

**IBM SPSS Collaboration and  
Deployment Services Repository 4.2  
Installation and Configuration Guide  
(IBM i)**



*Note:* Before using this information and the product it supports, read the general information under Notices on p. 82.

This edition applies to IBM® SPSS® Collaboration and Deployment Services 4.2 and to all subsequent releases and modifications until otherwise indicated in new editions.

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# Preface

IBM® SPSS® Collaboration and Deployment Services enable widespread use and deployment of predictive analytics. IBM® SPSS® Collaboration and Deployment Services Repository is a critical component of the system. Its features include centralized, secure, and auditable storage of analytical assets, advanced capabilities for management and control of predictive analytic processes, as well as sophisticated mechanisms of delivering the results of analytical processing to the end users.

This manual documents the software and hardware requirements for the repository and its installation and configuration on IBM i. Tasks such as setting up content repository server, managing users, auditing the repository, etc. are documented in the *IBM SPSS Collaboration and Deployment Services 4.2 Administrator's Guide*. The tasks associated with everyday use of the analytical facilities of IBM SPSS Collaboration and Deployment Services are documented in *IBM® SPSS® Collaboration and Deployment Services Deployment Manager 4.2 User's Guide*.

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# Overview

## ***IBM SPSS Collaboration and Deployment Services***

IBM® SPSS® Collaboration and Deployment Services is an enterprise-level application that enables widespread use and deployment of predictive analytics. IBM SPSS Collaboration and Deployment Services provides centralized, secure, and auditable storage of analytical assets and advanced capabilities for management and control of predictive analytic processes, as well as sophisticated mechanisms for delivering the results of analytical processing to the end users. The benefits of IBM SPSS Collaboration and Deployment Services include:

- Safeguarding the value of analytical assets
- Ensuring compliance with regulatory requirements
- Improving the productivity of analysts
- Minimizing the IT costs of managing analytics

IBM SPSS Collaboration and Deployment Services allows you to securely manage diverse analytical assets and fosters greater collaboration among those developing and using them. Furthermore, the deployment facilities ensure that the right people get the information they need to take timely, appropriate action.

### ***Collaboration***

Collaboration refers to the ability to share and reuse analytic assets efficiently, and is the key to developing and implementing analytics across an enterprise. Analysts need a location in which to place files that should be made available to other analysts or business users. That location needs a version control implementation for the files to manage the evolution of the analysis. Security is required to control access to and modification of the files. Finally, a backup and restore mechanism is needed to protect the business from losing these crucial assets.

To address these needs, IBM® SPSS® Collaboration and Deployment Services provides a repository for storing assets using a folder hierarchy similar to most file systems for organization. Files stored in the IBM® SPSS® Collaboration and Deployment Services Repository are available to users throughout the enterprise, provided those users have the appropriate permissions for access. To assist users in finding assets, the repository offers a search facility.

Analysts can work with files in the repository from client applications that leverage the service interface of IBM SPSS Collaboration and Deployment Services. Products such as IBM® SPSS® Statistics and IBM® SPSS® Modeler allow direct interaction with files in the repository. An analyst can store a version of a file in development, retrieve that version at a later time, and continue to modify it until it is finalized and ready to be moved into a production process. These files can include custom interfaces that run analytical processes allowing business users to take advantage of an analyst's work.

The use of the repository protects the business by providing a central location for analytical assets that can be easily backed-up and restored. In addition, permissions at the user, file, and version label levels control access to individual assets. Version control and object version labels ensure the right versions of assets are being used in production processes. Finally, logging features provide the ability to track file and system modifications.

## ***Deployment***

To realize the full benefit of predictive analytics, the analytic assets need to provide input for business decisions. Deployment bridges the gap between analytics and action by delivering results to people and processes on a schedule or in real time.

In IBM® SPSS® Collaboration and Deployment Services, individual files stored in the repository can be included in processing **jobs** that define an execution sequence for the files. The execution results can be stored in the repository, on a file system, or delivered to specified recipients. Results stored in the repository can be accessed by any user with sufficient permissions using the IBM® SPSS® Collaboration and Deployment Services Deployment Portal interface. The jobs themselves can be triggered according to a defined schedule or in response to system events.

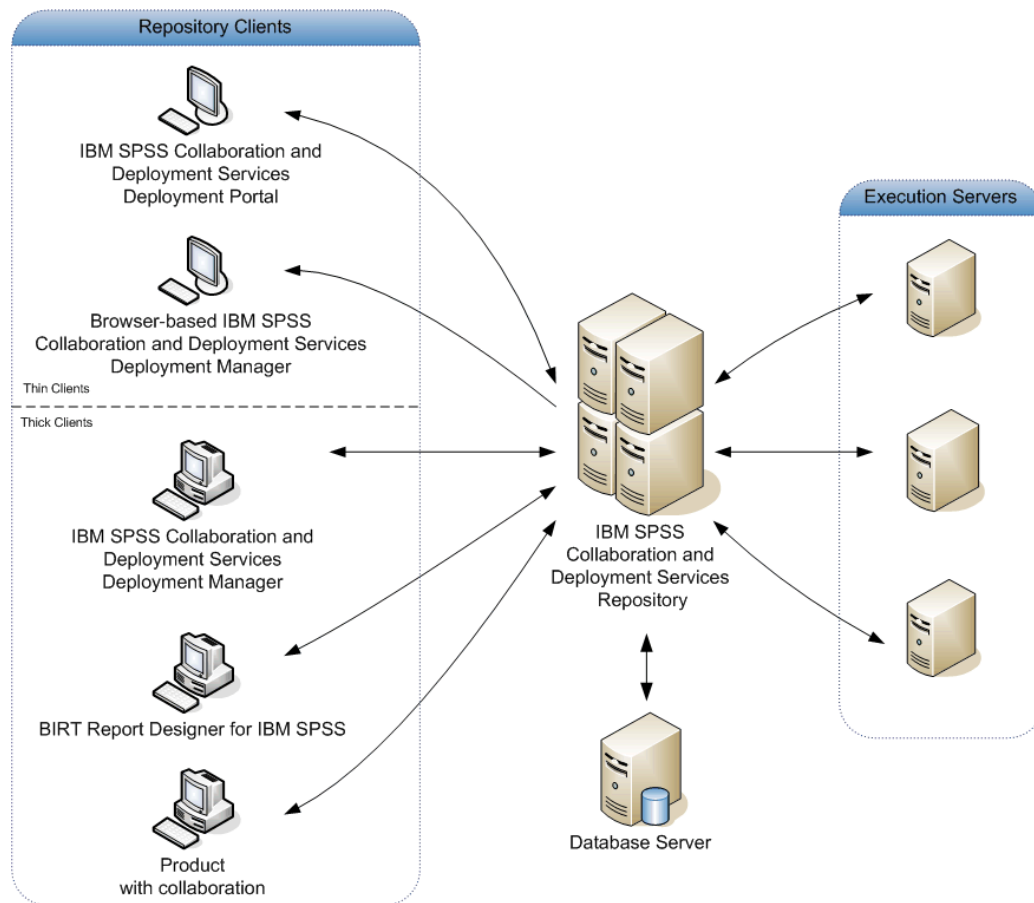
In addition, the scoring service of IBM SPSS Collaboration and Deployment Services allows analytical results from deployed models to be delivered in real time when interacting with a customer. An analytical model configured for scoring can combine data collected from a current customer interaction with historical data to produce a score that determines the course of the interaction. The service itself can be leveraged by any client application, allowing the creation of custom interfaces for defining the process.

The deployment facilities of IBM SPSS Collaboration and Deployment Services are designed to easily integrate with your enterprise infrastructure. Single sign-on reduces the need to manually provide credentials at various stages of the process. Moreover, the system can be configured to be compliant with Federal Information Processing Standard Publication 140-2.

## ***System architecture***

In general, IBM® SPSS® Collaboration and Deployment Services consists of a single, centralized IBM® SPSS® Collaboration and Deployment Services Repository that serves a variety of clients, using execution servers to process analytical assets.

Figure 1-1  
 IBM SPSS Collaboration and Deployment Services Architecture



IBM SPSS Collaboration and Deployment Services consists of the following components:

- IBM SPSS Collaboration and Deployment Services Repository for analytical artifacts
- Product with Collaboration
- IBM® SPSS® Collaboration and Deployment Services Deployment Manager
- IBM® SPSS® Collaboration and Deployment Services Deployment Portal
- Browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager
- IBM® SPSS® Collaboration and Deployment Services Enterprise View
- BIRT Report Designer for IBM® SPSS®

### ***IBM SPSS Collaboration and Deployment Services Repository***

The repository provides a centralized location for storing analytical assets, such as models and data. The repository includes facilities for:

- Security
- Version control

- Searching
- Auditing

The repository requires an installation of a relational database, such as Oracle, IBM DB2 UDB, or Microsoft SQL Server.

Configuration options for the repository are defined using the IBM® SPSS® Collaboration and Deployment Services Deployment Manager or the browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager. The contents of the repository are managed with the Deployment Manager and accessed with the IBM® SPSS® Collaboration and Deployment Services Deployment Portal.

### ***IBM SPSS Collaboration and Deployment Services Deployment Manager***

IBM® SPSS® Collaboration and Deployment Services Deployment Manager is a client application that allows users to schedule, automate, and execute analytical tasks, such as updating models or scores, using the repository. The client application allows a user to:

- View any existing files within the system, including reports, SAS syntax files, and data files
- Import files into the repository
- Schedule jobs to be executed repeatedly using a specified recurrence pattern, such as quarterly or hourly
- Modify existing job properties in a user-friendly interface
- Determine the status of a job
- Specify e-mail notification of job status

In addition, the client application allows users to perform administrative tasks for IBM® SPSS® Collaboration and Deployment Services, including:

- User management
- Security provider configuration
- Role and action assignment

### ***IBM SPSS Collaboration and Deployment Services Deployment Portal***

IBM® SPSS® Collaboration and Deployment Services Deployment Portal is a thin-client interface for accessing the repository. Unlike the browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager, which is intended for administrators, Deployment Portal is a web portal serving a variety of users. The web portal includes the following functionality:

- Browsing the repository content by folder
- Opening published content
- Running jobs and reports
- Generating scores using models stored in the repository
- Searching repository content

- Viewing content properties
- Accessing individual user preferences, such as e-mail address and password, general options, subscriptions, and options for output file formats

## ***Browser-based IBM SPSS Collaboration and Deployment Services Deployment Manager***

The browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager is a thin-client interface for performing setup and system management tasks, including:

- Configuring the system
- Configuring security providers
- Managing MIME types

Non-administrative users can perform any of these tasks provided they have the appropriate actions associated with their login credentials. The actions are assigned by an administrator.

## ***IBM SPSS Collaboration and Deployment Services Enterprise View***

The IBM® SPSS® Collaboration and Deployment Services Enterprise View provides a single, consistent view of enterprise data. It allows users to define and maintain a common view of warehoused and transaction data needed to perform analytics, optimization, deployment, and reporting. Underlying data may come from a variety of sources, including a data warehouse, an operational data store, and an online transaction database. The Enterprise View ensures a consistent use of enterprise data and hides the complexities of stored data structures from the end user. The Enterprise View is the data backbone for the predictive enterprise.

Data discovery requires a major investment of resources from the organizations deploying predictive analytics. The process is labor intensive—it can involve representatives from departments across the organization and often entails resolving differences in data structure and semantics across organizational boundaries. The Enterprise View provides a mechanism for recording the outcomes of the data discovery process, versioning and securing the resulting schema, and tracking changes over time.

The Enterprise View includes the IBM® SPSS® Collaboration and Deployment Services Enterprise View Driver component designed to provide other applications access to Enterprise View objects stored in the repository. The driver operates similarly to ODBC drivers with the exception that it does not directly query a physical data source but rather references Enterprise View Data Provider Definitions and Application Views. Note that while the Enterprise View is installed as part of IBM® SPSS® Collaboration and Deployment Services Deployment Manager, the Enterprise View driver must be installed separately. For more information, see the installation instructions.

## ***Execution servers***

Execution servers provide the ability to execute resources stored within the repository. When a resource is included in a job for execution, the job step definition includes the specification of the execution server used for processing the step. The execution server type depends on the resource.

Execution servers currently supported by IBM® SPSS® Collaboration and Deployment Services include:

- **SAS.** The SAS execution server is the SAS executable file *sas.exe*, included with Base SAS® Software. Use this execution server to process SAS syntax files.
- **Remote Process.** A remote process execution server allows processes to be initiated and monitored on remote servers. When the process completes, it returns a success or failure message. Any machine acting as a remote process server must have the necessary infrastructure installed for communicating with the repository.

Execution servers that process other specific types of resources can be added to the system by installing the appropriate adapters. For information, consult the documentation for those resource types.

During job creation, assign an execution server to each step included in the job. When the job executes, the repository uses the specified execution servers to perform the corresponding analyses.

## ***BIRT Report Designer for IBM SPSS***

The reporting functionality of IBM® SPSS® Collaboration and Deployment Services is enabled by BIRT (Business Intelligence and Reporting Tools), an open-source package distributed by Eclipse Foundation under the Eclipse Public License. BIRT provides core reporting features, such as report layout, data access, and scripting. For more information about BIRT, see the [BIRT project page \(http://www.eclipse.org/birt\)](http://www.eclipse.org/birt).

The IBM SPSS Collaboration and Deployment Services installation includes the BIRT reporting engine server components, which enable the execution of BIRT report syntax files as part of the IBM SPSS Collaboration and Deployment Services reporting job steps. BIRT Report Designer for IBM® SPSS® is a standalone application that can be used in conjunction with IBM SPSS Collaboration and Deployment Services. It provides a rich user interface with a number of advanced features for creating reports and must be installed separately.

If a BIRT Report Designer for IBM SPSS report requires a JDBC-based database connection, a corresponding JDBC driver must be installed with the IBM® SPSS® Collaboration and Deployment Services Repository. For application server-specific information on the location of the JDBC drivers, see the corresponding section of the repository installation instructions.

To start BIRT Report Designer for IBM SPSS, run the file *BIRT.exe* in the installation directory. For information on using BIRT Report Designer for IBM SPSS, see the documentation installed with the application.

## ***Products with collaboration***

A product with collaboration allows interaction with the IBM® SPSS® Collaboration and Deployment Services Repository from within the native interface. Files can be stored and retrieved directly from the collaborating product.

In addition, some files stored in the repository can be executed as steps within jobs. A job can contain any number of steps, with each step corresponding to a separate file. Relationships defined between the steps determine the processing flow. The job can be scheduled to execute at a specific time, according to a recurrence pattern, or in response to a defined event. Moreover, notifications can be sent to specified recipients to report on individual step and overall job execution status.

Collaboration between IBM® SPSS® Collaboration and Deployment Services and other products is enabled through the use of adapters. These adapters are installed into the IBM SPSS Collaboration and Deployment Services environment to add the product-specific features. For more information, consult the collaborating product documentation.

# What's new in this release?

## New in release 4.2

The following enhancements have been added to the application:

### **Product renaming**

This release marks the renaming of PASW Collaboration and Deployment Services to IBM® SPSS® Collaboration and Deployment Services. The following table identifies the new names for features introduced in previous releases.

<b>Old name</b>	<b>New Name</b>	<b>General usage</b>
PASW Collaboration and Deployment Services	IBM SPSS Collaboration and Deployment Services	IBM SPSS Collaboration and Deployment Services
Deployment Manager	IBM® SPSS® Collaboration and Deployment Services Deployment Manager	Deployment Manager
Deployment Portal	IBM® SPSS® Collaboration and Deployment Services Deployment Portal	Deployment Portal
browser-based Deployment Manager	browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager	browser-based Deployment Manager
PASW BIRT Report Designer	BIRT Report Designer for IBM® SPSS®	BIRT Report Designer for IBM SPSS
PASW Tag Library	IBM® SPSS® Collaboration and Deployment Services Tag Library	IBM SPSS Collaboration and Deployment Services Tag Library
repository	IBM® SPSS® Collaboration and Deployment Services Repository	IBM SPSS Collaboration and Deployment Services Repository
Enterprise View	IBM® SPSS® Collaboration and Deployment Services Enterprise View	IBM SPSS Collaboration and Deployment Services Enterprise View

### **Support for IBM z (mainframe)**

IBM SPSS Collaboration and Deployment Services 4.2 introduces support for IBM z, including the following:

- Accessing data in DB2 for z/OS and in DB2 LUW on Linux for System z.
- Accessing legacy System z data using Classic Federation Server.

### **Additional platforms support**

- Running the repository on IBM i v7r1.



***RSS Notifications***

IBM SPSS Collaboration and Deployment Services now allows users to subscribe to RSS (Real Simple Syndication) notification feeds for the purposes of receiving alerts of changes to repository contents and processing status, which enables incorporating notifications into custom browser-based interfaces and dashboards. It is also possible to filter RSS feeds to display only certain kinds of notifications; for example, a user interested in job success and failure notification can filter out content notifications.

# *Installation and configuration*

This chapter provides the information about the installation and configuration of IBM® SPSS® Collaboration and Deployment Services Repository. Configuration of the repository environment may consist of:

**Provisioning.** Certain prerequisites must be in place before beginning the installation. This includes verifying that hardware and software requirements are met, setting up the database, and configuring the application server.

**Installing.** New users must perform a clean installation of the repository in Windows, UNIX, or IBM i environment.

**Upgrading.** Users with an existing version of the repository can conveniently upgrade their environment to take advantage of new features and functions.

**Uninstalling.** In the event that an installation becomes corrupt or the application needs to be reinstalled due to system errors, the repository can be removed and the system restored to its original state.

When finished, verify the installation is successful and install IBM® SPSS® Collaboration and Deployment Services Deployment Manager on client workstations that will connect to the repository.

## *Provisioning the system*

Prior to installing the repository, verify that the necessary application server, database configuration, hardware, software, and permissions requirements have been met.

## *Hardware requirements*

The following hardware requirements must be met before installing the repository. Note that this does not reflect the hardware requirements of software beyond the repository, such as operating systems and databases.

Table 3-1  
*Hardware requirements*

Component	Requirement
Processor	At least RS64-IV
Hard Drive	At least 5 GB of free space
Memory	At least 4 GB RAM
Optical drive	DVD-ROM

## Software requirements

### Server operating systems

The repository can be installed into application servers running on the following operating system(s):

Operating System	Release	Processor	Word-size
IBM i	v7r1	POWER	64-bit
IBM i	v6r1	POWER	64-bit
IBM i	v5r4	POWER	64-bit

### Client operating systems

Repository desktop client applications, such as IBM® SPSS® Collaboration and Deployment Services Deployment Manager, can run on the following operating systems.

OS	Release	Edition	Processor	Required Patch Level
Windows	7	Enterprise	x86	
Windows	7	Professional	x86	
Windows	7	Enterprise	x64 (32-bit code)	
Windows	7	Professional	x64 (32-bit code)	
Windows	7	Enterprise	x64 (64-bit code)	
Windows	7	Professional	x64 (64-bit code)	
Windows	Vista	Enterprise	x86	SP1
Windows	Vista	Business	x86	SP1
Windows	Vista	Enterprise	x64 (32-bit code)	SP1
Windows	Vista	Business	x64 (32-bit code)	SP1
Windows	Vista	Enterprise	x64 (64-bit code)	SP1
Windows	Vista	Business	x64 (64-bit code)	SP1
Windows	XP	Pro	x86	SP3
Windows	XP	Pro	x64 (64-bit code)	SP3
Windows	XP	Pro	x64 (32-bit code)	SP3

### Web browsers

IBM® SPSS® Collaboration and Deployment Services 4.2 Web applications can be accessed by the following browsers.

Browser	Release	Windows 7	Vista	XP	Desktop Linux	Mac OSX
Internet Explorer	IE 8	Supported	Supported	Supported	Not Supported	Not Supported
Internet Explorer	IE 7	Not supported	Supported	Supported	Not Supported	Not Supported
Mozilla Firefox	3.x	Supported	Supported	Supported	Supported	Supported

Browser	Release	Windows 7	Vista	XP	Desktop Linux	Mac OSX
Mozilla Firefox	2.x	Supported	Supported	Supported	Supported	Supported
Apple Safari	3.x	Not supported	Not Supported	Not Supported	Not Supported	Required

### **Other requirements**

Other software requirements include:

- i5/OS PASE – licensed program, Service Pack 5722SS1, Portable App Solutions Environment.
- IBM Technology for JVM (J9), Service Pack 5722JV1, option 8, J2SE 5.0 32-bit.
- QShell environment.

The following PTF requirements are for IBM i V7R1 only:

PTF Group	Description	Level
SF99709	GROUP HIPER	5
SF99701	DB2 FOR IBM I	2
SF99572	JAVA	2
SF99364	WEBSPPHERE APP SERVER V6.1	1
SF99363	WEBSPPHERE APP SERVER V7.0	1

### **File system permissions**

The user installing the repository must have the following permissions on the host system:

- Write permissions to the repository installation directory and subdirectories.
- Write permissions to the deployment and configuration directories and read and execute permissions to other application server directories.
- It is recommended that the installing profile be granted *QSECOFR* or equivalent authority. At a minimum, the profile must have the following special authorities: *\*ALLOBJ*, *\*IOSYSCFG*, *\*SAVSYS*, *\*JOBCTL*, and *\*SECADM*.

### **Application servers**

Before installing the repository, a supported J2EE application server or a server cluster must be installed and accessible. The repository installation requires a connection to the application server to deploy the necessary Web services and components. If the repository is reinstalled, it is strongly recommended to use a new instance of the application server. It is also essential to make sure the latest versions of vendor patches have been applied to application server installations.

The following table lists supported application servers.

Application Server	Operating System	Java Environment					
		Sun	JRockit	HP-UX	IBM	Azul	Open JDK
IBM WebSphere 7	IBM i v5r4				1.5		
	IBM i v6r1				1.6		
	IBM i v7r1				1.6		
IBM WebSphere 6.1	IBM i v5r4				1.5		
	IBM i v6r1				1.6		
	IBM i v7r1				1.6		

Whether or not the application server should be running during installation depends on the server.

- For deployment into WebSphere, the application server should be running.
- WebSphere 7 requires Fix Pack 7 to be applied.
- Configuring single sign-on for the repository running on WebSphere 6.1 requires Fix Pack 19.

For additional information on installing an application server, refer to the vendor documentation.

## Databases

Before installing the repository, a database must be running and accessible. Repository installation requires a connection to the database to establish the necessary control tables and infrastructure. The following table lists supported repository databases.

Vendor	Database	Release	Version
IBM	DB2/400	v7r1	(embedded in OS)
IBM	DB2/400	v6r1	(embedded in OS)
IBM	DB2/400	v5r4	(embedded in OS)

*Notes:*

- For DB2 IBM i , DB2 XML Extender package must be enabled.

### Database permissions

The user must also have the following general permissions to the database to perform the install and initial startup of the repository:

- Create session
- Create table
- Drop table
- Create view
- Drop view
- Create function
- Create procedure

- Select
- Insert
- Update
- Delete
- Execute procedure

### ***DB2 configuration***

When using an IBM i embedded DB2 database, you must create the database collection prior to the repository installation.

### ***IBM Corp. products compatibility***

The system is compatible with the following versions of IBM Corp. applications.

Table 3-2  
*Supported versions of IBM Corp. applications*

<b>IBM Corp. Product</b>	<b>Version</b>
IBM® SPSS® Modeler	14, 14.1
IBM® SPSS® Statistics	18, 19
IBM® SPSS® Decision Management	6, 6.1
IBM® ShowCase®	9
IBM® SPSS® Data Collection	5.6, 6

SPSS Statistics client, SPSS Modeler client, and ShowCase clients are not required for use of IBM® SPSS® Collaboration and Deployment Services. However, these applications offer interfaces for using the IBM® SPSS® Collaboration and Deployment Services Repository to store and retrieve objects. The server versions of these products are required if jobs containing SPSS Statistics syntax, SPSS Modeler streams, or ShowCase files/sets will be executed.

By default, the repository is installed without adapters for other IBM Corp. products and users must install the adapter packages corresponding to their versions of products. The packages are included on the products' distribution media and installed with IBM® SPSS® Collaboration and Deployment Services Package Manager. For more information, see the topic [Repository package management](#) in Chapter 11 on p. 67.

### ***Virtualization***

IBM® SPSS® Collaboration and Deployment Services server or client components can be deployed into virtualized environments provided by third-party software. For example, in order to simplify deployment of a development or testing environment, a system administrator can configure a virtual server on which to install the repository. The virtual machines hosting IBM SPSS Collaboration and Deployment Services components must meet minimum system requirements. For more information, see the topic [Provisioning the system](#) on p. 10.

Table 3-3  
Supported virtualized environments

Vendor	Product	Version	Edition	Server or Client Virtualization
VMWare	VSphere	4.0		Server
VMWare	ESXServer	3.5		Server
Microsoft	Windows Terminal Services	Windows 2008 Server		Client
Microsoft	Windows Terminal Services	Windows 2003 R2 Server		Client
Microsoft	Windows Terminal Services	Windows 2003 Server		Client
Citrix	XenApp	5.0	Enterprise	Client
Citrix	XenApp	5.0	Advanced	Client
Citrix	XenApp	5.0	Standard	Client
Citrix	Presentation Server	4.5	Enterprise	Client
Citrix	Presentation Server	4.5	Advanced	Client
Citrix	Presentation Server	4.5	Standard	Client

Assuming that the configured virtualized environment meets the minimum system requirements, no performance degradation IBM SPSS Collaboration and Deployment Services server or client installations is expected. It is important to note, however, that virtualized systems might share available physical resources, and resource contention on systems with a heavy processing load can cause performance degradation of the hosted IBM SPSS Collaboration and Deployment Services installations.

## Installing the repository

The installation involves:

1. Copying the necessary files from the distribution disk to the target computer.
2. Deploying the repository into an application server for general use and configuring the database. Deployment is performed by the setup utility.

This can be accomplished by using either the graphical installation wizard or a command line equivalent. Environments without a graphical interface must use the command line approach.

## Command line installation

Before beginning the repository installation, you must create and start the WebSphere instance for the application. To create a WebSphere instance, execute commands similar to the following in IBM i QShell environment.

```
qsh
cd /QIBM/ProdData/WebSphere/AppServer/V61/Base/bin
./manageprofiles -create -profileName <profile name> -templatePath /QIBM/ProdData/WebSphere/AppServer/V61/
Base/profileTemplates/default -startingPort <port number> -enableAdminSecurity false -validatePorts
-profilePath /QIBM/UserData/WebSphere/AppServer/V61/Base/profiles/<profile name>
```

*Note:* In command line examples ‘Base’ in the paths must be substituted with ‘Express’ if the Express version of WebSphere 6.1 application server is used. <Profile name> corresponds to the WebSphere instance name.

IBM Technology for JVM (J9) is required to run the repository on IBM i. Configure the profile to use 9 Java environment with the following command:

```
./enableJVM -jvm std32 -profile <profile name>
```

To start the instance:

```
cd /QIBM/UserData/WebSphere/AppServer/V61/Base/profiles/<profile name>/bin
./startServer <profile name>
```

For more information, see WebSphere documentation. It can also be accessed at <http://publib.boulder.ibm.com/infocenter/wasinfo/v6r1/index.jsp>.

To install the repository on IBM i:

- ▶ In QShell environment, copy */Server/IBMi* directory of Disk 1 to an arbitrary location in IBM i IFS.

```
cp -R /QOPT/CADS_4_2/Server/IBMi /temp
```

- ▶ Execute *install.qsh*.

```
/temp/install.qsh
```

Follow the instructions that appear on the screen. When the initial installation is completed, the setup utility must be launched to deploy repository files into the application server and configure the repository database. For more information, see the topic [Setup](#) on p. 17.

*Notes:*

- The of the JVM for the repository installation must point to JVM used by the application server.

## ***Silent installation***

Silent mode enables the installation without any user interaction. Installation parameters are specified as a properties file. This feature can be used to automate the application installation in large network environments. The installation Disk 1 includes a properties file to enable a silent installation: */Administration/Server/SilentInstallOptions*.

### ***How to use the options file:***

- ▶ Copy the options file from the DVD to the file system.
- ▶ Open the copied options file in a text editor.
- ▶ Change the options as needed. Some options require a string value, while others that correspond to choices in the installer can be set to 0 (off) or 1 (on).



**To perform a silent installation:**

- ▶ Execute the installation program from the command line with the following parameters:

```
install -i silent -f "<properties file path>"
```

You can use the direct or the relative properties file path. If no path is specified, the properties file must be located in the same directory as the installation program.

*Note:* Silent installation does not automatically launch IBM® SPSS® Collaboration and Deployment Services Setup. It must be started manually after the installation is completed.

## Setup

IBM® SPSS® Collaboration and Deployment Services Setup deploys the installation files into the application server, modifies the application server settings, and configures the repository database after the initial installation is completed.

Setup must be run in the following cases:

- Initial repository installation.
- Migration to different hardware. For more information, see the topic [Migration](#) in Chapter 4 on p. 23.
- Migration to a different application server or database.
- Upgrade to a different version of the repository. For more information, see the topic [Upgrading the repository](#) on p. 21.
- Master database password change. For more information, see the topic [Changing master database password](#) on p. 21.

For an already existing repository installation, any customizations made to the application server settings, such as Java option, memory setting, etc., will be overwritten by setup. In order to preserve customizations, the application server configuration files must be backed up.

To launch setup, execute the script in *<repository installation directory>/setup/*.

```
./clisetup.qsh
```

Command line setup prompts for the following information. Most fields have default values shown in square brackets. Pressing Enter will accept the default value. Although passwords are echoed on-screen as typed, they are saved in encrypted form. At any time, typing \restart and pressing Enter (or Return) will return to the initial installation screen.

- ▶ **Security.Keystore location.** The location of the repository keystore. The keystore is an encrypted file that contains the key for decrypting the passwords used by the repository, such as the repository administration password, the database access password, etc.  
*Important!* If the keystore file is lost, none of the passwords can be decrypted and the system becomes unusable and must be reinstalled. Therefore, it is recommended that backup copies of the keystore file be maintained.
- ▶ **Environment Type.** Select the environment type for the repository installation: standalone application server or application server cluster.
- ▶ **Application server.** Only WebSphere application server can be selected.
- ▶ **IBM WebSphere.Port.** For standalone installations only, the port number on which the application server runs. Refer to the AboutThisProfile.txt file in your WebSphere instance logs directory for the HTTP port.
- ▶ **IBM WebSphere.Profile Directory.** For standalone installations, the directory where WebSphere profile is stored, for example, `/QIBM/UserData/WebSphere/AppServer/V61/Base/profiles/ProfileName`.
- ▶ **IBM WebSphere.Server Admin User ID.** For standalone installations, your IBM i user profile name.
- ▶ **IBM WebSphere.Server Admin Password.** For standalone installations, the password for the specified user.  
*Note:* The user profile name and password are not validated by the installation. To avoid post-installation problems, you must verify that valid values have been specified.
- ▶ **IBM WebSphere. SOAP Connector Address Port.** For standalone installations, the port number used by WebSphere for incoming SOAP requests via HTTP.
- ▶ **IBM WebSphere.Server.** For standalone installations, the name of the WebSphere instance.
- ▶ **IBM WebSphere.node.** For standalone installations, the name of the WebSphere node. Use the format: `IBM iSystemName_WebSphereInstanceName`.
- ▶ **IBM WebSphere.cell.** For standalone installations, the WebSphere cell containing the node. The name of the WebSphere node. Use the format: `IBM_iSystemName_WebSphereInstanceName`.
- ▶ **Clustered Application Server.WebSphere Cluster <Version>.Output Directory.** For clustered installations, the directory where repository files will be installed. The location must be accessible to all servers in the cluster, for example as a mapped or mounted disk drive.
- ▶ **Clustered Application Server.WebSphere Cluster <Version>.Load Balancer URL.** For clustered installations, the address of the load balancer. Users will be accessing the repository at this address.
- ▶ **Clustered Application Server.WebSphere Cluster <Version>.Cluster Name.** For clustered installations, the name of the WebSphere cluster.

- ▶ **Clustered Application Server.WebSphere Cluster <Version>.Secure HTTP/SOAP Communication Between Components** For clustered installations, specifies that communication between nodes in the cluster will be secure.

*Important!* Deploying the repository into an application server cluster includes a number of additional configuration steps. For more information, see the topic [Clustering](#) in Chapter 6 on p. 31.

- ▶ **Select Database.** The database to be used to store the repository objects.
- ▶ **IBM DB2 for System i.Host.** Host name or IP address of the database server.
- ▶ **IBM DB2 for System i.Username.** Account used to connect to the database. Enter your IBM i user profile name. This user must have rights to modify the selected database.
- ▶ **IBM DB2 for System i.Password.** Password for the specified database user.

*Note:* The database user name and password are not validated by the installation. To avoid post-installation problems, you must verify that valid values have been specified.

- ▶ **IBM DB2 for System i.Library.** The name of the library collection to be used to store repository objects. If the library does not exist, it will be created.
- ▶ **System i user profile the application server runs under.** IBM i user under whose profile WebSphere instance is started. It is recommended to accept the default value of QEJBSVR.
- ▶ **Preserve User Data.** Select either 1 to preserve the objects that already exist in the repository or 2 to discard the objects.
  - **Preserve.** Select either preserve.PES UserID (in administrator role) to enter a user ID for your the repository administrator or preserve.PES User Password to enter a password for the administrator user ID.
  - **Discard.** Select discard.Password for admin user to enter a password for the default admin user ID
- ▶ **Component.Email Notification Information.Email server.** Name or IP address of the server used for outgoing e-mail.
- ▶ **Component.Email Notification Information.Sender's email address.** A valid address for the default e-mail sender.
- ▶ **Is this OK?** Select 1 to confirm the entered values and begin repository installation. Select 2 if you would like to go back and specify different values.

After the setup is completed, the WebSphere instance must be stopped and restarted by executing QShell commands similar to the following:

```
cd /QIBM/UserData/WebSphere/AppServer/V61/Base/profiles/<profile name>/bin
./stopServer <profile name>
./startServer <profile name>
```

**Setup notes**

- Refer to the *AboutThisProfile.txt* file in your WebSphere instance logs directory for the HTTP port configuration information. This file can be found in */qibm/userdata/websphere/appserver/v61/Base/Express/profiles/instance\_name/logs/AboutThisProfile.txt*. The information can also be accessed through WebSphere administration Web console at *http://<server name>:<administration console port number>/ibm/console/*.
- The setup progress is recorded in *<repository installation directory>/setup/log/setup.log*.
- The parameter values specified during setup are saved in *<repository installation directory>/platform/setupinfo.xml* and will be used if setup is rerun.

**Configuring repository autostart**

WebSphere Application Server runs in its own subsystem, called QWAS61, which is installed with the application server. To configure application servers to start automatically when the QWAS61 subsystem starts:

1. Give your user profile authority to the QWAS61/QWASJOB0 job description and QWAS61/QWAS61 subsystem description.
2. For each profile, create a duplicate of the job description used by WebSphere Application Server profiles. Use the following command on the command line:

```
CRTDUPOBJ OBJ(QWASJOB0) FROMLIB(QWAS61) OBJTYPE(*JOB0) TOLIB(mywasjob0) NEWOBJ(mysevr)
```

3. Use the CHGJOB0 command to change the newly created job description such that the Request data or command (RQSDTA) field starts the new server. For example, to start the default profile's application server (server1) when the subsystem is started, set the RQSDTA field as follows:

```
'QSYS/CALL PGM(product_library/QWASSTRSVR) PARM("-profilePath" "user_data_root/profiles/default"
"-server" "server1")'
```

4. Add an autostart job entry to the QWAS61/QWAS61 subsystem. Enter the following command from the CL command line:

```
ADDAJE SBS0(QWAS61/QWAS61) JOB(mysevr) JOB0(mywasjob0/mysevr)
```

*Optional:* Configure the system such that the QWAS61 subsystem starts during system startup. To enable automatic startup, add the following line to the system startup program: STRSBS QWAS61/QWAS61.

*Note:* The system startup program is defined by the QSTRUPPGM system value. TCP/IP must be active before WebSphere Application Server subsystem can start. Ensure that the STRTCP command runs before the STRSBS QWAS61/QWAS61 command in your startup program or in your autostart job.

## Changing master database password

For security reasons, it may be necessary to change the master database password following repository installation. In such cases the password used by the repository for database access must also be changed. IBM® SPSS® Collaboration and Deployment Services Password Utility can be used in GUI or command line mode.

4. Run IBM® SPSS® Collaboration and Deployment Services Setup. For more information, see [Setup on p. 17](#)

To run the password utility in command line mode:

1. Execute  

```
<repository installation directory>/setup/clidbpassword.qsh
```
2. Specify and confirm the new password using the command prompt.
3. Run IBM SPSS Collaboration and Deployment Services Setup.

The password can also be changed by modifying the application server settings. Note that the password is stored in encrypted form, therefore the new password must be converted to an encrypted string by running *encrypt.sh* with the password as command line argument.

## Upgrading the repository

Users with an existing version of the repository can conveniently upgrade their environment to take advantage of new features and functions. To upgrade to the current version:

1. Verify that hardware and software requirements are met and determine an installation directory for the application.
2. Reinstall the application server. The old instance of the application server cannot be used with the upgraded repository installation.
3. Install the latest version of the repository. It is recommended to use the already existing installation directory.
4. When prompted, specify the path of the application server.
5. When prompted, preserve the existing data in the existing database.

For detailed information about repository migration, see [Chapter 4](#)

## Uninstalling the repository

In the event that an installation becomes corrupt or the repository needs to be reinstalled due to system errors, the current version must be uninstalled.

*Note:* Back up the database before continuing. Uninstalling removes any tables it has created in the database. You will not be prompted to save this data.

To uninstall the repository:

1. Stop the repository by executing the following command in QShell environment.

```
/QIBM/UserData/WebSphere/AppServer/V61/Base/profiles/<profile name>/bin/stopServer <profile name>
```

2. Delete BD2 database library by executing the following CL command.

```
DLTLIB (library name)
```

3. Delete the repository installation directory and all its contents by executing the following command in QShell environment.

```
rm -rf <installation directory>
```

4. Delete the WebSphere instance by executing the following command in QShell environment.

```
/QIBM/ProdData/WebSphere/AppServer/V61/Base/bin/manageprofiles -delete -profileName <profile name>
```

## **JDBC drivers**

The reporting functionality of IBM® SPSS® Collaboration and Deployment Services is enabled by BIRT (Business Intelligence and Reporting Tools), an open-source package distributed by Eclipse Foundation under the Eclipse Public License. BIRT provides core reporting features, such as report layout, data access, and scripting. For more information about BIRT, see the [BIRT project page \(http://www.eclipse.org/birt\)](http://www.eclipse.org/birt). The repository installation includes the BIRT reporting engine server components, which enable the execution of BIRT report design files as part of the IBM SPSS Collaboration and Deployment Services reporting job steps. BIRT Report Designer for IBM® SPSS® is a standalone application that can be used in conjunction with IBM SPSS Collaboration and Deployment Services. It provides a rich user interface with a number of advanced features for creating reports and must be installed separately.

BIRT Report Designer for IBM SPSS installation contains a set of IBM Corp. JDBC drivers for all major database systems: Oracle, DB2, and SQL Server. These JDBC drivers are also installed by default with the repository. If a BIRT report uses a JDBC driver other than the ones installed by default, the driver must be installed in the repository. Depending on the application server, the directory location of the JDBC drivers is as follows:

**WebSphere.** *<WebSphere installation directory>/lib/ext*

Note that for Netezza, the version 5.0 driver should be used to access both version 4.5 and 5.0 databases.

# ***Migration***

The following migration scenarios are supported for IBM® SPSS® Collaboration and Deployment Services Repository 4.2:

- Migration from an earlier version of the repository.
- Migration of IBM SPSS Collaboration and Deployment Services Repository 4.2 to a different host, application server, or database server.

*Important!* For SPSS Predictive Enterprise Services IBM i installations with a large number of objects, it is recommended that the number of migrated objects not exceed 6,000 files and 10,000 relationships.

## ***Migration paths***

The following paths can be used for migrating to IBM® SPSS® Collaboration and Deployment Services Repository 4.2 from an earlier version of the system:

- Saving and restoring the repository. In most environments, saving and restoring the repository is recommended.
- “Over-the-top” installation. Installation of the repository with an existing repository database is generally more resource-intensive because additional backups of the operational environment may be required.

*Important!* Regardless of the selected migration path, it is recommended that the latest patches be applied to the existing installation before migration is performed. To obtain the patches, contact IBM Corp. product support.

## ***Saving and restoring the repository***

IBM® SPSS® Collaboration and Deployment Services Save and Restore Utility can be used to preserve the configuration and the contents of existing SPSS Predictive Enterprise Services 3.5 and PASW Collaboration and Deployment Services 4 and 4.1 repositories including the following:

- Content repository files and folder structure
- Scheduling and notification components
- Local users
- Locally defined overrides of remote directory user lists and groups
- Role definitions and membership
- User preferences
- Notification templates
- Icons

The repository is saved in a compressed archive file which can later be used to restore the content a configuration settings.

Migration process does not automatically add label security actions, such as *Show All Versions* and *Show Latest* to role definitions, and non-administrator users may not be able to see labeled versions and latest versions of objects. IBM® SPSS® Collaboration and Deployment Services administrator must manually assign the actions to non-administrator roles after migration. Also, migration from SPSS Predictive Enterprise Services 3.5 does not preserve configured external security providers, such as Microsoft Active Directory or IBM i. For more information, see the corresponding sections of *IBM SPSS Collaboration and Deployment Services 4.2 Administrator's Guide*.

*Important!* Save and restore utility preserves the package configuration, but updated versions of packages may be required. For example, it may be necessary to install newer versions of IBM® SPSS® Modeler adapters.

The following table presents the use cases for save and restore utility.

Source	Target			
	SPSS Predictive Enterprise Services 3.5	PASW Collaboration and Deployment Services 4.0	PASW Collaboration and Deployment Services 4.1	IBM SPSS Collaboration and Deployment Services 4.2
SPSS Predictive Enterprise Services 3.5	Supported	Supported	Supported	Supported
PASW Collaboration and Deployment Services 4.0		Supported	Supported	Supported
PASW Collaboration and Deployment Services 4.1			Supported	Supported
IBM SPSS Collaboration and Deployment Services 4.2				Supported

*Important!* The save and restore utility is intended primarily for migration purposes and is not a substitute for database backup. A regular backup of the repository database outside is strongly recommended.

When save and restore utility is used as a migration tool, the following prerequisites must be in place before migration is performed:

- Existing repository database must be backed up.
- IBM® SPSS® Collaboration and Deployment Services Repository 4.2 must be installed.

The following steps must be completed for a successful migration:

- Save the existing repository.



- Make sure appropriate content adapter packages, such as IBM® SPSS® Statistics and SPSS Modeler adapters, are installed in the target repository . For more information, refer to product-specific adapter documentation. For example, for information about reinstalling SPSS Modeler adapter, see SPSS Modeler documentation.
- Restore saved data to the target repository.
- Rerun setup tool to update system configuration values.

## ***Saving the repository***

The IBM® SPSS® Collaboration and Deployment Services Save Utility can be used as a GUI application or as a command line application. On systems without a GUI interface, it must be used as a command-line application. It can also be called in batch mode by other applications. The user must be assigned the Administrator role to perform the save operation. It is strongly recommended to stop the repository before saving.

### ***To save the repository using the command line utility:***

1. Navigate to `<repository installation directory>/setup/`.
2. Execute the `saverestore.qsh -headless` command with the following required arguments:
  - userid <user ID>**. IBM® SPSS® Collaboration and Deployment Services user under whose credentials the save operation is being performed.
  - userpassword <password>**. The password of the user.
  - save <data location path>**. The path of the saved data.

Optional arguments include:

- explode**. The option to save the data as a directory.
- filepassword <file password>**. Encryption password.
- annotation <annotation>**. The annotation string. If the annotation contains spaces, it must be enclosed in quotation marks.
- lang <language code>**. The language code for localized instances of IBM SPSS Collaboration and Deployment Services.

The following example illustrates saving the contents of the repository in a password-protected file with an annotation.

```
./saverestore.qsh -headless -userid admin -userpassword pass1234 -save /home/cdsuser/savefile -filepassword secret -annotation "Preparing data for migration 1/09/2009"
```

## ***Restoring the repository***

The IBM® SPSS® Collaboration and Deployment Services Restore Utility can be used as a GUI application or as a command line application. On systems without a GUI interface, it must be used as a command-line application. It can also be called in batch mode by other applications. The

user must be assigned the Administrator role in IBM® SPSS® Collaboration and Deployment Services to perform the restore operation.

If IBM SPSS Collaboration and Deployment Services is being restored over an existing instance, the existing content will be overwritten. In such cases, it is strongly recommended to stop IBM SPSS Collaboration and Deployment Services before restoring.

If IBM SPSS Collaboration and Deployment Services is being migrated to another server, application components must already be in place. Therefore, the installation must be run prior to restoring. After the repository has been restored, it must be reindexed. For information about reindexing, see administrator documentation.

***To restore the repository using the command line utility:***

1. Stop the repository.
2. Navigate to `<repository installation directory>/setup/`.
3. Execute the `saverestore.qsh -headless` command with the following required arguments:
  - userid <user ID>**. IBM SPSS Collaboration and Deployment Services user under whose credentials the restore operation is being performed.
  - userpassword <password>**. The password of the user.
  - restore <data location path>**. The path of the restored data.

Optional arguments include:

- filepassword <file password>**. For encrypted files, the password.
- setupdir <path>**. Option to indicate that the setup directory is different from the current directory.

The following example illustrates restoring the contents of the repository from password-protected file.

```
./saverestore.qsh -headless -userid admin -userpassword pass1234 -restore /home/paswuser/savefile -filepassword secret
```

## ***Rerunning setup***

If a repository from an earlier version of the system has been migrated to IBM® SPSS® Collaboration and Deployment Services Repository 4.2 or if an existing installation has been migrated to a different server environment, system configuration values in the repository must be reset by rerunning the setup utility. The utility is initially run as part of the repository installation.

***To rerun setup:***

1. Start the setup utility.
 

```
<repository installation directory>/setup/clisetup.qsh
```
2. Specify setup parameters as prompted by the wizard or command line. The parameters include keystore location, application server, database, administrator password, and email settings for notifications. For more information about the setup utility, see [Setup on p. 17](#)

---

## ***Overwriting an existing installation***

You can also upgrade to IBM® SPSS® Collaboration and Deployment Services Repository 4.2 by installing the system over an older version. In that case, during the setup you must point to the existing repository database.

*Important!* Full database backup is strongly recommended prior to over-the-top installation because it is impossible to revert to the old version of the repository once the new version has been installed.

Adapter packages, such as IBM® SPSS® Modeler adapter, must be reinstalled. The repository must also be reindexed. For information about reindexing, see administrator documentation.

*Note:* If Java encryption used while installing the repository over an existing database is different from the encryption used by the original instance (for example, IBM Java encryption versus Sun Java encryption), credentials passwords will not be migrated and setup will report failure. However, the repository can be still started, and you can use IBM® SPSS® Collaboration and Deployment Services Deployment Manager to manually change credentials passwords.

## ***Optional components***

This chapter provides the information about the installation and configuration of the following optional components of IBM® SPSS® Collaboration and Deployment Services:

- Web installation modules for BIRT Report Designer for IBM® SPSS® and IBM® SPSS® Collaboration and Deployment Services Enterprise View Driver
- IBM® SPSS® Collaboration and Deployment Services Remote Process Server

For information about installing IBM SPSS Collaboration and Deployment Services Enterprise View Driver, see *IBM SPSS Collaboration and Deployment Services Enterprise View Driver 4.2 Guide*.

### ***Web installations from the repository***

In order to enable Web installations of BIRT Report Designer for IBM® SPSS® and IBM® SPSS® Collaboration and Deployment Services Enterprise View Driver, the following optional packages must be deployed into the repository:

- BIRT Report Designer for IBM SPSS—*birtdesignerinstall.package*
- IBM SPSS Collaboration and Deployment Services Enterprise View Driver—*pevdriverinstall.package*

The packages can be found in the */Server/Web/* directory of IBM® SPSS® Collaboration and Deployment Services distribution Disk 1. The packages are deployed using IBM® SPSS® Collaboration and Deployment Services Package Manager. For more information, see the topic [Repository package management](#) in Chapter 11 on p. 67.

### ***IBM SPSS Collaboration and Deployment Services Remote Process Server***

In order to enable remote process execution in IBM® SPSS® Collaboration and Deployment Services, IBM® SPSS® Collaboration and Deployment Services Remote Process Server must be deployed on the remote host. The hardware and software requirements for the remote process server host are the same as for the repository host. Note that a J2EE application server is not required but the system must have a configured Java environment.

The installation involves:

1. Copying the necessary files from the distribution media to the target computer.
2. Configuring the remote process server.
3. Starting the remote process server.

This can be accomplished by using either the graphical installation wizard or the command line equivalent. Environments without a graphical interface must use the command line approach. When executing the Windows batch file or executable shell scripts provided on the installation media, the user installing the application must have permissions to install software under the operating system.

### **Installation notes**

- After the component has been copied, the repository database connection information must be provided. Select the database type and then specify database host, database name, user name, and password.
- For remote process server configuration, server name, access port, and whether a secure connection is to be used must be specified.
- Clustering can be enabled for a remote process server. If clustering is enabled for a specific repository instance, it will be possible to include the remote server in a cluster defined in that repository. If you choose not to enable clustering, the installation will proceed to completion. Otherwise, you must specify the host, port, and login credentials of the repository for which clustering is to be enabled.

### **Graphical installation wizard**

1. When the disk menu opens, click Install Remote Process Server, or execute the program to start the installation wizard in the `/RPS/Disk1/InstData/<OS Name>/NoVM/` directory of Disk 2. For Windows, this is `install.exe`. For Unix-based systems, the setup file is named `install.bin`.
2. After the installation wizard is launched, follow the instructions on the screen.

### **Command line installation**

Command line installation must be used on systems without a graphical interface. After verifying that a database server exists for the repository to connect to, execute the program in the `/RPS/Disk1/InstData/<OS Name>/NoVM/` directory of Disk 2 with the `console` command line switch.

- On Windows:

```
install.exe -console
```

- On UNIX:

```
./install.bin -console
```

- On IBM i, in QShell environment copy `setupi5.sh` script and the installation JAR files to a temporary directory and then run setup using commands similar to the following:

```
cp /qopt//OPT_DVD/RPS/setupi5.sh /temp
cp /qopt//OPT_CD/RPS/*.jar /temp
cp /qopt//OPT_CD/RPS/SETUP.JAR /temp
/temp/setupi5.sh
```

*Note:* Remote process server installation on IBM i requires classic JVM 1.5 to be enabled.

After the installation wizard is launched, follow the instructions on the screen. Many items have default values, which are always shown in square brackets. Pressing Enter will accept the default value. Although passwords are echoed on-screen as typed, they are saved in encrypted form.

### ***Starting and stopping a remote process server***

After the remote process server has been installed on the target host system, it must be started.

- ▶ To start the server, execute the following command:

(Windows)

```
<remote process server installation directory>/startserver
```

(UNIX and IBM i)

```
<remote process server installation directory>/startserver.sh
```

- ▶ To enable remote process server over a secure connection additional parameters must be specified:

(Windows)

```
<remote process server installation directory>/startserver "-Djavax.net.ssl.keyStore=./keystore"  
"-Djavax.net.ssl.keyStorePassword=remote"
```

(UNIX and IBM i)

```
<remote process server installation directory>/startserver.sh "-Djavax.net.ssl.keyStore=./keystore"  
"-Djavax.net.ssl.keyStorePassword=remote"
```

- ▶ To stop remote process server, execute the following command:

(Windows)

```
<remote process server installation directory>/shutdown
```

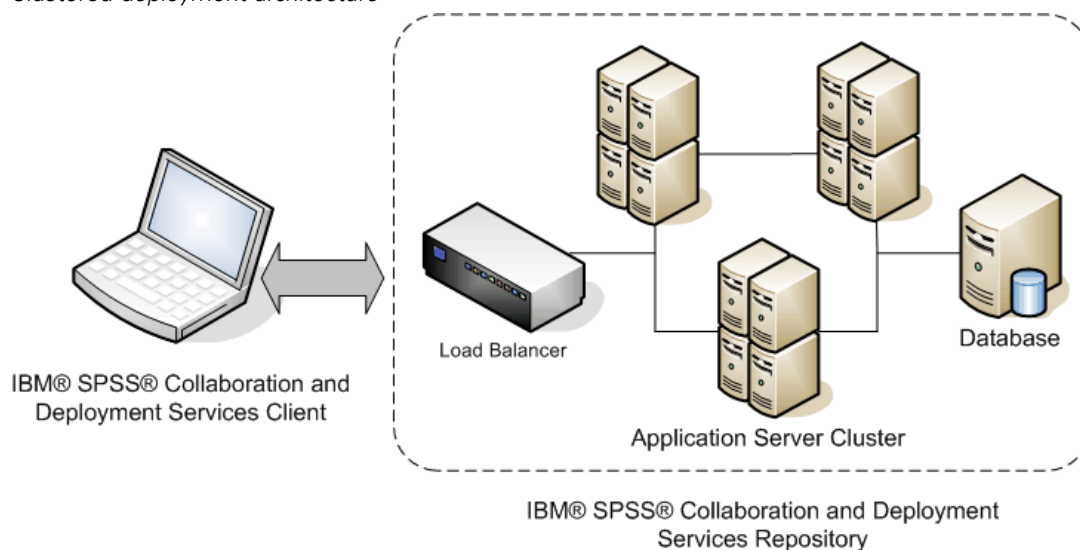
(UNIX and IBM i)

```
<remote process server installation directory>/shutdown.sh
```

# Clustering

IBM® SPSS® Collaboration and Deployment Services Repository can be deployed into an environment of clustered J2EE application servers. Each application server in the cluster should have the identical configuration for the hosted application components and the repository is accessed through a hardware- or software-based load balancer. This architecture allow processing to be distributed among multiple applications servers and it also provides redundancy in case of a single server failure.

Figure 6-1  
*Clustered deployment architecture*



IBM SPSS Collaboration and Deployment Services Repository currently supports clustering WebSphere application servers.

## Installation

The process of installing the repository into a cluster includes the following steps:

- Initial installation and configuration of application components on an arbitrarily selected node in the cluster, which is performed by the IBM® SPSS® Collaboration and Deployment Services Repository installation wizard.
  - Subsequent deployment of the application components into all of the nodes of the cluster performed through Jython-based script utilities or manually.
- Initial installation of the repository components must follow these guidelines:
- The repository should be installed on a single node in the cluster.
  - The cluster install location should be a directory available to all nodes in the cluster as a shared directory or a mounted drive.

- In the setup wizard, clustered install option must be selected.
- Regardless of the application server type, the following application server information must be provided:

Property	Description
Cluster Install Location	Location of the files to be deployed into the cluster. This directory will contain the repository applications and configuration files and a set of scripts that can assist in cluster configuration.
Cluster Name	The name of the WebSphere cluster that you will deploy into. If a cluster has been preconfigured, the cluster name must be provided. Otherwise, you must remember the name you specify because it will be required to create the cluster at a later time.
Load Balancer URL	The URL the clients will use to connect to the cluster. Typically this will be the URL of the load balancer.
Secure Communication	The option specifies whether secure communication will be used for HTTP/SOAP messages within the cluster. If it is selected, SSL must be configured in the cluster.

- The setup must be completed. For more information about the wizard, see [Installing the repository on p. 15](#)

After initial installation and configuration has been completed, the following directory structure is created in cluster install directory:

Subdirectory	Description
bin	OS-specific scripts for automating cluster deployment and configuration.
doc	Text files containing application server-specific instructions for deploying the repository into a cluster.
lib	Global libraries required for running the repository.
logging	Logging configuration files.
scripts	Jython scripts for automating cluster deployment and configuration.
toDeploy	Deployable application files.

Follow the application server-specific instructions to complete a script-assisted or manual deployment into all nodes. Note that Microsoft Visual C++ 2005 Redistributable Package must be installed on all nodes of the cluster. The 32-bit and 64-bit package executables (vcredist\_x86.exe and vcredist\_x64.exe) can be found in the repository installation directory.

## WebSphere

There are two methods for to deploying IBM® SPSS® Collaboration and Deployment Services Repository into a WebSphere cluster:

**Scripted deployment** is intended for less advanced users who want assistance with deploying the platform into an application server. Several scripts are provided for automating the deployment process. For more information, see the topic [Scripted deployment](#) on p. 33.



**Manual deployment** is intended for advanced users who want precise control over their application server environment. All deployment can be done through the administration console. For more information, see the topic [Manual deployment](#) on p. 36.

#### Notes

- Deploying the repository into a WebSphere cluster requires the use of a WebSphere shared library scoped to the WebSphere cluster. In order to use this functionality, WebSphere must have been at Fix Pack 19 (6.1.0.19) or later. If you are using the deployment scripts (*wsadmin*), you must also recreate your WebSphere Deployment Manager profile after the fix pack is applied.
- If you use a Windows share as the shared file system for installing IBM® SPSS® Collaboration and Deployment Services, you must configure the Node Agent Windows service to run as a Windows user that has access to the share. You must also use the UNC path as opposed to a mapped drive when configuring the installation because mapped drives are not available to Windows services.
- Make sure you use the IBM JVM/JRE when running setup. This is required to ensure that the same JCE (encryption) provider is used at setup time as will be used at run time. Because IBM WebSphere uses its own JVM, you must run setup with that JVM, so the same JCE Provider is used to create the keystore as will be used to read the keystore when the server is started. For more information, see the topic [Setup](#) in Chapter 3 on p. 17.

## Scripted deployment

### Scripted deployment files

There are several scripts that can be used to automate the cluster setup and the cluster deployment into WebSphere. These scripts are located in the *<cluster install location>/scripts* directory.

#### config.ini

The file contains the parameters used by the Jython scripts (described below) to automatically create a cluster. The file contains the following sections and properties:

#### cluster

- **name** name of the cluster (for example, *websphere\_cluster*).
- **cell** name of the WebSphere cell for the cluster (for example, *WSC1Cell01*).

#### servers

- **name** name of the server (for example, *platServer1*).
- **node** name of the node for the server (for example, *WSC1Node01*).
- **javaInitHeapSize** initial Java heap size (for example, 256).
- **javaMaxHeapSize** maximum Java heap size (for example, 1024).

- **platformOS** operating system, valid values include aix, aix64, hpux64, linux, linux64, solaris64, windows, windows64.
- **platformSharedDir** shared repository installation directory (for example, `\\machine\shared\platform_install`).

*jms*

- **dataStoreSchema** name of the schema to use for the JMS datastore.

*platform* (prepopulated by setup)

- **platformKeystoreLocation** location of the repository keystore created at install time.
- **platformKeystorePassword** password of the repository keystore created at install time.
- **database.name** name of database select in setup.
- **database.driver** repository database driver class name.
- **database.host** host for the database server.
- **database.library** database library (iSeries only).
- **database.user** repository database user.
- **database.password** repository database password (may be encrypted).
- **database.url** repository database URL.
- **deploy.directory** repository *toDeploy* directory.

These configuration parameters are used as follows:

- **platformDeploy.py** creates a new cluster containing all the servers defined in the servers section. The configuration in the *platform* section will be used to create the repository datasource and deploy the repository applications to the cluster.
- **platformClean.py** is used to remove the components installed by the *platformDeploy.py* script.

### **platformDeploy.py**

The script is used to deploy repository components to a clustered WebSphere domain as configured in *config.ini*. Arguments include:

- **all** Deploy everything (default).
- **sharedLibrary** Deploy shared library only.
- **cluster** Deploy cluster, servers, and shared library.
- **servers** Deploy servers only.
- **virtualHosts** Update the virtual host aliases for the cluster.
- **components** Deploy datasource and JMS components.
- **datasource** Deploy datasource components only.
- **jms** Deploy JMS components only.
- **applications** Deploy repository applications.
- **patch** Deploy updated repository applications.

### **platformClean.py**

The script is used to undeploy repository components from a clustered WebSphere domain as configured in *config.ini*.

- **all** Undeploy everything (default).
- **sharedLibrary** Undeploy shared library only.
- **cluster** Undeploy cluster, servers, and shared library.
- **servers** Undeploy servers only.
- **components** Undeploy datasource and JMS components.
- **datasource** Undeploy datasource components only.
- **jms** Undeploy JMS components only.
- **applications** Undeploy repository applications.

*Note:* If you clean your JMS components you will also need to remove the database tables before you can recreate them. Delete the tables that start with SIB in the repository database. They will be recreated on server startup once you recreate your JMS components.

The executable scripts for running Jython scripts are located in the *<cluster install location>/scripts* directory. They include:

- **setEnv** Sets up the environment.
- **wsadmin** Executes a specified Jython script.
- **installNode** Installs the necessary repository components on the local file system.

### ***Scripted deployment***

1. Install the same version of WebSphere Network Deployment on each node in the cluster.
  - Setup a single WebSphere Deployment Manager. If you have patched WebSphere after you created the Deployment Manager profile, you may need to recreate the Deployment Manager profile in order for the *wsadmin* scripts to run correctly.
  - Federate all nodes in the cluster using the Deployment Manager.
2. Setup the repository install directory as a shared directory for each node in the cluster.
3. Update */bin/setEnv* to set the values for the following environment variables
  - **DM\_PROFILE\_HOME** Location of your WebSphere Deployment Manager profile
  - **WSADMIN\_LANG** Language of your scripts (leave the default of Jython)
  - **WSADMIN\_SECURITY** User name and password if administrative security is enabled
4. Update *config.ini* to set up your cluster configuration.
5. Run the script to deploy the repository components into a WebSphere cluster. The configuration is read from *config.ini*.
  - Open a command prompt to the *<cluster install location>/bin* directory.

- Execute `wsadmin -f ./scripts/platformDeploy.py`.
  - The following components are deployed: Shared library targeted to the cluster; JDBC datasource targeted to the cluster; JDBC persistent stores targeted to a single server; JMS server targeted to a single server; a JMS connection factory targeted to the cluster; several JMS queues; all repository applications (EARs, WARs, and RARs).
6. Start all nodes in the cluster using the administration console.

*Notes:*

- If the ports are manually changed for any server in the cluster, the corresponding changes must be made to the `default_host` virtual host aliases in order to ensure cluster communication functions correctly.
- If `platformDeploy.py` is unable to create shared library objects for the cluster (error code WASX7129E), use instructions in “Shared Library” section of Manual deployment to create a shared library manually and then rerun the script.

***Installing new packages and patches***

Any updates to the repository will be available in the updates directory. Updates include patches and new packages installed with IBM® SPSS® Collaboration and Deployment Services Package Manager. Each update will create a new timestamp directory. It will contain a `toDeploy` directory. To deploy the updates:

1. Modify the `update.deploy.directory` property in `config.ini` to point to the `toDeploy` directory inside the newly created timestamp directory.
2. Run the script to deploy the repository components to a WebSphere Cluster.
  - Open a command prompt to the `bin` directory.
  - Execute `wsadmin -f ./scripts/platformDeploy.py patch`.
  - All repository applications (EARs, WARs, and RARs) in the `updates` directory will be updated.

***Manual deployment***

These instructions provide advanced J2EE users with the information necessary to deploy IBM® SPSS® Collaboration and Deployment Services Repository into a WebSphere application server cluster. It is expected that the cluster has already been configured and is ready for deployment.

The instructions use the following path placeholders:

- **<platform\_install\_directory>** The root of the shared installation directory for the repository on a single dedicated node. This is the directory containing the `setup`, `platform`, and `components` folders.
- **<path\_to\_keystore\_directory>** The directory specified during install where the keystore was created.
- **<cluster\_deploy\_directory>** The directory specified during install where the cluster deploy files were placed. The default location for this directory is `<platform_install_directory>/cluster_deploy`.

- **<node\_local\_directory>** The root of the local repository directory on the server nodes in the cluster. This can be any directory but it is suggested that the paths are the same on all servers.
- **<ws\_cell>** WebSphere server cell name.
- **<new\_ear\_name>** The name of the EAR file that you will create by following these instructions.

### **Shared file system**

The root of the *<platform\_install\_directory>* must be shared across all nodes in the cluster. It is necessary for each node to have read access to this directory and its entire contents. If *<path\_to\_keystore\_directory>* is not *<platform\_install\_directory>* or one of its subfolders, *<path\_to\_keystore\_directory>* must also be shared across all nodes in the cluster. On Windows, when referencing these directories from remote nodes, it is recommended that UNC paths be used rather than mapped drives.

### **Shared library**

A shared library must be configured and scoped to the repository cluster. The classpath must contain the following entries:

- /QIBM/ProdData/OS400/jt400/lib/jt400Native.jar
- \${SPSSPLATFORM\_DIR}/setup/resources/websphere
- \${SPSSPLATFORM\_DIR}/platform/globalLibraries
- \${SPSSPLATFORM\_DIR}/setup/lib/DataDirectAdapter.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MFbase.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MFsqlserver.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MFdb2.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MForacle.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MFinformix.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MFsybase.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/MFutil.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/jt400.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/log4j.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/commons-logging.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/icu4j.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/security-global.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/search-global.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/spsslic.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/spsslic7-global.jar
- \${SPSSPLATFORM\_DIR}/setup/lib/userpref-global.jar
- \${SPSSPLATFORM\_DIR}/components/process/workunit/process-native.jar
- \${SPSSPLATFORM\_DIR}/components/process/workunit/JimiProClasses.jar

- `${SPSSPLATFORM_DIR}/components/process/workunit/nvizn.jar`
- `${SPSSPLATFORM_DIR}/components/process/workunit/visual_parse.jar`
- `${SPSSPLATFORM_DIR}/setup/lib/spsswebsphere.jar`

WebSphere variable `SPSSPLATFORM_DIR` must be set up for each node in the cluster and point to `<platform_install_directory>`. For each server in the cluster, a classloader needs to exist with the following settings:

- Classes loaded with parent class loader first.
- Contains a shared library reference to the library defined above.

### **Datasource**

A JAAS Authentication Data entry with an alias of `PlatformAuth` must be created with the appropriate database username and password. The JDBC datasource with the following parameters must be configured and targeted to the server cluster:

1. JNDI name for the datasource must be set to `jdbc/spss/PlatformDS`.
2. Authentication Data Alias must be set to `PlatformAuth`.
3. Minimum connections 20, maximum connections 100.
10. The Datasource Helper Classname must be set to `com.spss.setup.websphere.SPSSDataStoreHelper`.
11. The *ClassPath* must be set to `${SPSSPLATFORM_DIR}/setup/lib/jt400.jar`.
12. Implementation Class Name must be set to `com.ibm.websphere.rsadapter.DB2AS400DataStoreHelper`.
13. The following properties must be added to the datasource:
  - *serverName* must be set to the database host.
  - *libraries* must be set to the database library.

### **JMS**

The following JMS components must be configured.

1. Non-secured System Integration Bus.
  - It must be created as a *DataStore* with a data source reference of `jdbc/spss/PlatformDS`.
  - The Authentication Alias must be set to `PlatformAuth`.
  - The JMS Data Score Schema will also need to be set.
2. JMS connection factory with the JNDI name `ConnectionFactory`.
3. JMS topic connection factory with the JNDI name `TopicConnectionFactory`.
4. JMS topic `PASWMessageBusTopic` with the JNDI name `topic/PASWMessageBus` for use by the repository components.

5. JMS queue *PASWScoringQueue* with the JNDI name *queue/PASWScoring* for use by the scoring message driven bean *ScoringMDB*.
6. JMS queue *PASWLogQueue* with the JNDI name *queue/PASWLog* for use by the scoring component.
7. JMS queue *SPSSAuditQueue* with the JNDI name *queue/SPSSAudit* for use by the auditing message driven bean *AuditMDB*.
8. JMS queue *SPSSNotificationQueue* with the JNDI name *queue/SPSSNotification* for use by the notification component.
9. JMS queue *SPSSProcessQueue* with the JNDI name *queue/SPSSProcess* for use by the process component.
10. JMS activation specification *SPSSAuditActivationSpec*.
  - JNDI name of *spss/AuditMDBAS*.
  - Destination JNDI name of *queue/SPSSAudit*.
  - Destination type of Queue
11. JMS Activation Specification *SPSSProcessEventActivationSpec*.
  - JNDI name of *spss/ProcessEventMDBAS*.
  - Destination JNDI name of *queue/SPSSProcess*.
  - Destination type of Queue.
12. JMS Activation Specification *PASWScoringActivationSpec*.
  - JNDI name of *pasw/ScoringMDBAS*.
  - Destination JNDI name of *queue/PASWScoring*.
  - Destination type of Queue.
13. JMS Activation Specification *PASWScoringNotificationsSpec*.
  - JNDI name of *pasw/ScoringNotificationsMDBAS*.
  - Destination JNDI name of *topic/PASWMessageBus*.
  - Destination type of *TopicSpace*.
14. JMS Activation Specification *PASWScoreLogSpec*.
  - JNDI name of *pasw/ScoreLogMDBAS*.
  - Destination JNDI name of *queue/PASWLog*.
  - Destination type of Queue.
15. JMS Activation Specification *PASWDMSResponseLogSpec*.
  - JNDI name of *pasw/DMSResponseLogMDBAS*.
  - Destination JNDI name of *queue/PASWLog*.
  - Destination type of Queue.
16. JMS Activation Specification *PASWDMSSimulationLogSpec*.

- JNDI name of *pasw/DMSSimulationLogMDBAS*.
- Destination JNDI name of *queue/PASWLog*.
- Destination type of Queue.

*Note:* All activation specifications must have a maximum concurrency of 5.

### **JCA resource adapters**

Each resource adapter must be deployed to the cluster. In order to do this, they must first be deployed to a single node and then copied to the cluster scope using the *wsadmin* command *AdminTask.copyResourceAdapter*. A deep copy must be performed. The following settings must be used for the resource adapter:

1. Archive path *<platform\_install\_directory>/platform/resourceAdapters*.
2. Classpath:

*\${SPSSPLATFORM\_DIR}/platform/resourceAdapters/<name>.rar*

*\${SPSSPLATFORM\_DIR}/platform/globalLibraries/<global\_dependency>.jar* (if applicable)

3. Native path *\${SPSSPLATFORM\_DIR}/platform/resourceAdapters/<name>.rar*.

A *J2CConnectionFactory* must be created for use by the resource adapter. The JNDI name indicated by the resource adapter must be used for the connection factory. The specifics for configuring the various resource adapters can be found in the [RAR\_CONNECTION\_FACTORIES] section of the *<cluster\_deploy\_directory>/doc/environment\_<timestamp>.properties* files. It may also be necessary to add classpath and/or native path entries if indicated in the *<cluster\_deploy\_directory>/doc/environment\_<timestamp>.properties* files.

### **Application deployment**

All J2EE applications in the *<cluster\_deploy\_directory>/toDeploy* directory must be deployed to the cluster.

The workflow application will not be initialized by default in a cluster environment. In order to use the workflow component, the following system property must be set on a single server in the cluster: *-Dcom.spss.workflow.active.override=true*.

The workflow component must not be initialized on multiple servers in the cluster. All repository J2EE applications must be deployed using *PARENT LAST* classloading (not the default). *PARENT LAST* classloading must be used for both the deployment classloader as well as the web module class loader. If the applications are not deployed in this manner they will not run correctly.



### ***MDB deployment***

When deploying EAR files, several EJB JNDI Bindings must be defined. The following are the bindings for the various ear files:

#### ***auditmdb.ear***

- ▶ Binding name *SPSSauditMDB*.
  - Module name of *auditmdb*.
  - URI of *auditMDB.jar*, *META-INF/ejb-jar.xml*.
  - Activation specification of *spss/AuditMDBAS*.

#### ***process-ejb.ear***

- ▶ Binding name *ProcessEventMDB*.
  - Module name of *process-ejb*.
  - URI of *process-ejb.jar*, *META-INF/ejb-jar.xml*.
  - Activation specification of *spss/ProcessEventMDBAS*.

#### ***scoring-ejb.ear***

1. Binding name *ScoringMDB*.
  - Module name of *scoring-ejb*.
  - URI of *scoring-ejb.jar*, *META-INF/ejb-jar.xml*.
  - Activation specification of *pasw/ScoringMDBAS*.
2. Binding name *ScoringNotificationsMDB*.
  - Module name of *scoring-ejb*.
  - URI of *scoring-ejb.jar*, *META-INF/ejb-jar.xml*.
  - Activation specification of *pasw/ScoringNotificationsMDBAS*.
3. Binding name *ScoreLogMDB*.
  - Module name of *scoring-ejb*.
  - URI of *scoring-ejb.jar*, *META-INF/ejb-jar.xml*.
  - Activation specification of *pasw/ScoreLogMDBAS*.

#### ***pasw\_dms.ear***

1. Binding name *DMSResponseLogMDB*.
  - Module name of *pasw\_dms*.
  - URI of *PASWLoggingMdb.jar*, *META-INF/ejb-jar.xml*.
  - Activation specification of *pasw/DMSResponseLogMDBAS*.
2. Binding name *DMSSimulationLogMDB*.
  - Module name of *pasw\_dms*.

- URI of *PASWLoggingMdb.jar*, *META-INF/ejb-jar.xml*.
- Activation specification of *pasw/DMSSimulationLogMDBAS*.

### **Java system properties**

The following Java system properties must be set appropriately for each server in the cluster:

1. JVM memory arguments must be set appropriately (recommended 1024m minimum maximum heap size).
2. `-Dcom.spss.configsys.installBase.override=<platform_install_directory>`.
4. `-Dlog4j.configuration=<node_local_directory>/logging/log4j.xml`.
5. `-Dplatform.keystore.file=<path_to_keystore_directory>`.
6. `-Dplatform.keystore.password=<keystore_password>`.
  - A non-cleartext version of the keystore password can be found in the `<platform_install_directory>/platform/setupinfo.xml` file.
7. The *Java.library.path* must contain the following:
  - For each resource adapter deployed: `<path_to_domain>/<rar_name>/bin`.
  - Additional native libraries may be added to the *Java.library.path* if required.
8. Check [JAVA\_PROPERTIES] section in all `<cluster_deploy_directory>/doc/environment_<timestamp>.properties` files for additional properties required by the resource adapters

### **Environment variables**

The path environment variable must be set for the Node Manager process on each machine in the cluster. Select the correct variable name for your environment (LD\_LIBRARY\_PATH, SHLIB\_PATH, LIB\_PATH, PATH). Check [INCLUDE\_PATHS] section in all `<platform_install_directory>/cluster_deploy/doc/environment_<timestamp>.properties` files for additional paths required by the resource adapters.

### **Virtual hosts**

There must be virtual host aliases created for the default hosts for each server in the cluster. There must be an alias setup for each *WC\_defaulthost* endpoint and *WC\_defaulthost\_secure* endpoint for all servers in the cluster. If these are not configured the cluster communication will not function properly.

### **Installing new packages and patches**

Any updates to the repository will be available in the `<cluster_deploy_directory>/updates` directory. Updates include patches and new packages installed with IBM® SPSS® Collaboration and Deployment Services Package Manager. Each update will create a new timestamp directory. It will contain *toDeploy* directory. The applications in

the *toDeploy* directory must be deployed to the application server. Check for a new `<cluster_deploy_directory>/doc/environment_<timestamp>.properties` file as there may be amended or additional Java properties or system paths that need to be set or removed.

## **Load balancer configuration**

A software- or hardware-based load balancer must be configured for accessing the repository in a clustered environment.

### **IBM HTTP server for WebSphere application server**

IBM HTTP server can be configured to act as a load balancer.

The configuration includes the following steps:

1. Install IBM HTTP Server. For more information, see WebSphere documentation. It can be accessed online at <http://publib.boulder.ibm.com/infocenter/wasinfo/v6r0/index.jsp>
2. Use the administration console to create a Web server object.
3. Use the administration console to generate a plugin descriptor and propagate it to IBM HTTP Server.
4. Start IBM HTTP Server.

## **Job step failover**

IBM® SPSS® Collaboration and Deployment Services Repository 4.2 supports rerunning of failed job steps only in clustered WebSphere environments. To ensure that in cases of a cluster node failure a job step will be processed by other nodes, the cluster must be configured for JMS failover. There are several ways to enable JMS failover.

### **Setting JMS message reliability level to "Assured Persistent"**

1. In WebSphere Administration Console, open  
Resources > JMS > Queue Connection factory > PlatformJMSConnection
2. From the ConnectionFactory, change the Quality of Service to "Assured Persistent."
3. Save the configuration. You may need to restart each node in the cluster. With this change all JMS queue messages will be guaranteed delivery. The drawback of this method is that it is very resource-intensive.

### **Setting ConnectionFactory as bus destination**

1. In WebSphere Administration Console, open  
Resources > JMS > Queue Connection factory > PlatformJMSConnection
2. From the ConnectionFactory, change the Quality of Service to "As Bus Destination."

3. Save the configuration.
4. In WebSphere Administration Console, open  
Service Integration > Buses > Platform Bus > Destinations > SPSSProcessQueue\_Bus
5. Uncheck the “Enable producers to override default reliability.” The bus destination will ensure each message is “Assured Persistent” and guaranteed delivery and processing.

### ***Workload balancing***

By default, WebSphere does not do workload balancing of the JMS messages. Repository configuration creates a single shared JMS engine for the cluster, and the entire messaging engine will failover to another node in the cluster. It is possible to configure the cluster running the repository for workload balancing by using additional JMS engines. For more information, see WebSphere documentation.

# Single EAR file deployment

IBM® SPSS® Collaboration and Deployment Services Repository consist of many individual J2EE applications deployed as WAR files. To simplify the management in clustered application server environments running many other J2EE applications, repository applications can be combined in single EAR (Enterprise Archive) file. This chapter provides the instructions for creating such a file for deployment into WebSphere . In order to successfully complete these instructions, you must understand the JAR specification, how it is applied to enterprise archives, as well as understand how to manually deploy archives into J2EE servers.

## WebSphere

These instructions are for creating a single EAR file of all repository WAR files for deployment into a WebSphere server cluster. Note that due to issues with WebSphere class loading, the resulting EAR file will not include such components as RAR files and EJB modules

The instructions use the following path placeholders:

**<platform\_install\_directory>** The root of the shared installation directory for the repository on a single dedicated node. The directory contains the *setup*, *platform*, and *components* folders.

**<path\_to\_keystore\_directory>** The directory specified during install where the keystore was created.

**<cluster\_deploy\_directory>** The directory specified during install where the cluster deploy files were placed. The default location for this directory is *<platform\_install\_directory>/cluster\_deploy*.

**<node\_local\_directory>** The root of the local repository directory on the server nodes in the cluster. This can be any directory but it is suggested that the paths are the same on all servers.

**<ws\_cell>** WebSphere server cell name.

**<new\_ear\_name>** The name of the EAR file that you will create by following these instructions.

The instructions assume that the repository has already been installed into a WebSphere cluster. For more information, see the topic [Clustering](#) in Chapter 6 on p. 31. If you are installing into a “clean” WebSphere cluster (i.e., a cluster with no existing applications), then you may want to consider using the scripted install which will install all of the necessary components automatically. For more information, see the topic [Scripted deployment](#) in Chapter 6 on p. 33. Since a scripted install deploys all applications by default, you will either need to remove the WAR files that it installs after the script completes or remove the WAR files from the *<cluster\_deploy\_directory>/toDeploy* directory prior to running the scripted install.

If you have a WebSphere cluster that is not “clean” (i.e., you have existing applications installed) or you prefer to do the installation yourself, you should install using the manual deployment instructions. For more information, see the topic [Manual deployment](#) in Chapter 6 on p. 36.

To deploy the repository into a WebSphere cluster as a single EAR file, follow these general steps:

1. Create the archive directory structure.
2. Create *application.xml*.
3. Create the EAR file.
4. Deploy the EAR.
5. Deploy other modules (optional).

Detailed information for these steps is provided below.

### ***EAR directory structure***

An EAR file is a compressed archive that follows the conventions of the JAR specification. In order to create a single EAR, you must create a directory structure containing repository components, and compress these directories into a single archive. Several items are located at the root of the directory structure, such as the META-INF folder and WAR files.

- The META-INF folder will contain a manifest and deployment descriptors (more on the details of this later).
- The WAR files can simply be placed into the root of the directory structure.

Note that you will find the required WAR files in the `<cluster_deploy_directory>/toDeploy` directory.

The directory structure of the EAR file must be as follows:

```
\_ META-INF
  \_ application.xml
  \_ MANIFEST.MF
\_ admin.war
\_ birt-viewer.war
\_ clientinstall.war
\_ config.war
\_ cr-ws.war
\_ cr_web.war
\_ er-extension.war
\_ groupman.war
\_ jmxhttp.war
\_ langman.war
\_ notification.war
\_ IBMSPSSTagLib.war
\_ peb-job.war
\_ peb-mmd.war
\_ peb-scoring.war
\_ peb.war
\_ pem.war
\_ pev.war
\_ process.war
\_ processui.war
```

```
\_ reporting-ws.war
\_ root.war
\_ scoring.war
\_ search-ws.war
\_ security-ws.war
\_ security.war
\_ spsscop-ws.war
\_ userpref-ws.war
```

## ***application.xml***

Next, *application.xml* file must be created. The file lets the application server know what modules are available and provides configuration information about each module. Module entries will instruct the application server where to find the module within our EAR, so you will have to create an entry in the *application.xml* file for each of these modules. Just keep in mind that the `<context-root>` element is the name of the WAR file, but without the extension. So for example, the `<context-root>` element for *admin.war* becomes `admin`.

Below is an example *application.xml* file that you can use as a starting point. Please bear in mind that you should verify that all entries are in place, because this example file only covers the basic modules that ship with the repository. Note that it covers only the modules that ship with IBM® SPSS® Collaboration and Deployment Services Repository 4.2 and does not include the modules that are not included in the distribution, for example, IBM® SPSS® Modeler scoring provider.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE application PUBLIC "-//Sun Microsystems, Inc.//DTD J2EE Application 1.3//EN"
    "http://java.sun.com/dtd/application_1_3.dtd">
<application>
  <display-name>CDS EAR</display-name>
  <description>CDS Application</description>

  <!--core -->
  <module>
    <web>
      <web-uri>admin.war</web-uri>
      <context-root>admin</context-root>
    </web>
  </module>

  <module>
    <web>
      <web-uri>birt-viewer.war</web-uri>
      <context-root>birt-viewer</context-root>
    </web>
  </module>

  <module>
    <web>
      <web-uri>clientinstall.war</web-uri>
      <context-root>clientinstall</context-root>
    </web>
  </module>
```

```
</web>
</module>

<module>
  <web>
    <web-uri>config.war</web-uri>
    <context-root>config</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>cr-ws.war</web-uri>
    <context-root>cr-ws</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>cr_web.war</web-uri>
    <context-root>cr_web</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>er-extension.war</web-uri>
    <context-root>er-extension</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>groupman.war</web-uri>
    <context-root>groupman</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>jmxhttp.war</web-uri>
    <context-root>jmxhttp</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>langman.war</web-uri>
    <context-root>langman</context-root>
  </web>
</module>
```



```
<module>
  <web>
    <web-uri>notification.war</web-uri>
    <context-root>notification</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>IBMSPSSTagLib.war</web-uri>
    <context-root>IBMSPSSTagLib</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>peb.war</web-uri>
    <context-root>peb</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>peb-job.war</web-uri>
    <context-root>peb-job</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>peb-mmd.war</web-uri>
    <context-root>peb-mmd</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>pem.war</web-uri>
    <context-root>pem</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>pev.war</web-uri>
    <context-root>pev</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>processui.war</web-uri>
```

```
    <context-root>processui</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>reporting-ws.war</web-uri>
    <context-root>reporting-ws</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>root.war</web-uri>
    <context-root>root</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>search-ws.war</web-uri>
    <context-root>search-ws</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>security.war</web-uri>
    <context-root>security</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>security-ws.war</web-uri>
    <context-root>security-ws</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>spsscop-ws.war</web-uri>
    <context-root>spsscop-ws</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>userpref-ws.war</web-uri>
    <context-root>userpref-ws</context-root>
  </web>
</module>
```

```
<!--scoring -->
<module>
  <web>
    <web-uri>scoring.war</web-uri>
    <context-root>scoring</context-root>
  </web>
</module>

<module>
  <web>
    <web-uri>peb-scoring.war</web-uri>
    <context-root>peb-scoring</context-root>
  </web>
</module>

<!--process -->
<module>
  <web>
    <web-uri>process.war</web-uri>
    <context-root>process</context-root>
  </web>
</module>

</application>
```

## Deploying the EAR File

Once the single EAR file is ready, you can use the WebSphere console to deploy it. You must also complete additional configuration steps as described below. Note that these instructions cover only the modules that ship with IBM® SPSS® Collaboration and Deployment Services Repository 4.2 and additional configuration may be required for any other modules.

- The shared library must be added to the new single EAR application, as well as any other modules (such as RAR and EJB modules). For more information, see the topic [Deploying other modules \(Optional\)](#) on p. 52.
- All repository J2EE applications should be deployed using *Parent Last* classloading (this is not the default). *Parent Last* classloading should be used for both the deployment classloader as well as the web module class loader. If the applications are not deployed in this manner they will fail to run correctly. In WebSphere Web console, click Manage Modules for the new application and set all WAR files to use *Application First* class loading.
- You should restart your application server after everything has been configured to ensure the native libraries are loaded correctly.

### **Deployment Problems**

- ▶ You may encounter out of memory errors when deploying the EAR file. The problem may be corrected by increasing the values of max heap size (-Xmx) and the max perm size (MaxPermSize) parameters in `<WebSphere_root>/deploytool/itp/ejbdeploy.sh`.
- ▶ You may also encounter out of memory errors in WebSphere Deployment Manager after deploying the EAR file.
  - In the Administrative Console, open System Administration > Deployment Manager > Process Definition > Java Virtual Machine
  - Specify 256 for Initial Heap Size and 1500 for Maximum Heap Size.
  - Save your changes and restart the Deployment Manager.

### **Deploying other modules (Optional)**

This section provides additional information for deploying EJB and RAR modules not found in the manual install instructions. If you successfully completed a scripted installation, these modules will be already installed.

#### **EJB Deployment**

When manually deploying the preexisting EAR files, several EJB JNDI Bindings will need to be defined. The bindings are as follows:

Binding Name	Module	Activation Specification
ScoringMDB	scoring-ejb	pasw/ScoringMDBAS
ScoringNotificationsMDB	scoring-ejb	pasw/ScoringNotificationsMDBAS
ScoreLogMDB	scoring-ejb	pasw/ScoreLogMDBAS
SPSSauditMDB	auditmdb	spss/AuditMDBAS
ProcessEventMDB	process-ejb	spss/ProcessEventMDBAS

Enter the JNDI name for non-MDB bean. These values should be set to the name found in the EJB column. The same value must be used for mapping EJB references to beans. For example:

- ScoringTimerSessionBean
- CalendarMonitorTimedObject
- MessageMonitorTimedObject

#### **JCA resource adapters**

One or more resource adapters will be deployed to the repository application server cluster. In order to do this, they must first be deployed to a single node and then copied to the cluster scope using the `wsadmin` command `AdminTask.copyResourceAdapter`. A deep copy should be performed. The following settings should be used for the resource adapter:

- ▶ Archive Path: `<platform_install_directory>/platform/resourceAdapters`

- ▶ Classpath:
  - `${SPSSPLATFORM_DIR}/platform/resourceAdapters/<name>.rar`
  - `${SPSSPLATFORM_DIR}/platform/globalLibraries/<global_dependency>.jar` (if applicable)

- ▶ Native Path:
  - `${SPSSPLATFORM_DIR}/platform/resourceAdapters/<name>.rar`

Example JCA Resource Adapter Settings for SPSS Smart Score:

- Archive Path
- Class Path

```

${SPSSPLATFORM_DIR}/platform/resourceAdapters/smartscore.rar
${SPSSPLATFORM_DIR}/platform/globalLibraries/smartscore-client.jar
${SPSSPLATFORM_DIR}/platform/globalLibraries/smartscorej-client.jar

```

- Native path (this has no value initially)

```

${SPSSPLATFORM_DIR}/platform/resourceAdapters/smartscore.rar

```

### ***J2C connection factory***

A J2CConnectionFactory should be created for use by the resource adapter. The JNDI name indicated by the resource adapter should be used for the connection factory. The specifics for configuring the resource adapters can be found in the [RAR\_CONNECTION\_FACTORIES] section of the `<cluster_deploy_directory>/doc/environment_<timestamp>.properties` files. It may also be necessary to add Class Path and/or Native Path entries if they are specified in the `<cluster_deploy_directory>/doc/environment_<timestamp>.properties` files.

Example J2C Connection Factory Settings

When you deploy the JCA Resource Adapters, the J2C connection factory is automatically created, but it contains incorrect information. Using the Smart Score JCA Resource Adapter as an example, you should change:

```

name = com.spss.smartscore.ra.SmartScoreConnectionFactory to name =
SmartScoreConnectionFactory

```

```

JNDI name = eis/com.spss.smartscore.ra.SmartScoreConnectionFactory to JNDI name =
SmartScoreConnectionFactory

```

### ***SPSSSharedLibrary settings***

- ▶ classpath
 

```

${SPSSPLATFORM_DIR}/setup/resources/websphere
${SPSSPLATFORM_DIR}/setup/lib/DataDirectAdapter.jar
${SPSSPLATFORM_DIR}/setup/lib/MFsqlserver.jar
${SPSSPLATFORM_DIR}/setup/lib/MFdb2.jar
${SPSSPLATFORM_DIR}/setup/lib/MForacle.jar
${SPSSPLATFORM_DIR}/setup/lib/MFmysql.jar
${SPSSPLATFORM_DIR}/setup/lib/MFinformix.jar

```

```

${SPSSPLATFORM_DIR}/setup/lib/MFsybase.jar
${SPSSPLATFORM_DIR}/setup/lib/jt400.jar
${SPSSPLATFORM_DIR}/setup/lib/log4j.jar
${SPSSPLATFORM_DIR}/setup/lib/commons-logging.jar
${SPSSPLATFORM_DIR}/setup/lib/icu4j.jar
${SPSSPLATFORM_DIR}/setup/lib/security-global.jar
${SPSSPLATFORM_DIR}/setup/lib/search-global.jar
${SPSSPLATFORM_DIR}/setup/lib/spsslic.jar
${SPSSPLATFORM_DIR}/setup/lib/spsslic7-global.jar
${SPSSPLATFORM_DIR}/setup/lib/userpref-global.jar
${SPSSPLATFORM_DIR}/components/process/workunit/process-native.jar
${SPSSPLATFORM_DIR}/setup/lib/spsswebsphere.jar
${SPSSPLATFORM_DIR}/platform/globalLibraries/XFjc.jar
${SPSSPLATFORM_DIR}/platform/globalLibraries/XFssl14.jar
${SPSSPLATFORM_DIR}/platform/globalLibraries/smartscore-client.jar
${SPSSPLATFORM_DIR}/platform/globalLibraries/smartscorej-client.jar

```

A WebSphere variable (SPSSPLATFORM\_DIR) should be set up for each node in the cluster and point to `<platform_install_directory>`.

► Native Path

```

${SPSSPLATFORM_DIR}/components/setup/jni/windows
$(APP_INSTALL_ROOT)/<ws_cell>/<new_ear_name>/smartscore.rar
${SPSSPLATFORM_DIR}/components/smartscore/win32

```

## ***Installing new packages and patches***

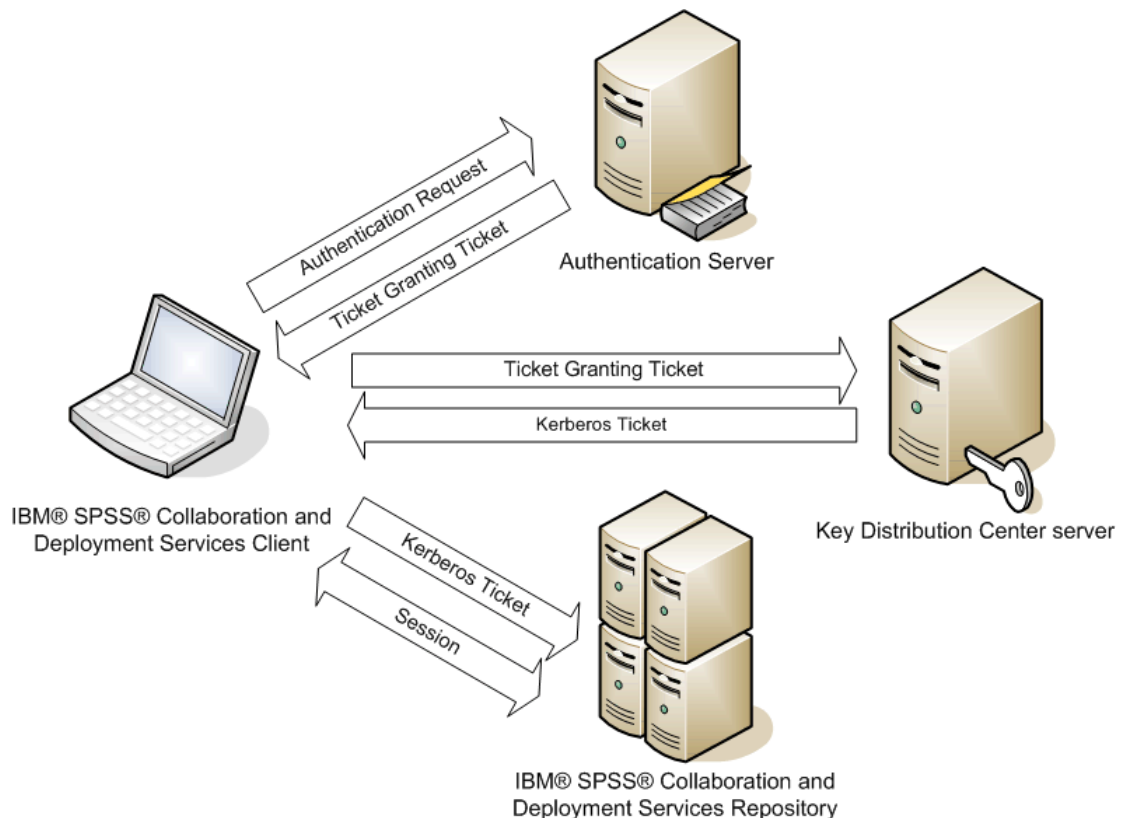
Any updates to the repository will be available in the `<cluster_deploy_directory>/updates` directory. Updates include patches and installing new packages with IBM® SPSS® Collaboration and Deployment Services Package Manager. Each update will create a new timestamp directory. It will contain a `toDeploy` directory. The applications in the `toDeploy` directory should be deployed to the application server. Check to see if there is a new `<cluster_deploy_directory>/doc/environment_<timestamp>.properties` file as there may be amended or additional Java properties or system paths that need to be set or removed.

# Single sign-on

Single sign-on (SSO) is a method of access control that enables a user to log in once and gain access to the resources of multiple software systems without being prompted to log in again. IBM® SPSS® Collaboration and Deployment Services provides single sign-on capability by initially authenticating users through an external directory service based on the **Kerberos** security protocol, and subsequently using the credentials in all IBM SPSS Collaboration and Deployment Services applications (for example, IBM® SPSS® Collaboration and Deployment Services Deployment Manager, IBM® SPSS® Collaboration and Deployment Services Deployment Portal, or a portal server) without additional authentication.

*Note:* Single sign-on is not allowed for browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager.

Figure 8-1  
IBM SPSS Collaboration and Deployment Services SSO architecture



For example, if IBM SPSS Collaboration and Deployment Services is used in conjunction with Windows Active directory, you must configure the **Kerberos Key Distribution Center (KDC)** service to enable single sign-on. The service will supply session tickets and temporary session

keys to users and computers within an Active Directory domain. The KDC must run on each domain controller as part of Active Directory Domain Services (AD DS). When single sign-on is enabled, IBM SPSS Collaboration and Deployment Services applications log into a Kerberos domain and use Kerberos tokens for web services authentication. If single sign-on is enabled, it is strongly recommended that SSL communication be configured for the repository.

Desktop client applications such as Deployment Manager and BIRT Report Designer for IBM® SPSS®, create a Java subject and then establishes a GSS session with the repository using the subject context. The repository returns a Kerberos service ticket to the client when the GSS context is established. Thin client applications, such as Deployment Portal, also obtains a Kerberos service ticket from the repository. However, thin clients first perform HTTP-based cross-platform authentication via the Negotiate Protocol. Both desktop and thin client applications require that you first log on to a Kerberos domain, for example, to your Microsoft Active Directory/Windows domain.

Single sign-on configuration in IBM SPSS Collaboration and Deployment Services includes the following steps:

- ▶ Directory system setup.
- ▶ Configuring the directory system as an IBM SPSS Collaboration and Deployment Services *security provider* using the Server Administration tab of Deployment Manager. For more information, see IBM SPSS Collaboration and Deployment Services administrator documentation.
- ▶ Kerberos Key Distribution Center server configuration. Credential delegation must be enabled for the Kerberos Service Principal on the Kerberos Key Distribution Center server. The procedure for enabling credential delegation will be different depending on your directory server and Kerberos environment.
- ▶ Configuring Kerberos Key Distribution Center server as an IBM SPSS Collaboration and Deployment Services *single sign-on provider* using the Server Administration tab of Deployment Manager. For more information, see IBM SPSS Collaboration and Deployment Services administrator documentation.
- ▶ Enabling Kerberos credential delegation on all client systems.
- ▶ Configuring the application server for single sign-on.
- ▶ For Windows client systems, the registry must be updated for Kerberos LSA access.
- ▶ Depending on the database used with the repository, the database may need to be configured for single sign-on.
- ▶ Depending on the application server used with the repository, it may be necessary to update the application server configuration.
- ▶ Windows client systems must have HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Control\Lsa\Kerberos\ registry value updated. For more information, [Updating Windows registry for single sign-on](#)
- ▶ For thin-client access to the repository (for example, with Deployment Portal), the Web browser must have Simple and Protected GSS-API Negotiation (SPNEGO) enabled.



## ***Directory configuration for single sign-on***

IBM® SPSS® Collaboration and Deployment Services single sign-on requires an external directory to be set up. Directory authentication for IBM SPSS Collaboration and Deployment Services single sign-on can be based on the following directory systems:

- IBM i profile directory

### ***IBM i***

To use IBM i as a security provider with Kerberos single sign-on, you must configure EIM (Enterprise Identity Management) on the IBM i system. Security provider configuration includes the following steps:

1. Using System i Navigator, configure an EIM domain and make sure the domain controller is running.
2. Connect to the domain.
3. Establish user identity mapping for each IBM® SPSS® Collaboration and Deployment Services user in the EIM domain registry by associating each EIM entry with a target IBM i profile and source Kerberos user.
4. Configure IBM i security provider to use EIM with IBM® SPSS® Collaboration and Deployment Services Deployment Manager.
5. Assign user roles with Deployment Manager.

## ***Kerberos server configuration***

In Microsoft Windows environment, using the Active Directory Server with Windows (integrated) Kerberos Server is recommended. You must update all client machines' registry for Kerberos LSA access. You must also make specific changes to the browsers to use Kerberos. For non-Microsoft-Windows Kerberos servers, you may need to install additional software both on your repository host machine as well as on each client machines. In all cases, Kerberos service principal must be set to delegate credential. You must also make specific changes to each client machines for credential delegation.

## ***Application server configuration for single sign-on***

### ***WebSphere***

IBM® SPSS® Collaboration and Deployment Services configuration for single sign-on in WebSphere 6.1 and 7 includes the following steps:

- Defining Kerberos keytab.
- Defining JAAS-JGSS policy.

**Defining Kerberos keytab**

- ▶ In the WebSphere administration console, choose:  
Servers > Application Servers > <Server Name> > Server Infrastructure > Process Definition > Java Virtual Machine > Custom Properties
- ▶ Add custom property *KRB5\_KTNAME* with the value of the value of */QIBM/UserData/OS400/NetworkAuthentication/keytab/krb5.keytab*.

**Defining JAAS-JGSS policy**

- ▶ In the WebSphere administration console, choose:  
Security > Secure Administration, application and infrastructure > Java Authentication and Authorization Service > Applications logins
- ▶ Define a property *JGSSServer*.
- ▶ In Additional Properties for *JGSSServer*, define the module class *com.ibm.security.auth.module.Krb5LoginModule* with authentication strategy **REQUIRED**.
- ▶ Define the following custom properties for *com.ibm.security.auth.module.Krb5LoginModule*.

Property name	Value
credType	both
principal	<principal name>, for example, <i>HTTP/cdserver.spss.com@SPSS.COM</i>
useDefaultKey	true

**Updating Windows registry for single sign-on**

IBM® SPSS® Collaboration and Deployment Services installation Disk 1 includes registry update files for configuring Windows XP SP2, Windows Vista, and Windows 2003 systems for Kerberos-based single sign-on. The files are as follows:

- */Server/Kerberos/Win2003\_Kerberos.reg*
- */Server/Kerberos/WinXPSP2\_Kerberos.reg*

For Windows Vista systems, use the *Win2003\_Kerberos.reg* file.

The registry files allow the system administrator to push registry changes to all systems on the network that must have single sign-on access to the repository.

**Configuring Browsers for Single Sign-on**

In order to enable single sign-on for IBM® SPSS® Collaboration and Deployment Services Deployment Portal and other thin clients of IBM® SPSS® Collaboration and Deployment Services, you must configure your Web browser to support Simple and Protected GSS-API Negotiation (SPNEGO) protocol.

**Microsoft Internet Explorer**

For information on configuring Microsoft Internet Explorer to support SPNEGO, see <http://msdn.microsoft.com/en-us/library/ms995329.aspx>.

**Mozilla Firefox**

SPNEGO support for Firefox is turned off by default. To enable it:

1. Go to the *about:config* URL (Firefox configuration file editor).
2. Change `network.negotiate-auth.trusted-uris` parameter value to include the local intranet domain name. The value of `network.negotiate-auth.using-native-gsslib` parameter must be set to `true`.

**Safari**

Single sign-on is not supported for Safari.

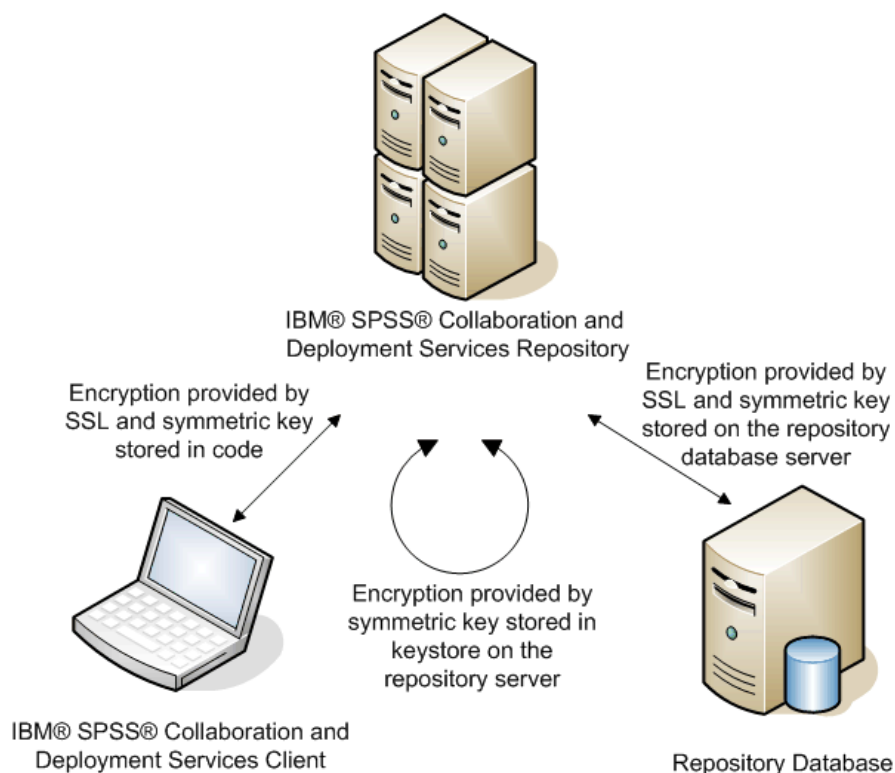
## ***FIPS 140–2 compliance***

The Federal Information Processing Standard (FIPS) Publication 140-2, FIPS PUB 140-2, is a U.S. government computer security standard used to accredit cryptographic modules. The document specifies the requirements for cryptography modules which include both hardware and software components, corresponding to four different levels of security that are mandated for organization that do business with the U.S. government. IBM® SPSS® Collaboration and Deployment Services can be configured to provide Security Level 1 as specified by FIPS 140-2.

Security configuration for FIPS 140-2-compliance must follow these guidelines:

- Communications between the repository and client applications must use SSL for transport layer security of general data transfers. Additional AES encryption is provided for credential passwords using a shared key stored in the application code. For more information, see the topic [Using SSL to secure data transfer](#) in Chapter 10 on p. 63.
- The repository server uses AES algorithm with the key stored in a keystore on the server file system to encrypt passwords in the configuration files, application server configuration files, security provider configuration files, etc.
- Communications between the repository server and the database server can optionally use SSL for transport layer security for general data transfer. AES encryption is provided for credential passwords, configuration passwords, user preference passwords, etc. using a shared key stored in a keystore on the database server file system.

Figure 9-1  
IBM SPSS Collaboration and Deployment Services FIPS 140-2-compliant security setup



## Repository configuration

The repository configuration for FIPS 140-2-compliance must follow these guidelines:

- The database must be set up to accept SSL communications; the JCE encryption module must also be configured.
- If the repository is installed on UNIX, the default JRE must be set up with a JCE module.
- The application server JRE must also be set up with a JCE module.
- The application server must be configured to accept SSL communications; a JCE module must also be configured.
- If the repository is installed on Windows, you must exit the installation at setup screen, configure a JCE module, then restart the setup and select to run in FIPS 140-2-compliant mode on the appropriate screen. For more information about the installation wizard, see [Installing the repository on p. 15](#)
- If the repository is deployed into a clustered environment, keystore must be replicated to all nodes in the cluster.
- The JREs that are being used by IBM Corp. server applications interacting with IBM® SPSS® Collaboration and Deployment Services, such as IBM® SPSS® Statistics Server and IBM® SPSS® Modeler Server, must have SSL certificates installed.

## ***Desktop client configuration***

For IBM® SPSS® Collaboration and Deployment Services desktop client applications, such as IBM® SPSS® Collaboration and Deployment Services Deployment Manager, JCE encryption module must be enabled for the JRE used to run the applications. The JRE must have SSL certificates installed.

## ***Browser configuration***

- Mozilla Firefox can be configured to run in FIPS 140-2 compliant mode by modifying the application options. For more information, see <http://support.mozilla.com/en-US/kb/Configuring+Firefox+for+FIPS+140-2>.
- Internet Explorer configuration requires enabling Windows cryptography and modifying the browser settings. For more information, see <http://support.microsoft.com/kb/811833>.
- Apple Safari cannot be used in FIPS 140-2 compliant mode.

---

## ***Using SSL to secure data transfer***

Security Sockets Layer (SSL) is a protocol for encrypting data transferred between two computers. SSL ensures that communication between the computers is secure. SSL can encrypt the authentication of a username/password and the contents of an exchange between a server and client.

### ***How SSL works***

SSL relies on the server's public and private keys, in addition to a public key certificate that binds the server's identity to its public key.

- ▶ When a client connects to a server, the client authenticates the server with the public key certificate.
- ▶ The client then generates a random number, encrypts the number with the server's public key, and sends the encrypted message back to the server.
- ▶ The server decrypts the random number with its private key.
- ▶ From the random number, both the server and client create the session keys used for encrypting and decrypting subsequent information.

The public key certificate is typically signed by a certificate authority. Certificate authorities, such as VeriSign and Thawte, are organizations that issue, authenticate, and manage security credentials contained in the public key certificates. Essentially, the certificate authority confirms the identity of the server. The certificate authority usually charges a monetary fee for a certificate, but self-signed certificates can also be generated.

### ***Securing client-server and server-server communications with SSL***

The main steps in securing client-server and server-server communications with SSL are:

- ▶ Obtain and install the SSL certificate and keys.
- ▶ If desired, install unlimited strength encryption on the client computers.
- ▶ If using a self-signed certificate, copy the certificate on the client computer.
- ▶ Instruct end users to enable SSL when connecting to the server.

*Note:* Occasionally a server product acts as a client. An example is IBM® SPSS® Statistics Server connecting to the IBM® SPSS® Collaboration and Deployment Services Repository. In this case, SPSS Statistics Server is the *client*.

### ***Obtaining and installing SSL certificate and keys***

- ▶ Obtain an SSL certificate and key file. There are two ways you can do this:
  - Purchase them from a public certificate authority (such as VeriSign or Thawte). The public certificate authority signs the certificate to verify the server that uses it.
  - Generate the key and certificate files with an internal self-signed certificate authority. OpenSSL provides a certificate management tool for this purpose.
- ▶ Install the SSL certificate and keys on the application server. For additional information on how the keys and certificate interoperate with a specific application server, see the original vendor's documentation. Note that you may be required to add the certificate and keys to the Java keystore.

### ***Installing unlimited strength encryption***

The Java Runtime Environment shipped with the product has US export-strength encryption enabled. For enhanced security of your data, we recommend that this is upgraded to unlimited-strength encryption.

- ▶ Download the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files 5.0 from <http://java.sun.com/javase/downloads/index.jsp>.
- ▶ Unzip the downloaded file.
- ▶ Copy the two *.jar* files *local\_policy.jar* and *US\_export\_policy.jar* into *<installation folder>/jre/lib/security*, where *<installation folder>* is the folder in which you installed the product.

### ***Copying the certificate file to client computers***

*Note:* Skip this step if you are using a certificate that is signed by a certificate authority.

If you are using a self-signed certificate, you need to copy the certificate to the *client* computers. Be aware that a server computer may also act as a client. An example is IBM® SPSS® Statistics Server connecting to the IBM® SPSS® Collaboration and Deployment Services Repository. In this case, SPSS Statistics Server is the *client*, and therefore you need to copy the certificate for the IBM SPSS Collaboration and Deployment Services Repository server to the SPSS Statistics Server.

- ▶ Copy *root.pem* to the following location on the client computers. By default, all IBM Corp. client products look in this location for trusted self-signed certificate files. If you would like to use another location, create an `SSL_CERT_DIR` environment variable and set the value of the variable to the location.

**Windows.** *C:\Documents and Settings\All Users\Application Data\SPSSInc\certificates*

If you already copied a *root.pem* file to the client for another IBM Corp. product, append the certificate information from the new server to the existing *root.pem* file. This file is a text file so you can copy and paste the certificate.



## ***Adding the certificate to client keystore (for connections to the repository)***

*Note:* Skip this step if you are using a certificate that is signed by a certificate authority.

If you are using SSL to connect to the repository and you are using self-signed certificates, you need to add the certificate to the client's Java keystore. The following steps are completed on the client computer.

- ▶ Open a command prompt and change directories to the following location, where *<product install dir>* is the directory in which you installed the product:

```
<product install dir>/jre/bin
```

- ▶ Enter the following command:

```
keytool -import -alias <alias name> -file <path to cert> -keystore <path to key store>
```

Where *<alias name>* is an arbitrary alias for the certificate, *<path to cert>* is the full path to the certificate, and *<path to key store>* is the full path to the Java keystore, which may be *<product install dir>/lib/security/jssecacerts* or *<product install dir>/lib/security/cacerts*.

- ▶ When prompted, enter the keystore password, which is `changeit` by default.
- ▶ When prompted about trusting the certificate, enter `yes`.

## ***Instructing end users to enable SSL***

When end users connect to the server through a client product, they need to enable SSL in the dialog box for connecting to the server. Be sure to tell your users to select the appropriate check box.

## ***URL prefix configuration***

If IBM® SPSS® Collaboration and Deployment Services Repository is set up for SSL access, the value of the URL Prefix configuration setting must be modified as follows:

1. Log into the repository using browser-based console.
2. Open *URL Prefix* configuration option.  
Configuration > Setup > URL Prefix
3. Set the value of the prefix to `https` instead of `http` and set the port value to the SSL port number.  
For example:

```
[default]  
http://<hostname>:<port>  
[SSL-enabled]  
https://<hostname>:<SSLport>
```

## **Securing LDAP with SSL**

Lightweight Directory Access Protocol (LDAP) is an Internet Engineering Task Force (IETF) standard for exchanging information between network directories and databases containing any level of information. For systems requiring additional security, LDAP providers, such as Microsoft's Active Directory, can operate over Secure Socket Layer (SSL), provided that the Web or application server supports LDAP over SSL. Using SSL in conjunction with LDAP can ensure that login passwords, application information, and other sensitive data are not hijacked, compromised, or stolen.

The following example illustrates how to enable LDAPS using Microsoft's Active Directory as a security provider. For more specific information on any of the steps or to find details that address a particular release of the security provider, see the original vendor documentation.

1. Verify that Active Directory and the Enterprise Certificate Authority are installed and functioning.
2. Use the certificate authority to generate a certificate, and import the certificate into the certificate store of the IBM® SPSS® Collaboration and Deployment Services Deployment Manager installation. This allows the LDAPS connection to be established between the IBM® SPSS® Collaboration and Deployment Services Repository and an Active Directory server.

To configure Deployment Manager for secure Active Directory connections, verify that a connection exists to the repository.

3. Launch the IBM® SPSS® Collaboration and Deployment Services Deployment Manager.
4. From the Tools menu, choose Server Administration.
5. Log in to a previously defined administered server.
6. Double-click the Configuration icon for the server to expand the hierarchy.
7. Double-click the Security Providers icon to expand the hierarchy.
8. Double-click the Active Directory security provider.
9. Enter configuration values for the instance of Active Directory with security certificates installed.
10. Select the Use SSL check box.
11. Note the name in the Domain User field. Subsequent logins using Active Directory are authenticated using SSL.

For additional information about installing, configuring, and implementing LDAPS on a particular application server, see the original vendor's documentation.

# ***Repository package management***

Occasionally it may be necessary to install updates for the IBM® SPSS® Collaboration and Deployment Services Repository as such updates are made available. It may also be necessary to install optional components that extend the repository functionality to support additional content types, security providers, etc., or install IBM® SPSS® Collaboration and Deployment Services Deployment Manager updates which will be pushed to clients when they access the server.

Updates are deployed on the repository server as compressed files with \*.*package* extension in the <*repository installation directory*>/*staging*/ directory with IBM® SPSS® Collaboration and Deployment Services Package Manager. A number of optional packages, including Coherence cache provide, SiteMinder security provider, etc., are available in the */Server/optional* directory of installation Disk 1.

## ***Installing packages***

IBM® SPSS® Collaboration and Deployment Services Package Manager can be used as a GUI application or as a command line application. It can also be called in batch mode by other applications to install their package files into the repository. The repository must be stopped prior to installing packages.

*Note:* If WebSphere application server is used with the repository, it must be running while packages are being installed and then restarted.

The user must have administrator-level privileges to be able to install packages. The deployed packages are located in the <*repository installation directory*>/*staging*/.

To prevent the newer version of a package from being overwritten by an older version, package manager performs a version check. Package manager also checks for prerequisite components to ensure that they are installed and their versions are equal to or newer than the required version. If any of these checks fail, the package is marked as missing prerequisites in the dialog pane but can still be installed. However, it is not recommended to install packages that failed dependencies checks.

*Note:* Dependency checks failures cannot be overridden if package manager is called in batch mode.

To install a package from the command line:

1. Navigate to <*repository installation directory*>/*setup*/.
2. Depending on the operating system, execute *clipackagemanager.bat* on Windows, *clipackagemanager.sh* on UNIX, or *clipackagemanager.qsh* on IBM i.
3. When prompted, enter the user name and password.

*Note:* The password is not masked when it is entered in the command prompt.

4. Type the install command and press Enter. The command must include the `install` option and the path of the package in quotes, as in the following example:

```
install 'C:\dir one\package1.package'
```

If failed dependencies are detected, you will be presented with a choice to ignore the failures and continue the installation or abort.

5. When the installation is completed, use `exit` command to exit package manager.

*Note:* To display more command line install options, type `help` and press Enter key. The options include:

**info** "`<package path>`" Display information for a specified package file

**install** "`<package path>`" Install the specified package files into the repository.

**tree** Display installed package tree information

## ***Uninstalling packages***

It may be necessary in certain situations to uninstall packages, for example deploy a newer version of a repository adapter, such as IBM® SPSS® Modeler adaptor, or to revert to an older version of a package.

To uninstall a package:

1. Stop the repository.
2. Locate the package to be uninstalled in `<repository installation directory>/staging/`.
3. Delete the package.
4. Restart the repository.

## Logging services

Logging tools are essential when troubleshooting existing problems as well as when planning preventive maintenance activities. As system and application events are generated, administrative personnel can be alerted when warning thresholds are reached or critical system events occur. Additionally, verbose information output can be stored in a text file or Syslog record for analysis at a later time.

The IBM® SPSS® Collaboration and Deployment Services Repository uses the **log4j** package for handling log information. Log4j is Apache Software Foundation's logging solution for **J2EE** applications. The log4j approach permits logging control using an XML-based configuration file; the application binary does not have to be modified. For a comprehensive discussion of log4j, see [the log4j Web site \(http://logging.apache.org/log4j/docs/\)](http://logging.apache.org/log4j/docs/).

The location of the *log4j.xml* configuration file varies, depending on the host application server:

- JBoss—*<JBoss installation directory>\server\default\conf*.
- WebLogic—*<repository installation directory>\SPSSDomain\lib*. Note that log4j components used for logging on to WebLogic are part of the repository installation.
- WebSphere—*<repository installation directory>\setup\resources\websphere*.

This file controls both the destination and the amount of log output. Configuration of log4j is handled by modifying this file to define **appenders** for log destinations and to route **logger** output to those appenders.

### Appendors

Log output can be sent to a variety of destinations. In log4j, the destination is referred to as an **appender**. Table 12-1 describes the appenders available in log4j.

Table 12-1  
*Log4j appenders*

Appender class	Description
<i>org.apache.log4j.ConsoleAppender</i>	<i>System.out</i> or <i>System.err</i> streams
<i>org.apache.log4j.FileAppender</i>	Log file
<i>org.apache.log4j.DailyRollingFileAppender</i>	Log file that is automatically backed up at a specified frequency
<i>org.apache.log4j.RollingFileAppender</i>	Log file that is automatically backed up at a specified size
<i>org.apache.log4j.net.SMTPAppender</i>	E-mail notification of log events
<i>org.apache.log4j.jdbc.JDBCAppender</i>	Database for log events
<i>org.apache.log4j.net.JMSAppender</i>	Notification of log events using Java Messaging Service
<i>org.apache.log4j.lf5.LF5Appender</i>	Swing-based logging console
<i>org.apache.log4j.nt.NTEventLogAppender</i>	Appends log events to NT event logs
<i>org.apache.log4j.net.SocketAppender</i>	Remote log server

Appender class	Description
<i>org.apache.log4j.net.SocketHubAppender</i>	Set of remote log servers
<i>org.apache.log4j.net.SyslogAppender</i>	Syslog daemon
<i>org.apache.log4j.net.TelnetAppender</i>	Read-only socket that can be monitored using TCP/IP
<i>org.apache.log4j.ext.SNMPTrapAppender</i>	Log4j extension that sends SNMP traps

The configuration file defines appenders using the `appender` element. This definition includes a name and class specification, plus any appender-specific parameters. The following example illustrates a *ConsoleAppender*. For more information about the child elements of `appender`, see the log4j documentation.

```
<appender name="CONSOLE" class="org.apache.log4j.ConsoleAppender">
  <errorHandler class="org.jboss.logging.util.OnlyOnceErrorHandler"/>
  <param name="Target" value="System.out"/>
  <param name="Threshold" value="INFO"/>
  <layout class="org.apache.log4j.PatternLayout">
    <!--The default pattern: Date Priority [Category] Message\n -->
    <param name="ConversionPattern" value="%d{ABSOLUTE} %-5p [%c{1}] %m%n"/>
  </layout>
</appender>
```

By default, the repository uses two appenders:

- *FILE*, a *DailyRollingFileAppender* that sends the log to a file named *server.log* in the JBoss log folder. At midnight, the year, month, and day are appended as a suffix to the filename, and a new *server.log* file begins recording log events for the next day.
- *CONSOLE*, a *ConsoleAppender* that sends the log to the *System.out* stream for display in a console window.

In addition, the configuration file includes a definition for a *DailyRollingFileAppender* named *FILE-MM*. This appender corresponds to a file named *mm.log* in the JBoss log folder that is similar to the *server.log* file. However, *FILE-MM* can be used for the repository loggers to separate log information for the application from log information for the application server. The *FILE-MM* appender appears below:

```
<appender name="FILE-MM" class="org.jboss.logging.appender.DailyRollingFileAppender">
  <errorHandler class="org.jboss.logging.util.OnlyOnceErrorHandler"/>
  <param name="File" value="$jboss.server.home.dir}/log/mm.log"/>
  <param name="Append" value="false"/>
  <!--Rollover at midnight each day -->
  <param name="DatePattern" value="'.yyyy-MM-dd'"/>
  <layout class="org.apache.log4j.PatternLayout">
    <!--The default pattern: Date Priority [Category] Message\n -->
    <param name="ConversionPattern" value="%-5p [%c] %m%n"/>
  </layout>
</appender>
```

## Defining appenders

To define an appender:

1. Open the *log4j.xml* configuration file in a text editor.
2. Locate the appender element that corresponds to the logging destination you want to employ. If the appender element is commented out of the file, remove the comment symbols (<!--and -->) that enclose the appender.
3. If the configuration file does not contain the desired appender, create a new appender element. Assign a name and specify the class for the desired log destination. See [Table 12-1](#) on p. 69.
4. Modify the content of the appender element as needed to reflect your system and network settings.
5. Save the file.

The repository automatically updates to reflect the changes. A restart of the server is not needed.

## Loggers

Loggers represent application systems that generate log output. For each logger, the *log4j* configuration file specifies both the amount of information logged and the destination for that information.

Logger names typically consist of a series of text strings separated by periods corresponding to the names of software components, such as *com.spss.process*. This naming convention defines a hierarchy of parent/child relationships for loggers. For example, the *com.spss.cmor* logger is a child of the *com.spss* logger, which itself is a child of the *com* logger. The exception to this rule is the *root* logger, which is an ancestor of all loggers in the system. The table below lists the loggers available in the repository.

Table 12-2  
Loggers

Logger	Description
<i>root</i>	Root logger
<i>com.spss.cmor</i>	Repository events
<i>com.spss.security</i>	Security events
<i>com.spss.process</i>	Job scheduling events

In the configuration file, the *root* and *category* elements define logger properties. The *root* element defines log destinations for all loggers in the system. The *category* element allows specification of behavior for particular loggers. The *category* specification for the repository follows:

```
<category name="com.spss.cmor">
  <priority value="WARN"/>
</category>
<category name="com.spss.security">
  <priority value="WARN"/>
</category>
<category name="com.spss.process">
  <priority value="WARN"/>
```

```
</category>
```

The `priority` element defines a logging level for the corresponding logger. The level controls the amount of information logged.

## Logging levels

The amount of information contained in the log output is controlled by the logging level. Valid levels include:

- **FATAL.** Severe errors that cause the application to fail.
- **ERROR.** *FATAL*-level errors plus errors resulting from specific requests that allow the application to continue functioning.
- **WARN.** *ERROR*-level errors plus suboptimal or unexpected events.
- **INFO.** *WARN*-level errors plus status messages reflecting general application processes.
- **DEBUG.** *INFO*-level errors plus detailed status messages used for application debugging purposes.

Levels are hierarchical; each level includes all of the output for levels above it. For example, setting the logging level to *WARN* results in all *WARN*, *ERROR*, and *FATAL* output being logged.

Configure the logging level for a particular logger using the `priority` element in the configuration file. This element uses the `value` attribute to specify the logging level. The following example sets the level for the *com.spss.cmor* logger to *WARN*:

```
<category name="com.spss.cmor">  
  <priority value="WARN"/>  
</category>
```

By default, the repository logs all information at the *WARN* level.

In the absence of a `priority` element for a logger, that logger inherits the level of the nearest ancestor. As a result, the logging level for all repository loggers could be set to the same level using the *com.spss* parent logger:

```
<category name="com.spss">  
  <priority value="WARN"/>  
</category>
```

## Modifying logging levels

To modify a logging level:

1. Open the *log4j.xml* configuration file in a text editor.
2. Locate the `category` element for the logger to be modified.
3. Change the value for the child `priority` element to the desired logging level. For more information, see [Logging levels on p. 72](#)
4. Save the file.



The repository automatically updates to reflect the changes. A restart of the server is not needed.

## Routing logs

Routing log information involves associating appenders with loggers. **Loggers** define the amount of information being logged; **appenders** define the destination for the information. In the *log4j* configuration file, use the `appender-ref` element to assign appenders to loggers.

In *log4j*, all log output is sent to any appenders associated with the *root* logger. The repository uses the *CONSOLE* and *FILE* appenders for the *root* logger, defined by using two `appender-ref` elements as children of the *root* element.

```
<root>
  <appender-ref ref="CONSOLE"/>
  <appender-ref ref="FILE"/>
</root>
```

To send the output for a specific logger to an alternative destination, add an `appender-ref` element as a child of the `category` element for the logger. For example, suppose we wanted to isolate all job scheduling log output in a single file. Using the `appender-ref` element, we add a reference to the *FILE-MM* appender for the *com.spss.process* logger.

```
<category name="com.spss.process">
  <priority value="WARN"/>
  <appender-ref ref="FILE-MM"/>
</category>
```

In this case, the job scheduling log is sent to the *FILE-MM* appender plus any appenders defined for the *root* category. To prevent the scheduling log from going to the *root* appenders, set the `additivity` attribute for the `appender-ref` element to *false*.

```
<category name="com.spss.process">
  <priority value="WARN"/>
  <appender-ref ref="FILE-MM" additivity="false"/>
</category>
```

## Assigning appenders

To assign an appender to a logger:

1. Open the *log4j.xml* configuration file in a text editor.
2. Locate the `category` element for the logger to be modified.
3. Add a child `appender-ref` element. Supply an appender name as the value for the `ref` attribute. Use the `additivity` attribute to control whether the logger should continue to send information to the root appenders.
4. Save the file.

The repository automatically updates to reflect the changes. A restart of the server is not needed.

## ***Import tool***

The IBM® SPSS® Collaboration and Deployment Services Import Tool allows you to populate the repository with any file type, such as IBM® SPSS® Modeler streams. The SPSS Modeler Stream Library is a set of streams that can help you learn to browse, view, and retrieve stored items. It also provides a methodology for organizing your own data mining work product. The streams provide a set of reusable data mining techniques that can help you to formulate solutions to business problems quickly.

The SPSS Modeler Stream Library includes a set of sample streams organized into the following categories:

- **Data Preparation**—After cataloging data resources, data preparation includes any cleaning, selecting, constructing, integrating, and formatting of data.
- **Data Understanding**—An exploratory stage in which data are examined using plots, histograms, and basic summary statistics.
- **Modeling**—Information is extracted from the data using sophisticated analytical methods to select modeling techniques, generate test designs, and build and assess models.

Once the repository is installed and functioning, the streams included in the SPSS Modeler Stream Library are imported into the database using the import tool Windows batch file or UNIX shell script. These import tools process streams, models, and standard output files included in the SPSS Modeler Stream Library, but they can also be used to handle any data object stored in a file system.

## ***Directory structure***

When the IBM® SPSS® Collaboration and Deployment Services Repository is installed, the import tool is included with the application. The tools are located in the `/applications/ImportTool` directory within the repository installation directory and are described in the table below.

Table 13-1  
*File location and directory structure*

<b>Name</b>	<b>Description</b>
ModelerStreamLibrary	Directory that contains subdirectories for: <i>Data Preparation</i> <i>Data Understanding</i> <i>Modeling</i> Each of the subdirectories contains the streams ( <i>.str</i> files) that are imported into the database.
lib	Directory containing <i>.jar</i> files used by the application. These should not be changed or deleted.
importTool.bat	Windows batch file for importing data objects. When using the import tool on a supported Windows system, execute this file to populate the database.

Name	Description
importTool.sh	UNIX shell script for importing data objects. When using the import tool on a supported UNIX platform, execute this file to populate the database.
repository.properties	Configuration file containing system-specific attributes. Some attributes are required and must be changed before using the import tool.

## Before you begin

Before working with the import tool, the repository must be installed. The batch file and shell script both attempt to use the repository-installed JRE if `JAVA_HOME` is not set. You will need to change the value of the `MM_INSTALL_HOME` variable in the Windows batch file (`importTool.bat`) or the UNIX shell script (`importTool.sh`).

Before running the batch file or shell script, set the installation path of the repository. To set the installation path:

1. Open `importTool.bat` or `importTool.sh` in a text editor.
2. Change the value of `MM_INSTALL_HOME` to match the installation path of IBM® SPSS® Collaboration and Deployment Services Deployment Manager.
3. Save and close the file.

## Customizing properties

Edit the `repository.properties` file using a text editor to customize the application properties. This file must specify the repository server name and login information. You may specify all of the properties for the connection, but the defaults are adequate in most cases.

Table 13-2  
Description of `repository.properties` file

Name	Description
repository.host	The name of the server. <i>Required.</i>
repository.username	The name of the user being authenticated. <i>Required.</i>
repository.password	The associated password for the user being authenticated. <i>Required.</i>
streams.directory	The directory location of the files to load.
author.names	Assigned list of comma-separated names to apply to the imported files. Note that these are randomly assigned.
version.labels	Assigned version names for imported files. These are assigned in the order in which they are listed. The first time a file is imported, the first label is applied. The second time a file is imported, the second label is applied, and so on.
repository.port	The port number the server is using. By default, this value is 80. This must be changed if other applications are using the default or if the application server is assigned to another port.
repository.protocol	The protocol used. By default, this value is http.
repository.context	The URL context string.

## Populating the repository

To populate the repository, start the repository server and execute the Windows batch file or run the shell script under a supported UNIX platform.

*Note:* Solaris users need to enter `chmod +x importTool.sh` before executing the shell script.

Verbose (and lengthy) INFO messages appear as the utility populates the repository. Specific output varies for each installation but is similar to the following output:

```
Using JAVA_HOME installation at C:\SPSS\ModelManager\jre\
INFO [main] - Creating URL with http://localhost:8080/cr-ws/services/ContentRepository
INFO [main] - Starting directory: ClementineStreamLibrary
INFO [main] - Validating repository connection
INFO [main] - Connecting as admin
INFO [main] - Service connection established.
INFO [main] - Looking for topic: '/'
INFO [main] - Found topic: /
INFO [main] - Looking for topic: '//CRISP-DM'
INFO [main] - Didn't find it.
INFO [main] - Creating new topic: CRISP-DM in /
INFO [main] - Created new topic with ID: 0a0b989f00b1b4c3000001028d5651008007
```

*Note:* The output should contain only INFO messages; output prefaced with ERROR indicates a configuration or system failure. Verify the settings in *repository.properties* and run the batch file or shell script again.

## Assigning topics

During stream import, the name of the file is used to assign a CRISP-DM topic to the stream. Topics provide searchable metadata to facilitate finding streams in the repository.

The first letter of the filename determines the topic assigned to the file. The table below describes the relationship between the first letter in the name and the assigned topics.

Table 13-3  
*Naming convention for topics*

First letter	Assigned topics
p	CRISP-DM > Data Preparation
e	CRISP-DM > Data Understanding
m	CRISP-DM > Modeling
	CRISP-DM > Evaluation
d	CRISP-DM > Deployment

Files with names beginning with any other character are not automatically assigned a topic.

## Verifying file import

After the batch file or shell script has finished processing, verify that the files have been successfully imported using IBM® SPSS® Modeler or IBM® SPSS® Collaboration and Deployment Services Deployment Manager.

**IBM SPSS Modeler User Interface**

To verify that files were imported correctly:

1. From the SPSS Modeler user interface, establish a connection to the IBM® SPSS® Collaboration and Deployment Services Repository. For specific instructions, see the SPSS Modeler documentation.
2. After a connection has been established, verify that the correct directory structure appears.

**IBM SPSS Collaboration and Deployment Services Deployment Manager User Interface**

To verify that files were imported correctly:

1. From the Deployment Manager user interface, establish a connection to the repository.
2. In the Content Explorer, expand *Content Repository* by clicking the + icon.
3. Verify that the correct directory structure appears.

# Troubleshooting

Certain error messages and symptoms are common when installing and working with the IBM® SPSS® Collaboration and Deployment Services Repository. Methods for clearing these errors and establishing a functional system exist for:

- **The repository.** Common problems when installing and starting the application on supported server platforms.
- **DB2 for IBM i.** Symptoms and error messages that surface while transacting with a DB2 database running on IBM i.
- **WebSphere.** WebSphere application server running the repository.

It is always a good practice to refer to the repository log files to establish the cause of the problem. For more information, see the topic [Logging services](#) in Chapter 12 on p. 69.

## Troubleshooting the repository

### ***How do I prevent performance bottlenecks and CPU usage issues when starting and deploying the repository?***

Depending on the specific system configuration, previously installed antivirus or spyware software may be configured for “deep scanning” of application components. These third party applications can be reconfigured to scan during certain times, or they can be turned off during installation and manually restarted.

Additionally, some of the more strict server-side firewall settings may negatively impact startup performance and not allow access.

If you are experiencing significant system degradation when starting the service, disable any nonessential processes and restart the repository.

### ***Once I log in to the administrative interface, how do I determine which database I am accessing?***

Database connection information can be downloaded and accessed from the Web interface.

1. After authenticating, click About from the navigation list options. The About page appears.
2. Click the Download version and system details link at the bottom of the page. When prompted, save the file to disk.
3. Open the file in a text editor and search for *Database Details*. This section contains detailed information on the database being used, including name, version, and a table listing.

***The application throws java.lang.OutOfMemoryError: PermGen space exception.***

This error occurs when the JVM runs out of space in the permanent generation heap due to a large number of used classes. The error can occur when running IBM® SPSS® Collaboration and Deployment Services or their utility applications, such as setup, save and restore, or package manager. Depending on the system's memory configuration, the solution may be to either increase or reduce the value specified with PermSize JVM parameter in the startup scripts of the application server and utility applications. If the total memory of consumption of the application server and the utilities is a lot smaller than the system's free memory and out of memory exception occurs, you should increase the value. If the total memory consumption of the utilities and the application server is greater than the system's free memory, try to reduce the size of permanent generation heap.

If memory errors occur when running the utilities, you must modify the launching scripts for these utilities to set lower values for the JVM memory parameters. For example, the Java command in *packagemanager.sh/packagemanager.bat* is as follows:

```
java -Xms128m -Xmx1024m -XX:PermSize=512m -classpath $CP com.spss.setup.packagemanager.ui.PlatformPackageTool $@
```

It can be changed to:

```
java -Xms128m -Xmx512m -XX:PermSize=256m -classpath $CP com.spss.setup.packagemanager.ui.PlatformPackageTool $@
```

Out of memory errors can also be prevented by adding JVM parameters to tune memory allocation and garbage collection, for example:

```
-XX:+CMSPermGenSweepingEnabled -XX:+CMSClassUnloadingEnabled
```

***When a BIRT Report Designer for IBM SPSS report is run in IBM SPSS Collaboration and Deployment Services Deployment Portal, the application is not able to authenticate my credential for accessing the data source of the report and is repeatedly displaying the login screen.***

- Verify that the data source for the report and the credentials are defined correctly. For more information, see the corresponding section of the *IBM® SPSS® Collaboration and Deployment Services Deployment Manager User's Guide*.
- If the data source for the report is JDBC-based, verify that the proper driver is installed with the repository. For driver path information specific to the operating platform, see the installation instructions.

***How do I restore the repository if my keystore file has been lost?***

The keystore file contains the keys used to encrypt passwords used by the repository, such as the master password for database access. If the keystore file is lost, the system becomes unusable. If backup of the keystore is available, it can be restored to the original location. If you are unsure what the original path of the keystore was, you can look up the *keystorePath* property of *keystoreSecurity* element in *<repository installation directory>/platform/setupinfo.xml*.

If the keystore file is lost and backup is not available, the system must be reinstalled by re-running the setup utility in `<repository installation directory>/setup` and pointing it to the existing repository database. All passwords that existed in the system, such as the passwords for external directory services, defined credentials, etc. must be manually reentered.

***A BIRT report against DB2 IBM i V6R1 database using prompted credentials fails when run in the repository.***

Add `prompt=true` parameter to the JDBC connection URL.

```
Driver Name: com.ibm.as400.access.AS400JDBCdriver
Driver URL: jdbc:as400://myServer/B101E31E;prompt=false
```

***“Build New Scoring Configuration Details Failed” error when configuring scoring on non-Windows repository installations***

“Build New Scoring Configuration Details Failed” error message is displayed when scoring configuration dialogue is opened in Deployment Manager. The problem is corrected by changing the permissions on `<repository installation directory>/components/modeler/modelerserver` file to `execute`, for example:

```
cd /usr/CDS/components/modeler/modelerserver
sudo chmod +x modelerserver
```

## **WebSphere**

***Miscellaneous errors occur during package installation (with Package Manager) into the repository using a WebSphere application server.***

Make sure the latest vendor patches have been applied to the application server.

***Server log is reporting encryption errors, such as exception `com.ibm.crypto.provider.AESCipher.engineGetKeySize(Unknown Source)`***

The error occurs with WebSphere 6.1 Service Pack 19 and is caused by the incorrect password value. To correct the error, copy the value of `platform.keystore.password` from

```
<repository installation directory>/platform/setupinfo.xml
```

to

```
<WEBSPPHERE_HOME>/profiles/AppSrv01/config/cells/xi-wyueNode01Cell/nodes/xi-wyueNode01/servers/
<server name>/server.xml
```

Upgrading to WebSphere 6.1 Service Pack 23 may also resolve encryption problems.



***“CWSIS1535E: The messaging engine’s unique id does not match that found in the data store” error***

The error can be corrected by stopping the repository and deleting the repository database tables with names beginning with the *SIB* prefix. The tables will be recreated when the repository is restarted. Note that this solution applies only if you do not need to keep any of the currently stored persistent messages. For more information about WebSphere JMS troubleshooting, see <http://www.redbooks.ibm.com/redpapers/pdfs/redp4076.pdf>.

***Remote exception when running a BIRT report against an IBM SPSS Statistics data source (with IBM SPSS Statistics data file JDBC driver) on a WebSphere cluster***

The problem may be resolved by adding `Dcom.ibm.ws.classloader.encodeResourceURLs=true` to generic JVM arguments using WebSphere administration console for every node of the cluster.

***When performing an install or setup action, the action fails and the log indicates one or more native library files (.dll, .so, .sl) could not be accessed***

This problem typically occurs when an attempt is made to update the native libraries in a scoring provider package while a scoring configuration is active and using the current libraries. This can occur in the following situations:

- Using IBM® SPSS® Collaboration and Deployment Services Package Manager to install a scoring adapter into a repository that already has a version of that scoring adapter installed
- Applying a patch containing a scoring adapter to a system that already has a version of that scoring adapter installed
- Rerunning IBM® SPSS® Collaboration and Deployment Services Setup on a 4.0 or later repository if any scoring adapter has been installed into that repository. This includes rerunning the setup tool after a restore.

To avoid this issue, make sure that the scoring libraries are not running before attempting the installation or setup action. The basic steps to do this are as follows:

1. Open the WebSphere administration console and navigate to the deployed applications for your repository server.
2. Disable the auto-start option for the *scoring* and *scoring-ejb* applications.
3. If the repository is version 4.0 or later, disable the auto-start option for the *admin*, *security*, and *security-ws* applications.
4. Save the changes and restart the WebSphere application server.
5. Perform the desired installation or setup action.
6. Return to the WebSphere administration console and enable the auto-start option for the previously disabled applications.
7. Save the changes and restart the WebSphere application server.

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