuration properties file for DB2 for z/OS is set to **true**. Do not change this setting, because, for a z/OS database, you cannot create the database objects at the same time that the database scripts are generated. After the **BPMConfig** command completes, you can run the database scripts to manually create the database objects at a time that you choose. When **bpm.de.deferSchemaCreation** is set to **true**, the bootstrap utility, which loads the Process database with system information, also must be run manually.

   • Work with your DB2 for z/OS database administrator to establish good naming conventions for DB2 components such as database names, storage group names, schema qualifiers, and VSAM catalog names (VCATs).

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** will fail when it is run.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

   The database SQL scripts are generated in the `DMGR_PROFILE/dbscripts` folder by default.

   • The database scripts that can be used to create the cluster-scoped database are generated in `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name`.

   These subdirectories also contain a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

5. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode.

After you have created your deployment environment, you can create the product databases.

After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Related tasks:

"Creating and configuring DB2 for z/OS databases after network deployment profile creation"
After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP    @STOGRP@      TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@      TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS          TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:

- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.

- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:

– Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the WebSphere administrator ID to the RACF group. For example, you can define a RACF group named S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS    OWNER=ZWPS    CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)=  ACCESS=  ACCESS COUNT=  UNIVERSAL ACCESS=
   WSADMIN   CONNECT   000000    NONE
    CONNECT ATTRIBUTES=NONE
    REVOKE DATE=NONE     RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10 views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create the databases and storage groups. Additionally, the GRANT permissions that are required to authorize the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided.

When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet, these values are propagated to the Database worksheet, and are used to complete the CREATE and GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create the databases and storage groups, and to use the GRANT statements to authorize the WebSphere administrator. For more information about using the artifacts generated from the spreadsheet, see the accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message in a log, but might cause problems later. It is better to resolve such problems now rather than when the system has been handed over for use. For example, correcting storage groups and VCATs is not easy after the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
* The **createDatabase.sh** script, which was additionally created with the database scripts
* Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script
* **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
* **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
* **createDatabase.sh** runs the SQL for each component in the correct sequence.
* **createDatabase.sh** creates database objects according to a naming convention that you define.
* **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
* **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
* **createDatabase.sh** runs in a UNIX System Services environment.
* **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools
* You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
* There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
* Some tools can be run from a z/OS environment.
* The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.
   - Specify the `DB2JccConfiguration.properties` file that defines the JDBC properties to be applied to the command line processor.

   You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

   ```
   export CLPHOME=clp_install_dir
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=clp_properties_file_path
   alias db2="java -Ddb2.jcc.propertiesFile=
   /file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

   For example:

   ```
   export CLPHOME=/shared/db2910_base
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=/wasv85config/clp.properties
   alias db2="java -Ddb2.jcc.propertiesFile=
   /wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server*:*port*/*database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

   For example:

   ```
   DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
   ```

Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

"Creating DB2 for z/OS database objects using the createDatabase.sh script"
You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

"Creating DB2 for z/OS database objects using the DB2 command line processor" on page 476
You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.

  1. `DB2 system administrator (SYSADM)` Create the physical databases as follows:
     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

     Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

– DMGR_PROFILE/dbscripts/*de_name*/DB2zOS/*cluster_database_name*

You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
```
db2 -tvf createDatabase.sql
```

2. `WebSphere administrator (DBADM)` Populate each database with objects as follows:

   a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

   b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to   EBCDIC. For example:
   ```
   iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
   ```
   Also grant execute permissions to the **createDatabase.sh** script.

   c. Run the **createDatabase.sh** script by using the following syntax:
   ```
   createDatabase.sh -DBAlias alias_name -RunSQL
   ```
   where:

   -DBAlias
   > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

   -RunSQL
   > Runs the SQL statements that create the database objects.

   For example:
   ```
   createDatabase.sh -DBAlias DSNXWBD -RunSQL
   ```

   For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

   d. Review the messages that are displayed in the console, checking that no error messages are displayed.

   When the script has finished running, you can also review the `z_output.txt` file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2 system administrator (SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

  1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

  2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to   EBCDIC. For example:
  ```
  iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
  ```
  Also grant execute permissions to the **createDatabase.sh** script.

  3. Run the **createDatabase.sh** script by using the following syntax:
  ```
  createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
  ```
  where:

  -DBAlias
  > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-DBCreate
  Creates the database.

-RunSQL
  Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

4. Review the messages that are displayed in the console, checking that no error messages are displayed.

   Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

   When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

5. Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 473
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2 system administrator (SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

   - `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*

   You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   `db2 -tvf createDatabase.sql`

2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the `DMGR_PROFILE/` `dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

      1) `createTablespace_Standard.sql`
      2) `createSchema_Standard.sql`
      3) `createSchema_Messaging.sql`
      4) `createProcedure_Standard.sql`

      Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the `-td` parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 473
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
   A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:

   - Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

     a. `createTablespace_Standard.sql`

     b. `createSchema_Standard.sql`

     c. `createSchema_Messaging.sql`

     d. `createProcedure_Standard.sql`

   These files are in ASCII format.

2. Assign the appropriate read permissions to the SQL files; for example:

   `chmod 644 createSchema_Standard.sql`

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:

   `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

   Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

   Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

   `iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql`

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.

5. Run the SQL files by using the tool of your choice.

6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use **BPMConfig** to create the network deployment profiles, the **manageprofiles** command-line utility to augment them, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the **BPMConfig** command-line utility, and augment them using the **manageprofiles** command-line utility.

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

    Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

    The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

    Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

    Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:
   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example
   bpm.dmgr.installPath=c:\\IBM\\BPM85.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

  profile_root/bin/startManager.sh

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

   profile_root/bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

   ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

   ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username *userID_for_authentication* -password *password_for_authentication*

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

   ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

⏏ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first

cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database subsystem is located.
     - **Port**: Type the port number to connect to the database subsystem.
     - **Database connection location**: Type the database connection location name.
     - **Storage group**: Type the storage group name.
     - **Volume Catalog**: Type the volume catalog name.
     - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
     - **Index buffer pool** : Type the index buffer pool name.
     - **LOB buffer pool** : Type the LOB buffer pool name.
     - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
     - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
     - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
   - **Process database**
     - **Name**: Type a name for the Process Center database.
     - **Schema name**: Type the schema name for the Process database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
     - **Schema name**: Type the schema name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.
       - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. Load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the

administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

  The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

  There are four types of environments available for selection:

  Development

  > Select **Development** if the server will serve in a development capacity.

  Test Select **Test** if the server you are configuring will be used as a testing environment.

  Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

  Production

  > Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database subsystem is located.
  - **Port**: Type the port number to connect to the database subsystem.
  - **Database connection location**: Type the database connection location name.
  - **Storage group**: Type the storage group name.
  - **Volume Catalog**: Type the volume catalog name.
  - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
  - **Index buffer pool** : Type the index buffer pool name.
  - **LOB buffer pool** : Type the LOB buffer pool name.
  - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
  - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
  - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
- **Process database**
  - **Name**: Type a name for the Process Center database.
  - **Schema name**: Type the schema name for the Process database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
  - **Schema name**: Type the schema name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.
    - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas

manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. Load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Generating DB2 for z/OS database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

   The database SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. This folder includes the following sub-folder:
   - The database scripts that can be used to create the cluster-scoped database are generated in the following directory: *DMGR_PROFILE*/dbscripts/de_name/DB2zOS/cluster_database_name.

   This sub-folder also contains a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.

4. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sql** script as an ASCII text file, and transfer the database schema files in binary mode.

Related tasks:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed

nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP   @STOGRP@      TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@     TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS          TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:
- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.
- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:
  - Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

```
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
         GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the
WebSphere administrator ID to the RACF group. For example, you can define a RACF group named
S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS    OWNER=ZWPS    CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)= ACCESS=  ACCESS COUNT=  UNIVERSAL ACCESS=
   WSADMIN   CONNECT   000000    NONE
    CONNECT ATTRIBUTES=NONE
    REVOKE DATE=NONE     RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this
spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10
views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is
available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create
the databases and storage groups. Additionally, the GRANT permissions that are required to authorize
the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided.
When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet,
these values are propagated to the Database worksheet, and are used to complete the CREATE and
GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create the databases and storage groups, and to use the GRANT statements to authorize the WebSphere administrator. For more information about using the artifacts generated from the spreadsheet, see the accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message in a log, but might cause problems later. It is better to resolve such problems now rather than when the system has been handed over for use. For example, correcting storage groups and VCATs is not easy after the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
- The **createDatabase.sh** script, which was additionally created with the database scripts
- Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script
- **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
- **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
- **createDatabase.sh** runs the SQL for each component in the correct sequence.
- **createDatabase.sh** creates database objects according to a naming convention that you define.
- **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
- **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
- **createDatabase.sh** runs in a UNIX System Services environment.
- **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools
- You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
- There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
- Some tools can be run from a z/OS environment.
- The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.
   - Specify the `DB2JccConfiguration.properties` file that defines the JDBC properties to be applied to the command line processor.

   You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

   ```
   export CLPHOME=clp_install_dir
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=clp_properties_file_path
   alias db2="java -Ddb2.jcc.propertiesFile=
   /file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

   For example:

   ```
   export CLPHOME=/shared/db2910_base
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=/wasv85config/clp.properties
   alias db2="java -Ddb2.jcc.propertiesFile=
   /wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

   For example:

   ```
   DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
   ```

   Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

"Creating DB2 for z/OS database objects using the createDatabase.sh script"
You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

"Creating DB2 for z/OS database objects using the DB2 command line processor" on page 499
You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.

  1. `DB2 system administrator (SYSADM)` Create the physical databases as follows:

     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

     Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

     – DMGR_PROFILE/dbscripts/*de_name*/DB2zOS/*cluster_database_name*

You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
```
db2 -tvf createDatabase.sql
```

2. `WebSphere administrator (DBADM)` Populate each database with objects as follows:

   a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

   b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
   ```
   iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
   ```
   Also grant execute permissions to the **createDatabase.sh** script.

   c. Run the **createDatabase.sh** script by using the following syntax:
   ```
   createDatabase.sh -DBAlias alias_name -RunSQL
   ```
   where:

   -DBAlias
   > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

   -RunSQL
   > Runs the SQL statements that create the database objects.

   For example:
   ```
   createDatabase.sh -DBAlias DSNXWBD -RunSQL
   ```
   For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

   d. Review the messages that are displayed in the console, checking that no error messages are displayed.

   When the script has finished running, you can also review the `z_output.txt` file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2 system administrator (SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

  1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

  2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
  ```
  iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
  ```
  Also grant execute permissions to the **createDatabase.sh** script.

  3. Run the **createDatabase.sh** script by using the following syntax:
  ```
  createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
  ```
  where:

  -DBAlias
  > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-DBCreate
> Creates the database.

-RunSQL
> Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

4. Review the messages that are displayed in the console, checking that no error messages are displayed.

   Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

   When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

5. Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 496
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*`de_name`*`/DB2zOS/`*`cluster_database_name`*

You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
`db2 -tvf createDatabase.sql`

2. `WebSphere administrator (DBADM)` Populate each database with objects as follows:

a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the `DMGR_PROFILE/dbscripts/`*`de_name`*`/DB2zOS/`*`cluster_database_name`* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:

   1) `createTablespace_Standard.sql`
   2) `createSchema_Standard.sql`
   3) `createSchema_Messaging.sql`
   4) `createProcedure_Standard.sql`

   Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2 system administrator (SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 496
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
> A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:
   - Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
     a. `createTablespace_Standard.sql`
     b. `createSchema_Standard.sql`
     c. `createSchema_Messaging.sql`
     d. `createProcedure_Standard.sql`

   These files are in ASCII format.

2. Assign the appropriate read permissions to the SQL files; for example:

   `chmod 644 createSchema_Standard.sql`

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:

   `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

   Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

   Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

   `iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql`

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.

5. Run the SQL files by using the tool of your choice.

6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring profiles, databases, and deployment environments for Oracle:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:
- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.

- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[-*environment_type*]-*topology*-*database_type*[-*suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called Standard-PC-SingleCluster-DB2.properties.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from local host to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   BPM_home/bin/BPMConfig -create -de *my_environment.properties*

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Related tasks:

"Running the generated Oracle database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*
           - createSchema_Standard.sql
           - createSchema_Messaging.sql
         - *psuser*
           - createSchema_Standard.sql
           - createProcedure_Standard.sql
         - *pdwuser*
           - createSchema_Standard.sql

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   sqlplus *cmnuser*/*cmnpassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/cmnuse

   sqlplus *cmnuser*/*cmnpassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/cmnuse

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   sqlplus *psuser*/*pspassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/psuser/

   sqlplus *psuser*/*pspassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/psuser/

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   bootstrapProcessServerData.sh -clusterName myAppCluster

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   sqlplus *pdwuser*/*pdwpassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/pdwuse

Related tasks:

"Generating Oracle database scripts using the BPMConfig command" on page 520
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use **BPMConfig** to create the network deployment profiles, the **manageprofiles** command-line utility to augment them, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the **BPMConfig** command-line utility, and augment them using the **manageprofiles** command-line utility.

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:
   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.
- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**

- **bpm.dmgr.nodeName=**
- **bpm.dmgr.profileName=**

To create a managed node profile, you must specify the following minimum set of properties:

- **bpm.dmgr.soapPort=**
- **bpm.node.#.hostname=**
- **bpm.node.#.installPath=**

It is recommended that you also set:

- **bpm.node.#.nodeName=**
- **bpm.node.#.profileName=**

The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   install_root/bin/BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

   profile_root/bin/startManager.sh

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.

- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

   profile_root/bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

   ```
   ./addNode.sh deployment_manager_host deployment_manager_SOAP_port
   ```

   Run the following command from the command line if security is enabled:

   ```
   ./addNode.sh deployment_manager_host deployment_manager_SOAP_port -username
   userID_for_authentication -password password_for_authentication
   ```

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

   ```
   ADMU0003I: Node DMNDID2Node03 has been successfully federated.
   ```

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.

- Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

- **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.

- **Port**: Type the port number to connect to the database.
- **Instance name**: Type the instance name for the Oracle database.
- **Create Tables**: Select to create the required tables.

   Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **User name**: Type a user name for the Process Center database.
  - **Password**: Type the password for the Process Center database user.
  - **Confirm password**: Type to confirm the password for the Process database user.
- **Performance Data Warehouse database**
  - **User name**: Type a user name for the Performance Data Warehouse database.
  - **Password**: Type the password for the Performance Data Warehouse database user.
  - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **User name**: Type a user name for the messaging engine database.
    - **Password**: Type the password for the messaging engine database user.
    - **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:
- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

   a. Stop the deployment environment.

   b. Stop the node agent.

   c. Stop the deployment manager.

   d. Start the deployment manager.

   e. Start the node agent.

   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  – Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.

– Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.

- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:

- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

- **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
- **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.
   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.
   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on

a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

There are four types of environments available for selection:

Development
>   Select **Development** if the server will serve in a development capacity.

Test   Select **Test** if the server you are configuring will be used as a testing environment.

Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production
>   Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Instance name**: Type the instance name for the Oracle database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **User name**: Type a user name for the Process Center database.
  - **Password**: Type the password for the Process Center database user.
  - **Confirm password**: Type to confirm the password for the Process database user.
- **Performance Data Warehouse database**
  - **User name**: Type a user name for the Performance Data Warehouse database.
  - **Password**: Type the password for the Performance Data Warehouse database user.
  - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **User name**: Type a user name for the messaging engine database.
    - **Password**: Type the password for the messaging engine database user.
    - **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:
- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

   a. Stop the deployment environment.

   b. Stop the node agent.

   c. Stop the deployment manager.

   d. Start the deployment manager.

   e. Start the node agent.

   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*/BPM/dbscripts/Oracle/Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace @*DB_USER*@ with the user name that you want to use for the database and replace @*DB_PASSWD*@ with the password for that user.

Run the following sample script to create the database users.
BPM_HOME/BPM/dbscripts/Oracle/Create/createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Generating Oracle database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

Important: If you are using an Oracle database, you must include the database user name and password for all databases, including the optional ones.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:
1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file *BPM_HOME*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME/bin/BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.

- To generate the database scripts in an output directory of your choice, use the following syntax:

  `BPM_HOME`/bin/BPMConfig -create -sqlfiles *my_environment.properties* -outputDir /MyBPMScriptDir

  In the above syntax, **MyBPMScriptDir** is the directory you specify.

  Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the `DMGR_PROFILE`/dbscripts folder by default. This folder includes the following sub-folder:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a `createDatabase.sql` script, which you can use to run the database scripts to create the Oracle database tables.

A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - Oracle
    - *orcl*
      - *cmnuser*
        - `createSchema_Standard.sql`
        - `createSchema_Messaging.sql`
      - *psuser*
        - `createSchema_Standard.sql`
        - `createProcedure_Standard.sql`
      - *pdwuser*
        - `createSchema_Standard.sql`

In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 503
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment
Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the
deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the
   following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*
           - createSchema_Standard.sql
           - createSchema_Messaging.sql
         - *psuser*
           - createSchema_Standard.sql
           - createProcedure_Standard.sql
         - *pdwuser*
           - createSchema_Standard.sql

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user,
   psuser is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse
   databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment
   environment-level** Common database configuration:

   sqlplus *cmnuser*/*cmnpassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/cmnuse

   sqlplus *cmnuser*/*cmnpassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/cmnuse

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database
   configuration:

   sqlplus *psuser*/*pspassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/psuser/

   sqlplus *psuser*/*pspassword*@orcl @*BPM_HOME*/profiles/DmgrProfile/dbscripts/*deployment_environment_name*/Oracle/orcl/psuser/

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM
   applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment
   but not part of a cluster:

   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or
   Process Center:

   bootstrapProcessServerData.sh -clusterName myAppCluster

   Additional information about running the **bootstrapProcessServerData** command is found in the
   topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data
   Warehouse database configuration:

```
    sqlplus pdwuser/pdwpassword@orcl @BPM_HOME/profiles/DmgrProfile/dbscripts/deployment_environment_name/Oracle/orcl/pdw
```

Configuring profiles, databases, and deployment environments for SQL Server:

Select which method to use to configure your profiles, databases, and network deployment environment.
You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and
deployment environment setup.

Tip: If you are using the federated repositories as a user registry, you can ignore warnings in the
systemout.log file about maximum key length: **... Warning! The maximum key length is 900 bytes ...**. If
you are using the stand-alone LDAP registry, ensure that the number of characters in all the user
distinguished name (DN) entries in your organization do not exceed the 131 character limit. If the
number of characters in any of the user DN entries exceeds 131 characters, you must change the user
account registry to the federated repositories option.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process,
database scripts are generated, which you must run to create the tables for the databases.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are
generated by the BPMConfig command or the Deployment Environment wizard. Although you must
create the databases by manually running the SQL scripts, you can create the tables by either manually
running the scripts or by running them automatically when the BPMConfig command or Deployment
Environment wizard are used to configure your deployment environment. You can also automatically
create the bootstrapping during deployment environment configuration. Both the tables and the
bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or
automatically run to create the database tables. If the property is set to true, you must create the tables
by manually running the scripts. If the property is set to false, the scripts are automatically run during
deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or
during configuration. To generate the SQL scripts before deployment environment configuration, run the
following command:
```
BPMConfig.sh -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before
deployment environment configuration. When you subsequently configure your deployment
environment, you will be able to automatically run the SQL scripts that create the corresponding database
tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be
automatically generated when you run the following command to configure the deployment
environment:
```
BPMConfig.sh -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL
scripts are generated into the directory *profile_root*/dbscripts.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**.

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

    On Windows XP and Windows Server 2003:

    a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

    b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

    c. Click the **MSDTC** tab, and then click **Security Configuration**.

    d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

    e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

    f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

    On Windows Vista, Windows 7, and Windows Server 2008 R2:

    a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

    b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

    c. Right-click **Local DTC** and then select **Properties**.

    d. Click the **Security** tab on the **Local DTC Properties** window.

    e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

    f. Click **OK** again to close the Properties window, and then close Component Services.

    g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

    a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

    b. If BPM is already installed, go to `bpm_install_root`/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

       - Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/ MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the x64 folder.

       - Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

- Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/ Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

If IBM Business Process Manager is not installed, run the following command from the command line:

```
sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"
```

Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.
2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   ```

```
        GO
        EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
        EXEC sp_addrolemember 'db_datareader', @DB_USER@;
        EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
```

In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 64. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

For your SQL Server database server, make sure that the username and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:

- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

Note: If SQLServer Windows Authentication is used, you must manually run the bootstrap utility to load the Process database because this step is not done automatically by **BPMConfig**.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[-*environment_type*]-*topology*-*database_type*[-*suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called Standard-PC-SingleCluster-DB2.properties.
3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from local host to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   • *deployment_environment_name*

- – SQLServer
  - - *CMNDB*
    - • *schema name*
      - – `createSchema_Standard.sql`
      - – `createSchema_Messaging.sql`
  - - *BPMDB*
    - • *schema name*
      - – `createSchema_Standard.sql`
      - – `createProcedure_Standard.sql`
  - - *PDWDB*
    - • *schema name*
      - – `createSchema_Standard.sql`

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/CMN[
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/CMN[
   ```

   In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/BPM[
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/BPM[
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration. For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/PDW[
   ```

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use **BPMConfig** to create the network deployment profiles, the **manageprofiles** command-line utility to augment them, and the Deployment Environment wizard to create the network deployment environment.

If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the **BPMConfig** command-line utility, and augment them using the **manageprofiles** command-line utility.

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*/properties/ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.sh -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*/properties/profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*/profileTemplates/BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:
   ```
   manageprofiles.sh -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*/BPM/samples/config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - `bpm.dmgr.hostname=`
   - `bpm.dmgr.installPath=`

   It is also recommended that you set values for:
   - `bpm.cell.name=`
   - `bpm.dmgr.nodeName=`
   - `bpm.dmgr.profileName=`

   To create a managed node profile, you must specify the following minimum set of properties:
   - `bpm.dmgr.soapPort=`
   - `bpm.node.#.hostname=`
   - `bpm.node.#.installPath=`

   It is recommended that you also set:
   - `bpm.node.#.nodeName=`
   - `bpm.node.#.profileName=`

   The `bpm.dmgr.soapPort` property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the `bpm.dmgr.hostname` property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the `BPMConfig` command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   For more information about the available properties, read the comments in the sample files, or see the `BPMConfig` command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the `BPMConfig` command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `install_root/bin/BPMConfig -create -profile my_environment.properties`

Important: Run the `BPMConfig` command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the `federateLater` option of the `BPMConfig` command when creating the managed node profiles and then run the command with the `create de` option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:
*   You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
*   The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root/bin/startManager.sh
*   The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
*   The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
*   The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root/bin

2. Run the **addNode** command.

    Run the following command from the command line if security is not enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port*

    Run the following command from the command line if security is enabled:

    ./addNode.sh *deployment_manager_host deployment_manager_SOAP_port* -username
    userID_for_authentication -password *password_for_authentication*

    An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

    ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

▸ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

SQL Server database server with Windows authentication:

Create your network deployment environment to work with an SQL Server database server using Windows authentication. The username and password you used to log on to the system would be used to connect to and access the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.
7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number

of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the `BPMConfig` command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

11. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.

    f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

    g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

    h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
     > Select **Development** if the server will serve in a development capacity.

     Test   Select **Test** if the server you are configuring will be used as a testing environment.

     Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production

> Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**

- **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:

- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the `BPMConfig` command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp`.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the `bootstrapProcessServerData` command.

Important: This command must be run before starting any cluster members.

12. Verify the deployment environment was created properly by completing the following steps:
    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the `XXXBE##` schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

SQL Server database server without Windows authentication:

Create your network deployment environment to work with an SQL Server database server without Windows authentication. You will need to provide the username and passsword for accessing the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:

• Installed the product

- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the

administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

   Attention: For an SQL server:
   - Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
   - IBM Process Server and IBM Performance Data Warehouse should not use the same database.
   - If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

   You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the `BPMConfig` command.

   You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

   Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page

after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

11. Verify the deployment environment was created properly by completing the following steps:
   a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
   b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.
   c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.
   d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.
   e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.
   f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.
   g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.
   h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
   a. Stop the deployment environment.
   b. Stop the node agent.
   c. Stop the deployment manager.
   d. Start the deployment manager.
   e. Start the node agent.
   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

     Development
     > Select **Development** if the server will serve in a development capacity.

     Test   Select **Test** if the server you are configuring will be used as a testing environment.

     Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

     Production
     > Select **Production** if the server will serve in a production capacity.

   - **Use server offline**

     Indicate whether the server you are configuring is an offline server.

     An offline server is a Process Server that is not connected to the Process Center.

Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.

- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root/logs/config` folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the `XXXBE##` schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to `true`, you must create the tables by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:

```
BPMConfig.sh -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:

```
BPMConfig.sh -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory *profile_root*/dbscripts.

Configuring XA transactions for SQL Server:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**..

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

   c. Click the **MSDTC** tab, and then click **Security Configuration**.

   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

   c. Right-click **Local DTC** and then select **Properties**.

   d. Click the **Security** tab on the **Local DTC Properties** window.

   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

   f. Click **OK** again to close the Properties window, and then close Component Services.

   g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

b. If BPM is already installed, go to *bpm_install_root*/jdbcdrivers/SQLServer/xa to obtain the files you require in the following steps:

   • Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/ MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the x64 folder.

   • Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

   • Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.

2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**

3. Locate **TCP/IP** on the right-hand side.

4. Double click **TCP/IP** and enable it under the **Protocol** tab.

5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

• You cannot share databases across multiple installations or Deployment Environments

• The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

• Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server

• CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server

• The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*/BPM/dbscripts/SQLServer/ `Create` folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`

3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME/BPM/dbscripts/SQLServer/Create/createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"`

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

The **createUser.sql** script is available in the *BPM_HOME*/BPM/dbscripts/SQLServer/Create folder is used to create the users and schema for the SQL Server.

1. Locate the SQL scripts to run.

2. Run the scripts to create the users and schemas for SQL Server databases. For example, run the following sample script to create the required users.

   ```
   BPM_HOME/BPM/dbscripts/SQLServer/Create/createUser.sql
   ```

   Optionally, if the above script is unavailable during configuration, an copy the contents of the above SQL file and run the commands from the command line as follows:

   ```
   USE master
   GO
   CREATE LOGIN @DB_USER@ WITH PASSWORD='@DB_PASSWD@'
   GO

   USE @DB_NAME@
   GO
   CREATE USER @DB_USER@ FOR LOGIN @DB_USER@ WITH DEFAULT_SCHEMA=@DB_USER@
   GO
   CREATE SCHEMA @DB_USER@ AUTHORIZATION @DB_USER@
   GO
   EXEC sp_addrolemember 'db_ddladmin', @DB_USER@;
   EXEC sp_addrolemember 'db_datareader', @DB_USER@;
   EXEC sp_addrolemember 'db_datawriter', @DB_USER@;
   ```

   In the above example, replace *@DB_NAME@* with the BPM database name for which you created users and schema, *@DB_USER@* with the database user you want to create, and *@DB_PASSWD@* with the password for that user.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 65. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that

is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

For your SQL Server database server, make sure that the username and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:

- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.

- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

Note: If SQLServer Windows Authentication is used, you must manually run the bootstrap utility to load the Process database because this step is not done automatically by **BPMConfig**.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*/BPM/samples/config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[-*environment_type*]-*topology*-*database_type*[-*suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.

- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created. For example:

   `BPM_home/bin/BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

Generating SQL database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:
1. On the machine where you want to create the deployment environment, locate the appropriate sample properties file `BPM_HOME/BPM/samples/config`.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the `dbscripts` directory of the deployment manager profile, use the following syntax:

     `BPM_HOME/bin/BPMConfig -create -sqlfiles my_environment.properties`

     Note: The SQL scripts are generated in the `DMGR_PROFILE/dbscripts` folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     `BPM_HOME/bin/BPMConfig -create -sqlfiles my_environment.properties -outputDir /MyBPMScriptDir`

     In the above syntax, **MyBPMScriptDir** is the directory you specify.

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the `DMGR_PROFILE/dbscripts` folder by default. This folder includes the following sub-folder:
- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the SQL Server database tables.

A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - SQLServer
    - *CMNDB*
      - *schema name*
        - createSchema_Standard.sql
        - createSchema_Messaging.sql
    - *BPMDB*
      - *schema name*
        - createSchema_Standard.sql
        - createProcedure_Standard.sql
    - *PDWDB*
      - *schema name*
        - createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using the BPMConfig command" on page 527
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*/dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - SQLServer
       - *CMNDB*
         - *schema name*
           - createSchema_Standard.sql
           - createSchema_Messaging.sql

- *BPMDB*
  - *schema name*
    - createSchema_Standard.sql
    - createProcedure_Standard.sql
- *PDWDB*
  - *schema name*
    - createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/C
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/C
   ```

   In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/B
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/B
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.sh -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.sh -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration. For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles/DmgrProfile/dbscripts/deployment_environment_name/SQLServer/P
   ```

Loading the database with system information in a network deployment environment:

If you are creating a Standard or Advanced network deployment environment, you must run the **bootstrapProcessServerData** command before you try to start or use Process Server or Process Center.

When you run the **bootstrapProcessServerData** command, configuration data for the BPM applications is loaded into the Process database. This data is required for the BPM applications to run correctly.

- Important: If you created an Advanced-only Process Server deployment environment (an environment without the capabilities included in Standard deployment environments), you can skip this task. There is no need to run the **bootstrapProcessServerData** command.

- If you created the database tables when you created the deployment environment, either by setting the parameter **bpm.de.deferSchemaCreation** to **false** for the **BPMConfig** command, or by enabling **Create Tables** in the Deployment Environment wizard, there is no need to run the **bootstrapProcessServerData** command.
- In a Standard or Advanced network deployment (ND) environment, you must run this command after a server or cluster of servers is created. For a cluster, you need to specify the cluster name. Run this command before the first server is started. You do not need to rerun the command if you add another cluster member.
- If a single WebSphere cell contains multiple application target clusters, you must run this command on each of the clusters.

Run the bootstrap utility from the command line. The bootstrap utility is found in the deployment manager profile directory. For example: `Linux` `UNIX` *BPM_HOME*/profiles/*dmgr_profile_name*/bin Run the bootstrap utility using one of the following commands:

- **bootstrapProcessServerData.sh -clusterName** *cluster_name*
- **bootstrapProcessServerData.sh -nodeName** *node_name* **-serverName** *server_name*

where:

- **-clusterName** is the name of the application target cluster. You must specify this parameter when you want the bootstrap data to run on a cluster.
- **-nodeName** is the name of the node. You must specify this parameter and the **-serverName** parameter when you want the bootstrap data to run on the server that is part of the network deployment environment and not part of the cluster.
- **-serverName** is the name of the server. You must specify either this parameter and the **-nodeName** parameter when you want the bootstrap data to run on the server that is part of the network deployment and not part of the cluster.

The parameters are case-sensitive

You have loaded the database with system information before successfully starting the IBM Business Process Manager server. The log information for the bootstrap operation is saved to the *USER_INSTALL_ROOT*/logs directory in a file called bootstrapProcessServerData.*clusterName.timestamp*.log or bootstrapProcessServerData.*nodeName.serverName.timestamp*.log depending on the target you specified. The console displays a subset of the logged information.

Bootstrap data onto a server that is part of an ND environment but not part of a cluster:

bootstrapProcessServerData.sh –nodeName node1 –serverName myServer

Bootstrap data onto a cluster that hosts the Process Server or Process Center:

bootstrapProcessServerData.sh –clusterName myAppCluster

Starting your environment and verifying the installation:

After you create the deployment environment and complete the relevant configuration tasks, you can start all the servers in a cluster or deployment environment. Then you can verify the IBM Business Process Manager installation.

1. Start the cluster or deployment environment as described in Starting and stopping your environment.
2. From the administrative console, verify that you can see **IBM Business Process Manager** on the Welcome page.
3. Check that the enterprise applications are started by clicking **Applications** > **Application Types** > **WebSphere enterprise applications**.
4. Check that the messaging engine is started by clicking **Service integration** > **Buses**. Then click the name of the bus, and under **Topology**, click **Messaging engines**.

After the cluster has started, verify that the applications are set up correctly by running a series of tests and deploying samples as detailed in the following table.

Table 66. Application verification tests

Application and description	Action
Process Admin Console Use the Process Admin Console to manage the Process Servers in your runtime environments and the Process Center server. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Log on to the Process Admin Console by using the default account for IBM Business Process Manager administrators. For information about accessing the Process Admin Console, see Accessing the Process Admin Console.
Performance Admin Console Use the Performance Admin Console tools to manage the Performance Data Warehouse queues in your environment, manage data transfer errors, and monitor overall performance. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Verify that you can access the Performance Admin Console, as described in Managing Business Performance Data Warehouses.
Process Portal Use Process Portal to interact with processes from a web browser. **Restriction:** Process Portal is not available if you created an Advanced-only Process Server deployment environment.	Process Portal is configured by default. Verify that you can access Process Portal and that the applications used by Process Portal are all accessible, as described in Verifying Process Portal.
Hiring Sample process application Use the samples that are provided with the product to further verify the installation and as tutorials to learn the product.	Run the Hiring Sample process application and tutorial in Process Designer, as described in Samples and tutorials. Additionally deploy the samples to a Process Server and then run them, as described in Installing process application snapshots.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Installing and configuring IBM Business Process Manager on Windows

Install IBM Business Process Manager on Windows and configure a network deployment environment.

Installing IBM Business Process Manager Standard using a typical installation and configuration path

The Typical installation option is the simplest and quickest method for installing and configuring IBM Business Process Manager Standard.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Installing and configuring IBM Business Process Manager Standard with a new DB2 Express database server:

The typical installation can install DB2 Express on Windows and configure the required databases and deployment environment for IBM Business Process Manager. Only select this path if you have administrative privileges (Administrator user) and do not have an existing DB2 database server on the system.

Installing and configuring Process Center with a new DB2 Express database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

The typical installation installs DB2 Express and configures the required databases for IBM Business Process Manager. Only select this path if you have administrative privileges (Administrator user) and do not have an existing DB2 database server on the system.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > C:/*HOMEPATH*/bpm_updates.properties

   where:

   > On Windows XP, the HOMEPATH environment variable points to C:/Documents and Settings/*user_name*
   >
   > On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to C:/Users/*user_name*

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=C:/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=C:/launchpad_updates
   fixpack.WAS_REP=C:/WAS_updates
   fixpack.BPM_REP=C:/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

- If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

  To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

     (from a command line) `DVD_root`/`launchpad.exe`
- If you are installing from images downloaded from Passport Advantage, perform the following steps:
  a. Go to the directory into which you extracted the images.
  b. Enter the following command to start the launchpad:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

        (from a command line) `extract_directory`/`launchpad.exe`

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Click **Next**.

7. Optionally change the location information.
   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   Restriction: Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

8. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

9. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator.

A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

10. Click **Next**.
11. Select **No. I need one installed for me.** to install DB2 Express.
12. Specify the **Username** and **Password** for the DB2 Express database.

   Restriction:
   - User names must not contain National Language Strings (NLS)
   - User names must be maximum 30 characters in length
13. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

   Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

   After successfully installing the product, you can use Installation Manager to install the required fixes.
14. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.
15. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

If you used the Windows domain user ID to create a new DB2 Express database and tables, and profile creation failed, use one of the following solutions:
- Log into the Windows system as a local system user and run the Profile Management Tool to create a profile.
- Follow the steps listed in DB2 log file error: SQL1092N "USERID does not have the authority to perform the requested command or operation" and then create a profile.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➡ Installation Manager updates

Installing and configuring Process Server with a new DB2 Express database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

The typical installation installs DB2 Express and configures the required databases for IBM Business Process Manager. Only select this path if you have administrative privileges (Administrator user) and do not have an existing DB2 database server on the system.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

       C:/*HOMEPATH*/bpm_updates.properties

   where:

   > On Windows XP, the HOMEPATH environment variable points to `C:/Documents and Settings/`*user_name*

   > On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to `C:/Users/`*user_name*

   Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=C:/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=C:/launchpad_updates
   fixpack.WAS_REP=C:/WAS_updates
   fixpack.BPM_REP=C:/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

         (from a command line) *DVD_root*/`launchpad.exe`

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

> (from a command line) *extract_directory*/`launchpad.exe`

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Click **Next**.

7. Specify Process Server information:
   - **Hostname**: This field shows the name of your machine.
   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:
     - Select **Production** if the server is to be used in a production capacity.
     - Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     - Select **Test** if the server is to be used as a testing environment, for example, for load testing.
     - Select **Development** if the server is to be used in a development capacity.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.

   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

   - Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

   Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

8. Click **Next**.
9. Select **No. I need one installed for me.** to install DB2 Express.
10. Specify the **Username** and **Password** for the DB2 Express database.

   Restriction:
   - User names must not contain National Language Strings (NLS)
   - User names must be maximum 30 characters in length

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

   Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

   After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

If you used the Windows domain user ID to create a new DB2 Express database and tables, and profile creation failed, use one of the following solutions:

- Log into the Windows system as a local system user and run the Profile Management Tool to create a profile.
- Follow the steps listed in DB2 log file error: SQL1092N "USERID does not have the authority to perform the requested command or operation" and then create a profile.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➡ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with a DB2 database server:

You can install IBM Business Process Manager using an existing DB2 database server.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the `createDatabase.sql` script is used to create the databases. It is available in the *BPM_HOME*`\BPM\dbscripts\DB2\Create` folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script `createDatabase.sql` to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME`\BPM\dbscripts\DB2\Create\createDatabase.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Installing and configuring Process Center with a DB2 database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:
• The user name and password for database authentication

- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

       C:/*HOMEPATH*/bpm_updates.properties

   where:

   On Windows XP, the HOMEPATH environment variable points to C:/Documents and Settings/*user_name*

   On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to C:/Users/*user_name*

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=C:/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=C:/launchpad_updates
   fixpack.WAS_REP=C:/WAS_updates
   fixpack.BPM_REP=C:/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click launchpad.exe and select **Run as administrator**.

       (from a command line) *DVD_root*/launchpad.exe

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

b. Enter the following command to start the launchpad:

   To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

   (from a command line) *extract_directory*/`launchpad.exe`

 3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

 4. After starting the launchpad, click **Typical installation** on the Welcome page.

 5. Select **Install Process Center** and click **Next**.

 6. Click **Next**.

 7. Optionally change the location information:
    * **Hostname**: This field shows the name of your machine.

      Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.
    * **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

      Note:
      – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
      – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

 8. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

 9. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

10. Click **Next**.

11. Select **Yes** to use an existing database.

12. Specify the required database information.

Table 67. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.

Table 67. Required database configuration fields for DB2 (continued)

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 50000 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

13. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

14. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

15. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

 Installation Manager updates

Installing and configuring Process Server with a DB2 database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty. The databases must be created with at least a 32K page size.

Be prepared to specify the following information during installation:

- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   `C:/`*HOMEPATH*`/bpm_updates.properties`

   where:

   On Windows XP, the HOMEPATH environment variable points to `C:/Documents and Settings/`*user_name*

   On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to `C:/Users/`*user_name*

   Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

   ```
   ifix.1=C:/bpmUpdates
   fixpack.2=http://test/rep
   launchpad.1=C:/launchpad_updates
   fixpack.WAS_REP=C:/WAS_updates
   fixpack.BPM_REP=C:/BPM_updates
   ```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

        (from a command line) *DVD_root*`/launchpad.exe`

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

a. Go to the directory into which you extracted the images.

b. Enter the following command to start the launchpad:

To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

(from a command line) *extract_directory*/`launchpad.exe`

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Click **Next**.

7. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.
   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:
     – Select **Development** if the server is to be used in a development capacity.
     – Select **Production** if the server is to be used in a production capacity.
     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
     – Select **Test** if the server is to be used as a testing environment, for example, for load testing.

   - **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

     Restriction: Do not mix production and non-production servers in the same cell.

   - Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

   - Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

8. Click **Next**.
9. Select **Yes** to use an existing database.
10. Specify the required database information.

Table 68. Required database configuration fields for DB2

Field	Action needed
Username	Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Enter a password to authenticate with the database.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of `50000` or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the name for the Process database.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the name for the Performance Data Warehouse database.

Click **Test Database Connection** to verify that you can connect to the BPM databases that are created. Only if the connections to the databases are successful, you can click **Next** to proceed.

11. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

12. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

13. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

If you used the Windows domain user ID to create a new DB2 Express database and tables, and profile creation failed, use one of the following solutions:

- Log into the Windows system as a local system user and run the Profile Management Tool to create a profile.
- Follow the steps listed in DB2 log file error: SQL1092N "USERID does not have the authority to perform the requested command or operation" and then create a profile.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

 Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an Oracle database server:

You can install IBM Business Process Manager using an Oracle database server.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the `BPM_HOME`\BPM\dbscripts\Oracle\Create folder contains the `createUser.sql` script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
`BPM_HOME`\BPM\dbscripts\Oracle\Create\createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Installing and configuring Process Center with an Oracle database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   > C:/*HOMEPATH*/bpm_updates.properties

   where:

   > On Windows XP, the HOMEPATH environment variable points to C:/Documents and Settings/*user_name*

   > On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to C:/Users/*user_name*

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

   The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=C:/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=C:/launchpad_updates
fixpack.WAS_REP=C:/WAS_updates
fixpack.BPM_REP=C:/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

     (from a command line) *DVD_root*/launchpad.exe

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

        (from a command line) *extract_directory*/launchpad.exe

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Click **Next**.

7. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:

     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.

     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

8. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables

administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

9. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

10. Click **Next**.

11. Select **Yes** to use an existing database.

12. Specify the required database information.

Table 69. Required database configuration fields for Oracle

Field	Action needed
Instance name	Enter the name of the Oracle database instance.
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Common database	For the deployment environment-level Common database, enter values for the following parameters: • **User name**: Enter the Common database user name. • **Password**: Enter a password to authenticate with the Common database.
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

13. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

   Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

   After successfully installing the product, you can use Installation Manager to install the required fixes.

14. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

15. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

⮕ Installation Manager updates

Installing and configuring Process Server with an Oracle database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

       C:/*HOMEPATH*/bpm_updates.properties

   where:

       On Windows XP, the HOMEPATH environment variable points to C:/Documents and Settings/*user_name*

       On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to C:/Users/*user_name*

   Note: Ensure that you have read/write access to the folders specified in the bpm_updates.properties file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=C:/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=C:/launchpad_updates
fixpack.WAS_REP=C:/WAS_updates
fixpack.BPM_REP=C:/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click launchpad.exe and select **Run as administrator**.

     (from a command line) *DVD_root*/launchpad.exe

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click launchpad.exe and select **Run as administrator**.

        (from a command line) *extract_directory*/launchpad.exe

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:

     – The installation location must either be an empty directory or a directory that does not exist and is created during installation.

     – Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:

     – Select **Development** if the server is to be used in a development capacity.

     – Select **Production** if the server is to be used in a production capacity.

     – Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.

- Select **Test** if the server is to be used as a testing environment, for example, for load testing.
- **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

   Restriction: Do not mix production and non-production servers in the same cell.
- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.
- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.
- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.
- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.
- **Password**: Enter the password for the Process Center user.

   You can click **Test Connection** to check the connection to the Process Center.
7. Click **Next**.
8. Select **Yes** to use an existing database.
9. Specify the required database information.

Table 70. Required database configuration fields for Oracle

Field	Action needed
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1521 or enter the correct server port number.
Instance name	Enter the name of the Oracle database instance.

Table 70. Required database configuration fields for Oracle (continued)

Field	Action needed
Common database	For the deployment environment-level Common database, enter values for the following parameters: • **User name**: Enter the Common database user name. • **Password**: Enter a password to authenticate with the Common database.
Process database	For the Process database, enter values for the following parameters: • **User name**: Enter the Process database user name. • **Password**: Enter a password to authenticate with the Process database.
Performance Data Warehouse database	For the Performance Data Warehouse database, enter values for the following parameters: • **User name**: Enter the Performance Data Warehouse database user name. • **Password**: Enter a password to authenticate with the Performance Data Warehouse database.

10. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

   Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

   After successfully installing the product, you can use Installation Manager to install the required fixes.

11. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

12. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

➡️ Installation Manager updates

Installing and configuring IBM Business Process Manager Standard with an SQL Server database server:

You can install IBM Business Process Manager using a Microsoft SQL Server database server.

Creating and configuring SQL Server databases before typical installation:

IBM Business Process Manager requires a Process database, Performance Data Warehouse database, and Common database. The Common database contains Business Space and other components. You can install and configure the required databases before you install.

Configuring XA transactions:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**..

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

    On Windows XP and Windows Server 2003:

    a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

    b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

    c. Click the **MSDTC** tab, and then click **Security Configuration**.

    d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

    e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

    f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

    On Windows Vista, Windows 7, and Windows Server 2008 R2:

    a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

    b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

    c. Right-click **Local DTC** and then select **Properties**.

    d. Click the **Security** tab on the **Local DTC Properties** window.

    e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

    f. Click **OK** again to close the Properties window, and then close Component Services.

    g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

    a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

    b. If BPM is already installed, go to *bpm_install_root*\jdbcdrivers\SQLServer\xa to obtain the files you require in the following steps:

        • Copy the sqljdbc_xa.dll file from the JDBC unarchived directory to the Binn directory (for a default SQL Server install, the location is C:\Program Files\Microsoft SQL Server\ MSSQL10_50.MSSQLSERVER\MSSQL\Binn) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the sqljdbc_xa.dll file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the sqljdbc_xa.dll file in the x64 folder.

- Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.
  - Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

3. Follow these steps for configuring Windows authentication:
   - Locate **sqljdbc_auth.dll**. If you haven't installed IBM Business Process Manager, go to the `BPM_install_root`\jdbcdrivers\SQLServer\auth to obtain the file. If you haven't installed BPM, locate the dll file in the Microsoft JDBC driver package that you downloaded.
   - Copy the `sqljdbc_auth.dll` file to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If your JRE is 32-bit , use the **sqljdbc_auth.dll** file in the x86 folder, even if the SQL Server is installed on a x64 processor. If your JRE 64-bit, use the **sqljdbc_auth.dll** file in the x64 folder.

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*\BPM\dbscripts\SQLServer\ Create folder.

In the following examples, replace @*DB_NAME*@ with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME\BPM\dbscripts\SQLServer\Create\createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`
3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME\BPM\dbscripts\SQLServer\Create\createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"`

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.

- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

When using Windows authentication, you must ensure that the domain account is added to the SQL Sever login. You must login as the SQL Server administrator and follow the below steps to create users and schemas for Windows authentication.

1. Create the SQL Server login account for your Windows machine using the login information for the machine. For example, if **user1** is the user name and **password** is password for your Windows machine, use the following command syntax:

```
USE [master]
GO
CREATE LOGIN [user1\password] FROM WINDOWS WITH DEFAULT_DATABASE=[master]
GO
```

   Note: The SQL Server login that is created must not have SYSADMIN privileges. If the login user has SYSADMIN privileges, the specified schema value is ignored for database connections by SQL Server since the **sysadmin** user's default schema is always *dbo*.

2. Update the master database to grant permission for XA transactions for the Windows user. Use the following command syntax:

```
USE [master];
CREATE USER [sqluser] FOR LOGIN [user1\password];
USE [master];
EXEC sp_addrolemember N'SqlJDBCXAUser', N'sqluser';
```

3. For each database that you create, you must set the default schema for the SQL Server login. Use the following command syntax for the BPMDB (Process Server) database:

```
CREATE DATABASE BPMDB COLLATE SQL_Latin1_General_CP1_CI_AS
GO
USE [BPMDB]
GO
CREATE USER [sqluser] FOR LOGIN [user1\password] WITH DEFAULT_SCHEMA=[BPMPS00]
GO
CREATE SCHEMA [BPMPS00] AUTHORIZATION [sqluser]
GO
EXEC sp_addrolemember 'db_ddladmin', 'sqluser';
EXEC sp_addrolemember 'db_datareader', 'sqluser';
EXEC sp_addrolemember 'db_datawriter', 'sqluser';
```

   Note:

   - The BPMDB and PDWDB databases must be created as case-insensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CI_AS**, where **CI** is the **COLLATE** attribute value that is applicable for the case-insensitive databases.
   - The CommonDB database must be created as case-sensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CS_AS**, where **CS** is the **COLLATE** attribute value that is applicable for the case-sensitive databases.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 71. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Installing and configuring Process Center with an SQL Server database server:

Process Center includes a repository for all processes, services, and other assets created in the IBM Business Process Manager authoring environments. You can use the integrated Process Server within Process Center to run processes as you build them. When you are ready, you can install and run those same processes on the Process Server in your runtime environments.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

       C:/*HOMEPATH*/bpm_updates.properties

   where:

   On Windows XP, the HOMEPATH environment variable points to `C:/Documents and Settings/`*user_name*

   On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to `C:/Users/`*user_name*

Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=C:/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=C:/launchpad_updates
fixpack.WAS_REP=C:/WAS_updates
fixpack.BPM_REP=C:/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

     (from a command line) *DVD_root*/`launchpad.exe`

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

        (from a command line) *extract_directory*/`launchpad.exe`

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Center** and click **Next**.

6. Click **Next**.

7. Optionally change the location information:

   - **Hostname**: This field shows the name of your machine.

     Important: If a value of localhost or 127.0.0.1 is used for the hostname, Process Server installations on a remote system will not be able to connect to the Process Center.

   - **Location**: Enter the installation location for Process Center, or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

8. Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

9. Specify the **Username** and **Password** for the deployment environment administrative account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

10. Click **Next**.

11. Select **Yes** to use an existing database.

12. Specify the required database information.

Table 72. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

13. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

   Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

   The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

After successfully installing the product, you can use Installation Manager to install the required fixes.

14. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

15. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

▷ Installation Manager updates

Installing and configuring Process Server with an SQL Server database server:

Process Server provides a single BPM runtime environment that can support a range of business processes for development, test, staging, or production.

To install IBM Business Process Manager Standard using the typical installation, you must confirm that the Process database, Performance Data Warehouse database, and Common database already exist and that they are empty.

Be prepared to specify the following information during installation:
- The user name and password for database authentication
- The database server host name and port
- The name of the Process database.
- The name of the Performance Data Warehouse database.
- The name of the Common database.

If you are installing from images downloaded from Passport Advantage, ensure that you have downloaded all three required images for Windows, and extracted them to the same directory.

Using the product launchpad, the typical installation installs the software, configures the deployment manager and managed-node profiles, and configures a single cluster deployment environment that consists of a single node and single server.

Only one IBM Installation Manager is required to install multiple instances of IBM Business Process Manager.

1. Optional: If you are connected to the Internet, the typical installation upgrades your product to the latest refresh pack and interim fix level automatically. If you want these upgrades to be installed from a local directory instead, or if you want to specify the fix level, you can use a properties file to tell the Installation Manager where to find the upgrades and which upgrades to install.

   Create the following file:

   `C:/`*`HOMEPATH`*`/bpm_updates.properties`

   where:

   On Windows XP, the HOMEPATH environment variable points to `C:/Documents and Settings/`*`user_name`*

On Windows 7, Windows Vista, or Windows Server 2008, the HOMEPATH environment variable points to `C:/Users/user_name`

Note: Ensure that you have read/write access to the folders specified in the `bpm_updates.properties` file.

The file uses three prefixes: ifix, fixpack, and launchpad. Each prefix must be followed by a dot. The part of the name after the prefix and the dot can be anything you want, which enables you to point to multiple locations for ifixes, fixpacks, and launchpad upgrades. The locations can be either local directories or URLs. For example:

```
ifix.1=C:/bpmUpdates
fixpack.2=http://test/rep
launchpad.1=C:/launchpad_updates
fixpack.WAS_REP=C:/WAS_updates
fixpack.BPM_REP=C:/BPM_updates
```

2. Access the media in one of the following ways, depending on whether you are installing from the product DVD or from images downloaded from Passport Advantage. You can run only one launchpad at a time.

   - If you are installing from the product DVD, insert the product disk labeled IBM Business Process Manager Standard into the disk drive. If autorun is enabled on your workstation, the launchpad program automatically opens, and you can proceed to the next step. If autorun is not enabled on your workstation, enter the following command to start the launchpad manually:

     To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

       (from a command line) `DVD_root/launchpad.exe`

   - If you are installing from images downloaded from Passport Advantage, perform the following steps:

     a. Go to the directory into which you extracted the images.

     b. Enter the following command to start the launchpad:

        To install or run IBM Business Process Manager Standard on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click `launchpad.exe` and select **Run as administrator**.

          (from a command line) `extract_directory/launchpad.exe`

3. Optional: If you see a message that prompts you to update the launchpad, click **Update** to receive the latest updates. The updates are installed and your launchpad is restarted automatically. If you do not have access to the Internet and want the updates to be installed from a local directory, you can use a properties file with the appropriate launchpad prefix as described in step 1 to tell the Installation Manager where to find the upgrades and which upgrades to install.

4. After starting the launchpad, click **Typical installation** on the Welcome page.

5. Select **Install Process Server** and click **Next**.

6. Specify Process Server information:

   - **Hostname**: This field shows the name of your machine.

   - **Location**: Enter the installation location for Process Server or click **Browse** to select the location.

     Note:
     - The installation location must either be an empty directory or a directory that does not exist and is created during installation.
     - Because you are installing DB2 Express, your installation location cannot contain National Language Strings (NLS).

   - Environment **Type**: Select how the Process Server is used:

- Select **Development** if the server is to be used in a development capacity.
- Select **Production** if the server is to be used in a production capacity.
- Select **Stage** if the server is to be used as a temporary location to host changes before putting them into production.
- Select **Test** if the server is to be used as a testing environment, for example, for load testing.

- **Name**: Specify the name for the Process Server environment. This name is used to connect from a Process Center to this Process Server.

  Restriction: Do not mix production and non-production servers in the same cell.

- Specify the **Username** and **Password** for the cell administrative account. The cell administrator is the primary WebSphere Application Server administrator. A user assigned to this role can assign other administrator roles, and is responsible for the administration of the cell and topology. A user assigned to this role is not responsible for the administration of the IBM Business Process Manager components. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This role also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups. You must be a user assigned to this role to deploy Process Applications on the Process Center server.

- Specify the **Username** and **Password** for the deployment environment account. The deployment environment administrator is the primary IBM Business Process Manager administrator. A user assigned to this role has administrative access to Process Center and Process Admin Console. This role provides access to all interfaces, enabling users to alter or delete all types of available library items and assets, including process applications and toolkits. This account also enables administration of Process Servers, Performance Data Warehouses, and internal users and groups.

Select **Use this server offline** if this Process Server will not be connected to a Process Center. Offline servers can still be used when deploying snapshots of process applications, but the method for deploying process applications to an offline Process Server differs from the method for deploying process applications to an online Process Server.

If you did not select **Use this server offline**, provide the following information for the Process Center that this server is to connect to:

- **Hostname**: Enter the host or virtual host that this Process Server will use to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

- **Port**: Enter the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**: Enter the name of a Process Center user. Process Server will connect to Process Center as this user.

- **Password**: Enter the password for the Process Center user.

You can click **Test Connection** to check the connection to the Process Center.

7. Click **Next**.
8. Select **Yes** to use an existing database.
9. Specify the required database information.

Table 73. Required database configuration fields for SQL Server

Field	Action needed
Username	Only required if you are not using Windows authentication. Enter the user name to authenticate with the database. **Restriction:** User names must not contain National Language Strings (NLS).
Password	Only required if you are not using Windows authentication. Enter a password to authenticate with the database.
Select the **Apply Windows authentication** option to indicate that you will connect to your databases using your Windows authentication information. If you select this option, the previous fields are made inactive.	
Hostname	Accept the default value of `localhost` or enter the correct database server host name. For example, the IP address.
Port	Accept the default value of 1433 or enter the correct server port number.
Common database name	Accept the default value of CMNDB, or enter the name for the Common database.
Process database name	Accept the default value of BPMDB, or enter the Process database name.
Performance Data Warehouse database name	Accept the default value of PDWDB, or enter the Performance Data Warehouse database name.

10. Click **Next** to continue. You are prompted to provide your IBM ID and password to connect to the IBM service repositories.

    Note: If you are using a local properties file, you do not need to provide your IBM ID and password.

    The connection to the service repositories is required to download and install any fix packs and required interim fixes from the Internet, including fixes for WebSphere Application Server and IBM Business Process Manager. An IBM ID and password can be obtained by registering at http://www.ibm.com.

    Click **Cancel** to continue installing without downloading the required fixes from the Internet or clear the **Use your support account to include updates with the installation** option on the Installation summary page.

    After successfully installing the product, you can use Installation Manager to install the required fixes.

11. On the Installation summary page, verify the installation options and read the license agreements. If you agree to the terms of the license agreements, click **I have read and accepted the license agreement and notices**.

12. Click **Install Software**.

After a successful installation, the Quick Start console will start automatically.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.

Related information:

 Installation Manager updates

Installing IBM Business Process Manager Standard using a custom installation and configuration path

Use the Custom installation option to install IBM Business Process Manager Standard if you need any installation or configuration options that are not provided by the Typical installation option, if you want to install silently, or if you want to install on an existing installation of WebSphere Application Server.

Granting write permission of files and directories to nonadministrative users for profile creation or augmentation:

If you are not the user who installed the product, you must have write permission to selected directories within the IBM Business Process Manager installation. The product installer can grant this permission or create a group with permission to create or augment profiles.

The product installer (who can be an administrative or nonadministrative user) can grant write permission to the appropriate IBM Business Process Manager files and directories to nonadministrative users. The nonadministrative users can then create profiles. Alternatively, the product installer can create a group for users who are authorized to create profiles or give individual users the authority to create profiles.

Nonadministrative users create their own profiles to manage their own environments. Typically, they manage environments for development purposes.

Nonadministrative users must store their profiles in their private directory structure, not in the `installation_root\profiles` directory of the product.

Restrictions:
- IBM Business Process Manager does not support changing ownership of existing profiles from the product installer to nonadministrative users. A nonadministrative user cannot augment profiles owned by another user.
- Mechanisms within the Profile Management Tool that suggest unique names and port values are disabled for nonadministrative users. The nonadministrative user must change the default field values in the Profile Management Tool for the profile name, node name, cell name, and port assignments. The product installer can assign nonadministrative users a range of values for each of the fields, and assign responsibility to the users for adhering to their assigned value ranges and for maintaining the integrity of their own definitions.

If you already created at least one profile, certain directories and files were created. You can skip the steps in this topic that create these directories and files. If no profile was previously created, you must complete the steps to create the required directories and files.

The following example task shows how to create a group that is authorized to create profiles. The terms "installer" and "product installer" refer to the user ID that installed IBM Business Process Manager. The installer can perform the following steps to create the `profilers` group and give the group appropriate permissions to create a profile.
1. Log on to the IBM Business Process Manager system as the product installer. The product installer can be a administrative or nonadministrative user.
2. Using operating system commands, perform the following steps:
   a. Create a group named **profilers**, which will contain all users who can create profiles.
   b. Create a user named **user1**, who can create profiles.
   c. Add users **product_installer** and **user1** to the **profilers** group.
3. Log off and log back on as the installer to pick up the new group.
4. If no profile exists, create the following directories as the installer:

- Create the *install_root***\logs\manageprofiles** directory by following instructions in the Windows documentation. For this example procedure, the directory is:

  ```
  install_root\logs\manageprofiles
  ```

- Create the *install_root***\properties\fsdb** directory by following instructions in the Windows documentation. For this example procedure, the directory is:

  ```
  install_root\properties\fsdb
  ```

5. If no profile exists, create the `profileRegistry.xml` file as the installer. For this example, the file path is:

   ```
   install_root\properties\profileRegistry.xml
   ```

   Add the following information to the `profileRegistry.xml` file. The file must be encoded as UTF-8.

   ```
   <?xml version="1.0" encoding="UTF-8"?>
   <profiles/>
   ```

6. As the product installer, use operating system tools to change directory and file permissions. The following example assumes that the variable **$WASHOME** is the IBM Business Process Manager root installation directory **C:\Program Files\IBM\WebSphere\AppServer**. Follow instructions in the Windows documentation to give the **profilers** group read and write permission to the following directories and their files:

   ```
   @WASHOME\logs\manageprofiles
   @WASHOME\properties
   @WASHOME\properties\fsdb
   @WASHOME\properties\profileRegistry.xml
   ```

   You might have to change the permissions on additional files if the nonadministrative user encounters permission errors. For example, if the product installer authorizes a nonadministrative user to delete a profile, then the product installer might have to delete the following file:

   ```
   install_root\properties\profileRegistry.xml_LOCK
   ```

   Give write access to the nonadministrative user for the file to authorize the user to delete the file. If the nonadministrative user still cannot delete the profile, then the product installer can delete the profile.

The installer created the **profilers** group and gave the group the correct permissions to the directories and files required for a nonadministrative user to create profiles.

The nonadministrative user that belongs to the **profilers** group can create profiles in a directory that the nonadministrative user owns and to which the nonadministrative user has write permission. However, the nonadministrative user cannot create profiles in the installation root directory of the product.

The administrative user and the nonadministrative user can use the same tasks to manage profiles.

Configuring profiles and creating a network deployment environment:

After you install the product, you must create or augment a deployment manager and one or more managed-node profiles to define the runtime environment. Before starting the deployment manager, you must have configured the databases that are to be used with IBM Business Process Manager.

Configuring profiles, databases, and deployment environments for DB2:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space

components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional createTablespace*.sql files that you must run before the createSchema*.sql files to create the tablespaces for Business Process Choreographer or Business Space. The generated createSchema*.sql files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*\BPM\dbscripts\DB2\Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.
2. Run the following sample script to create each database.

   BPM_HOME\BPM\dbscripts\DB2\Create\createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

   Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

   If IBM Business Process Manager is not installed, run the following command from the command line:

   ```
   db2 -tvf createDatabase.sql
   ```

Creating profiles, network deployment environments and database tables using BPMConfig:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*\BPM\samples\config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and

configuration environments. The sample files are named according to the following format: *de_type[-environment_type]-topology-database_type[-suffix]*, where:

- *de_type* can be set to **Standard** .
- *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

   `BPM_home\bin\BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMConfig** command with the **-start** action from the

deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

If the new or updated node is on the same computer as the deployment manager node, then the updated or new node is automatically synchronized with the deployment manager node. Before you start the node, ensure that this synchronization has completed by checking the `syncNode.log` file found in the *profile_root*\logs directory. If the new or updated node is on a different computer than the deployment manager node, you need to run the **syncNode.bat** or **syncNode.sh** command on the new or updated node and wait for the synchronization to complete before starting the node.

Related tasks:

"Running the generated DB2 database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*\dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - DB2
       - *CMNDB*
         - `createSchema_Standard.sql`
         - `createSchema_Messaging.sql`
       - *BPMDB*
         - `createSchema_Standard.sql`
         - `createProcedure_Standard.sql`
       - *PDWDB*
         - `createSchema_Standard.sql`

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

```
db2 connect to CMNDB USER username USING password
db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\CMNDB\createSchema_Standard.sql
db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\CMNDB\createSchema_Messaging.sql
db2 connect reset
```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

   ```
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\BPMDB\createDatabase.sql
   db2 connect to BPMDB USER username USING password
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\BPMDB\createSchema_Standard.sql
   db2 -tdGO -vf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\BPMDB\createProcedure_Standard.sql
   db2 connect reset
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.bat -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.bat -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

   ```
   db2 connect to PDWDB USER username USING password
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\PDWDB\createSchema_Standard.sql
   db2 connect reset
   ```

Related tasks:

"Generating DB2 database scripts using the BPMConfig command" on page 627
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

If you installed BPM in a Windows domain controller environment and installed DB2 Express as part of installation, profile creation will fail because you cannot use the domain user ID to create a new database and tables. Before creating a profile, use one of the following solutions:

- Log into the Windows system as a local system user to create a profile.
- Follow the steps listed in DB2 log file error: SQL1092N "USERID does not have the authority to perform the requested command or operation" before creating a profile.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: **Vista** Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.
- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.
  1. Use one of the following methods to start the Profile Management Tool.
     - Start the tool from the Quick Start console.
     - Run the command *installation_root***bin****ProfileManagement****pmt.bat**
  2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
  3. On the **Profiles** tab, click **Create**.

     The Environment Selection page opens in a separate window.
  4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.
  5. On the Profile Name and Location page, complete the following steps:
     a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
     b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*\profiles*profile_name*.
     c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.
   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.
     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     – Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.

- `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports that are currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

   Ports are recognized as being in use if the following conditions are satisfied:

   - The ports are assigned to a profile created under an installation performed by the current user.
   - The ports are currently in use.

   Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

   If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

   profile_root\properties\portdef.prop

   Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. Advanced: If you do not have administrative privileges, skip to the next step. If you have administrative privileges, on the Service Definition, page indicate whether to use a Windows service to run IBM Business Process Manager.

   If the profile is configured as a Windows service, IBM Business Process Manager starts Windows services for processes started by the **startServer** or **startManager** commands. For example, if you configure a server as a Windows service and issue the **startServer** command, the **wasservice** command starts the defined services.

   Important: If you choose to log on as a specified user account, you must specify the user ID and the password for the user who is to run the service, and the startup type (default is `Manual`). The user ID must not have spaces in its name, must belong to the Administrator group, and must have the advanced user right "Log on as a service." If the user ID belongs to the Administrator group, the Profile Management Tool grants it the advanced user right if it does not already have it.

   During profile deletion, you can remove the Windows service that is added during profile creation.

   IPv6 (Internet Protocol version 6) considerations when running profiles as Windows services
      Profiles created to run as a Windows service fail to start when using IPv6 if the service is configured to run as Local System. Create a user-specific environment variable to enable IPv6. Because this environment variable is a user variable instead of a Local System variable, only a Windows service that runs as that specific user can access this environment variable. By default, when a new profile is created and configured to run as a Windows service, the service is set to run as Local System. When the IBM Business Process Manager Windows service tries to run, the service is unable to access the user environment variable that specifies IPv6, and thus tries to start as IPv4. The server does not start correctly in this case.

To resolve the problem, when creating the profile, specify that the IBM Business Process Manager Windows service runs as the same user ID under which the environment variable that specifies IPv6 is defined, instead of as Local System.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➔ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with a DB2 database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

If you installed BPM in a Windows domain controller environment and installed DB2 Express as part of installation, profile creation will fail because you cannot use the domain user ID to create a new database and tables. Before creating a profile, use one of the following solutions:

- Log into the Windows system as a local system user to create a profile.
- Follow the steps listed in DB2 log file error: SQL1092N "USERID does not have the authority to perform the requested command or operation" before creating a profile.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: **Vista** **Windows 7**

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

   Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*\bin\ProfileManagement\pmt.bat

2. Shut down any servers associated with a profile you plan to augment.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.

6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

↪ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

If you installed BPM in a Windows domain controller environment and installed DB2 Express as part of installation, profile creation will fail because you cannot use the domain user ID to create a new database and tables. Before creating a profile, use one of the following solutions:

- Log into the Windows system as a local system user to create a profile.
- Follow the steps listed in DB2 log file error: SQL1092N "USERID does not have the authority to perform the requested command or operation" before creating a profile.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

You can determine the template by viewing the profile registry in the *installation_root*\properties\ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.bat -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: | Vista | | Windows 7 |

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the pmt.bat file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a com.ibm.wsspi.profile.WSProfileException or Access is denied message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the Program Files directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***\bin\ProfileManagement\pmt.bat**
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.
5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.
6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*\profiles*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.
7. On the Node and Host Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.
8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.

- The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
- The deployment manager does not have a JMX administrative port enabled.
- The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

  Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
  - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
  - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

  Click **Next**.
9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     - In the **Path** field, enter the directory path to the existing certificate.
     - In the **Password** field, enter the password for the certificate
     - In the **Keystore type** field, select the keystore type for the certificate you are importing.
     - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     - Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.
10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.

- ltpa.jceks: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the key.p12 file or the root-key.p12 file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: **Vista**   Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the pmt.bat file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a com.ibm.wsspi.profile.WSProfileException or Access is denied message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the Program Files directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.

2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*\bin\ProfileManagement\pmt.bat

3. Shut down any servers associated with a profile you plan to augment.

4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.
8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⬈ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the `manageprofiles` command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the `manageprofiles` command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*\properties\profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

```
manageprofiles.bat -augment -templatePath BPM/BpmNode
-profileName MyProfileName
-adminUsername celladmin -adminPassword celladmin
```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*\BPM\samples\config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

Note: Your modified properties file must use UTF-8 encoding.

To create a deployment manager profile, you must specify the following minimum set of properties:

* **bpm.dmgr.hostname=**
* **bpm.dmgr.installPath=**

It is also recommended that you set values for:

* **bpm.cell.name=**
* **bpm.dmgr.nodeName=**
* **bpm.dmgr.profileName=**

To create a managed node profile, you must specify the following minimum set of properties:

* **bpm.dmgr.soapPort=**
* **bpm.node.#.hostname=**
* **bpm.node.#.installPath=**

It is recommended that you also set:

* **bpm.node.#.nodeName=**
* **bpm.node.#.profileName=**

The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

   install_root\bin\BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

* You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.

- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

  `profile_root\bin\startManager.bat`

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the `bin` directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

   `profile_root\bin`

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

   `addNode.bat deployment_manager_host deployment_manager_SOAP_port`

   Run the following command from the command line if security is enabled:

   `addNode.bat deployment_manager_host deployment_manager_SOAP_port -username userID_for_authentication -password password_for_authentication`

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

   `ADMU0003I: Node DMNDID2Node03 has been successfully federated.`

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

◧ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.

- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the *BPM_Install*\profiles\DmgrProfile\dbscripts\ folder. You can run the scripts from the dbscripts folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:

* Installed the product
* Created the deployment manager profile and the associated nodes
* Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
* Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
* When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
    – Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
    – Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.

- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

DB2 considerations:
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.

   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

     The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

     There are four types of environments available for selection:

Development
> Select **Development** if the server will serve in a development capacity.

Test   Select **Test** if the server you are configuring will be used as a testing environment.

Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production
> Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the following database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.

- **Password**: Type the password for the user name.
- **Confirm password**: Type to confirm the password for the user name.
- **Server**: Type a server name where the database is located.
- **Port**: Type the port number to connect to the database.
- **Create Tables**: Select to create the required tables.

  Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: The IBM Process Server and IBM Performance Data Warehouse should not use the same database.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the `BPMConfig` command.

You can edit all key parameters, such as the database name, whether or not to create tables and the data source runtime user name for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root/logs/config` folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp.properties`. Save this file for future reference or for troubleshooting any issues.
11. If you have postponed the Process database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the `bootstrapProcessServerData` command. The bootstrap code runs automatically if the Process database table creation is selected on the Database page wizard.
12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.
    a. Stop the deployment environment.
    b. Stop the node agent.
    c. Stop the deployment manager.

d. Start the deployment manager.

e. Start the node agent.

f. Start the deployment environment.

For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

If you are using DB2 PureScale, you must also configure automatic client rerouting and configure workload balancing.

Creating DB2 databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

The Process Server and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

In an IBM Business Process Manager environment, the **createDatabase.sql** script is used to create the databases. It is available in the *BPM_HOME*\BPM\dbscripts\DB2\Create folder.

In the following example, replace *@DB_NAME@* with the name that you want to use for the created database and *@DB_USER@* with the user name that you want to use for the database.

1. If IBM Business Process Manager is installed on your machine, locate the SQL script **createDatabase.sql** to run. Otherwise, use the command line option.

2. Run the following sample script to create each database.

   BPM_HOME\BPM\dbscripts\DB2\Create\createDatabase.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   ```
   create database @DB_NAME@ automatic storage yes  using codeset UTF-8 territory US pagesize 32768;
   connect to @DB_NAME@;
   grant dbadm on database to user @DB_USER@;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGFILSIZ 4096 DEFERRED;
   UPDATE DB CFG FOR @DB_NAME@ USING LOGSECOND 64 DEFERRED;
   connect reset;
   ```

Note: If a command fails to execute from the DB2 command prompt, remove the semicolon (;) and rerun the command.

If IBM Business Process Manager is not installed, run the following command from the command line:

```
db2 -tvf createDatabase.sql
```

Generating DB2 database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you created the databases, locate the appropriate sample properties file *BPM_HOME*\BPM\samples\config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     ```
     BPM_HOME\bin\BPMConfig -create -sqlfiles my_environment.properties
     ```

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     ```
     BPM_HOME\bin\BPMConfig -create -sqlfiles my_environment.properties -outputDir \MyBPMScriptDir
     ```

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*\dbscripts folder by default. This folder includes the following sub-folders:
- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a `createDatabase.sql` script, which you can use to run the database scripts to create the DB2 database tables.

A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - DB2
    - *CMNDB*
      - `createSchema_Standard.sql`
      - `createSchema_Messaging.sql`
    - *BPMDB*
      - `createSchema_Standard.sql`
      - `createProcedure_Standard.sql`
    - *PDWDB*
      - `createSchema_Standard.sql`

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using BPMConfig" on page 601
You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated DB2 database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*\dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with DB2 databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - DB2
       - *CMNDB*
         - `createSchema_Standard.sql`
         - `createSchema_Messaging.sql`
       - *BPMDB*
         - `createSchema_Standard.sql`

- createProcedure_Standard.sql
  - *PDWDB*
    - createSchema_Standard.sql

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   db2 connect to CMNDB USER username USING password
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\CMNDB\createSchema_Standard.sql
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\CMNDB\createSchema_Messaging.sql
   db2 connect reset
   ```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for Process database configuration:

   ```
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\BPMDB\createDatabase.sql
   db2 connect to BPMDB USER username USING password
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\BPMDB\createSchema_Standard.sql
   db2 -tdGO -vf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\BPMDB\createProcedure_Standard.sql
   db2 connect reset
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.bat -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.bat -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for Performance Data Warehouse database configuration:

   ```
   db2 connect to PDWDB USER username USING password
   db2 -tvf profiles\DmgrProfile\dbscripts\deployment_environment_name\DB2\PDWDB\createSchema_Standard.sql
   db2 connect reset
   ```

Configuring profiles, databases, and deployment environments for DB2 for z/OS:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Space component, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*
- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional `createTablespace*.sql` files that you must run before the `createSchema*.sql` files to create the tablespaces for Business Process Choreographer or Business Space. The generated `createSchema*.sql` files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating profiles, network deployment environments and database tables using the BPMConfig command:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can generate the scripts for creating the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

You must have installed the product. You must also have created all the users that you specify in the properties file.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- Generates the scripts that you can use to create the database tables.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*\BPM\samples\config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[*-environment_type*]*-topology-database_type*[*-suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .

- *topology* can be set to **SingleCluster** or **ThreeClusters**.
- *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
- *suffix* can be set to **-WinAuth** for an SQL Server database.

For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 for z/OS database is called `Standard-PC-SingleCluster-DB2zOS.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Additional notes for database configuration:
   - By default, the **bpm.de.deferSchemaCreation** property in the sample configuration properties file for DB2 for z/OS is set to **true**. Do not change this setting, because, for a z/OS database, you cannot create the database objects at the same time that the database scripts are generated. After the **BPMConfig** command completes, you can run the database scripts to manually create the database objects at a time that you choose. When **bpm.de.deferSchemaCreation** is set to **true**, the bootstrap utility, which loads the Process database with system information, also must be run manually.
   - Work with your DB2 for z/OS database administrator to establish good naming conventions for DB2 components such as database names, storage group names, schema qualifiers, and VSAM catalog names (VCATs).

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** will fail when it is run.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

   `BPM_home\bin\BPMConfig -create -de my_environment.properties`

   The database SQL scripts are generated in the `DMGR_PROFILE/dbscripts` folder by default.
   - The database scripts that can be used to create the cell-scoped database are generated in `DMGR_PROFILE\dbscripts\cell_name\DB2zOS\cell_database_name`.
   - The database scripts that can be used to create the cluster-scoped database are generated in `DMGR_PROFILE\dbscripts\de_name\DB2zOS\cluster_database_name`.

   These subdirectories also contain a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

5. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode.

After you have created your deployment environment, you can create the product databases.

After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMConfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with Advanced or AdvancedOnly capabilities.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the product. After you run the **BPMConfig** script, a copy of createDatabase.sql is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP   @STOGRP@     TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@    TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS         TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:
• Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

   This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.
• On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual

GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:

– Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the WebSphere administrator ID to the RACF group. For example, you can define a RACF group named S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS   OWNER=ZWPS   CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)= ACCESS= ACCESS COUNT= UNIVERSAL ACCESS=
   WSADMIN   CONNECT   000000     NONE
    CONNECT ATTRIBUTES=NONE
    REVOKE DATE=NONE    RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10 views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create the databases and storage groups. Additionally, the GRANT permissions that are required to authorize the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided. When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet, these values are propagated to the Database worksheet, and are used to complete the CREATE and GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create the databases and storage groups, and to use the GRANT statements to authorize the WebSphere administrator. For more information about using the artifacts generated from the spreadsheet, see the accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message in a log, but might cause problems later. It is better to resolve such problems now rather than when the system has been handed over for use. For example, correcting storage groups and VCATs is not easy after the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
- The **createDatabase.sh** script, which was additionally created with the database scripts
- Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script
- **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
- **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
- **createDatabase.sh** runs the SQL for each component in the correct sequence.
- **createDatabase.sh** creates database objects according to a naming convention that you define.
- **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
- **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
- **createDatabase.sh** runs in a UNIX System Services environment.
- **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools
- You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
- There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
- Some tools can be run from a z/OS environment.

- The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.
   - Specify the `DB2JccConfiguration.properties` file that defines the JDBC properties to be applied to the command line processor.

   You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

   ```
   export CLPHOME=clp_install_dir
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=clp_properties_file_path
   alias db2="java -Ddb2.jcc.propertiesFile=
   /file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

   For example:

   ```
   export CLPHOME=/shared/db2910_base
   export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
   export CLPPROPERTIESFILE=/wasv85config/clp.properties
   alias db2="java -Ddb2.jcc.propertiesFile=
   /wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
   ```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

For example:

```
DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
```

> **Tip:** When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

"Creating DB2 for z/OS database objects using the createDatabase.sh script"
You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

"Creating DB2 for z/OS database objects using the DB2 command line processor" on page 638
You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.
  1. `DB2 system administrator (SYSADM)` Create the physical databases as follows:
     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

- DMGR_PROFILE\dbscripts*cell_name*\DB2zOS*cell_database_name*
- DMGR_PROFILE\dbscripts*de_name*\DB2zOS*cluster_database_name*

You can copy the createDatabase.sql files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
```
db2 -tvf createDatabase.sql
```

2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

   a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

   b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
   ```
   iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
   ```
   Also grant execute permissions to the **createDatabase.sh** script.

   c. Run the **createDatabase.sh** script by using the following syntax:
   ```
   createDatabase.sh -DBAlias alias_name -RunSQL
   ```
   where:

   -DBAlias
   Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

   -RunSQL
   Runs the SQL statements that create the database objects.

   For example:
   ```
   createDatabase.sh -DBAlias DSNXWBD -RunSQL
   ```

   For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

   d. Review the messages that are displayed in the console, checking that no error messages are displayed.

   When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

  1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

  2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
  ```
  iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
  ```
  Also grant execute permissions to the **createDatabase.sh** script.

  3. Run the **createDatabase.sh** script by using the following syntax:
  ```
  createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
  ```
  where:

-DBAlias

Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

-DBCreate

Creates the database.

-RunSQL

Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

4. Review the messages that are displayed in the console, checking that no error messages are displayed.

Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

5. Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 635
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:

1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:

   a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:

   - `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name`

   You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   `db2 -tvf createDatabase.sql`

2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:

   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the `DMGR_PROFILE/dbscripts/de_name/DB2zOS/cluster_database_name` subdirectories on the IBM Business Process Manager system. Each `cluster_database_name` subdirectory contains one or more of these files, which you must run in the following order:

      1) `createTablespace_Standard.sql`

      2) `createSchema_Standard.sql`

      3) `createSchema_Messaging.sql`

      4) `createProcedure_Standard.sql`

      Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 635
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.

- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.

- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
      A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:
    - Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
        a. `createTablespace_Standard.sql`
        b. `createSchema_Standard.sql`
        c. `createSchema_Messaging.sql`
        d. `createProcedure_Standard.sql`

    These files are in ASCII format.
2. Assign the appropriate read permissions to the SQL files; for example:
    `chmod 644 createSchema_Standard.sql`
3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:
    `iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql`

    Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

    Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

    `iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql`
4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.
5. Run the SQL files by using the tool of your choice.
6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that

is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles with a DB2 for z/OS database server using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: Vista   Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

  Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a

`com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***bin****ProfileManagement****pmt.bat**

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*\profiles*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

   When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.
   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:

- In the **Path** field, enter the directory path to the existing certificate.
- In the **Password** field, enter the password for the certificate
- In the **Keystore type** field, select the keystore type for the certificate you are importing.
- In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
- Click **Next** to display the Security Certificate (Part 2) page

When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

- `key.p12`: Contains the default personal certificate.
- `trust.p12`: Contains the signer certificate from the default root certificate.
- `root-key.p12`: Contains the root signing certificate.
- `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports that are currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

Ports are recognized as being in use if the following conditions are satisfied:

- The ports are assigned to a profile created under an installation performed by the current user.
- The ports are currently in use.

Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

profile_root\properties\portdef.prop

Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. Advanced: If you do not have administrative privileges, skip to the next step. If you have administrative privileges, on the Service Definition, page indicate whether to use a Windows service to run IBM Business Process Manager.

   If the profile is configured as a Windows service, IBM Business Process Manager starts Windows services for processes started by the **startServer** or **startManager** commands. For example, if you configure a server as a Windows service and issue the **startServer** command, the **wasservice** command starts the defined services.

   Important: If you choose to log on as a specified user account, you must specify the user ID and the password for the user who is to run the service, and the startup type (default is Manual). The user ID must not have spaces in its name, must belong to the Administrator group, and must have the advanced user right "Log on as a service." If the user ID belongs to the Administrator group, the Profile Management Tool grants it the advanced user right if it does not already have it.

   During profile deletion, you can remove the Windows service that is added during profile creation.

   IPv6 (Internet Protocol version 6) considerations when running profiles as Windows services
      Profiles created to run as a Windows service fail to start when using IPv6 if the service is configured to run as Local System. Create a user-specific environment variable to enable IPv6. Because this environment variable is a user variable instead of a Local System variable, only a Windows service that runs as that specific user can access this environment variable. By default, when a new profile is created and configured to run as a Windows service, the service is set to run as Local System. When the IBM Business Process Manager Windows service tries to run, the service is unable to access the user environment variable that specifies IPv6, and thus tries to start as IPv4. The server does not start correctly in this case. To resolve the problem, when creating the profile, specify that the IBM Business Process Manager Windows service runs as the same user ID under which the environment variable that specifies IPv6 is defined, instead of as Local System.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

• Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➦ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with a DB2 for z/OS database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: Vista | Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***bin****ProfileManagement****pmt.bat**
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➦ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*\properties\ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

```
manageprofiles.bat -augment -templatePath BPM/BpmDmgr
-profileName MyProfileName
-adminUsername celladmin -adminPassword celladmin
```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions:　Vista　Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the pmt.bat file and select **Run as administrator**. Alternatively,

use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a com.ibm.wsspi.profile.WSProfileException or Access is denied message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the Program Files directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.

2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Click *Linux_operating_system_menus_to_access_programs* > IBM > *your_product* > Profile Management Tool.
   - Run the command *installation_root*/bin/ProfileManagement/pmt.sh.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.

6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*\profiles*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the bin directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.
     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     – Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password.

The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

- `key.p12`: Contains the default personal certificate.
- `trust.p12`: Contains the signer certificate from the default root certificate.
- `root-key.p12`: Contains the root signing certificate.
- `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.
12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: Vista Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.
- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not

have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*\bin\ProfileManagement\pmt.bat
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.
8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⇨ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*\properties\profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.bat -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*\BPM\samples\config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:
   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.
   install_root\bin\BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any

given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

      profile_root\bin\startManager.bat

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

      profile_root\bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

      addNode.bat *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

      addNode.bat *deployment_manager_host deployment_manager_SOAP_port* -username
      userID_for_authentication -password *password_for_authentication*

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

      ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

⬕ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the

administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
    - **User name**: Type the user name to connect to the database.
    - **Password**: Type the password for the user name.
    - **Confirm password**: Type to confirm the password for the user name.
    - **Server**: Type a server name where the database subsystem is located.
    - **Port**: Type the port number to connect to the database subsystem.
    - **Database connection location**: Type the database connection location name.
    - **Storage group**: Type the storage group name.
    - **Volume Catalog**: Type the volume catalog name.
    - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
    - **Index buffer pool** : Type the index buffer pool name.
    - **LOB buffer pool** : Type the LOB buffer pool name.
    - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
    - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
    - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
- **Process database**
    - **Name**: Type a name for the Process Center database.
    - **Schema name**: Type the schema name for the Process database.
- **Performance Data Warehouse database**
    - **Name**: Type a name for the Performance Data Warehouse database.
    - **Schema name**: Type the schema name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
    - **Messaging**: Select this option to create a separate messaging engine database.
        - **Name**: Type a name for the messaging engine database.
        - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
10. Load the database with system information by running the **bootstrapProcessServerData** command.

   Important: This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.

- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.
6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.
7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.
   - **Environment name**

     Enter an environment name of the Process Server.

     An environment name is the name by which this server or cluster will be known to a Process Center user.
   - **Environment type**

     From the pull-down list, select the environment type for the Process Server you are configuring.

The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

There are four types of environments available for selection:

Development
> Select **Development** if the server will serve in a development capacity.

Test Select **Test** if the server you are configuring will be used as a testing environment.

Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

Production
> Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **DB2 On ZOS**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **User name**: Type the user name to connect to the database.
  - **Password**: Type the password for the user name.
  - **Confirm password**: Type to confirm the password for the user name.
  - **Server**: Type a server name where the database subsystem is located.
  - **Port**: Type the port number to connect to the database subsystem.
  - **Database connection location**: Type the database connection location name.
  - **Storage group**: Type the storage group name.
  - **Volume Catalog**: Type the volume catalog name.
  - **Buffer pool of 4k size**: Type a name for the buffer pool with size 4k.
  - **Index buffer pool** : Type the index buffer pool name.
  - **LOB buffer pool** : Type the LOB buffer pool name.
  - **Buffer pool of 8k size**: Type a name for the buffer pool with size 8k.
  - **Buffer pool of 16k size**: Type a name for the buffer pool with size 16k.
  - **Buffer pool of 32k size**: Type a name for the buffer pool with size 32k.
- **Process database**
  - **Name**: Type a name for the Process Center database.
  - **Schema name**: Type the schema name for the Process database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
  - **Schema name**: Type the schema name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.
    - **Schema name**: Type the schema name for the messaging engine database.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

For a production environment, you should set the same values for **User name** and **Schema name** and you should clear **Create Tables**. For a production environment, create the required schemas manually and use the SQL files generated to create the tables. When you create a 3-cluster Process Server using the Deployment Environment wizard the process will take a lot of time to complete. Perform one of the following steps to create the 3-cluster Process Server:

- Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment.
- Do not create tables during the Deployment Environment creation. After creating the environment create the databases, tables, and then run the bootstrap command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

> **Tip:** Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:
    a. Optional: If you want to exit without generating the configuration, click **Cancel**.
    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
11. Load the database with system information by running the **bootstrapProcessServerData** command.

> **Important:** This command must be run before starting any cluster members.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Generating DB2 for z/OS database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

• Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  – The location of the databases.
  – The user ID and password for authenticating to the database.
• Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
• An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.

- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you created the databases, locate the appropriate sample properties file *BPM_HOME*\BPM\samples\config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.

   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME\bin\BPMConfig -create -sqlfiles *my_environment.properties*

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME\bin\BPMConfig -create -sqlfiles *my_environment.properties* -outputDir \MyBPMScriptDir

   The database SQL scripts are generated in the *DMGR_PROFILE*\dbscripts folder by default. This folder includes the following sub-folders:

   - The database scripts that can be used to create the cluster-scoped database are generated in the following directory: *DMGR_PROFILE*\dbscripts\de_name\DB2zOS\cluster_database_name.

   This sub-folder also contains a **createDatabase.sh** script, which you can use to run the database scripts to create the DB2 for z/OS database tables.

4. Use FTP to transfer all the generated database scripts to the z/OS system that contains the installation of DB2. Transfer the **createDatabase.sql** script as an ASCII text file, and transfer the database schema files in binary mode.

Creating and configuring DB2 for z/OS databases after network deployment profile creation:

After creating or augmenting profiles, you or your database administrator must create the databases and their tables manually, and you must also run the **bootstrapProcessServerData** command before you try to start or use the IBM Business Process Manager server.

DB2 for z/OS authorization prerequisites:

A set of user authorizations are required for your IBM Business Process Manager databases. Depending on your DB2 for z/OS version, view authorizations might also be required.

User authorization requirements for DB2 for z/OS

Ask your DB2 for z/OS system administrator to check the authorizations that have been granted to ensure that you have not granted more authority than necessary to any user ID. It can be tempting to grant DB2 SYSADM authority to the JCA authentication aliases in order to avoid possible problems with DB2 security during the configuration. The WebSphere administrator ID should not require more than DBADM authority to create the IBM Business Process Manager database objects.

The following storage group, database, and buffer pool GRANT permissions are provided by default in the createDatabase.sql file, for the WebSphere administrator that is identified by the **@DB_USER@** symbolic variable. This file is provided as a template with symbolic variables when you install the

product. After you run the **BPMConfig** script, a copy of `createDatabase.sql` is added to the subdirectories that are created for your database scripts, with relevant substitutions for the symbolic variables.

```
GRANT USE OF STOGROUP   @STOGRP@     TO  @DB_USER@ WITH GRANT OPTION;
GRANT DBADM ON DATABASE @DB_NAME@    TO  @DB_USER@;
GRANT USE OF ALL BUFFERPOOLS         TO  @DB_USER@;
```

The following GRANT permission might be required to permit the **@DB_USER@** user to create sequences and stored procedures with a schema qualifier of **@SCHEMA@**:

```
GRANT CREATEIN,ALTERIN,DROPIN ON SCHEMA @SCHEMA@ TO @DB_USER@ WITH GRANT OPTION;
```

The following permissions are also required:

```
GRANT CREATE ON COLLECTION @SCHEMA@ TO @DB_USER@;
GRANT BINDADD TO @DB_USER@;
```

Authorization requirements for views on DB2 for z/OS V10

If you are planning to use DB2 for z/OS V10, additional permissions are required for views in the database:

- Before you run the SQL to define views, you might need to set the DBACRVW subsystem parameter to YES.

  This setting ensures that WebSphere administrator IDs with DBADM authority on database *@DB_NAME@* can create views for other user IDs.

- On DB2 for z/OS V10, the WebSphere administrator ID must be specifically granted access to views, because access is not implicitly granted to users with DBADM authority on the database. Individual GRANT statements or a Resource Access Control Facility (RACF) group can be used to provide access to views in DB2 for z/OS V10. Ask your DB2 for z/OS administrator to provide this access by using either of the following methods:

  - Issue an explicit GRANT statement for each view. For example, the following sample GRANT statements can be issued for user ID WSADMIN:

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ACTIVITY_SERVICE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.APPLICATION_COMP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.AUDIT_LOG_B TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.BUSINESS_CATEGORY_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESCALATION_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.ESC_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.EVENT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.MIGRATION_FRONT TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_ATTRIBUTE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_INSTANCE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPLATE TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.PROCESS_TEMPL_ATTR TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROPERTY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.QUERY_PROP_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.SHARED_WORK_ITEM TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_AUDIT_LOG TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_DESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_HISTORY TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_CPROP TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.TASK_TEMPL_DESC TO WSADMIN WITH GRANT OPTION;
```

```
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_DIST_TARGET TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_BASKET_LDESC TO WSADMIN WITH GRANT OPTION;
GRANT DELETE,INSERT,SELECT,UPDATE ON TABLE S1CELL.WORK_ITEM TO WSADMIN WITH GRANT OPTION;
```

– Define a RACF group that corresponds to the schema name for the views, and connect the WebSphere administrator ID to the RACF group. For example, you can define a RACF group named S1CELL, and connect user WSADMIN to it, as follows:

```
INFORMATION FOR GROUP S1CELL
 SUPERIOR GROUP=ZWPS    OWNER=ZWPS    CREATED=07.144
 INSTALLATION DATA=OWNED BY EMP SERIAL 009179, SITE ABCUK
 NO MODEL DATA SET
 TERMUACC
 NO SUBGROUPS
 USER(S)=  ACCESS=  ACCESS COUNT=  UNIVERSAL ACCESS=
   WSADMIN    CONNECT   000000     NONE
    CONNECT ATTRIBUTES=NONE
    REVOKE DATE=NONE     RESUME DATE=NONE
```

Using the configuration planning spreadsheet to define authorizations

If you have downloaded the configuration planning spreadsheet for use, you can alternatively use this spreadsheet to generate the GRANT permissions that are required for users and for DB2 for z/OS V10 views (as identified in the preceding sections in this topic). The configuration planning spreadsheet is available from Techdoc WP102261 in the IBM Support Portal.

The Database worksheet in the spreadsheet lists a set of sample SQL statements that can be used to create the databases and storage groups. Additionally, the GRANT permissions that are required to authorize the WebSphere administrator and to provide access to DB2 for z/OS V10 database tables are provided. When you specify the user and database object names on the BPMVariables worksheet of the spreadsheet, these values are propagated to the Database worksheet, and are used to complete the CREATE and GRANT statements with the appropriate values.

You can ask your DB2 for z/OS system administrator to use the relevant CREATE statements to create the databases and storage groups, and to use the GRANT statements to authorize the WebSphere administrator. For more information about using the artifacts generated from the spreadsheet, see the accompanying PDF document in the Techdoc.

Storage group assignments and buffer pool usage

Ask your DB2 for z/OS system administrator to check the storage group assignments and buffer pool usage. Incorrect storage group assignment and buffer pool usage might not show up as an error message in a log, but might cause problems later. It is better to resolve such problems now rather than when the system has been handed over for use. For example, correcting storage groups and VCATs is not easy after the tables and indexes have been used.

Creating databases in the DB2 for z/OS subsystem:

You can use the **BPMConfig** script to generate the database scripts that are required to create the databases for the IBM Business Process Manager components.

You can use various tools to run these database scripts:
- The **createDatabase.sh** script, which was additionally created with the database scripts
- Tools such as the DB2 command line processor, SPUFI, or DSNTEP2

Choosing which tool to use

You can choose one tool over another based on experience and familiarity, or personal preference. Your organization might also have implemented standards or conventions for the tools that are used to create DB2 for z/OS objects, particularly in a production environment.

Considerations for choosing the createDatabase.sh script

- **createDatabase.sh** can create all your database objects in a single execution of the tool, for each database to be created. Therefore, using this script is a good choice if this is your first server implementation.
- **createDatabase.sh** runs the database scripts that the **BPMConfig** script generates.
- **createDatabase.sh** runs the SQL for each component in the correct sequence.
- **createDatabase.sh** creates database objects according to a naming convention that you define.
- **createDatabase.sh** organizes the layout of database objects across DB2 for z/OS databases.
- **createDatabase.sh** issues GRANT permissions to database, storage group, and buffer pool objects.
- **createDatabase.sh** runs in a UNIX System Services environment.
- **createDatabase.sh** produces an audit trail of the objects that it creates.

Considerations for choosing other tools

- You might prefer to use the DB2 command line processor to run the SQL statements in the UNIX Systems Services environment.
- There is no restriction on the naming or organization conventions that apply to the database objects other than the standard database subsystem restrictions.
- Some tools can be run from a z/OS environment.
- The tools can produce an audit trail of the DB2 database commands that have been issued.

Restriction: The SQL files that you need to run are in ASCII format. If you intend to use tools like the SQL processor using file input facility (SPUFI) or DSNTEP2 to run the SQL statements, some manual effort might be required to reformat SQL statements that exceed 71 characters in length after EBCDIC conversion. You can use the lineLength.sh utility to help you identify and fix SQL statements that exceed 71 characters in length.

Configuring the DB2 command line processor:

Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Ensure that a properties file, for example, `clp.properties`, exists for the DB2 command line processor. If required, you can create your own properties file by using the sample properties file that is available in the directory where the command line processor is installed. For more information, see your DB2 for z/OS documentation.

Complete the following configuration steps in the z/OS UNIX System Services environment from which the **createDatabase.sh** script will be run:

1. Configure the DB2 command line processor for each user ID that will work with DB2 for z/OS from the command line. You can update the user profiles as follows:
   - Modify the CLASSPATH environment variable to include the `clp.jar` file.
   - Use the CLPPROPERTIESFILE environment variable to define the fully qualified name of the properties file for the command line processor.
   - Define the **db2** command as an alias for the command that starts the command line processor.

- Specify the `DB2JccConfiguration.properties` file that defines the JDBC properties to be applied to the command line processor.

You can use the following syntax to add the required entries to the `.profile` file of the user ID running the command:

```
export CLPHOME=clp_install_dir
export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
export CLPPROPERTIESFILE=clp_properties_file_path
alias db2="java -Ddb2.jcc.propertiesFile=
/file_path/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
```

For example:

```
export CLPHOME=/shared/db2910_base
export CLASSPATH=$CLASSPATH:$CLPHOME/lib/clp.jar
export CLPPROPERTIESFILE=/wasv85config/clp.properties
alias db2="java -Ddb2.jcc.propertiesFile=
/wasv85config/DB2JccConfiguration.properties com.ibm.db2.clp.db2"
```

2. In the properties file for the command line processor, define alias names that can be used to connect to the DB2 for z/OS server. An alias name definition can include the following entities:
   - A URL that specifies the domain name or IP address of the database server, the port on which the server listens, and the DB2 location name that was defined during installation. The URL can take the form: *server:port/database*. The port is optional, and the DB2 location name must be specified in uppercase characters.
   - A user ID and an associated password that can be used to connect to the DB2 server. This user ID should correspond to the user ID that either the DB2 system administrator (with SYSADM authority) or the WebSphere administrator (with DBADM authority) uses to run the **createDatabase.sh** script.

   You can add the required alias name entries to the properties file by using the following syntax:

   ```
   DB2ALIASNAME=URL,user_ID,password
   ```

   For example:

   ```
   DSNXWBD=localhost:9446/DSNXWBD,SYSADM1,SYSPWRD1
   ```

   Tip: When you define a *DB2ALIASNAME* value in the properties file, ensure that the correct connection details are specified to avoid connecting to the wrong database and inadvertently overwriting its contents.

3. Configure the DB2 DBACRVW subsystem parameter to enable user IDs with DBADM authority on a database to perform the following tasks for other user IDs: create views on tables in the database, create aliases for tables, and create materialized query tables. You can use the installation Command List (CLIST) to access the DSNTIPP ISPF panel and update the DBADM CREATE AUTH field to set DB2 ZPARM DBACRVW=YES.

Create and configure the product databases.

Related tasks:

"Creating DB2 for z/OS database objects using the createDatabase.sh script"
You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

Creating DB2 for z/OS database objects using the createDatabase.sh script:

You can run the **createDatabase.sh** script to create the product databases in the DB2 for z/OS subsystem (if required) and to also populate each database with objects. Depending on your organization or site standards, your DB2 for z/OS system administrator might have already created the databases.

You can also use tools such as the DB2 command line processor, SPUFI, or DSNTEP2 to configure your databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution. The **createDatabase.sh** script was additionally generated in these subdirectories. You can run the **createDatabase.sh** script once from each subdirectory, for each instance of a database to be created or configured.

Use one of the following methods to create and populate the databases, as appropriate for your environment and standards:

- A user with SYSADM authority creates the databases and storage groups, and grants DBADM authority to a WebSphere user that is identified as the owner of the databases. The WebSphere user with DBADM authority then runs the **createDatabase.sh** script to populate the databases.

  1. `DB2 system administrator (SYSADM)` Create the physical databases as follows:
     a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

     Tip: The `createDatabase.sql` files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:
     - DMGR_PROFILE\dbscripts*cell_name*\DB2zOS*cell_database_name*
     - DMGR_PROFILE\dbscripts*de_name*\DB2zOS*cluster_database_name*

     You can copy the `createDatabase.sql` files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
     `db2 -tvf createDatabase.sql`

  2. `WebSphere administrator (DBADM)` Populate each database with objects as follows:
     a. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.
     b. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to EBCDIC. For example:
        `iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh`
        Also grant execute permissions to the **createDatabase.sh** script.
     c. Run the **createDatabase.sh** script by using the following syntax:
        `createDatabase.sh -DBAlias alias_name -RunSQL`
        where:

        -DBAlias
        Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

        -RunSQL
        Runs the SQL statements that create the database objects.

For example:

```
createDatabase.sh -DBAlias DSNXWBD -RunSQL
```

For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

d. Review the messages that are displayed in the console, checking that no error messages are displayed.

When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

- A user with SYSADM authority runs the **createDatabase.sh** script to create the databases and storage groups, and populate the databases. Complete the following steps for each database:

  1. In the z/OS system that contains the DB2 installation, access the UNIX System Services command shell and then change to the directory to which you transferred the database scripts.

  2. Check whether the **createDatabase.sh** script is in EBCDIC format. If it is not, use the **iconv** command to convert the script to   EBCDIC. For example:

  ```
  iconv -t IBM-1047 -f ISO8859-1 createDatabase.sh > createDatabase_EBCDIC.sh
  ```

  Also grant execute permissions to the **createDatabase.sh** script.

  3. Run the **createDatabase.sh** script by using the following syntax:

  ```
  createDatabase.sh -DBAlias alias_name -DBCreate -RunSQL
  ```

  where:

  -DBAlias
  > Specifies an alias name that maps to the DB2 server URL, user ID, and password, and which is used to connect to DB2. If you do not specify this parameter when you run the **createDatabase.sh** script, you are prompted for a value.

  -DBCreate
  > Creates the database.

  -RunSQL
  > Runs the SQL statements that create the database objects.

  For example:

  ```
  createDatabase.sh -DBAlias DSNXWBD -DBCreate -RunSQL
  ```

  For further information about the **createDatabase.sh** script parameters and example usage, see createDatabase.sh script.

  4. Review the messages that are displayed in the console, checking that no error messages are displayed.

  Tip: The first time that you run **createDatabase.sh** to create the database, you see a few messages because the script first attempts to drop the database, which at that stage does not yet exist. These messages can be ignored.

  When the script has finished running, you can also review the z_output.txt file, which provides an audit trail of the operations completed and status messages. This file is saved to the directory from which you ran the **createDatabase.sh** script.

  5. Grant access to views to the WebSphere administrator that has DBADM authority.

  You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 666
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using the DB2 command line processor:

You can use the DB2 command line processor to run the database scripts to create and populate the product databases.

You can also run the database scripts by using any other database tool of your choice, such as SPUFI or DSNTEP2.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts, including the **createDatabase.sh** script, to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Configure the DB2 command line processor.

When you generated the database scripts, the files for configuring each of the databases were generated into separate subdirectories for ease of execution.

Complete the following steps to create the databases and database objects:
1. `DB2` `system` `administrator` `(SYSADM)` Create the physical databases and storage groups, and grant DBADM authority to a WebSphere user that is identified as the owner of the databases:
   a. Create the cluster-scoped databases and storage groups, and grant the WebSphere administrator DBADM access to the databases.

   Tip: The createDatabase.sql files, which are in the subdirectories where the database scripts were generated, contain the relevant CREATE and GRANT statements. The default locations of the database scripts are:
   - DMGR_PROFILE/dbscripts/*de_name*/DB2zOS/*cluster_database_name*

   You can copy the createDatabase.sql files from the z/OS location to which they were transferred, and then run the SQL on the database server; for example:
   db2 -tvf createDatabase.sql
2. `WebSphere` `administrator` `(DBADM)` Populate each database with objects as follows:
   a. To create the database objects for the cluster-scoped databases, use the DB2 command line processor to run the following SQL files, which were transferred from the DMGR_PROFILE/ dbscripts/*de_name*/DB2zOS/*cluster_database_name* subdirectories on the IBM Business Process Manager system. Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
      1) createTablespace_Standard.sql
      2) createSchema_Standard.sql
      3) createSchema_Messaging.sql
      4) createProcedure_Standard.sql

Note: In the `createProcedure_Standard.sql` file, the "at" sign (@) is used as a statement termination character, so when you use the DB2 command line processor to run the SQL commands in this file, use the **-td** parameter to define @ as the statement termination character.

3. `DB2` `system` `administrator` `(SYSADM)` Grant access to views to the WebSphere administrator that has DBADM authority.

   You can use individual GRANT statements or a Resource Access Control Facility (RACF) group to provide the required access. For more information, see DB2 for z/OS authorization prerequisites.

Each database is created and populated with the required database objects.

Related tasks:

"Configuring the DB2 command line processor" on page 666
Before you run the **createDatabase.sh** script in the z/OS UNIX System Services environment, you must configure the DB2 command line processor by defining a set of environment variables and a **db2** command alias. You must also define alias names that can be used to connect to the DB2 for z/OS server.

Creating DB2 for z/OS database objects using SPUFI or DSNTEP2:

You can use tools such as SPUFI or DSNTEP2 to run the database scripts that are used to create the DB2 for z/OS database objects for your configuration. This task assumes that a DB2 system administrator with SYSADM authority has created the physical databases and storage groups, and granted DBADM authority to a WebSphere user that is identified as the owner of the databases.

- Create the database scripts for the IBM Business Process Manager components.
- Use FTP to transfer the database scripts to the z/OS system that contains the DB2 for z/OS installation. Transfer the **createDatabase.sh** script as an ASCII text file, and transfer the database schema files in binary mode. Also ensure that you retain the directory structure when you transfer the files.
- Create the required buffer pools. For more information, see Sample DB2 commands for allocating buffer pools.
- Create the databases and assign the relevant permissions.

When you generated the database scripts, the scripts for configuring each of the databases were generated into separate subdirectories for ease of execution. The default locations of the database scripts are:

- `DMGR_PROFILE/dbscripts/`*de_name*`/DB2zOS/`*cluster_database_name*: Contains the files that can be used to create each of the cluster-scoped databases.

You can create the database objects by using the tool of your choice. For example:

SPUFI A utility that runs SQL files from z/OS. SPUFI uses EBCDIC input.

DSNTEP2
A sample dynamic SQL program provided with the DB2 for z/OS product.

1. On the z/OS system that contains the DB2 for z/OS installation, go to the location to which you transferred the database scripts:
   - Each *cluster_database_name* subdirectory contains one or more of these files, which you must run in the following order:
     a. `createTablespace_Standard.sql`
     b. `createSchema_Standard.sql`
     c. `createSchema_Messaging.sql`
     d. `createProcedure_Standard.sql`

   These files are in ASCII format.
2. Assign the appropriate read permissions to the SQL files; for example:

```
chmod 644 createSchema_Standard.sql
```

3. If the tool that you want to use to view and run the SQL files requires the files to be in EBCDIC format, rather than ASCII format, use the **iconv** command to convert the files to EBCDIC. For example:

```
iconv -t IBM-1047 -f ISO8859-1 createSchema_Standard.sql > createSchema_Standard_EBCDIC.sql
```

   Important: After converting from ASCII to EBCDIC, check that no SQL statements exceed 71 characters in length. Longer lines will lead to line truncation and invalid statements when copying to fixed-width MVS data sets.

   Tip: If you have converted the files from ASCII format to EBCDIC, but need to run the files in ASCII format, you can also use **iconv** to convert the files back to ASCII. For example:

```
iconv -t ISO8859-1 -f IBM-1047 createSchema_Standard_EBCDIC.sql > createSchema_Standard.sql
```

4. To create database objects outside of the z/OS UNIX environment by using SPUFI or DSNTEP2, copy the SQL files from z/OS UNIX to a partitioned data set.
5. Run the SQL files by using the tool of your choice.
6. Verify that the database tables are created successfully with no errors by inspecting the output.

Granting table privileges to the JCA authentication alias user ID:

If the schema name you are using is not the same as the JCA authentication alias user ID, you must grant a subset of DB2 for z/OS privileges to the JCA authentication alias user ID.

Use a schema name that is different from the JCA authentication alias to prevent the alias user ID from having the authority to drop tables. (The authority to drop tables is implicitly granted to the creator, that is, the schema.) Note that it does not make sense to grant a privilege like DBADM to the JCA authentication alias user ID because DBADM also has the ability to drop tables.

If you want IBM Business Process Manager to function while not allowing the alias user ID to have DROP capability, create some GRANT statements by copying the database scripts and editing them to construct GRANT commands from the CREATE commands. You can create GRANT commands like the one shown in the following example:

```
GRANT ALL PRIVILEGES ON TABLE
cell.tablename TO userid/sqlid
```

where *userid/sqlid* is the JCA authentication alias user ID.

Note: Typically, the creator of a database object has implicit use of that object without requiring additional GRANT permissions. However, for DB2 for z/OS Version 10, additional GRANT permissions might be required for views because access to views is not implicitly granted to the creator.

Configuring profiles, databases, and deployment environments for Oracle:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

When configuring databases, the system default tablespaces are used. However, if you want to use scripts that create custom tablespaces for the Business Process Choreographer and the Business Space components, see the **usetablespaces** property as described in the Database and cell properties section of Configuration properties for the BPMConfig command.

You can run one of the following commands:

- run **BPMConfig -create -sqlfiles** *properties_file_name* **-outputDir** *output_directory*

- run **BPMConfig -create -de** *properties_file_name* when **bpm.de.deferSchemaCreation** is set to **true**.

The generated SQL files can be found in the output directory that you specified or in *profile_root*/dbscripts. The files include additional `createTablespace*.sql` files that you must run before the `createSchema*.sql` files to create the tablespaces for Business Process Choreographer or Business Space. The generated `createSchema*.sql` files include the appropriate references to the tablespaces that you specified.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*\BPM\dbscripts\Oracle\Create folder contains the **createUser.sql** script that is used to create the users for Oracle databases.

In the following examples, replace *@DB_USER@* with the user name that you want to use for the database and replace *@DB_PASSWD@* with the password for that user.

Run the following sample script to create the database users.
BPM_HOME\BPM\dbscripts\Oracle\Create\createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Creating profiles, network deployment environments and database tables using BPMConfig:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when

the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:
- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

To create the deployment environment for the first time, complete the following steps:
1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: `BPM_home\BPM\samples\config`.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a `standard` folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: `de_type[-environment_type]-topology-database_type[-suffix]`, where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called `Standard-PC-SingleCluster-DB2.properties`.

3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from `local host` to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

   If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

   BPM_home\bin\BPMConfig -create -de *my_environment.properties*

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to true, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an Advanced or AdvancedOnly deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with Advanced or AdvancedOnly capabilities.

If the new or updated node is on the same computer as the deployment manager node, then the updated or new node is automatically synchronized with the deployment manager node. Before you start the node, ensure that this synchronization has completed by checking the syncNode.log file found in the *profile_root*\logs directory. If the new or updated node is on a different computer than the deployment manager node, you need to run the **syncNode.bat** or **syncNode.sh** command on the new or updated node and wait for the synchronization to complete before starting the node.

Related tasks:

"Running the generated Oracle database scripts"
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*\dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*
           - createSchema_Standard.sql
           - createSchema_Messaging.sql
         - *psuser*
           - createSchema_Standard.sql
           - createProcedure_Standard.sql
         - *pdwuser*
           - createSchema_Standard.sql

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   sqlplus *cmnuser/cmnpassword*@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts*deployment_environment_name*\Oracle\orcl\cmnuse

   sqlplus *cmnuser/cmnpassword*@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts*deployment_environment_name*\Oracle\orcl\cmnuse

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   sqlplus *psuser/pspassword*@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts*deployment_environment_name*\Oracle\orcl\psuser\d

   sqlplus *psuser/pspassword*@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts*deployment_environment_name*\Oracle\orcl\psuser\d

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

For example:

Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

```
bootstrapProcessServerData.bat -nodeName node1 -serverName myServer
```

Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

```
bootstrapProcessServerData.bat -clusterName myAppCluster
```

Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

```
sqlplus pdwuser/pdwpassword@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts\deployment_environment_name\Oracle\orcl\pdw
```

Related tasks:

"Generating Oracle database scripts using the BPMConfig command" on page 699
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: � **Vista** ▏ **Windows 7**

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the pmt.bat file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the `installation_root\bin\ProfileManagement\pmt.bat` file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***bin****ProfileManagement****pmt.bat**

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is `installation_root\profiles\profile_name`.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.
   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
    - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
    - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
        - In the **Path** field, enter the directory path to the existing certificate.
        - In the **Password** field, enter the password for the certificate
        - In the **Keystore type** field, select the keystore type for the certificate you are importing.
        - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
        - Click **Next** to display the Security Certificate (Part 2) page

      When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.
9. On the Security Certificate (Part 2) page, verify that the certificate information is correct, and click **Next** to display the Port Values Assignment page.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.
10. On the Port Values Assignment page, verify that the ports specified for the profile are unique and click **Next**. The Profile Management Tool detects ports that are currently used by other WebSphere products and displays recommended port values that do not conflict with existing ones. If you have applications other than WebSphere ones that use specified ports, verify that the ports do not conflict.

    Ports are recognized as being in use if the following conditions are satisfied:
    - The ports are assigned to a profile created under an installation performed by the current user.
    - The ports are currently in use.

    Although the tool validates ports when you access the Port Values Assignment page, port conflicts can still occur resulting from selections you make on subsequent Profile Management Tool pages. Ports are not assigned until profile creation completes.

If you suspect a port conflict, you can investigate it after the profile is created. Determine the ports used during profile creation by examining the following file:

profile_root\properties\portdef.prop

Included in this file are the keys and values used in setting the ports. If you discover port conflicts, you can reassign ports manually. To reassign ports, see "Updating ports in existing profiles" in the WebSphere Application Server information center. Run the **updatePorts.ant** file through the **ws_ant** script detailed in this topic.

11. Advanced: If you do not have administrative privileges, skip to the next step. If you have administrative privileges, on the Service Definition, page indicate whether to use a Windows service to run IBM Business Process Manager.

    If the profile is configured as a Windows service, IBM Business Process Manager starts Windows services for processes started by the **startServer** or **startManager** commands. For example, if you configure a server as a Windows service and issue the **startServer** command, the **wasservice** command starts the defined services.

    Important: If you choose to log on as a specified user account, you must specify the user ID and the password for the user who is to run the service, and the startup type (default is Manual). The user ID must not have spaces in its name, must belong to the Administrator group, and must have the advanced user right "Log on as a service." If the user ID belongs to the Administrator group, the Profile Management Tool grants it the advanced user right if it does not already have it.

    During profile deletion, you can remove the Windows service that is added during profile creation.

    IPv6 (Internet Protocol version 6) considerations when running profiles as Windows services
    Profiles created to run as a Windows service fail to start when using IPv6 if the service is configured to run as Local System. Create a user-specific environment variable to enable IPv6. Because this environment variable is a user variable instead of a Local System variable, only a Windows service that runs as that specific user can access this environment variable. By default, when a new profile is created and configured to run as a Windows service, the service is set to run as Local System. When the IBM Business Process Manager Windows service tries to run, the service is unable to access the user environment variable that specifies IPv6, and thus tries to start as IPv4. The server does not start correctly in this case. To resolve the problem, when creating the profile, specify that the IBM Business Process Manager Windows service runs as the same user ID under which the environment variable that specifies IPv6 is defined, instead of as Local System.

12. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

13. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➡ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with an Oracle database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: **Vista** Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*\bin\ProfileManagement\pmt.bat
2. Shut down any servers associated with a profile you plan to augment.
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.
6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.
7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➦ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*\properties\ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:
   ```
   manageprofiles.bat -augment -templatePath BPM/BpmDmgr
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node managed node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: ▐ Vista ▌   ▐ Windows 7 ▌

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.

2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command **installation_root\bin\ProfileManagement\pmt.bat**

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.

6. On the Profile Name and Location page, complete the following steps:
   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.
   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*\profiles*profile_name*.
   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.
   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:
   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.
   - In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.

9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
   - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
     – In the **Path** field, enter the directory path to the existing certificate.
     – In the **Password** field, enter the password for the certificate
     – In the **Keystore type** field, select the keystore type for the certificate you are importing.
     – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
     – Click **Next** to display the Security Certificate (Part 2) page

   When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password.

The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

When you create either or both certificates, or import either or both certificates, the keystore files that are created are:

- `key.p12`: Contains the default personal certificate.
- `trust.p12`: Contains the signer certificate from the default root certificate.
- `root-key.p12`: Contains the root signing certificate.
- `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
- `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
- `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.
12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: Vista Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.
- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not

have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***\bin\ProfileManagement\pmt.bat**
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)
   - The deployment manager is not running or you are not sure if it is running.
   - The deployment manager has the SOAP connector disabled
   - The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
   - The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
   - The deployment manager does not have a JMX administrative port enabled.
   - The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
   - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
   - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.
8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⮞ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*\properties\profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

    Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

    Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

    ```
    manageprofiles.bat -augment -templatePath BPM/BpmNode
    -profileName MyProfileName
    -adminUsername celladmin -adminPassword celladmin
    ```

    The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*\BPM\samples\config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.

   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**

   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**

   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**
   - **bpm.node.#.hostname=**
   - **bpm.node.#.installPath=**

   It is recommended that you also set:
   - **bpm.node.#.nodeName=**
   - **bpm.node.#.profileName=**

   The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

   If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

   For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

   install_root\bin\BPMConfig -create -profile *my_environment.properties*

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any

given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:
- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root\bin\startManager.bat
- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

    profile_root\bin

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:

    addNode.bat *deployment_manager_host deployment_manager_SOAP_port*

   Run the following command from the command line if security is enabled:

    addNode.bat *deployment_manager_host deployment_manager_SOAP_port* -username
    userID_for_authentication -password *password_for_authentication*

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:

    ADMU0003I: Node DMNDID2Node03 has been successfully federated.

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

⇨ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.
  1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Instance name**: Type the instance name for the Oracle database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **User name**: Type a user name for the Process Center database.
  - **Password**: Type the password for the Process Center database user.
  - **Confirm password**: Type to confirm the password for the Process database user.
- **Performance Data Warehouse database**
  - **User name**: Type a user name for the Performance Data Warehouse database.
  - **Password**: Type the password for the Performance Data Warehouse database user.
  - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **User name**: Type a user name for the messaging engine database.
    - **Password**: Type the password for the messaging engine database user.
    - **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:

- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:

   a. Optional: If you want to exit without generating the configuration, click **Cancel**.

   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

11. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative

console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

Oracle database considerations:
- Make sure that the user name and schema name are exactly the same. The user specified should exist in the database before generating the environment.

- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.

2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   - **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   - **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

  The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

  There are four types of environments available for selection:

  Development
  > Select **Development** if the server will serve in a development capacity.

  Test Select **Test** if the server you are configuring will be used as a testing environment.

  Stage Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

  Production
  > Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between

the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Oracle**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Instance name**: Type the instance name for the Oracle database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **User name**: Type a user name for the Process Center database.
     - **Password**: Type the password for the Process Center database user.
     - **Confirm password**: Type to confirm the password for the Process database user.
   - **Performance Data Warehouse database**
     - **User name**: Type a user name for the Performance Data Warehouse database.
     - **Password**: Type the password for the Performance Data Warehouse database user.
     - **Confirm password**: Type to confirm the password for the Performance Data Warehouse database user.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **User name**: Type a user name for the messaging engine database.

- **Password**: Type the password for the messaging engine database user.
- **Confirm password**: Type to confirm the password for the messaging engine database user.

Attention: The default schema names that are displayed on this page might conflict with your site naming convention or might conflict with existing schemas. As such, it is likely that you will need to change the schema name. Pay close attention to the values specified to avoid potential naming conflicts.

Also ensure that you have completed the following items:

- Make sure that the user name and the schema name are exactly the same. The user specified should exist in the database before generating the environment.
- IBM Process Server and IBM Performance Data Warehouse can use the same database instance, but should use different users.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating users for Oracle databases:

You can create the users for Oracle databases before you create profiles and configure your network deployment environment. Create the cell-scoped user, the deployment environment-level user, the Process Server user, and the Performance Data Warehouse user. Note: The Process Server user and the Performance Data Warehouse user are not needed for an Advanced-only deployment environment.

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

You can use a single instance of Oracle for configuring BPM. The Oracle instance must exist and be available for access. Consult the Oracle documentation to create an Oracle instance. If you use a single Oracle instance, make sure that you use different user IDs for the three different BPM databases.

If IBM Business Process Manager is installed, the *BPM_HOME*\BPM\dbscripts\Oracle\Create folder contains the `createUser.sql` script that is used to create the users for Oracle databases.

In the following examples, replace @*DB_USER*@ with the user name that you want to use for the database and replace @*DB_PASSWD*@ with the password for that user.

Run the following sample script to create the database users.
BPM_HOME\BPM\dbscripts\Oracle\Create\createUser.sql
Optionally, or if IBM Business Process Manager is not installed, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE USER @DB_USER@ IDENTIFIED BY @DB_PASSWD@;
grant connect, resource, unlimited tablespace to @DB_USER@;
grant create view to @DB_USER@;
grant javauserpriv to @DB_USER@;
grant execute on dbms_lock to @DB_USER@;
```

Generating Oracle database scripts using the BPMConfig command:

You can use the `BPMConfig` command to generate the database scripts that are used to create your database tables. If you used the `BPMConfig` command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:
- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.
  - The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.

- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

Important: If you are using an Oracle database, you must include the database user name and password for all databases, including the optional ones.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you created the databases, locate the appropriate sample properties file *BPM_HOME*\BPM\samples\config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.
   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME\bin\BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.
   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME\bin\BPMConfig -create -sqlfiles *my_environment.properties* -outputDir \MyBPMScriptDir

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*\dbscripts folder by default. This folder includes the following sub-folders:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the Oracle database tables.

A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - Oracle
    - *orcl*
      - *cmnuser*
        - createSchema_Standard.sql
        - createSchema_Messaging.sql
      - *psuser*
        - createSchema_Standard.sql
        - createProcedure_Standard.sql
      - *pdwuser*

> – createSchema_Standard.sql

In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Related tasks:

"Creating profiles, network deployment environments and database tables using BPMConfig" on page 673

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Running the generated Oracle database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*\dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for a **Standard** deployment environment with Oracle databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - Oracle
       - *orcl*
         - *cmnuser*
           - createSchema_Standard.sql
           - createSchema_Messaging.sql
         - *psuser*
           - createSchema_Standard.sql
           - createProcedure_Standard.sql
         - *pdwuser*
           - createSchema_Standard.sql

   In the above example, **orcl** is the Oracle instance, **cmnuser** is the **deployment environment-level** user, **psuser** is the Process Server user, and **pdwuser** is the Performance Data Warehouse user.

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

```
sqlplus cmnuser/cmnpassword@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts\deployment_environment_name\Oracle\orcl\cmnuse
sqlplus cmnuser/cmnpassword@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts\deployment_environment_name\Oracle\orcl\cmnuse
```

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlplus psuser/pspassword@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts\deployment_environment_name\Oracle\orcl\psuser\c
   sqlplus psuser/pspassword@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts\deployment_environment_name\Oracle\orcl\psuser\c
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.bat -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.bat -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlplus pdwuser/pdwpassword@orcl @BPM_HOME\profiles\DmgrProfile\dbscripts\deployment_environment_name\Oracle\orcl\pdwuse
   ```

Configuring profiles, databases, and deployment environments for SQL Server:

Select which method to use to configure your profiles, databases, and network deployment environment. You can use either the **BPMConfig** command-line utility or multiple tools to complete the profile and deployment environment setup.

Tip: If you are using the federated repositories as a user registry, you can ignore warnings in the systemout.log file about maximum key length: **... Warning! The maximum key length is 900 bytes ...**. If you are using the stand-alone LDAP registry, ensure that the number of characters in all the user distinguished name (DN) entries in your organization do not exceed the 131 character limit. If the number of characters in any of the user DN entries exceeds 131 characters, you must change the user account registry to the federated repositories option.

Creating profiles, deployment environments, and databases simultaneously using the BPMConfig command:

Use the BPMConfig command to create profiles and deployment environments. During this process, database scripts are generated, which you must run to create the tables for the databases.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to true, you must create the tables

by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:

```
BPMConfig -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:

```
BPMConfig -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory `profile_root`/dbscripts.

Configuring XA transactions:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**.

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

   c. Click the **MSDTC** tab, and then click **Security Configuration**.

   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

   c. Right-click **Local DTC** and then select **Properties**.

   d. Click the **Security** tab on the **Local DTC Properties** window.

   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

   f. Click **OK** again to close the Properties window, and then close Component Services.

g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

   a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

   b. If BPM is already installed, go to *bpm_install_root*\jdbcdrivers\SQLServer\xa to obtain the files you require in the following steps:

      • Copy the sqljdbc_xa.dll file from the JDBC unarchived directory to the Binn directory (for a default SQL Server install, the location is C:\Program Files\Microsoft SQL Server\ MSSQL10_50.MSSQLSERVER\MSSQL\Binn) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the sqljdbc_xa.dll file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the sqljdbc_xa.dll file in the x64 folder.

      • Run the xa_install.sql database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by sqljdbc_xa.dll. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

      • Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

3. Follow these steps for configuring Windows authentication:

   • Locate **sqljdbc_auth.dll**. If you haven't installed IBM Business Process Manager, go to the *BPM_install_root*\jdbcdrivers\SQLServer\auth to obtain the file. If you haven't installed BPM, locate the dll file in the Microsoft JDBC driver package that you downloaded.

   • Copy the sqljdbc_auth.dll file to the Binn directory (for a default SQL Server install, the location is C:/Program Files/Microsoft SQL Server/MSSQL10_50.MSSQLSERVER/MSSQL/Binn) of SQL Server computer. If your JRE is 32-bit , use the **sqljdbc_auth.dll** file in the x86 folder, even if the SQL Server is installed on a x64 processor. If your JRE 64-bit, use the **sqljdbc_auth.dll** file in the x64 folder.

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.

2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**

3. Locate **TCP/IP** on the right-hand side.

4. Double click **TCP/IP** and enable it under the **Protocol** tab.

5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

• You cannot share databases across multiple installations or Deployment Environments

• The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.

- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*\BPM\dbscripts\SQLServer\ Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database
1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   BPM_HOME\BPM\dbscripts\SQLServer\Create\createDatabase_CaseInsensitive.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;

   If IBM Business Process Manager is not installed, run the following command from the command line:

   sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"
3. Run the script to create the CommonDB database. Run the following sample script:

   BPM_HOME\BPM\dbscripts\SQLServer\Create\createDatabase_CaseSensitive.sql

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;

   If IBM Business Process Manager is not installed, run the following command from the command line:

   sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"

   Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.
- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must

create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.

1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

When using Windows authentication, you must ensure that the domain account is added to the SQL Sever login. You must login as the SQL Server administrator and follow the below steps to create users and schemas for Windows authentication.

1. Create the SQL Server login account for your Windows machine using the login information for the machine. For example, if **user1** is the user name and **password** is password for your Windows machine, use the following command syntax:

```
USE [master]
GO
CREATE LOGIN [user1\password] FROM WINDOWS WITH DEFAULT_DATABASE=[master]
GO
```

   Note: The SQL Server login that is created must not have SYSADMIN privileges. If the login user has SYSADMIN privileges, the specified schema value is ignored for database connections by SQL Server since the **sysadmin** user's default schema is always *dbo*.

2. Update the master database to grant permission for XA transactions for the Windows user. Use the following command syntax:

```
USE [master];
CREATE USER [sqluser] FOR LOGIN [user1\password];
USE [master];
EXEC sp_addrolemember N'SqlJDBCXAUser', N'sqluser';
```

3. For each database that you create, you must set the default schema for the SQL Server login. Use the following command syntax for the BPMDB (Process Server) database:

```
CREATE DATABASE BPMDB COLLATE SQL_Latin1_General_CP1_CI_AS
GO
USE [BPMDB]
GO
CREATE USER [sqluser] FOR LOGIN [user1\password] WITH DEFAULT_SCHEMA=[BPMPS00]
GO
CREATE SCHEMA [BPMPS00] AUTHORIZATION [sqluser]
GO
EXEC sp_addrolemember 'db_ddladmin', 'sqluser';
EXEC sp_addrolemember 'db_datareader', 'sqluser';
EXEC sp_addrolemember 'db_datawriter', 'sqluser';
```

   Note:
   - The BPMDB and PDWDB databases must be created as case-insensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CI_AS**, where **CI** is the **COLLATE** attribute value that is applicable for the case-insensitive databases.
   - The CommonDB database must be created as case-sensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CS_AS**, where **CS** is the **COLLATE** attribute value that is applicable for the case-sensitive databases.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 74. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Creating profiles, network deployment environments and database tables using BPMConfig:

You can use the **BPMConfig** command to create a typical network deployment environment using a properties file that contains all of the values used in the configuration of your deployment environment. At the same time as the deployment environment is created, you can create the required database tables, and create a new deployment manager profile and custom profiles for managed nodes by including settings for these profiles in the properties file used by the **BPMConfig** command.

Before you create a deployment environment using the BPMConfig command-line utility, you may need to manually create all of the databases that are specified in the properties file. Although the BPMConfig command can create the database schema and tables, it cannot create the databases. The databases must be created before the tables are created (and before the servers are started). Depending on the value that is set for the bpm.de.deferSchemaCreation property, the database schema and tables can be created when the BPMConfig command is run or they can be created after the command is run. Information about the bpm.de.deferSchemaCreation property is found in the "About this task" section below.

For your SQL Server database server, make sure that the username and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.

If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio. You should also be sure to use the sample properties file that matches your authentication method as a basis for your own configuration properties file. For example, if you base your own configuration properties file on one of the sample configuration files with a name ending in SQLServer-WinAuth, the setting for the attribute **sqlServerWinAuth** is set to "true" by default.

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

When run with the **-create -de** options, the **BPMConfig** command performs the following tasks:

- Creates any local profiles specified in the configuration properties file that do not already exist.
- Creates the deployment manager node based on the values in the deployment manager properties file and starts the deployment manager.
- For each node specified in the configuration properties file, creates a managed node based on the specified values.
- Federates each managed node and adds the node to the deployment environment.
- Generates the deployment environment.
- If the properties file that is used has the parameter **bpm.de.deferSchemaCreation** set to **false**, then the database tables are also created when you run the command. If the **bpm.de.deferSchemaCreation** property in the configuration properties file is set to **true** then only the scripts for creating the database tables are generated. In this case, the database tables need to be created separately using these scripts, and the bootstrap utility will need to be run manually.

  Tip: If you run the **BPMConfig** command to generate the database scripts instead of creating the actual tables, you can pass along these scripts to your database administrator to review and run the scripts.
- If the **bpm.de.deferSchemaCreation** property is set to **true**, then the Process database is not loaded with system information and you must run the **bootstrapProcessServerData** utility manually.

Note: If SQLServer Windows Authentication is used, you must manually run the bootstrap utility to load the Process database because this step is not done automatically by **BPMConfig**.

To create the deployment environment for the first time, complete the following steps:

1. On the computer where you want to create the deployment environment, locate the appropriate sample properties file: *BPM_home*\BPM\samples\config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file. For each of the different product configurations, there is a different folder containing sample configuration files. For example, for configuring a **Standard** deployment environment, there is a standard folder containing a set of sample configuration properties files. Within each folder, there is a set of files that are specific to the different database types and configuration environments. The sample files are named according to the following format: *de_type*[*-environment_type*]*-topology-database_type*[*-suffix*], where:
   - *de_type* can be set to **Standard** .
   - *environment_type* can be set to **PS** for Process Server or **PC** for Process Center. .
   - *topology* can be set to **SingleCluster** or **ThreeClusters**.
   - *database_type* can be set to **DB2**, **DB2 for z/OS**, **Oracle**, or **SQLServer**.
   - *suffix* can be set to **-WinAuth** for an SQL Server database.

   For example, the sample configuration properties file for configuring an **Standard** deployment environment with Process Center and a single cluster topology using a DB2 database is called Standard-PC-SingleCluster-DB2.properties.
3. Modify your version of the properties file so that the values correspond to your own configuration. When modifying the sample properties file, use the guidance provided within the file for specifying values.

   When you are configuring a Process Server environment to use Process Center remotely, you must change the default value for the **psProcessCenterHostname** property from local host to a valid host name. If you are configuring an offline Process Server and the value for **bpm.de.psOffline** is set to true, then you do not need to specify a value for the **psProcessCenterHostname** property.

   Note: Your modified properties file must use UTF-8 encoding.

   Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example `bpm.dmgr.installPath=c:\\IBM\\BPM85`.

If you are configuring a three-cluster setup that is based on the Advanced or AdvancedOnly template, and you want your deployment environment to include the optional Business Process Archive Manager, include the properties file entries that are described in Configuring Business Process Archive Manager.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

   `BPM_home\bin\BPMConfig -create -de my_environment.properties`

5. Start the deployment manager. Run the **BPMConfig** command on each computer that has one or more managed nodes, passing it the name of the same properties file.

   Note: For each node that is to be configured on a different machine from the deployment manager, check the soap port of the deployment manager and update the value of **bpm.dmgr.soapPort** in the properties file before running **BPMConfig** on the node.

   Note: For each cluster member in the properties file, **BPMConfig** adds **http** and **https** ports to the virtual hosts list. Check the virtual hosts list after running **BPMConfig** to make sure that the assigned ports are acceptable.

If you ran **BPMConfig** with the **deferSchemaCreation** set to `true`, then you must create your database tables and if your environment includes the ProcessServer component, you must also load the Process Server database. To create the database, run the SQL scripts that are generated by the **BPMConfig** command. To load the Process Server database, run the **bootstrapProcessServerData** utility. For more information see the related task link for running the generated scripts for creating database tables. After you have created your deployment environment and your database tables, you can start the deployment manager, node agents, and clusters by running the **BPMconfig** command with the **-start** action from the deployment manager computer. If you are creating an `Advanced` or `AdvancedOnly` deployment environment, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment with `Advanced` or `AdvancedOnly` capabilities.

If the new or updated node is on the same computer as the deployment manager node, then the updated or new node is automatically synchronized with the deployment manager node. Before you start the node, ensure that this synchronization has completed by checking the `syncNode.log` file found in the `profile_root\logs` directory. If the new or updated node is on a different computer than the deployment manager node, you need to run the **syncNode.bat** or **syncNode.sh** command on the new or updated node and wait for the synchronization to complete before starting the node.

If SQLServer Windows Authentication is used, you must manually run the bootstrap utility to load the Process Server database.

Related tasks:
"Running the generated SQL Server database scripts" on page 710
If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the `dmgr_profile_name\dbscripts` folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - *deployment_environment_name*
     - SQLServer
       - *CMNDB*
         - *schema name*
           - `createSchema_Standard.sql`
           - `createSchema_Messaging.sql`
       - *BPMDB*
         - *schema name*
           - `createSchema_Standard.sql`
           - `createProcedure_Standard.sql`
       - *PDWDB*
         - *schema name*
           - `createSchema_Standard.sql`

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\CMND
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\CMND
   ```

   In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\BPMD
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\BPMD
   ```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

```
bootstrapProcessServerData.bat -nodeName node1 -serverName myServer
```

Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

```
bootstrapProcessServerData.bat -clusterName myAppCluster
```

Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

```
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\P
```

Related tasks:

"Generating SQL database scripts using the BPMConfig command" on page 747
You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Configuring the profiles and network deployment environment using multiple tools:

You can use multiple tools to configure the profiles and the network deployment environment. You can use the **manageprofiles** command-line utility or the Profile Management Tool to create or augment the network deployment profiles, and the Deployment Environment wizard to create the network deployment environment. If you want to create the deployment manager and managed-node profiles separately from creating the deployment environment, you can use the **BPMConfig** command.

Creating or augmenting network deployment profiles:

You must create or augment a deployment manager profile and one or more custom profiles before creating the deployment environment. Using profiles, you can have more than one runtime environment on a system, without having to install multiple copies of IBM Business Process Manager.

Creating or augmenting deployment manager profiles:

To start the network deployment configuration, create or augment a deployment manager profile. You can create deployment manager profiles using the Profile Management Tool, and augment profiles using the Profile Management Tool or the **manageprofiles** command-line utility.

Creating deployment manager profiles with an SQL Server database server using the Profile Management Tool:

You can configure a deployment manager profile using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: Vista Windows 7

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the pmt.bat file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

  Non-administrative users are prompted for the administrator password.
- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does

not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the `installation_root\bin\ProfileManagement\pmt.bat` file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***bin****ProfileManagement****pmt.bat**

2. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

3. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

4. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM deployment manager profile template and click **Next**.

5. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is `installation_root\profiles\profile_name`.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

   When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

6. On the Node, Host and Cell Names page, complete the following actions for the profile you are creating:

   - In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   - In the **Host name** field, enter a name for the host or accept the default value.

   - In the **Cell name** field, enter a name for the cell or accept the default value.

   Click **Next**.

7. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

   Click **Next**.

8. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.

   - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.

- To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
  - In the **Path** field, enter the directory path to the existing certificate.
  - In the **Password** field, enter the password for the certificate
  - In the **Keystore type** field, select the keystore type for the certificate you are importing.
  - In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
  - Click **Next** to display the Security Certificate (Part 2) page

  When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

9. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

   If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

   When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
   - `key.p12`: Contains the default personal certificate.
   - `trust.p12`: Contains the signer certificate from the default root certificate.
   - `root-key.p12`: Contains the root signing certificate.
   - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
   - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
   - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

   These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

10. Advanced: If you do not have administrative privileges, skip to the next step. If you have administrative privileges, on the Service Definition, page indicate whether to use a Windows service to run IBM Business Process Manager.

    If the profile is configured as a Windows service, IBM Business Process Manager starts Windows services for processes started by the **startServer** or **startManager** commands. For example, if you configure a server as a Windows service and issue the **startServer** command, the **wasservice** command starts the defined services.

    Important: If you choose to log on as a specified user account, you must specify the user ID and the password for the user who is to run the service, and the startup type (default is `Manual`). The user ID must not have spaces in its name, must belong to the Administrator group, and must have the advanced user right "Log on as a service." If the user ID belongs to the Administrator group, the Profile Management Tool grants it the advanced user right if it does not already have it.

    During profile deletion, you can remove the Windows service that is added during profile creation.

    IPv6 (Internet Protocol version 6) considerations when running profiles as Windows services
    Profiles created to run as a Windows service fail to start when using IPv6 if the service is

configured to run as Local System. Create a user-specific environment variable to enable IPv6. Because this environment variable is a user variable instead of a Local System variable, only a Windows service that runs as that specific user can access this environment variable. By default, when a new profile is created and configured to run as a Windows service, the service is set to run as Local System. When the IBM Business Process Manager Windows service tries to run, the service is unable to access the user environment variable that specifies IPv6, and thus tries to start as IPv4. The server does not start correctly in this case. To resolve the problem, when creating the profile, specify that the IBM Business Process Manager Windows service runs as the same user ID under which the environment variable that specifies IPv6 is defined, instead of as Local System.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

➡ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles with an SQL Server database server using the Profile Management Tool:

You can use the Profile Management Tool to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: 　Vista　 　Windows 7　

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

  ```
  runas /user:MyAdminName /env pmt.bat
  ```

  Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***bin\ProfileManagement\pmt.bat**

2. Shut down any servers associated with a profile you plan to augment.

3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.

4. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.

5. On the Augment Selection page, select the **IBM BPM deployment manager** augmentation template. Then click **Next**.

6. Required: On the Administrative Security page, enter values for the **User name**, **Password**, and **Confirm password**. The password specified during installation for administrator will be used for all internal users. Because all IBM Business Process Manager profiles must have administrative security enabled, **Next** is enabled only after you enter the values.

7. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.

8. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

• Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Related information:

⇨ Updating ports in existing profiles (WebSphere Application Server)

Augmenting deployment manager profiles using the manageprofiles command-line utility:

You can use the manageprofiles command-line utility to augment an existing WebSphere Application Server deployment manager profile.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a deployment manager profile.

   Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.
   You can determine the template by viewing the profile registry in the *installation_root*\properties\ profileRegistry.xml file. Do not modify this file; use it only to view the templates.

2. Find the appropriate template to use for the augmentation.

   Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For deployment manager profiles, use the BPM/BpmDmgr template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions

are installed in your environment. The file path for **-templatePath** need not be fully qualified; `/profileTemplates` is automatically added as a prefix.

> **Note:** Do not manually modify the files that are located in the *installation_dir*`/profileTemplates/`BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

```
manageprofiles.bat -augment -templatePath BPM/BpmDmgr
-profileName MyProfileName
-adminUsername celladmin -adminPassword celladmin
```

The status is written to the console window when the command completes running.

- Add managed-node profiles to be managed by the deployment manager, and then configure the deployment environment.

Creating or augmenting managed-node profiles:

As part of the network deployment configuration, you must create or augment at least one managed-node profile. A managed-node profile contains an empty node that you must federate into a deployment manager cell to make operational. Federating the node changes it into a managed node.

Creating managed-node profiles using the Profile Management Tool:

You can create and federate managed-node profiles using the Profile Management Tool.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: | **Vista** | Windows 7 |

- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the **runas** command at the command line. For example, the following command can be run from the *installation_root*`\bin\ProfileManagement` directory:

```
runas /user:MyAdminName /env pmt.bat
```

Non-administrative users are prompted for the administrator password.

- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*`\bin\ProfileManagement\pmt.bat` file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while creating the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root***bin\ProfileManagement\pmt.bat**
3. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
4. On the **Profiles** tab, click **Create**.

   The Environment Selection page opens in a separate window.

5. On the Environment Selection page, locate the IBM Business Process Manager Standard configuration and expand the section. Select the IBM BPM managed-node profile template and click **Next**.

6. On the Profile Name and Location page, complete the following steps:

   a. In the **Profile name** field, specify a unique name or accept the default value. Each profile that you create must have a name. When you have more than one profile, you can tell them apart at their highest level by this name.

   b. In the **Profile directory** field, enter the directory for the profile or use the **Browse** button to go to the profile directory. The directory you specify will contain the files that define the runtime environment, such as commands, configuration files, and log files. The default directory is *installation_root*\profiles*profile_name*.

   c. Optional: Select **Make this profile the default** to make the profile you are creating the default profile. This check box is shown only if you have an existing profile on your system.

      When a profile is the default profile, commands work automatically with it. The first profile that you create on a workstation is the default profile. The default profile is the default target for commands that are issued from the `bin` directory in the product installation root. When only one profile exists on a workstation, every command operates on that profile. If more than one profile exists, certain commands require that you specify the profile to which the command applies.

   d. Click **Next**. If you click **Back** and change the name of the profile, you might have to manually change the name on this page when it is displayed again.

7. On the Node and Host Names page, complete the following actions for the profile you are creating:

   • In the **Node name** field, enter a name for the node or accept the default value. Try keeping the node name as short as possible, but ensure that node names are unique within your deployment environment.

   • In the **Host name** field, enter a name for the host or accept the default value.

   Click **Next**.

8. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile creation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:

   • Another profile is being federated. (Node federation must be serialized.)

   • The deployment manager is not running or you are not sure if it is running.

   • The deployment manager has the SOAP connector disabled

   • The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.

   • The deployment manager is not at a release level the same or higher than the release level of the profile you are creating.

   • The deployment manager does not have a JMX administrative port enabled.

   • The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

   Note: Note the processing that is associated with federating the node as part of the managed-node profile creation:

- The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
- If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.

   Click **Next**.

 9. On the Security Certificate (Part 1) page, specify whether to create new certificates or import existing certificates.
    - To create a new default personal certificate and a new root signing certificate, select **Create a new default personal certificate** and **Create a new root signing certificate**, and click **Next**.
    - To import existing certificates, select **Import an existing default personal certificate** and **Import an existing root signing certificate** and provide the following information:
      – In the **Path** field, enter the directory path to the existing certificate.
      – In the **Password** field, enter the password for the certificate
      – In the **Keystore type** field, select the keystore type for the certificate you are importing.
      – In the **Keystore alias** field, select the keystore alias for the certificate you are importing.
      – Click **Next** to display the Security Certificate (Part 2) page

      When you import a personal certificate as the default personal certificate, import the root certificate that signed the personal certificate. Otherwise, the Profile Management Tool adds the signer of the personal certificate to the `trust.p12` file.

10. On the Security Certificate (Part 2) page, verify that the certificate information is correct.

    If you create the certificates, you can use the default values or modify them to create new certificates. The default personal certificate is valid for one year by default and is signed by the root signing certificate. The root signing certificate is a self-signed certificate that is valid for 15 years by default. The default keystore password for the root signing certificate is `WebAS`. Change the password. The password cannot contain any double-byte character set (DBCS) characters because certain keystore types, including PKCS12, do not support these characters. The keystore types that are supported depend on the providers in the `java.security` file.

    When you create either or both certificates, or import either or both certificates, the keystore files that are created are:
    - `key.p12`: Contains the default personal certificate.
    - `trust.p12`: Contains the signer certificate from the default root certificate.
    - `root-key.p12`: Contains the root signing certificate.
    - `default-signers.p12`: Contains signer certificates that are added to any new keystore file that you create after the server is installed and running. By default, the default root certificate signer and a DataPower signer certificate are in this keystore file.
    - `deleted.p12`: Holds certificates deleted with the deleteKeyStore task so that they can be recovered if needed.
    - `ltpa.jceks`: Contains server default Lightweight Third-Party Authentication (LTPA) keys that the servers in your environment use to communicate with each other.

    These files all have the same password when you create or import the certificates, which is either the default password, or a password that you specify. An imported certificate is added to the `key.p12` file or the `root-key.p12` file. If you import any certificates and the certificates do not contain the information that you want, click **Back** to import another certificate.

11. On the Profile Summary page, review the information. Click **Create** to create the profile or **Back** to change the characteristics of the profile.

12. On the Profile Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Augmenting managed-node profiles using the Profile Management Tool:

If you have existing WebSphere Application Server managed-node profiles, you can augment an existing profile using the Profile Management Tool to add support for IBM Business Process Manager.

Remember to shut down any servers associated with a profile you plan to augment.

Restriction: You cannot augment a deployment manager profile where the default WebSphere VMM user registry has been changed, for example, to using LDAP.

Restrictions: **Vista** Windows 7
- To run the Profile Management Tool on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges. Whether you are an administrative user or a non-administrative user, right-click the `pmt.bat` file and select **Run as administrator**. Alternatively, use the `runas` command at the command line. For example, the following command can be run from the *installation_root*\bin\ProfileManagement directory:

```
runas /user:MyAdminName /env pmt.bat
```

  Non-administrative users are prompted for the administrator password.
- If you install multiple instances of IBM Business Process Manager as the root user and give a nonadministrative user access to only a subset of those instances, the Profile Management Tool does not function correctly for the nonadministrative user. In addition, a `com.ibm.wsspi.profile.WSProfileException` or `Access is denied` message occurs in the *installation_root*\bin\ProfileManagement\pmt.bat file. By default, nonadministrative users do not have access to the `Program Files` directory, which is the default installation location for the product. To resolve this issue, nonadministrative users must either install the product by themselves or be given permission to access the other product instances.

1. If you want to federate the node to a deployment manager while augmenting the managed-node profile, start the deployment manager.
2. Use one of the following methods to start the Profile Management Tool.
   - Start the tool from the Quick Start console.
   - Run the command *installation_root*\bin\ProfileManagement\pmt.bat
3. Shut down any servers associated with a profile you plan to augment.
4. On the Welcome page, click **Launch Profile Management Tool** or select the **Profile Management Tool** tab.
5. On the **Profiles** tab, select the profile that you want to augment and click **Augment**. If you augment a WebSphere Application Server profile, it must be from the version of WebSphere Application Server on which IBM Business Process Manager is installed. The **Augment** button cannot be selected unless a profile can be augmented. The Augment Selection page opens in a separate window.
6. On the Augment Selection page, select the **IBM BPM managed node** augmentation template. Then click **Next**.
7. On the Federation page, choose to federate the node into the deployment manager now as part of the profile augmentation, or at a later time and apart from profile augmentation. If you choose to federate the node as part of the profile augmentation, specify the host name or IP address and SOAP port of the deployment manager, and an authentication user ID and password if to be used to authenticate with the deployment manager.

   Important:

   Select **Federate this node later** if any one of the following situations is true:
   - Another profile is being federated. (Node federation must be serialized.)

- The deployment manager is not running or you are not sure if it is running.
- The deployment manager has the SOAP connector disabled
- The deployment manager has not yet been augmented into a IBM Business Process Manager deployment manager.
- The deployment manager is not at a release level the same or higher than the release level of the profile you are augmenting.
- The deployment manager does not have a JMX administrative port enabled.
- The deployment manager is re-configured to use the non-default remote method invocation (RMI) as the preferred Java Management Extensions (JMX) connector. (Select **System administration** > **Deployment manager** > **Administration services** in the administrative console of the deployment manager to verify the preferred connector type.)

  Note: Note the processing that is associated with federating the node as part of the managed-node profile augmentation:
  - The Profile Management Tool verifies that the deployment manager exists and can be contacted, and that the authentication user ID and password are valid for that deployment manager (if it is secured).
  - If you attempt to federate a custom node when the deployment manager is not running or is not available for other reasons, a warning box prevents you from continuing. If this warning box appears, click **OK** and then make different selections on the Federation page.
8. On the Profile Augmentation Summary page, review the information. Click **Augment** to augment the profile or **Back** to change the characteristics of the profile.
9. On the Profile Augmentation Complete page, review the information. To proceed to the Quick Start console, make sure that **Launch Quick Start console** is selected and click **Finish**.

After you have finished adding managed-node profiles, configure the deployment environment.

Related information:

⇨ Updating ports in existing profiles (WebSphere Application Server)

Augmenting managed-node profiles using the manageprofiles command-line utility:

Instead of using the Profile Management Tool, you can use the **manageprofiles** command-line utility to augment existing WebSphere Application Server profiles.

Remember to shut down any servers associated with a profile you plan to augment.

Make sure that you are not already running the **manageprofiles** command-line utility on the same profile. If an error message is displayed when you run the command, determine if there is another profile creation or augmentation action in progress. If so, wait until it completes.

Restriction: To run the **manageprofiles** command on Windows 7, Windows Vista, or Windows Server 2008, you must elevate your Microsoft Windows user account privileges using the **runas** command. Remember to put double quotation marks around the **manageprofiles** command and all parameters. For example, the following command can be run from the *installation_root*\bin directory:

```
runas /env /user:MyAdminName "manageprofiles.bat"
```

Non-administrative users are prompted for the administrator password.

1. Determine the template that was used to create the existing profile that you want to augment. You must augment a managed-node profile. You can determine the template by viewing the profile registry in the *installation_root*\properties\profileRegistry.xml file. Do not modify this file; use it only to view the templates.
2. Find the appropriate template to use for the augmentation.

Templates for each profile are located in the *installation_root*\profileTemplates\BPM directory for BPM templates. For managed-node profiles, use the BPM/BpmNode template. This template is available with IBM BPM Standard and IBM BPM Advanced.

3. Use the augment parameter to make changes to an existing profile with an augmentation template. The augment parameter causes the **manageprofiles** command-line utility to update or augment the profile identified in the **-profileName** parameter using the template in the **-templatePath** parameter. The augmentation templates that you can use are determined by which IBM products and versions are installed in your environment. The file path for **-templatePath** need not be fully qualified; /profileTemplates is automatically added as a prefix.

   Note: Do not manually modify the files that are located in the *installation_dir*/profileTemplates/ BPM directory.

4. Run the file from the command line. Do not supply a **-profilePath** parameter. For example:

   ```
   manageprofiles.bat -augment -templatePath BPM/BpmNode
   -profileName MyProfileName
   -adminUsername celladmin -adminPassword celladmin
   ```

   The status is written to the console window when the command completes running.

After you have finished adding managed-node profiles, configure the deployment environment.

Creating a deployment manager and managed-node profiles with the BPMConfig command:

You can use the **BPMConfig** command to create the deployment manager and managed node profiles separately from creating the deployment environment.

If you have an existing WebSphere Application Server profile that you want to augment, you must use the **manageprofiles** command-line utility instead.

To create the deployment manager and managed node profiles separately from creating the deployment environment, complete the following steps.

1. On the computer where you want to create the profiles, locate the appropriate sample properties file: *install_root*\BPM\samples\config.

2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.

3. Modify your version of the properties file so that the values correspond to your own configuration.

   All of the deployment environment properties (cell name, node name, host name) in the properties file must match exactly the values you will use later to create the deployment environment with the Deployment Environment wizard.

   Note: Your modified properties file must use UTF-8 encoding.
   To create a deployment manager profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.hostname=**
   - **bpm.dmgr.installPath=**
   It is also recommended that you set values for:
   - **bpm.cell.name=**
   - **bpm.dmgr.nodeName=**
   - **bpm.dmgr.profileName=**
   To create a managed node profile, you must specify the following minimum set of properties:
   - **bpm.dmgr.soapPort=**

- **bpm.node.#.hostname=**
- **bpm.node.#.installPath=**

It is recommended that you also set:

- **bpm.node.#.nodeName=**
- **bpm.node.#.profileName=**

The **bpm.dmgr.soapPort** property should be set to the actual value of the deployment manager SOAP_CONNECTOR_ADDRESS endpoint. This property is not used during deployment manager profile creation. It is read during profile creation for managed nodes, and together with the **bpm.dmgr.hostname** property, it identifies the deployment manager that manages the node profile.

Do not add any custom properties to this file when you perform your modifications or the **BPMConfig** command will fail when it is run.

If you need to use a backslash character (\) in your properties file, for example when specifying path names or passwords, you must use an escape backslash before it, for example bpm.dmgr.installPath=c:\\IBM\\BPM85.

For more information about the available properties, read the comments in the sample files, or see the **BPMConfig** command reference and the sample property file descriptions in Configuration properties for the BPMConfig command.

4. Run the **BPMConfig** command on the computer that has the deployment manager, passing it the name of the properties file you created.

    install_root\bin\BPMConfig -create -profile my_environment.properties

Important: Run the **BPMConfig** command with the same properties file on all computers that will participate in the deployment environment. You must first run the command on the computer that has the deployment manager profile and then run it on each computer that has a managed node. At any given time, only one profile creation can be performed on a computer and only one node federation can be performed against a particular deployment manager. For this reason, if you are creating multiple profiles at once on different computers, you must use the **federateLater** option of the **BPMConfig** command when creating the managed node profiles and then run the command with the **create de** option sequentially on each computer to federate the managed nodes.

Federating nodes to the deployment manager:

After creating a node, you can use the **addNode** command to federate the node into a deployment manager cell. You can manage all federated nodes from the deployment manager.

Before using this procedure, ensure that the following prerequisites are met:

- You have installed IBM Business Process Manager and created a deployment manager and a managed-node profile. This procedure assumes you did *not* federate the managed-node profile during its creation or augmentation, either with the Profile Management Tool or with the **manageprofiles** command-line utility.
- The deployment manager is running. If it is not, start it either by selecting **Start the deployment manager** from its Quick Start console or by entering the following command, where *profile_root* represents the installation location of the deployment manager profile:

    profile_root\bin\startManager.bat

- The deployment manager has been created or augmented to be an IBM Business Process Manager deployment manager.
- The deployment manager is at the same release level or higher than the managed-node profile you created or augmented.
- The deployment manager has a JMX administrative port enabled. The default protocol is SOAP.

1. Go to the bin directory of the managed-node profile you want to federate. Open a command window and go to the following directory (from a command line), where *profile_root* represents the installation location of the managed-node profile):

```
profile_root\bin
```

2. Run the **addNode** command.

   Run the following command from the command line if security is not enabled:
   ```
   addNode.bat deployment_manager_host deployment_manager_SOAP_port
   ```

   Run the following command from the command line if security is enabled:
   ```
   addNode.bat deployment_manager_host deployment_manager_SOAP_port -username
   userID_for_authentication -password password_for_authentication
   ```

   An output window opens. If you see a message similar to the following message, your managed-node profile was federated successfully:
   ```
   ADMU0003I: Node DMNDID2Node03 has been successfully federated.
   ```

The managed-node profile is federated into the deployment manager.

After federating the managed-node profile, go to the administrative console of the deployment manager to customize the empty node or to create a server.

Related information:

⬆ Add managed node settings (WebSphere Application Server)

Configuring a network deployment environment using the Deployment Environment wizard:

After performing a Custom installation and creating the deployment manager and custom (managed node) profiles, you can create a network deployment configuration based on the topology pattern templates packaged with the software.

SQL Server database server with Windows authentication:

Create your network deployment environment to work with an SQL Server database server using Windows authentication. The username and password you used to log on to the system would be used to connect to and access the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.

- – Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.
   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

- **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
- **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

- **Shared parameters**
  - **Server**: Type a server name where the database is located.
  - **Port**: Type the port number to connect to the database.
  - **Create Tables**: Select to create the required tables.

    Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:
- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install`\profiles\DmgrProfile\dbscripts\ folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.
10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

Important: This command must be run before starting any cluster members.

11. Verify the deployment environment was created properly by completing the following steps:

   a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

   b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

   c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

   d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

   e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

   f. Optional: Check that tables have been created with the `XXXBE##` schema in the Business Process Choreographer database.

   g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

   h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

   a. Stop the deployment environment.

   b. Stop the node agent.

   c. Stop the deployment manager.

   d. Start the deployment manager.

   e. Start the node agent.

   f. Start the deployment environment.

   For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:

- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:

- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.

1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

   c. Enter a password for the deployment environment administrator in the **Password** field.

   d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

  The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

  There are four types of environments available for selection:

  Development
  > Select **Development** if the server will serve in a development capacity.

  Test   Select **Test** if the server you are configuring will be used as a testing environment.

  Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

  Production
  > Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

  Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server using Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.
   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

   Attention: For an SQL server:

   - Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
   - IBM Process Server and IBM Performance Data Warehouse should not use the same database.
   - If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

   You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install\profiles\DmgrProfile\dbscripts\` folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

   You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.

    f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

    g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

    h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

SQL Server database server without Windows authentication:

Create your network deployment environment to work with an SQL Server database server without Windows authentication. You will need to provide the username and passsword for accessing the SQL database.

Creating the Standard Process Center deployment environment:

Create a Process Center deployment environment to store, run and administer process applications and toolkits that are developed in Process Designer. You can create more than one deployment environments in the same cell using the Deployment Environment wizard. However, you can create only one Process Center-based deployment environment in a single cell.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes
- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Center installed to install a Process Center-based deployment environment. If you have a Process Server installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Center feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
• Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
• IBM Process Server and IBM Performance Data Warehouse should not use the same database.
• If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

   a. Enter a unique name for the deployment environment in the **Deployment environment name** field.
   b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

      Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.
   c. Enter a password for the deployment environment administrator in the **Password** field.
   d. Reconfirm the password in the **Confirm password** field.
3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Center**. Features represent the runtime processing capabilities of your deployment environment.
4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:
   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.
   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.
5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

- **Process database**
  - **Name**: Type a name for the Process Center database.
- **Performance Data Warehouse database**
  - **Name**: Type a name for the Performance Data Warehouse database.
- **Select the databases that you want to separate from the Common database.**
  - **Messaging**: Select this option to create a separate messaging engine database.
    - **Name**: Type a name for the messaging engine database.

Attention: For an SQL server:

- Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install`\profiles\DmgrProfile\dbscripts\ folder. You can run the scripts from the `dbscripts` folder and do not need to generate scripts using the **BPMConfig** command.

You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

9. Verify that the information on the Summary page is correct and perform the following substeps:
   a. Optional: If you want to exit without generating the configuration, click **Cancel**.
   b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.
   c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the `BPM_Install_Root`/logs/config folder on the deployment manager machine with a timestamp in the file name, `bpmconfig-de_name-timestamp`.properties. Save this file for future reference or for troubleshooting any issues.

10. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

11. Verify the deployment environment was created properly by completing the following steps:
    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.
    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

e. Locate the `Tables` folder for the common database. Check that the tables have been created with the four schemas that you created manually.

f. Optional: Check that tables have been created with the `XXXBE##` schema in the Business Process Choreographer database.

g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

12. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

a. Stop the deployment environment.

b. Stop the node agent.

c. Stop the deployment manager.

d. Start the deployment manager.

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For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating the Standard Process Server deployment environment:

Create a Process Server deployment environment to run processes and that are deployed from the Process Center. You can create more than one deployment environments in the same cell using the Deployment Environment wizard.

Ensure that you have completed the following tasks:
- Installed the product
- Created the deployment manager profile and the associated nodes

- Ensure that the database specified in the Database Configuration panel of the Deployment Environment wizard is already created. The deployment environment configuration never creates a database. For more information, see the section about creating databases.
- Make sure that you start all the local and remote nodes that you want to add in the deployment environment.
- When you create a 3-cluster deployment environment using the Deployment Environment wizard, the process might take a lot of time to complete. In that case, you can perform one of the following steps to create the 3-cluster environment:
  - Increase the transaction timeout value using the Deployment Manager and re-create the deployment environment. For more information, see Preventing timeout and out-of-memory exceptions during installation or deployment.
  - Do not create tables during the Deployment Environment creation. After creating the environment, create the databases, tables, and then run the bootstrap command.
- If you are using the Deployment Environment wizard, you can enable deployment manager trace for details about the deployment creation. To enable trace for a single run and till the deployment manager restarts, log on to the administrative console, go to **Troubleshooting** > **Logs and trace** > *deployment_manager_name* > **Change log detail levels** > **Runtime**, add **com.ibm.bpm.config.*=all** to the **Change log detail levels** text area, and save the changes.

Note: You must have Process Server installed to install a Process Server-based deployment environment. If you have a Process Center installed, you need to start the IBM Installation Manager and modify your installation to use the Business Process Manager Advanced Process Server Production or Business Process Manager Advanced Process Server Non-Production feature.

Because the procedure for creating deployment environments using the Deployment Environment wizard includes steps for selecting patterns and features, you should read and understand the information about patterns and features documented in the planning section.

Required security role for this task: When security and role-based authorization are enabled, you must log in to the administrative console as a Cell administrator to create a deployment environment.

This task describes the procedure for creating a deployment environment that is based on a specific pattern and uses the Deployment Environment wizard.

SQL Server considerations:
- Make sure that the user name and schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
- IBM Process Server and IBM Performance Data Warehouse should not use the same database.
- If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

Complete the following steps to create the deployment environment.
1. From the administrative console, navigate to the Deployment Environments page by clicking **Servers** > **Deployment Environments**.
2. Launch the Deployment Environment wizard by clicking **New** on the Deployment Environments page. The Create new deployment environment page is displayed.

   Note: The database provides isolation of internal groups, such as administrators. If the database is shared by two deployment environments, one administrators group is shared between them. When such a situation occurs, both administrators are able to login as administrator for each of the deployment environment.

a. Enter a unique name for the deployment environment in the **Deployment environment name** field.

b. Enter a user name for the deployment environment administrator in the **Deployment environment administrator user name** field.

   Note: It is recommended to use a different administrator for each deployment environment and also the cell administrator.

c. Enter a password for the deployment environment administrator in the **Password** field.

d. Reconfirm the password in the **Confirm password** field.

3. From the **IBM BPM Deployment Environment Type** section, select **Standard Process Server**. Features represent the runtime processing capabilities of your deployment environment.

4. From the Select the deployment environment pattern section, select a pattern for the deployment environment and click **Next** to display the Select Nodes page. The available patterns are:

   • **Single Cluster**: The application deployment target includes the messaging infrastructure and supporting applications.

   • **Application, Remote Messaging, Remote Support**: A separate cluster each for application deployment, remote messaging, and remote support.

5. On the Select Nodes page, select the nodes that you want to include in this deployment environment, then click **Next** to display the Define Clusters page.

   Select nodes that have the required capabilities for the environment you selected on the IBM BPM Deployment Environment Features section.

   Select at least one node for the deployment environment. For high-availability and failover environments, select at least two nodes. For scalability, you can add more nodes.

6. On the Define Clusters page, assign the required number of clusters for each node and click **Next** to display the Customize Cluster Name and Ports page.

   By default one cluster member is assigned on each node for each function. You change the number by replacing the number in each column. If you are unfamiliar with the different cluster roles and functions provided by each type of cluster, see "Topology types and deployment environment patterns."

   A 0 (zero) value for a node means that the node does not contribute to the selected function, based on features that you have selected.

7. On the Customize Cluster Name and Ports page, customize the cluster names or cluster member names for the cluster type. You can use the default values provided, or customize the cluster details, and click **Next**.

   Note: You can specify the starting port for the cluster members. The system generates default values for cluster member names and the starting port.

   Ensure that the starting port numbers you specify are at least 20 ports apart. Port numbers are reserved and assigned to each node for the cluster members using the port number that is specified. If you specify an initial port when you create the deployment environment, that same initial port specified would be assigned to the cluster member. For example, if the port number for the first cluster member is 2000, it would use the port numbers 2000, 2001, 2002, and so on. The port number of the second cluster member would be 2020 and the port numbers would be 2020, 2021, 2022, and so on. The port number of the third cluster member would be 2040.

   If there is already a node on that physical system then there may be port conflicts and these must be resolved manually by changing the port values.

   If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the

administrative console to add a new host alias for each of the ports that are used by the new server. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.

8. On the Configure Process Server page, set the values for the Process Center configuration and click **Next**.

- **Environment name**

  Enter an environment name of the Process Server.

  An environment name is the name by which this server or cluster will be known to a Process Center user.

- **Environment type**

  From the pull-down list, select the environment type for the Process Server you are configuring.

  The environment type refers to how the Process Server is used. For example, in what capacity will the Process Server be used - *development*, *test*, *staging*, or *production*. Load testing might be done on a test server, while a staging environment type might be used as a temporary location to host changes before putting those changes into production. You might specify a staging environment type if the Process Server you are configuring will be accessed and used to review content and new functionality.

  There are four types of environments available for selection:

  Development
  > Select **Development** if the server will serve in a development capacity.

  Test   Select **Test** if the server you are configuring will be used as a testing environment.

  Stage   Select **Stage** if the server will serve as a staging platform to be used as a preproduction server.

  Production
  > Select **Production** if the server will serve in a production capacity.

- **Use server offline**

  Indicate whether the server you are configuring is an offline server.

  An offline server is a Process Server that is not connected to the Process Center.

  Offline servers can still be used when deploying snapshots of process applications. However the method for deploying process applications to an offline process server differs from the method for deploying process applications to an online process server.

- **Protocol**

  Select either **http://** or **https://** as the connection protocol to the Process Center.

- **Host name or virtual host in a load-balanced environment**

  Type the host or virtual host that this Process Server needs to communicate with Process Center. Use a fully qualified host name. In an environment with a load balancer or proxy server between the Process Server and the Process Center services, make sure that what you designate here matches the URL for accessing the Process Center.

  Note: Ensure that you specify the host name instead of *localhost* for the server name when you configure the Process Server. This is required when you are using the Process Designer remotely.

- **Port**

  Type the port number of the Process Center. In an environment with a load balancer or proxy server between the Process Server and the Process Center, make sure that what you designate here matches the URL for accessing the Process Center.

- **User name**

  Type a valid user name that exists on the Process Center. Process Server will connect to Process Center as this user.

- **Password**

Type the password for the user.

- **Confirm password**

  Type to confirm the password for the user.

- **Test Connection**

  Click to test the Process Center connection.

9. Required: On the Configure Databases page, select **Microsoft SQL Server without Windows Authentication**, configure the database parameters for data sources of the deployment environment, click **Test connection**, and after the connection succeeds click **Next** to go to the Summary page.

   On this page, define the database information for the components that are included in this deployment environment. Where possible, the wizard supplies default information for the parameters, but change those values to match the values that you defined when you planned the environment.

   Important: The database specified in this panel must already exist. Deployment environment configuration never creates a database. For more information, see the section about creating databases.

   - **Shared parameters**
     - **User name**: Type the user name to connect to the database.
     - **Password**: Type the password for the user name.
     - **Confirm password**: Type to confirm the password for the user name.
     - **Server**: Type a server name where the database is located.
     - **Port**: Type the port number to connect to the database.
     - **Create Tables**: Select to create the required tables.

       Note: If this option is selected, ensure that the user has sufficient rights to access the database and create tables.

   - **Process database**
     - **Name**: Type a name for the Process Center database.
   - **Performance Data Warehouse database**
     - **Name**: Type a name for the Performance Data Warehouse database.
   - **Select the databases that you want to separate from the Common database.**
     - **Messaging**: Select this option to create a separate messaging engine database.
       - **Name**: Type a name for the messaging engine database.

   Attention: For an SQL server:

   - Make sure that the user name and the schema exist before the configuration is done. The schema value should be the default schema for the user chosen.
   - IBM Process Server and IBM Performance Data Warehouse should not use the same database.
   - If connections to the database will be made by the current Windows user that the server is running under, the SQL Server must have **Windows authentication mode** or **SQL Server and Windows Authentication mode** enabled, as specified through Microsoft SQL Server Management Studio.

   You can clear the **Create Tables** check box if you want to create the tables manually instead of the configuration creating it automatically. The scripts to create tables are generated in the `BPM_Install`\profiles\DmgrProfile\dbscripts\ folder. You can run the scripts from the dbscripts folder and do not need to generate scripts using the `BPMConfig` command.

   You can edit all key parameters, such as the database name, whether or not to create tables, the data source runtime user name, and the password for the deployment environment. You can select which database to use for the given component.

Tip: Steps that cannot be completed through the Deployment Environment wizard, and which need to be completed manually, are listed on the Deferred Configuration page. You can view this page after you have created your deployment environment. To view this administrative console page, click **Servers** > **Deployment Environments** > *Deployment environment name* > **Deployment Environment Configuration** > **Additional Properties** > **Deferred Configuration**.

10. Verify that the information on the Summary page is correct and perform the following substeps:

    a. Optional: If you want to exit without generating the configuration, click **Cancel**.

    b. Optional: If you want to save the environment configuration to configure a similar Deployment Environment, click **Export for Scripting**.

    c. If you are satisfied with the deployment environment configuration, click **Generate Deployment Environment** to save and complete the configuration of the deployment environment. This will also generate a properties file in the *BPM_Install_Root*/logs/config folder on the deployment manager machine with a timestamp in the file name, bpmconfig-*de_name-timestamp*.properties. Save this file for future reference or for troubleshooting any issues.

11. If you have postponed the Process Server database table creation by clearing the create table option on the Database page, create the tables and load the database with system information by running the **bootstrapProcessServerData** command.

    Important: This command must be run before starting any cluster members.

12. Verify the deployment environment was created properly by completing the following steps:

    a. Log off from the administrative console, shut down the deployment manager, and then shut down all of the custom profiles.

    b. Start the custom profiles, start the deployment manager, and then log in to the administrative console.

    c. In the administrative console, start the deployment environment by clicking **Servers** > **Deployment Environments**. Select the check box next to the deployment environment and clicking **Start**.

    d. After 5 to 10 minutes (or longer, depending on the system), refresh the deployment environment page; the Status of the deployment environment changes to **started**.

    e. Locate the Tables folder for the common database. Check that the tables have been created with the four schemas that you created manually.

    f. Optional: Check that tables have been created with the XXXBE## schema in the Business Process Choreographer database.

    g. In the administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications** and check that the installed applications started successfully.

    h. Select **Resources** > **JDBC** > **Data sources** and test that the connection of every component that is not related to the message engine (that is, every component that does not include **ME** in the name) is successful.

13. Restart the following resources after you have completed your configurations in the order specified here. For the steps to restart a resource, see Starting and stopping individual resources.

    a. Stop the deployment environment.

    b. Stop the node agent.

    c. Stop the deployment manager.

    d. Start the deployment manager.

    e. Start the node agent.

    f. Start the deployment environment.

    For Advanced or Advanced-only deployment environments, the deployment manager and node agents need to be restarted for the cell scoped configuration to take affect. This is only required for the first deployment environment that you create.

When the configuration completes, you can examine the configuration files to view the changes.

Either save the changes to the master configuration or discard them.

Important: If you use additional servers with unique ports, WebSphere Application Server does not automatically configure the virtual host for the server. Specifically, WebSphere Application Server does not automatically add the host alias ports to a virtual host. However, you can use the administrative console to add a new host alias for each of the ports that are used by the new server. To add a host alias, in the administrative console navigate to **Environment** > **Virtual hosts** > **default_host** > **Host Aliases** and click **New**. For more information, see the WebSphere Application Server documentation about configuring virtual hosts.
Clean all applicable profile logs or save them in another directory. You may want to clean or move the logs as they will be appended with the last configuration. This can make it difficult to view the most current information.

Creating and configuring SQL Server databases:

You must create all SQL Server (and DB2) databases and tables by running the SQL scripts that are generated by the BPMConfig command or the Deployment Environment wizard. Although you must create the databases by manually running the SQL scripts, you can create the tables by either manually running the scripts or by running them automatically when the BPMConfig command or Deployment Environment wizard are used to configure your deployment environment. You can also automatically create the bootstrapping during deployment environment configuration. Both the tables and the bootstrapping must be created before the deployment environment is started.

The **bpm.de.deferSchemaCreation** property is used to specify whether the SQL scripts are manually or automatically run to create the database tables. If the property is set to `true`, you must create the tables by manually running the scripts. If the property is set to `false`, the scripts are automatically run during deployment environment configuration and the tables are automatically created.

You can choose to generate the SQL scripts either before deployment environment configuration or during configuration. To generate the SQL scripts before deployment environment configuration, run the following command:
```
BPMConfig -create -sqlfiles properties_file
```

This is useful if you want to generate and run the SQL scripts and create your databases before deployment environment configuration. When you subsequently configure your deployment environment, you will be able to automatically run the SQL scripts that create the corresponding database tables.

If you don't generate the SQL scripts before deployment environment configuration, they will be automatically generated when you run the following command to configure the deployment environment:
```
BPMConfig -create -de properties_file
```

After the deployment environment has been configured, you can run the generated SQL scripts. All SQL scripts are generated into the directory *profile_root*/dbscripts.

Configuring XA transactions:

You must configure XA transactions after the Microsoft SQL Server database is installed and before you start the server. The SQL Server JDBC driver provides support for Java Platform, Enterprise Edition/JDBC 2.0 optional distributed transactions. JDBC connections obtained from the **SQLServerXADataSource** class can participate in standard distributed transaction processing environments such as Java Platform, Enterprise Edition (Java EE) application servers.

Failure to configure the XA transactions can result in the following error when the server starts:**javax.transaction.xa.XAException: com.microsoft.sqlserver.jdbc.SQLServerException: Failed to create the XA control connection. Error: "Could not find stored procedure 'master..xp_sqljdbc_xa_init_ex'."**.

The MS DTC service should be marked Automatic in Service Manager to make sure that it is running when the SQL Server service is started.

1. To enable MS DTC for XA transactions, you must follow these steps:

   On Windows XP and Windows Server 2003:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** and right-click **My Computer**, and select **Properties**.

   c. Click the **MSDTC** tab, and then click **Security Configuration**.

   d. Select the **Enable XA Transactions** check box, and then click **OK**. This will cause a MS DTC service restart.

   e. Click **OK** again to close the **Properties** window, and then close **Component Services**.

   f. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

   On Windows Vista, Windows 7, and Windows Server 2008 R2:

   a. Select **Control Panel** > **Administrative Tools** > **Component Services**.

   b. Select **Component Services** > **Computers** > **My Computer** > **Distributed Transaction Coordinator**.

   c. Right-click **Local DTC** and then select **Properties**.

   d. Click the **Security** tab on the **Local DTC Properties** window.

   e. Select the **Enable XA Transactions** check box, and click **OK**. This will restart the MS DTC service.

   f. Click **OK** again to close the Properties window, and then close Component Services.

   g. Restart SQL Server to ensure that it syncs up with the MS DTC changes.

2. Configure the JDBC Distributed Transaction Components:

   a. If you haven't installed IBM Business Process Manager, download "Microsoft SQL Server JDBC Drive 3.0" driver from the Microsoft Site using the URL from Resources section and extract it to any folder.

   b. If BPM is already installed, go to `bpm_install_root`\jdbcdrivers\SQLServer\xa to obtain the files you require in the following steps:

      - Copy the `sqljdbc_xa.dll` file from the `JDBC unarchived` directory to the `Binn` directory (for a default SQL Server install, the location is `C:\Program Files\Microsoft SQL Server\MSSQL10_50.MSSQLSERVER\MSSQL\Binn`) of SQL Server computer. If you are using XA transactions with a 32-bit SQL Server, use the `sqljdbc_xa.dll` file in the x86 folder, even if the SQL Server is installed on a x64 processor. If you are using XA transactions with a 64-bit SQL Server on the x64 processor, use the `sqljdbc_xa.dll` file in the x64 folder.

      - Run the `xa_install.sql` database script on SQL Server. For example; from the command prompt, run **sqlcmd -i xa_install.sql**. This script installs the extended stored procedures that are called by `sqljdbc_xa.dll`. These extended stored procedures implement distributed transaction and XA support for the Microsoft SQL Server JDBC Driver. You will need to run this script as an administrator of the SQL Server instance. You can ignore errors about unable to drop procedures that don't exist.

      - Open the SQL Server Management Studio to locate the security folder under the **master** database. To grant permissions to a specific user to participate in distributed transactions with the JDBC driver, add the user to the **SqlJDBCXAUser** role in the master database (for example, for a Lombardi user add master database in User mappings and check **SqlJDBCXAUser** role).

3. Follow these steps for configuring Windows authentication:

   - Locate **sqljdbc_auth.dll**. If you haven't installed IBM Business Process Manager, go to the `BPM_install_root`\jdbcdrivers\SQLServer\auth to obtain the file. If you haven't installed BPM, locate the dll file in the Microsoft JDBC driver package that you downloaded.

- Copy the `sqljdbc_auth.dll` file to the `Binn` directory (for a default SQL Server install, the location is `C:/Program Files/Microsoft SQL Server/MSSQL10_50.MSSQLSERVER/MSSQL/Binn`) of SQL Server computer. If your JRE is 32-bit , use the **sqljdbc_auth.dll** file in the x86 folder, even if the SQL Server is installed on a x64 processor. If your JRE 64-bit, use the **sqljdbc_auth.dll** file in the x64 folder.

After you configure the XA transactions and before you start the server, you must configure your TCP/IP connectivity using the below steps:

1. From Start menu, click **Microsoft SQl Server 2008 R2** > **Configuration Tools** > **SQL Server Configuration Manager**.
2. Expand **SQl Server network Configuration** > **Protocols for SQL2008**
3. Locate **TCP/IP** on the right-hand side.
4. Double click **TCP/IP** and enable it under the **Protocol** tab.
5. Click the **IP Addresses** tab to enable the TCP port for each configured IP address.

Creating SQL Server databases:

You can create the required databases for IBM Business Process Manager V8.5 before you create profiles and configure your network deployment environment. Usually you require the Process database, the Performance Data Warehouse database, and the Common database. In the case of an Advanced-only deployment environment, you need only the Common database.

- You cannot share databases across multiple installations or Deployment Environments
- The Process and Performance Data Warehouse require their own separate databases and cannot be configured on the same database as the other BPM components.
- Process and Performance Data Warehouse components require the databases to be case-insensitive for SQL Server
- CommonDB (and legacy WPS) components require the databases to be case-sensitive for SQL Server
- The schema name used for each component should match the user

The default database names are BPMDB for the Process database, PDWDB for the Performance Data Warehouse database, and CMNDB for the Common database.

If IBM Business Process Manager is installed on your machine, the **createDatabase_CaseInsensitive.sql** and **createDatabase_CaseSensitive.sql** scripts are available in the *BPM_HOME*\BPM\dbscripts\SQLServer\ Create folder.

In the following examples, replace *@DB_NAME@* with the name that you want to use for the created database

1. If IBM Business Process Manager is installed on your machine, locate the SQL scripts to run. Otherwise, use the command line option.
2. Run the scripts to create the BPMDB and PDWDB databases. Run the following sample script:

   `BPM_HOME\BPM\dbscripts\SQLServer\Create\createDatabase_CaseInsensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

   `CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS;`

   If IBM Business Process Manager is not installed, run the following command from the command line:

   `sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CI_AS"`

3. Run the script to create the CommonDB database. Run the following sample script:

   `BPM_HOME\BPM\dbscripts\SQLServer\Create\createDatabase_CaseSensitive.sql`

   Optionally, you can copy the contents of the above SQL file in a command editor and run the commands as follows:

```
CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS;
```
If IBM Business Process Manager is not installed, run the following command from the command line:
```
sqlcmd -Q "CREATE DATABASE @DB_NAME@ COLLATE SQL_Latin1_General_CP1_CS_AS"
```

Note: The letter *CI* in the **COLLATE** attribute value is applicable for the case-insensitive databases and *CS* is applicable for case-sensitive databases.

Creating users and schemas for SQL Server databases:

You must create the users and schemas after creating the SQL Server databases.

Assign the IBM Business Process Manager database user to the following three roles:

Note: The database must be created by the database administrator who can then assign these roles to the database user for IBM Business Process Manager.
- db_ddladmin
- db_datawriter
- db_datareader

For information about the permissions that are provided by these roles, see documentation from Microsoft.

Important: In Microsoft SQL server, the default schema name associated with a user must be the same as the user name. For example, if the user name for the Performance Data Warehouse database is *dbuser* then the default schema name associated with the user *dbuser* must also be named *dbuser*. You must create an ordinary database user and assign the required rights to the user instead of using a super user, such as *sa*. This is because the default schema for the super user is dbo and this cannot be changed.

You can complete the following steps if existing tables are not associated with a schema that is the same as the user name.
1. In SQL Server Management Studio Object Explorer, right-click the table name and then click **Design**.
2. From the Design view, press F4 to view the Properties window.
3. From the Properties window, update the schema name.
4. Right-click the tab and select **Close** to close the Design view.
5. Click **OK** when prompted to save. The selected table is transferred to the schema.
6. Repeat the previous steps for all the tables in the Performance Data Warehouse database.

When using Windows authentication, you must ensure that the domain account is added to the SQL Sever login. You must login as the SQL Server administrator and follow the below steps to create users and schemas for Windows authentication.
1. Create the SQL Server login account for your Windows machine using the login information for the machine. For example, if **user1** is the user name and **password** is password for your Windows machine, use the following command syntax:
```
USE [master]
GO
CREATE LOGIN [user1\password] FROM WINDOWS WITH DEFAULT_DATABASE=[master]
GO
```

Note: The SQL Server login that is created must not have SYSADMIN privileges. If the login user has SYSADMIN privileges, the specified schema value is ignored for database connections by SQL Server since the **sysadmin** user's default schema is always *dbo*.
2. Update the master database to grant permission for XA transactions for the Windows user. Use the following command syntax:

```
USE [master];
CREATE USER [sqluser] FOR LOGIN [user1\password];
USE [master];
EXEC sp_addrolemember N'SqlJDBCXAUser', N'sqluser';
```

3. For each database that you create, you must set the default schema for the SQL Server login. Use the following command syntax for the BPMDB (Process Server) database:

```
CREATE DATABASE BPMDB COLLATE SQL_Latin1_General_CP1_CI_AS
GO
USE [BPMDB]
GO
CREATE USER [sqluser] FOR LOGIN [user1\password] WITH DEFAULT_SCHEMA=[BPMPS00]
GO
CREATE SCHEMA [BPMPS00] AUTHORIZATION [sqluser]
GO
EXEC sp_addrolemember 'db_ddladmin', 'sqluser';
EXEC sp_addrolemember 'db_datareader', 'sqluser';
EXEC sp_addrolemember 'db_datawriter', 'sqluser';
```

Note:

- The BPMDB and PDWDB databases must be created as case-insensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CI_AS**, where **CI** is the **COLLATE** attribute value that is applicable for the case-insensitive databases.
- The CommonDB database must be created as case-sensitive. Use the command **COLLATE SQL_Latin1_General_CP1_CS_AS**, where **CS** is the **COLLATE** attribute value that is applicable for the case-sensitive databases.

When you create database schemas the using the generated scripts, your user ID must have the authority to create tables. When the tables are created, you must have the authority to select, insert, update, and delete information in the tables.

The following table describes the database privileges that are needed to access the data stores.

Table 75. Database privileges

Minimum privileges that are required to create objects in the database	Minimum privileges that are required to access objects in the database
The user ID ideally requires DB OWNER privileges on the data stores used for IBM Business Process Manager.	Configure the SQL Server for SQL Server and Windows authentication so that authentication to be based on an SQL server login ID and password. The user ID must be the owner of the tables, or a member of a group that has sufficient authority to issue TRUNCATE TABLE statements. See the **Detailed SQL Server database privileges** table at SQL Server database privileges.

Generating SQL database scripts using the BPMConfig command:

You can use the **BPMConfig** command to generate the database scripts that are used to create your database tables. If you used the **BPMConfig** command or the network deployment environment wizard in the administrative console to create the deployment environment, the scripts were generated for you.

Prepare the following information:

- Information about the database configuration that you are designing. This might be a document that describes the general purpose of the database configuration supplied by the database administrator or solution architect. Alternatively, it might be a description of required parameters and properties. This information must include:
  - The location of the databases.

- The user ID and password for authenticating to the database.
- Information about how IBM Business Process Manager and its components have been installed, the database software used, and the properties required by that type of database.
- An understanding of the profiles that you plan to create, specifically, the functional relationship between the profile types and the databases.
- Information about the topology pattern to be implemented, and an understanding of how the database design fits into the pattern that you plan to use.

To generate the database SQL scripts that you can use to create your database tables, complete the following steps:

1. On the machine where you created the databases, locate the appropriate sample properties file *BPM_HOME*\BPM\samples\config.
2. Find the sample properties file that most closely represents your target deployment environment and make a copy of this file.

   For more information about the sample configuration files, refer to Configuration properties for the BPMConfig command.
3. Run the **BPMConfig** command with the parameter **-sqlfiles** and the name of the equivalent properties file you choose.

   - To generate the database scripts in the dbscripts directory of the deployment manager profile, use the following syntax:

     BPM_HOME\bin\BPMConfig -create -sqlfiles *my_environment.properties*

     Note: The SQL scripts are generated in the *DMGR_PROFILE*/dbscripts folder by default. These scripts are deleted if you run the **BPMConfig** command again or configure the deployment environment using the Deployment Environment wizard.

   - To generate the database scripts in an output directory of your choice, use the following syntax:

     BPM_HOME\bin\BPMConfig -create -sqlfiles *my_environment.properties* -outputDir \MyBPMScriptDir

     Note: If you do not use the **-outputDir** parameter with the **BPMConfig** command, the profile is generated, if it does not exist, even before the database scripts are generated.

The database SQL scripts are generated in the *DMGR_PROFILE*\dbscripts folder by default. This folder includes the following sub-folders:

- *deployment_environment_name* - For each Deployment Environment, this folder will contain the SQL files that need to be executed.

These subdirectories also contain a **createDatabase.sql** script, which you can use to run the database scripts to create the SQL Server database tables.

A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

- *deployment_environment_name*
  - SQLServer
    - *CMNDB*
      - *schema name*
        - createSchema_Standard.sql
        - createSchema_Messaging.sql
    - *BPMDB*
      - *schema name*
        - createSchema_Standard.sql
        - createProcedure_Standard.sql

   - *PDWDB*
  - *schema name*
    - `createSchema_Standard.sql`

Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

Running the generated SQL Server database scripts:

If you run the BPMConfig command with the property *bpm.de.deferSchemaCreation* set to **true**, or if you used the Deployment Environment Wizard and cleared the Create Tables option, you must run the generated database scripts manually to create the database tables.

Before you begin this task, you must have run the **BPMConfig** command or the Deployment Environment Wizard to generate the correct SQL scripts.

If the property *bpm.de.deferSchemaCreation* is set to **false**, or if you used the Deployment Environment Wizard and did not clear the Create Tables option, the SQL scripts are run during configuration of the deployment environment.

The database SQL scripts are generated in the *dmgr_profile_name*\dbscripts folder by default.

1. Locate the generated SQL scripts.

   A default configuration for sea **Standard** deployment environment with SQL Server databases contains the following sub-folders and SQL scripts:

   - ***deployment_environment_name***
     - SQLServer
       - *CMNDB*
         - *schema name*
           - `createSchema_Standard.sql`
           - `createSchema_Messaging.sql`
       - *BPMDB*
         - *schema name*
           - `createSchema_Standard.sql`
           - `createProcedure_Standard.sql`
       - *PDWDB*
         - *schema name*
           - `createSchema_Standard.sql`

   Note: The *BPMDB* and *PDWDB* folders for Process Server and Performance Data Warehouse databases are not generated for an **Advanced-only** deployment environment.

2. Run the scripts to apply the schema to the CMNDB.

   For example, use the following commands to run the scripts manually for a **deployment environment-level** Common database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\C
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d CMNDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\C
   ```

   In the above and following examples, **schema1** is the name of the schema used.

3. Run the scripts to apply the schema to the BPMDB.

   For example, use the following commands to run the scripts manually for the Process database configuration:

```
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\BPMD
sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d BPMDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\BPMD
```

4. Run the **bootstrapProcessServerData** command to load configuration data for the IBM BPM applications into the Process database. This data is required for the applications to run correctly.

   For example:

   Use the following command to load bootstrap data onto a server that is part of an ND environment but not part of a cluster:

   ```
   bootstrapProcessServerData.bat -nodeName node1 -serverName myServer
   ```

   Use the following command to load bootstrap data onto a cluster that hosts the Process Server or Process Center:

   ```
   bootstrapProcessServerData.bat -clusterName myAppCluster
   ```

   Additional information about running the **bootstrapProcessServerData** command is found in the topic "Loading the database with system information in a network deployment environment."

5. Run the scripts to apply the schema to the PDWDB.

   For example, use the following commands to run the scripts manually for the Performance Data Warehouse database configuration:

   ```
   sqlcmd -U @DB_USER@ -P @DB_PASSWD@ -d PDWDB -i profiles\DmgrProfile\dbscripts\deployment_environment_name\SQLServer\PDWD
   ```

Loading the database with system information in a network deployment environment:

If you are creating a Standard or Advanced network deployment environment, you must run the **bootstrapProcessServerData** command before you try to start or use Process Server or Process Center.

When you run the **bootstrapProcessServerData** command, configuration data for the BPM applications is loaded into the Process database. This data is required for the BPM applications to run correctly.

- Important: If you created an Advanced-only Process Server deployment environment (an environment without the capabilities included in Standard deployment environments), you can skip this task. There is no need to run the **bootstrapProcessServerData** command.
- If you created the database tables when you created the deployment environment, either by setting the parameter **bpm.de.deferSchemaCreation** to **false** for the **BPMConfig** command, or by enabling **Create Tables** in the Deployment Environment wizard, there is no need to run the **bootstrapProcessServerData** command.
- In a Standard or Advanced network deployment (ND) environment, you must run this command after a server or cluster of servers is created. For a cluster, you need to specify the cluster name. Run this command before the first server is started. You do not need to rerun the command if you add another cluster member.
- If a single WebSphere cell contains multiple application target clusters, you must run this command on each of the clusters.

Run the bootstrap utility from the command line. The bootstrap utility is found in the deployment manager profile directory. For example: `Linux`   `UNIX`   *BPM_HOME*\profiles*dmgr_profile_name*\bin
Run the bootstrap utility using one of the following commands:

- **bootstrapProcessServerData.bat -clusterName** *cluster_name*
- **bootstrapProcessServerData.bat -nodeName** *node_name* **-serverName** *server_name*

where:

- **-clusterName** is the name of the application target cluster. You must specify this parameter when you want the bootstrap data to run on a cluster.
- **-nodeName** is the name of the node. You must specify this parameter and the **-serverName** parameter when you want the bootstrap data to run on the server that is part of the network deployment environment and not part of the cluster.

- **-serverName** is the name of the server. You must specify either this parameter and the **-nodeName** parameter when you want the bootstrap data to run on the server that is part of the network deployment and not part of the cluster.

The parameters are case-sensitive

You have loaded the database with system information before successfully starting the IBM Business Process Manager server. The log information for the bootstrap operation is saved to the *USER_INSTALL_ROOT*\logs directory in a file called bootstrapProcessServerData.*clusterName.timestamp*.log or bootstrapProcessServerData.*nodeName.serverName.timestamp*.log depending on the target you specified. The console displays a subset of the logged information.

Bootstrap data onto a server that is part of an ND environment but not part of a cluster:

bootstrapProcessServerData.bat -nodeName node1 -serverName myServer

Bootstrap data onto a cluster that hosts the Process Server or Process Center:

bootstrapProcessServerData.bat -clusterName myAppCluster

Starting your environment and verifying the installation:

After you create the deployment environment and complete the relevant configuration tasks, you can start all the servers in a cluster or deployment environment. Then you can verify the IBM Business Process Manager installation.

1. Start the cluster or deployment environment as described in Starting and stopping your environment.
2. From the administrative console, verify that you can see **IBM Business Process Manager** on the Welcome page.
3. Check that the enterprise applications are started by clicking **Applications** > **Application Types** > **WebSphere enterprise applications**.
4. Check that the messaging engine is started by clicking **Service integration** > **Buses**. Then click the name of the bus, and under **Topology**, click **Messaging engines**.

After the cluster has started, verify that the applications are set up correctly by running a series of tests and deploying samples as detailed in the following table.

Table 76. Application verification tests

Application and description	Action
Process Admin Console Use the Process Admin Console to manage the Process Servers in your runtime environments and the Process Center server. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Log on to the Process Admin Console by using the default account for IBM Business Process Manager administrators. For information about accessing the Process Admin Console, see Accessing the Process Admin Console.

Table 76. Application verification tests (continued)

Application and description	Action
Performance Admin Console Use the Performance Admin Console tools to manage the Performance Data Warehouse queues in your environment, manage data transfer errors, and monitor overall performance. **Restriction:** This console is not available if you created an Advanced-only Process Server deployment environment.	Verify that you can access the Performance Admin Console, as described in Managing Business Performance Data Warehouses.
Process Portal Use Process Portal to interact with processes from a web browser. **Restriction:** Process Portal is not available if you created an Advanced-only Process Server deployment environment.	Process Portal is configured by default. Verify that you can access Process Portal and that the applications used by Process Portal are all accessible, as described in Verifying Process Portal.
Hiring Sample process application Use the samples that are provided with the product to further verify the installation and as tutorials to learn the product.	Run the Hiring Sample process application and tutorial in Process Designer, as described in Samples and tutorials. Additionally deploy the samples to a Process Server and then run them, as described in Installing process application snapshots.

To learn about security for the environment and applications, see Securing IBM Business Process Manager and applications.