

**IBM SPSS Collaboration and  
Deployment Services Repository 5  
Installation and Configuration Guide**



*Note:* Before using this information and the product it supports, read the general information under Notices on p. 97.

This edition applies to IBM SPSS Collaboration and Deployment Services 5 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. Tasks such as setting up content repository server, managing users, auditing the repository, etc. are documented in the *IBM SPSS Collaboration and Deployment Services 5 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 5 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. 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**. Jobs define an execution sequence for analytical artifacts and can be created with IBM® SPSS® Collaboration and Deployment Services Deployment Manager. 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.

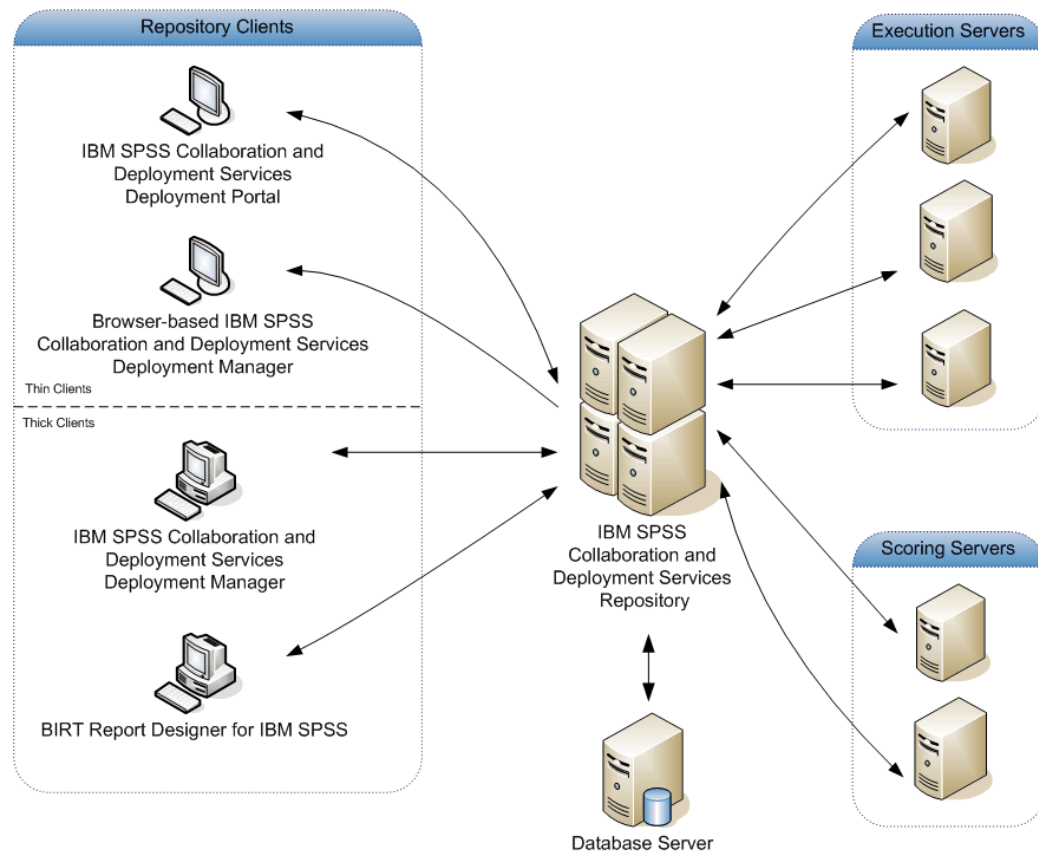
In addition, the scoring service of IBM SPSS Collaboration and Deployment Services allows analytical results from deployed models to be delivered in real time when interacting with a customer. An analytical model configured for scoring can combine data collected from a current customer interaction with 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
- 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 IBM DB2, Microsoft SQL Server, or Oracle.

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 for IBM® SPSS® Collaboration and Deployment Services Repository that enables users to schedule, automate, and execute analytical tasks, such as updating models or generating scores. 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:

- Manage users
- Configure security providers
- Assign roles and actions

### ***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:

- Setting system configuration options
- 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 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

## ***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, or 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 JDBC and ODBC drivers with the exception that it does not directly query physical data sources but rather virtualizes the physical data sources according to the design of the Data Provider Definitions. Note that while the Enterprise View is installed as part of IBM® SPSS® Collaboration and Deployment Services Deployment Manager, the IBM SPSS Collaboration and Deployment Services Enterprise View Driver driver must be installed separately. For more information, see IBM SPSS Collaboration and Deployment Services Enterprise View Driver documentation.

## **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.

## **Scoring server**

IBM® SPSS® Collaboration and Deployment Services Scoring Service is also available as a separately deployable application, the Scoring Server. The Scoring Server improves deployment flexibility in several key areas:

- Scoring performance can be scaled independently from other services
- Scoring Server(s) can be independently configured to dedicate computing resources to one or any number IBM SPSS Collaboration and Deployment Services scoring configurations
- Scoring Server operating system and processor architecture does not need match the IBM® SPSS® Collaboration and Deployment Services Repository or other Scoring Servers
- Scoring Server application server does not need match the application server used for IBM SPSS Collaboration and Deployment Services Repository or other Scoring Servers

## **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.

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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.

## ***IBM Analytical Decision Management***

IBM® SPSS® Collaboration and Deployment Services are a prerequisite for installing IBM® Analytical Decision Management, a suite of applications for integrating predictive analytics with operational decision-making. IBM Analytical Decision Management uses high-speed scoring, master data management, and process automation facilities of IBM SPSS Collaboration and Deployment Services to optimize and automate high-volume decisions and produce improved outcomes in specific business situations.

## ***IBM ShowCase***

IBM® SPSS® Collaboration and Deployment Services can be deployed on IBM i to enable integration with IBM® ShowCase® business intelligence suite, providing an enterprise-level reporting platform that can be used to deliver information to any number of individuals or groups efficiently, securely and cost effectively. Within this reporting environment, you can establish a centralized, secure, and searchable repository for IBM® ShowCase® Query and IBM® ShowCase® Report Writer content; giving users easy access to content and report output through a Web browser-based interface; share query and report definitions over the web for both scheduled and dynamic execution; publish Excel spreadsheets that can be scheduled for refresh or dynamically refreshed through a web browser; and create reports that include charts, images, and links to other reports.

*Important!* High-speed scoring features of IBM SPSS Collaboration and Deployment Services are not available on IBM i.

# *What is new for installers*

IBM® SPSS® Collaboration and Deployment Services Repository 5 delivers new capabilities that can help you simplify deployment of predictive analytics and manage costs.

## ***Additional operating platforms support***

IBM SPSS Collaboration and Deployment Services Repository 5 includes support for new versions of operating systems, application servers, databases, virtualization environments, and Web browsers.

## ***Installation and migration***

The following new features simplify the installation, migration, and maintenance of IBM SPSS Collaboration and Deployment Services Repository:

- **New installation utility:** Based on IBM Installation Manager, the utility enables streamlined management of the application components and improves enterprise integration.
- **Configuration utility:** The utility to simplify IBM SPSS Collaboration and Deployment Services Repository deployment into your enterprise environment.
- **Re-engineered repository migration process:** Based on native database vendor tools, the new process enables faster repository migration.
- **Deployment as a single enterprise archive (EAR) file:** To simplify administration and maintenance, IBM SPSS Collaboration and Deployment Services Repository is now deployed into the application server as a single EAR file.

## ***Server Process Credential***

In environments with configured single sign-on, Server Process (middle-tier) Credential enables simplified data access for enterprise reporting, improved job scheduling, and directory access for authentication.

## ***Scoring Server***

Scoring Server enables IBM® SPSS® Collaboration and Deployment Services high-speed scoring processing on remote systems. The scoring components of IBM SPSS Collaboration and Deployment Services can be deployed to dedicated hosts or clusters, improving the performance and providing failover capabilities for critical enterprise functions.



### ***Documentation***

Complete IBM SPSS Collaboration and Deployment Services documentation set can now be accessed on the Web through an IBM Information Center:

<http://publib.boulder.ibm.com/infocenter/spsscads/v5r0m0/index.jsp>. The following guides have been added to the documentation set:

- Troubleshooting Guide
- Quickstart Guide

### ***What has changed in this release***

The following are no longer supported:

- Java 1.5
- AIX 5.3
- Solaris 9.x
- Red Hat Enterprise Linux Enterprise Advanced Platform 4.x
- Windows Server Standard 2003
- IBM i v5r4
- WebSphere 6.1
- JBoss 5.1.x
- JBoss 4.2.x
- JBoss Enterprise Application Platform 5.0
- Citrix Presentation Server 4.5
- Citrix XenApp 5.0
- Microsoft Windows Terminal Services Windows 2003 Server
- VMWare VSphere 4.0

# Installation

This chapter provides the information about installing IBM® SPSS® Collaboration and Deployment Services Repository. The process consists of a number of pre-installation, installation and configuration, and post-installation steps.

- **Pre-installation** steps for setting up the application environment include determining the system requirements based on the installation type and projected system use, provisioning the machine(s) to run the J2EE server or server cluster, making sure the server(s) meet all hardware and software requirements, configuring the J2EE application server or cluster, and configuring the database. It may also be necessary to migrate the content from the previous installation to the new database using database copy tools.
- **Installation and configuration** steps include installing the application files on the host system using IBM Installation Manager and subsequent IBM SPSS Collaboration and Deployment Services Repository configuration to run with the designated application server or server cluster and the repository database.
- **Post-installation** steps include starting IBM SPSS Collaboration and Deployment Services Repository, verifying connectivity, configuring autostart, installing additional database drivers, optional components, and content adapters for other IBM SPSS products.

Note that in some environments IBM SPSS Collaboration and Deployment Services Repository deployment may also require a number of optional enterprise configuration steps related to the application security, access control, and notification capabilities.

- Email and RSS notifications. For more information, see the corresponding chapter of the administrator's guide.
- Secure repository connection. For more information, see the topic [Using SSL to secure data transfer](#) in Chapter 9 on p. 63.
- FIPS 140-2 security and secure repository database connection. For more information, see the topic [FIPS 140-2 compliance](#) in Chapter 8 on p. 60.
- Single sign-on. For more information, see the topic [Single sign-on](#) in Chapter 7 on p. 50.

## Pre-installation

Before you install IBM® SPSS® Collaboration and Deployment Services, you must set up the resources in your environment so that the components can operate. For example, you must create a database for the content repository, and configure a J2EE application server.

Use the following checklist to guide you through the pre-installation process:

- Determine the installation type based on projected system use and the corresponding system requirements.
- Provision the machine(s) to run the J2EE server or server cluster. Make sure the server(s) meet all hardware and software requirements.

- Verify installing user authority and host file system permissions.
- Configure the J2EE application server or cluster.
- Configure the database. If necessary, migrate the content from the previous installation to the new database using database copy tools. For more information, see the topic [Migration](#) in Chapter 4 on p. 39.

## ***Planning your installation***

Prior to installing IBM® SPSS® Collaboration and Deployment Services Repository, you must determine the installation type in order to be able to set up the application environment. IBM SPSS Collaboration and Deployment Services Repository is an enterprise-level system that requires integration with multiple IBM Corp. and third-party components and technologies. In its most basic configuration, it requires a preexisting installation of a J2EE application server to run the Web services that enable the application's functionality, and a relational database, such as IBM DB2 UDB, Oracle, or Microsoft SQL Server to store analytical artifacts and application settings.

Use the following guidelines when planning your installation:

- In operational environments, the repository must be installed on a server-grade system. For more information, see the topic [Host system requirements](#) on p. 11. Running the repository database on a separate dedicated server may improve overall system performance.
- In enterprise environments with large processing loads (for example, producing real-time scores) and a greater number of users, scaling up with an application server cluster rather than a standalone application server is recommended.
- While the repository can be installed and run on a desktop workstation or a notebook for educational and demonstration purposes, it cannot be run on such systems in a production environment.

When planning your IBM SPSS Collaboration and Deployment Services Repository deployment, you must also consider the additional requirements of a production environment. For example, to enable the processing of analytical artifacts and scoring, it may be necessary to set up execution servers, such as IBM® SPSS® Statistics and IBM® SPSS® Modeler servers, which may also require dedicated hardware and network resources. To enable the email notifications functionality, an SMTP server must be available. It may also be necessary to configure repository authentication through an external directory system and single sign-on with a Kerberos server.

## ***Host system requirements***

Prior to installing IBM® SPSS® Collaboration and Deployment Services Repository, verify that the following hardware and software requirements have been met. If you are installing with an application server cluster, the requirements must be met on all nodes. The deployment requires dedicated resources on a server-grade system with the following specifications:

<b>Component</b>	<b>Requirement</b>
Processor	A current-generation multi-core processor, for example, Power, Xeon, Itanium, or Sparc, compatible with a supported operating system (see below)

Component	Requirement
Disk space	At least 10 GB free space
Memory	2 GB dedicated RAM. <i>Important!</i> The specified amount of RAM is the minimum required to successfully install and start the repository. Depending on the types of analytical processing performed by IBM® SPSS® Collaboration and Deployment Services, runtime memory requirements may be significantly higher and use a large portion of RAM typically installed on a server-grade system. Note that installing repository adapters for other IBM SPSS products, such as IBM® SPSS® Modeler adapter, requires additional dedicated memory. It is recommended to consult the application server documentation when estimating for memory requirements for your selected application server.
Server operating system	AIX 7.1 AIX 6.1 IBM i v7r1 IBM i v6r1 Windows Server 2008 R2 64-bit Windows Server 2008 32-bit Windows Server 2008 64-bit Windows Server Standard 2003 R2 32-bit Windows Server Standard 2003 R2 64-bit HP-UX 11i v3 Red Hat Enterprise Linux Enterprise Advanced Platform 6.x 64-bit Red Hat Enterprise Linux Enterprise Advanced Platform 5.x 32-bit Red Hat Enterprise Linux Enterprise Advanced Platform 5.x 64-bit Red Hat Enterprise Linux Enterprise Advanced Platform 6.x zLinux Red Hat Enterprise Linux Enterprise Advanced Platform 5.x zLinux Solaris 10 on SPARC SuSE Enterprise Server 11 64-bit SuSE Enterprise Server 10 64-bit SuSE Enterprise Server 11 zLinux SuSE Enterprise Server 10 zLinux
JDK/JRE	1.6. <i>Note:</i> that the choice of JDK vendor must be determined by the application server selected for the installation. For more information, see application server documentation.

### ***Additional requirements***

#### ***IBM i***

Verify that all IBM i prerequisites for WebSphere application server and DB2 database have been met and all required fix packs have been applied.

#### ***UNIX and Linux***

- X-Windows Terminal software is required for IBM® SPSS® Collaboration and Deployment Services Repository GUI-based installation and BIRT (Business Intelligence Reporting Tools) charts and graphs rendering functionality. Alternatively, it may be possible to run the server in headless mode (Java command line option `-Djava.awt.headless=true`) or use PJA (Pure Java AWT) Toolkit.
- On Solaris, the 32-bit Sun JRE must be installed before installing the 64-bit JRE. For more information, see vendor documentation.

### **Windows**

- Microsoft Visual C++ 2008 Redistributable Package. The package can be downloaded from Microsoft support portal.

### **IBM Installation Manager**

IBM Installation Manager 1.5 must be installed and configured to use a repository which contains IBM® SPSS® Collaboration and Deployment Services installation files.

If IBM Installation Manager is not already present on the system, it will be automatically installed when you launch IBM SPSS Collaboration and Deployment Services installation from the distribution disk. If you have an older version of IBM Installation Manager, you will be required to update it as part of the installation.

If you do not have the disk and IBM Installation Manager is not present on the system, download and install IBM Installation Manager 1.5 from IBM Corp. support site (<http://www.ibm.com/support>). For download location and user information, see IBM Installation Manager documentation: <http://publib.boulder.ibm.com/infocenter/install/v1r5/index.jsp>.

### **User and file system permissions**

As a general rule, you should install and configure the repository with the same user permissions that were used to install and configure the application server. See your application server vendor documentation for information about supporting installations as a non-root/non-administrator user.

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

- Write permissions to the installation directory and subdirectories.
- Write permissions to the deployment and configuration directories and read and execute permissions to other application server directories.
- When the repository is installed with an application server cluster, the repository installation directory on the machine hosting the management profile (WebSphere) or adminServer (WebLogic) must be shared to be available to all nodes of the cluster.
- When installing on Solaris, the user running the installation must also have write access to `/etc/java`. If the installation is executed by a user without write access to the directory, switch to a user with write access and rerun setup. Once setup is complete, verify that `/etc/java/.systemPrefs/com/spss/setup/component/services/prefs.xml` exists.
- When installing on IBM i, 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`.

*Note:* When installing IBM SPSS content adapters, you must use the same user that was used for IBM® SPSS® Collaboration and Deployment Services Repository installation.

## Virtualization

IBM® SPSS® Collaboration and Deployment Services Repository 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 IBM® SPSS® Collaboration and Deployment Services. The virtual machines hosting IBM SPSS Collaboration and Deployment Services components must meet minimum system requirements. For more information, see the topic [Host system requirements](#) on p. 11.

Assuming that the configured virtualized environment meets the minimum system requirements, no performance degradation of IBM SPSS Collaboration and Deployment Services Repository 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.

Table 3-1  
Supported virtualization environments for IBM SPSS Collaboration and Deployment Services

Product	Hosted OS
IBM PowerVM Hypervisor	AIX
IBM PR/SM	Linux for Z
IBM z/VM	Linux for Z
VMWare VSphere 4.1	Windows, Linux
VMWare ESXServer 3.5	Windows, Linux

Note that additional restrictions on deployment into virtualized environments may exist if J2EE application servers used to run the repository cannot be deployed into these environments.

## Application server

Before installing IBM® SPSS® Collaboration and Deployment Services Repository, a supported application server or a server cluster must be installed and accessible. If the repository is reinstalled, it is strongly recommended to recreate the application server, for example, by deploying a new WebSphere profile. It is also essential to make sure the latest versions of vendor patches have been applied to application server installations. The application server must be set up with an appropriate JRE. Note that when installing IBM SPSS Collaboration and Deployment Services Repository with application server cluster, all cluster nodes must have the same version of the application server and run on the same operating system.

## WebSphere

The IBM® SPSS® Collaboration and Deployment Services Repository can be run with a standalone WebSphere server, a managed server, or a cluster.

Application server
WebSphere 8, Base or ND version, Fix Pack 2 (8.0.0.2)
WebSphere 7, Base or ND version, Fix Pack 21 (7.0.0.21)

**Prior to installing with a standalone WebSphere server**

- Create a new profile for every installation using the default application profile template.

**Prior to installing with a managed WebSphere server**

- Create the deployment management profile.
- Start management profile.
- Create the managed profile.
- Add a managed node to the management profile.
- Using WebSphere console, create the managed server based on the managed node.

**Prior to installing with a WebSphere cluster**

- Create the cluster and make sure it is accessible through the load balancer.

**JBoss**

The IBM® SPSS® Collaboration and Deployment Services Repository can be run only with a standalone JBoss server.

<b>Application server</b>
JBoss 6.0

**Prior to installing with JBoss**

- Create a new server for every repository installation.
- Notes:*
- JBoss application server is not supported on HP-UX.
  - It is recommended that only one instance of the server be run. If multiple instances of the repository must be set up on a single machine using JBoss, consult JBoss documentation.
  - To avoid errors at repository startup, it is recommended that JBoss application server installation path not contain any spaces, for example, as in *C:\jboss6.0.0.Final*.

**WebLogic**

The IBM® SPSS® Collaboration and Deployment Services Repository can be run with a standalone WebLogic server or a cluster.

<b>Application server</b>
Oracle WebLogic 11gR1 (10.3.5)
Oracle WebLogic 10 (10.3.0)

**Prior to installing with a standalone WebLogic server**

- Create a new server for every repository installation.

**Prior to installing with a managed WebLogic server**

- Created a new managed server for every repository installation.

**Prior to installing with a WebLogic cluster**

- Create the cluster and make sure it is accessible through the load balancer.

*Note:* If WebLogic is run with JRockit JRE, the server must be started with `-XstrictFP` parameter (to enable strict floating point arithmetics globally for all methods in all classes).

**Database**

Before installing IBM® SPSS® Collaboration and Deployment Services Repository, a database must be running and accessible. A connection to the database is required in order to establish the necessary control tables and infrastructure. The following table lists supported databases.

Vendor	Database	Release	Version
IBM	DB2 Enterprise LUW	9.7	32-bit
IBM	DB2 Enterprise LUW	9.7	64-bit
IBM	DB2 Enterprise LUW	9.5	32-bit
IBM	DB2 Enterprise LUW	9.5	64-bit
IBM	DB2 Enterprise LUW	9.1	32-bit
IBM	DB2 Enterprise LUW	9.1	64-bit
IBM	DB2 for i	v7r1	(embedded in OS)
IBM	DB2 for i	v6r1	(embedded in OS)
IBM	DB2 for z/OS	10	64-bit
Oracle	Oracle Database	11g R2	32-bit
Oracle	Oracle Database	11g R2	64-bit
Oracle	Oracle Database	11g (11.0)	32-bit
Oracle	Oracle Database	11g (11.0)	64-bit
Oracle	Oracle Database	10g (10.2)	32-bit
Oracle	Oracle Database	10g (10.2)	64-bit
Microsoft	SQL Server R2	2008	32-bit
Microsoft	SQL Server R2	2008	64-bit
Microsoft	SQL Server	2008	32-bit
Microsoft	SQL Server	2008	64-bit
Microsoft	SQL Server	2005	32-bit
Microsoft	SQL Server	2005	64-bit

The database and the IBM SPSS Collaboration and Deployment Services Repository do not need to be installed on the same server, but some configuration information is necessary to ensure connectivity. During the installation, you will be prompted for the database server name, port number, user name and password, and the name of the database to use for information storage and retrieval.

DB2 for i is supported as the repository database only when IBM SPSS Collaboration and Deployment Services Repository is run on IBM i.



---

*Important!* You must manually create the database prior to installation. Any valid database name can be used, but if a previously created database does not exist, the installation will not continue.

### ***Database permissions***

The user must also have the following general permissions to the database to perform the install and initial startup of IBM® SPSS® Collaboration and Deployment Services Repository:

- Create session
- Create table
- Drop table
- Create view
- Drop view
- Create function
- Create procedure
- Select
- Insert
- Update
- Delete
- Execute procedure

The exact names of these permissions vary depending on the database type. For example, permissions for Microsoft SQL Server 2005 are as follows:

- Alter any schema
- Connect
- Create function
- Create procedure
- Create table
- Create view
- Create XML schema collection
- Delete
- Execute
- Insert
- References
- Select
- Update

Depending on the database, additional permissions may be needed. For example, Oracle also requires the following explicit permissions:

- Connect
- Create index

- Alter session
- Create type
- Alter type
- Drop type
- Create directory
- Drop any directory

When IBM SPSS Collaboration and Deployment Services Repository is installed with WebSphere as the application server and DB2 as the database, explicit *create schema* permission is required.

## **DB2**

### **DB2 LUW**

When using DB2 UDB LUW database, the default database creation parameters are not sufficient. The following additional parameters must be specified:

- UTF-8 codeset
- 8 KB page sized buffer pool (in the sample script below *CDS8K*) for the tables that are wider than 4 KB
- 8 KB tablespace using the 8 KB buffer pool
- 32 KB buffer pool (*CDSTEMP* in the sample script)
- 32 KB temporary tablespace for any wide result sets using the 32 KB buffer pool

An example script for creating a database named *SPSSCDS* follows. If you copy and paste the script, make sure it matches exactly the SQL as shown. Note that the script references a UNIX-style database file path which must be modified if the script is to be run on Windows. For physical media, the script is included on the disk. For software downloads, the script is included as part of the documentation package.

```
CREATE DATABASE SPSSCDS ON /home/cdsuser USING CODESET UTF-8 TERRITORY US COLLATE USING SYSTEM;
CONNECT TO SPSSCDS;
CREATE Bufferpool CDS8K IMMEDIATE SIZE 250 AUTOMATIC PAGESIZE 8 K;
CREATE REGULAR TABLESPACE CDS8K PAGESIZE 8 K MANAGED BY AUTOMATIC STORAGE EXTENTSIZE 8
OVERHEAD 10.5 PREFETCHSIZE 8 TRANSFERRATE 0.14 BUFFERPOOL CDS8K DROPPED TABLE RECOVERY ON;
COMMENT ON TABLESPACE CDS8K IS '';
CREATE Bufferpool CDSTEMP IMMEDIATE SIZE 250 PAGESIZE 32 K;
CREATE SYSTEM TEMPORARY TABLESPACE CDSTEMP PAGESIZE 32 K MANAGED BY AUTOMATIC STORAGE
EXTENTSIZE 16 OVERHEAD 10.5 PREFETCHSIZE 16 TRANSFERRATE 0.14 BUFFERPOOL "CDSTEMP";
COMMENT ON TABLESPACE CDSTEMP IS '';
CONNECT RESET;
```

When using DB2 LUW 9.1, you must increase the value of the following parameters:

- *APPLHEAPSZ* should be at least 1024
- *APP\_CTL\_HEAP\_SZ* should be at least 512

---

```
UPDATE DATABASE CONFIGURATION FOR db_name USING APPLHEAPSZ 1024
UPDATE DATABASE CONFIGURATION FOR db_name USING APP_CTL_HEAP_SZ 512
```

### ***DB2 on IBM i***

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

### ***DB2 on z/OS***

- When using DB2 z/OS database, you must ensure that DB2 zOS subsystem is enabled for Java, Stored Procedure, Function and XML.
- To enable XQuery support, PTF UK73139 or later must be applied.

### ***JMS message store table configuration***

When IBM® SPSS® Collaboration and Deployment Services Repository is installed with a WebSphere application server, the default WebSphere JMS provider, System Integration Bus (SIB), is configured to use the repository database as the JMS message store. When the repository is started, it will automatically create the required JMS tables in the database if they do not already exist.

When using WebSphere on z/OS with DB2, you must manually create the JMS message store tables. To create WebSphere JMS message store tables on z/OS with DB2, use WebSphere *sibDDLGenerator* command to generate the DDL and then apply the DDL to the database to create the tables. For more information about *sibDDLGenerator*, see WebSphere documentation.

### ***Additional considerations***

When running DB2 on dedicated hardware, it is recommended that DB2 Configuration Advisor be used for database performance management. Increasing the values of the following parameters may improve performance:

- **IBMDEFAULTBP**. The buffer pool size should be set according to the available memory and with regard to other applications running on the system.
- **NUM\_IOCLEANERS**. The number of asynchronous page cleaners must at least equal the number of processors on the system.
- **NUM\_IOSERVERS**. Increasing the number of I/O servers optimizes prefetching.
- **LOCKLIST**. Increasing the amount of storage for the lock list helps avoid timeouts and deadlocks during write operations.
- **MAXLOCKS**. The percentage of the *LOCKLIST* that must be filled before the database manager performs an escalation.

If DB2 is run on a shared system, changing these values must be done with consideration of available system resources, and DB2 self-tuning functionality should be considered as an alternative for managing the database performance.

### Microsoft SQL Server

When using Microsoft SQL Server database:

- The *DBO* schema must be used.
- A SQL Server user is required for configuring database access. Windows-based authentication is not supported.
- IP addresses must be enabled for the TCP/IP network protocol.
- Appropriate options must be used for processing non-Latin character sets. For example, it is recommended to use the Kana-sensitive (*\_KS*) option to distinguish between Hiragana and Katakana Japanese characters. For more information about database collation, refer to Microsoft SQL Server documentation.
- Snapshot isolation must be enabled for Microsoft SQL Server database. The following is an example of statements to activate snapshot isolation:

```
USE MASTER
GO
ALTER DATABASE <database_name> SET ALLOW_SNAPSHOT_ISOLATION ON
GO
ALTER DATABASE <database_name> SET READ_COMMITTED_SNAPSHOT ON
GO
```

### Oracle

#### Initialization parameters

When using an Oracle 10g or 11g database in conjunction with IBM® SPSS® Collaboration and Deployment Services, the following parameters and configurations must be followed. Changes are made to the *init.ora* and *spfile.ora* parameter files.

Table 3-2  
Oracle Database Parameters

Parameter	Setting
OPEN_CURSORS	300
NLS_CHARACTERSET	AL32UTF8
NLS_NCHAR_CHARACTERSET	AL16UTF16

*Note: Both NLS\_CHARACTERSET and NLS\_NCHAR\_CHARACTERSET should be set when creating the Oracle instance.*

#### Oracle XDB

For Oracle database, Oracle XDB (XML database feature) must be installed. You can verify that by querying for schema (user account) *XDB* (`SELECT * FROM ALL_USERS`), or by verifying that *RESOURCE\_VIEW* exists (`DESCRIBE RESOURCE_VIEW`). Note that the Oracle principal used with IBM® SPSS® Collaboration and Deployment Services Repository must be granted the *XDBADMIN* role.

### **Repository database maintenance**

It is strongly recommended that IBM® SPSS® Collaboration and Deployment Services Repository database maintenance tasks be performed at regular intervals.

Table 3-3  
Repository database maintenance schedule

Task	Recommended schedule
Backup	Daily
Update statistics	Daily
Consistency check	Weekly
Reorganize	Weekly
Rebuild	Monthly

## **Installation and configuration**

Use the following checklist to guide you through installation with a standalone application server:

- Install the application files on the host system using IBM Installation Manager.
- Configure IBM® SPSS® Collaboration and Deployment Services Repository to be used with the application server and the database.

While the steps described for standalone server are also applicable to clustered installation, it requires several additional steps. For more information, see the topic [Cluster configuration](#) on p. 28.

### **Installation**

IBM® SPSS® Collaboration and Deployment Services Repository application files are installed on the host system with IBM Installation Manager. Installation files can be found on the physical media or downloaded from IBM Passport Advantage.

1. Log on to the operating system as a user with appropriate level of permissions. For more information, see the topic [User and file system permissions](#) on p. 13.
2. Launch IBM Installation Manager:

GUI mode:

```
<IBM Installation Manager installation directory>/eclipse/IBMIM
```

Command line mode:

```
<IBM Installation Manager installation directory>/eclipse/tools/imcl -c
```

All installation tasks on IBM i must be performed in the QShell environment.

3. If the installation repository is not configured, specify the repository path, for example, as the mounted installation disk or a location on the host file system, the network, or an HTTP address.
4. On the main menu, select Install.

5. Select IBM® SPSS® Collaboration and Deployment Services Server as the package to be installed.
6. Read the license agreement and accept its terms.
7. Specify the package group and the installation directory.
  - A new package group is required for IBM SPSS Collaboration and Deployment Services Repository install.
  - Specify the installation directory for shared resources. You can specify the shared resources directory only the first time that you install a package.
8. Select features to be installed.
9. Review summary information and proceed with the installation. The application files will be installed in the specified directory. Further configuration is necessary. For more information, see the topic [Configuration](#) on p. 22. If you are running IBM Installation Manager in GUI mode, the option to start the configuration utility will be presented on the last panel.

If problems occur during the installation, you can troubleshoot them using IBM Installation Manager logs. The log files can be accessed from the main menu of IBM Installation Manager.

To automate IBM SPSS Collaboration and Deployment Services installation, IBM Installation Manager can be run in the silent mode. For more information, see IBM Installation Manager documentation: <http://publib.boulder.ibm.com/infocenter/install/v1r5/index.jsp>.

## **Configuration**

IBM® SPSS® Collaboration and Deployment Services Repository configuration utility performs the following tasks:

- Creates database objects for the content repository
- Creates application server resources, for example, JMS queues and deploys J2EE executables into the application server
- Configures encryption and security

While configuration with a standalone application server is the last required installation step, additional steps will be required in a clustered environment. For more information, see the topic [Cluster configuration](#) on p. 28.

### **Prior to configuration**

- ▶ Verify that the application server is installed and working. If you are performing an automatic configuration (configuration that creates the artifacts and deploys them to the application server) the application server must be in the following state:
  - **WebSphere standalone:** Server must be stopped.
  - **WebSphere managed:** Managed server must be stopped, Deployment Manager server must be running.

- **WebSphere cluster:** Cluster members must be stopped, Deployment Manager server must be running.
  - **JBoss:** Server must be stopped.
  - **WebLogic standalone:** Server must be stopped.
  - **WebLogic managed:** Managed server must be stopped, WebLogic administration server must be running.
  - **WebLogic cluster:** Cluster members must be stopped, WebLogic administration server must be running.
- ▶ Verify that the database is accessible.
  - ▶ If reusing an existing repository database with WebSphere, delete the SIB (JMS message store tables).

#### ***To run the configuration utility***

1. Log on to the operating system as the same user that installed IBM SPSS Collaboration and Deployment Services Repository.
2. Launch the configuration utility:

#### **GUI mode - Windows**

<repository installation directory>\bin\configTool.bat

#### **GUI mode - UNIX and Linux**

<repository installation directory>/bin/configTool.sh

#### **Command line mode - Windows**

<repository installation directory>\bin\cliConfigTool.bat

#### **Command line mode - UNIX, Linux, and IBM i in QShell**

<repository installation directory>/bin/cliConfigTool.sh

*Note:* The utility can also be automatically launched either launched as an option at the end of the installation step. For more information, see the topic [Installation](#) on p. 21.

3. Select the application server type.
4. Specify the application server settings:

#### **WebSphere**

- **WebSphere Profile Root** The directory location of the profile of the WebSphere server. Note that for a managed server or cluster, it is the path of the deployment manager profile. Other WebSphere settings, such as WebSphere installation root, profile topology (for standalone server), server, and node, will be automatically populated based on profile information. If the values cannot be populated automatically, you must specify them manually.
- **WebSphere Install Root** The directory location where WebSphere server is installed.

- **Server topology** WebSphere profile topology: standalone, managed, or cluster. You must select a topology if the deployment manager profile contains both managed servers and clusters.
- **URL Prefix** For clustered installation, the URL of the load balancer or proxy server for routing server-initiated requests.
- **WebSphere Server or Cluster** WebSphere server or cluster name.
- **WebSphere Node** For a managed WebSphere server, the name of the node where the target server is located.
- **WebSphere user name and password** Only if administrative security is enabled.

#### JBoss

- **Server Directory Path** The directory location where JBoss is installed.
- **JBoss Server** JBoss server name, for example, *default*.
- **JVM** Directory location of the JBoss JVM.
- **URL Prefix** The URL for routing server-initiated requests. The default URL prefix for JBoss is *http://127.0.0.1:8080*, unless server properties, such as bind address or port, have been modified. Note that *localhost* is not allowed as part of the URL prefix.

#### WebLogic

- **WebLogic Domain Root Directory** The directory location of the WebLogic domain. Other WebLogic settings, such as server directory path, domain topology (standalone or cluster), server or cluster name, and the path to WebLogic JVM, will be automatically populated based on the domain information. If the values cannot be populated automatically, you must specify them manually.
- **Server Directory Path** The directory location where WebLogic server is installed.
- **Domain topology** WebLogic domain topology: single server or cluster.
- **URL Prefix** For clustered installation, the URL of the load balancer or proxy server for routing server-initiated requests.
- **WebLogic Server or Cluster** The name of WebLogic server or cluster.
- **Path to WebLogic JVM** Directory location of WebLogic JVM.
- **WebLogic user name and password.**

#### 5. Specify database connection information:

- **Database type** IBM DB2, SQL Server, or Oracle.
- **Host** The host name or address of the database server.
- **Port** The access port for the database server.
- **Database name** The name of the database to be used for content repository.
- **SID/Service Name** For Oracle, SID or service name
- **Run as service** For Oracle, indicates that the connection is to a database service rather than by SID.
- **User name** Database user name.
- **Password** Database user password.



6. If reusing a database from a prior installation, specify whether existing data should be preserved or discarded.
7. Specify the options for the encryption 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.
  - To reuse a keystore from an existing repository installation, specify the path and password to the keystore. The key from the old keystore will be extracted and used in the new keystore. Note that the JRE used to run the application server must be compatible with the JRE that was used to create the encryption keys.
  - If you are not reusing an existing keystore, specify and confirm the password to the new keystore. The keystore will be created in *<repository installation directory>/keystore*.

*Important!* If the keystore file is lost, the application will not be able to decrypt any passwords and will become unusable. It will subsequently have to be reinstalled. Therefore, it is recommended that backup copies of the keystore file be maintained.

8. Specify the password value to be used for the built-in repository administrator user account (*admin*). The password will be used when logging into the repository for the first time.
9. Select deployment mode (automatic or manual):
  - Automatic deployment will create application server resources and deploy the application executables.
  - Manual deployment will generate J2EE executables and installation scripts in the *toDeploy/<timestamp>* output directory. These artifacts can later be used to manually deploy the repository. Manual configuration is intended for advanced users when more control of the application server environment is required.
10. Review summary information and proceed with configuration.
  - If configuration reports success, you can proceed with post-installation steps, such as starting the repository and verifying connectivity. For more information, see the topic [Post-installation](#) on p. 32.
  - If you have chosen the manual deployment mode, you can proceed to the manual steps. For more information, see the topic [Manual deployment](#) on p. 26.
  - If you are installing the repository with an application server cluster, you can proceed to configuring the other cluster nodes. For more information, see the topic [Cluster configuration](#) on p. 28.

*Note:* The configuration operation can take 15-30 minutes or longer to complete, depending on your hardware, network speed, the complexity of your application server topology, etc. If it appears that configuration process is not responding or if a failure is reported, examine the log files in the *<IBM SPSS Collaboration and Deployment Services Repository installation directory>/log*.

### **Silent configuration**

IBM SPSS Collaboration and Deployment Services Repository configuration can be automated by running the utility in silent mode with input from a properties file. The template for the properties file is available in `<repository home>/setup/resources/properties/config.properties`. When the configuration utility is run in interactive mode, it creates `<repository home>/platform/engineConfig.properties`.

To run the configuration utility in silent mode:

```
<repository installation home>/bin/engine.bat|.sh -config <config properties file path>
```

To re-run the configuration utility in silent mode with previously created default properties files, for example, after fixing the problems that caused the initial configuration to fail:

```
<repository installation home>/bin/engine.bat|.sh -rerun
```

You can change the logging level for silent configuration by using the `-antLogLevel <VERBOSE|DEBUG|INFO|WARN|ERROR>` parameter.

## **Manual deployment**

Manual configuration is intended for advanced users when more control of the application server environment is required. When the configuration utility is run with the manual deployment mode selected, it makes necessary changes to the database, but your application server is not changed. J2EE deployables, installation scripts, and properties files are generated in the `<repository installation directory>/toDeploy/<timestamp>` directory. These artifacts can be used to deploy IBM® SPSS® Collaboration and Deployment Services Repository.

*Important!* If you are planning to install the adapters for IBM SPSS products into IBM SPSS Collaboration and Deployment Services Repository, the adapters must be installed before manual deployment. If adapters are installed after the repository has been manually deployed, you must first undeploy the repository artifacts from the application server. After that, you can install the adapters, and then redeploy the repository using the following procedures for each application server type. For information about undeploying the repository, see [Uninstalling](#).

### **To manually deploy on WebSphere**

1. Perform IBM SPSS Collaboration and Deployment Services Repository installation. During the configuration step, select the manual option on the application server information panel. For more information, see the topic [Configuration](#) on p. 22.
  - The `<repository installation directory>/toDeploy/<timestamp>` directory will contain the files for the WebSphere server configuration and application deployment. `CrtCDSresources.py` script creates the application server resources, such as JDBC providers, data sources, messaging engine, etc. `DeployCDS.py` deploys the applications executables.

2. Verify that the application server is in the following state:
  - **WebSphere standalone:** Stopped.
  - **WebSphere managed/cluster:** Managed server/cluster members must be stopped, Deployment Manager server must be running.
3. Execute the scripts in the *<repository installation directory>/toDeploy/<time stamp>* directory.

If you are manually deploying to a standalone WebSphere server, `-connType NONE` option must be used:

```
<WAS profile root>/bin/wsadmin -lang jython -connType NONE -f CrtCDSResources.py
<WAS profile root>/bin/wsadmin -lang jython -connType NONE -f DeployCDS.py
```

If administration security is enabled for the WebSphere server, you also need to include the administrator user ID and password parameters:

```
<WAS profile root>/bin/wsadmin -lang jython -user <admin_user> -password <admin_password> -f CrtCDSresources.py
<WAS profile root>/bin/wsadmin -lang jython -user <admin_user> -password <admin_password> -f DeployCDS.py
```

4. Start the server.
  - For a cluster, complete the required steps for all cluster members. For more information, see the topic [WebSphere cluster](#) on p. 29.

#### ***To manually deploy the repository on JBoss***

1. Perform IBM SPSS Collaboration and Deployment Services Repository installation. During the configuration step, select the manual option on the application server information panel. For more information, see the topic [Configuration](#) on p. 22.
  - The *<repository installation directory>/toDeploy/<timestamp>* directory will contain the files for the JBoss server configuration and application deployment. *CrtCDSresources.bat* or *CrtCDSresources.sh* script creates the application server resources, such as JDBC providers, data sources, messaging engine, etc. *DeployCDS.bat* or *DeployCDS.sh* deploys the applications executables.
2. Verify that the application server is stopped.
3. Execute the scripts in the *<repository installation directory>/toDeploy/<timestamp>* directory.

Windows

```
CrtCDSresources.bat
DeployCDS.bat
```

UNIX

```
CrtCDSresources.sh
DeployCDS.sh
```

4. Start the server.

### **To manually deploy the repository on WebLogic**

1. Perform IBM SPSS Collaboration and Deployment Services Repository installation. During the configuration step, select the manual option on the application server information panel. For more information, see the topic [Configuration](#) on p. 22.
  - The `<repository installation directory>/toDeploy/current` directory will contain the files for the WebLogic server configuration and application deployment. `DeployCDS.bat` or `DeployCDS.sh` creates the application server resources, such as JDBC providers, data sources, messaging engine, etc., and deploys the applications executables.
5. Verify that the application server is in the following state:
  - **WebLogic standalone:** Stopped.
  - **WebLogic managed/cluster:** Managed server/cluster members must be stopped, administration server must be running.
2. Execute the following commands from the `<repository installation directory>/toDeploy/current` directory:
 

Windows

```
deploy.bat -user <weblogic_user> -password <weblogic_password> -resources -deploy
```

UNIX

```
deploy.sh user <weblogic_user> -password <weblogic_password> -resources -deploy
```
3. Update the WebLogic server startup script to include a call to script setting the environment variables. These files are located in the `<repository installation directory>/toDeploy/current` directory and also the `<WebLogic domain>/bin` directory.
 

Windows

```
setCDSEnv.cmd
```

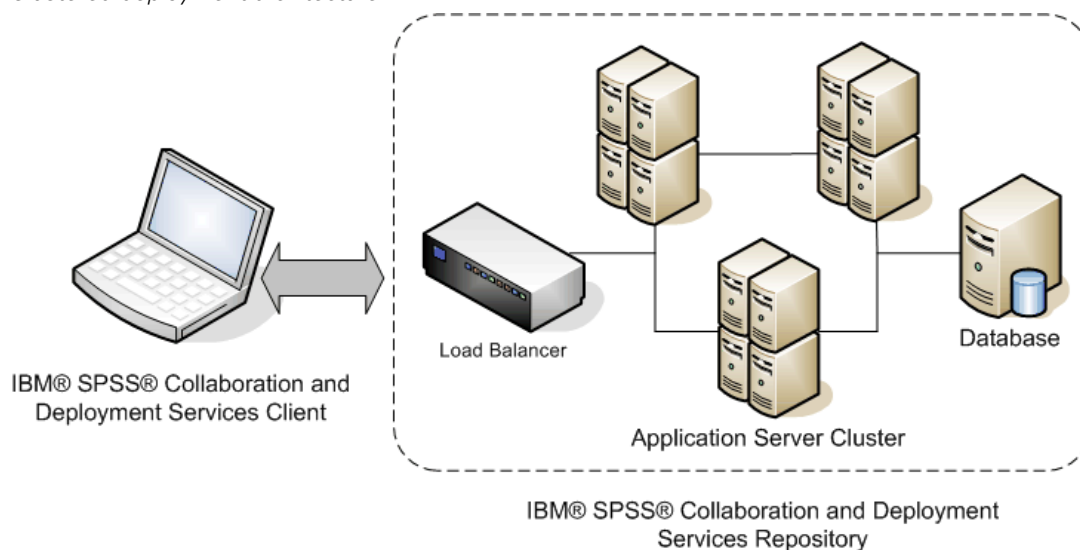
UNIX

```
setCDSEnv.sh
```
4. Start the server.
  - For a cluster, complete the required steps for all cluster members. For more information, see the topic [WebLogic cluster](#) on p. 30.

### **Cluster configuration**

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 allows processing to be distributed among multiple applications servers and it also provides redundancy in case of a single server failure.

Figure 3-1  
Clustered deployment architecture



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

- Initial installation and configuration of application components on the management node of the cluster.
- Subsequent configuration of cluster nodes.

IBM SPSS Collaboration and Deployment Services Repository currently supports clustering WebSphere and WebLogic application servers. Follow the application server-specific instructions to complete the deployment.

#### ***Installation prerequisites***

- Host system requirements must be met on all nodes of the cluster.
- All members of IBM SPSS Collaboration and Deployment Services Repository cluster must run on the same operating system as the main (management) node.
- The repository database must already exist and be accessible
- The application server topology must already exist before installing IBM SPSS Collaboration and Deployment Services Repository. It is recommended that you verify that the cluster is accessible and running properly at the load balancer address.
- The IBM SPSS Collaboration and Deployment Services Repository installation directory must be shared across all nodes in the cluster.

#### ***WebSphere cluster***

1. Make sure all prerequisites have been met.
2. Perform the installation and configuration. You can choose to deploy the application either automatically or manually. For more information, see the topic [Installation and configuration](#) on p. 21.

3. Configure the installation directory to be shared so that it is accessible to all members of the cluster.
4. Set the value of the *CDS\_HOME* variable for each node.
  - Open WebSphere administrative console
  - Open the *Environment* —> *WebSphere* variables section.
  - For each node in the cluster, there will be a *CDS\_HOME* variable defined. Verify that the value contains the appropriate path to the shared installation directory.
5. Save and synchronize your changes.
6. Make sure the IBM® SPSS® Collaboration and Deployment Services Repository URL Prefix configuration property value is set correctly to the URL of the load balancer. For more information, see the topic [Load balancer configuration](#) on p. 31.
7. Start the cluster.

### **WebLogic cluster**

1. Make sure all prerequisites have been met.
2. Perform the installation and configuration. You can choose to deploy the application either automatically or manually. For more information, see the topic [Installation and configuration](#) on p. 21.
3. Configure the installation directory to be shared so that it is accessible to all members of the cluster.
4. To ensure JMS failover, configure the JMS Server to a migratable target:
  - For automatic migration, WebLogic requires a data source with a specific table. The IBM® SPSS® Collaboration and Deployment Services Repository database can be used for this purpose, but the table must be created manually. Navigate to *<WebLogic server directory>/server/db* and select the subfolder that corresponds with the database vendor you are using with the repository. The database-specific SQL to create the table WebLogic needs can be found in the file *leasing.ddl*, for example, *<WebLogic server directory>/server/db/db2/leasing.ddl*. Notice the default table name is *ACTIVE*. Use the database vendor tools to create the table in the repository database.
  - Using WebLogic administration console, Under *Environment > Cluster > Configuration > Migration*, set *Migration Basis* to *Database* and *Data Source for Automatic Migration* to *CDS\_DataSource*. This is the data source for the repository and should already be created and targeted to the cluster.
  - Under *Environment > Migratable Targets*, set *Service Migration Policy* to *Auto-Migrate Exactly-Once Services*. This will cause the JMS services to automatically be moved to a different server if one should fail. Changes to the migratable target may require the servers to be restarted.

- Under Services > Persistent Stores > PlatformStore > Configuration, modify the Target setting to refer to the migratable target configured in the previous step. If you receive an error message about PlatformJMSServer not being targeted to the same target, it can be ignored.
  - Under Services > Messaging > JMS Servers > PlatformJMSServer, modify the Target setting to refer to the migratable target configured in the previous step.
5. Update the WebLogic server startup script to include a call to the *setCDSEnv.sh* or *setCDSEnv.cmd* script to set up the environment variables. Note that when repository adapters are installed, the script file is updated with new settings. The simplest way to ensure all servers have the latest settings is to refer directly to the script file in the *<repository installation directory>/toDeploy/current* directory using the shared network path.
  6. Make sure the IBM SPSS Collaboration and Deployment Services Repository URL Prefix configuration property value is set correctly to the URL of the load balancer. For more information, see the topic [Load balancer configuration](#) on p. 31.
  7. Start the cluster.

### **Load balancer configuration**

A software or hardware-based load balancer must be configured for accessing the repository in a clustered environment. Both WebLogic and WebSphere application servers provide built-in software-based load-balancer utilities, for example, WebLogic Apache plugin and IBM HTTP server.

*Important!* Session affinity must be enabled for any load balancer used with IBM® SPSS® Collaboration and Deployment Services cluster. For more information, see load balancer vendor documentation.

#### **Setting the URL prefix property**

In a cluster environment, *URL\_Prefix* repository configuration property value, used for routing server-initiated HTTP requests, must be set to the URL of the load balancer. Note that this property can be initially set when the IBM® SPSS® Collaboration and Deployment Services Repository configuration utility is run. For more information, see the topic [Configuration](#) on p. 22.

To set/update the value of URL prefix property after repository configuration:

- Start a single cluster member.
- Open the browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager by navigating to *http://<repository host>:<port number>/security/login*.
- Update the *URL\_Prefix* configuration property with the URL of the load balancer for the cluster and save your changes.
- Stop the running cluster member.
- Start the cluster.

### **Expanding the cluster**

In enterprise environments with large processing loads, it may be necessary to expand the cluster running IBM® SPSS® Collaboration and Deployment Services Repository by adding nodes after the initial installation.

#### **WebSphere**

1. Create additional WebSphere managed profiles and federate them to the cell. Create servers and add them to the cluster using the WebSphere console.
2. Execute the *CrtCDSresources.py* script in the */toDeploy/* directory to update the new node(s) that have been defined for the cell.

```
/bin/wsadmin -lang jython -f CrtCDSresources.py -update
```

3. Set the value of the *CDS\_HOME* variable for each node. For more information, see the topic [WebSphere cluster](#) on p. 29.
4. Restart the cluster.

#### **WebLogic**

1. Create additional WebLogic servers and add them to the cluster using WebLogic console.
2. Update the WebLogic server startup script to include a call to the *setCDSEnv.sh* or *setCDSEnv.cmd* script to set up the environment variables. Note that when repository adapters are installed, the script file is updated with new settings. The simplest way to ensure all servers have the latest settings is to refer directly to the script file in the *<repository installation directory>/toDeploy/current* directory using the shared network path.
3. Restart the server that was added to the cluster.

## **Post-installation**

Use the following checklist to guide you through post-installation steps:

- Start the server and verify the connectivity. If necessary, configure server autostart.
- Install any content adapter for using IBM® SPSS® Collaboration and Deployment Services Repository with other IBM SPSS products such as IBM® SPSS® Statistics and IBM® SPSS® Modeler.
- Install optional components: IBM® SPSS® Collaboration and Deployment Services Remote Process Server, IBM® SPSS® Collaboration and Deployment Services - Essentials for Python, and IBM® SPSS® Collaboration and Deployment Services Enterprise View Driver. For more information, see [Optional components on p. 47](#), *IBM SPSS Collaboration and Deployment Services Enterprise View Driver 5 Guide*, and *IBM SPSS Collaboration and Deployment Services - Essentials for Python 5 Reference*.
- If necessary, change the master database password.
- If necessary, install additional JDBC drivers.



- Install IBM® SPSS® Collaboration and Deployment Services clients, IBM® SPSS® Collaboration and Deployment Services Deployment Manager and BIRT Report Designer for IBM® SPSS®. For more information, see client application installation instructions.
- Using Deployment Manager, create repository users and group and assign application permissions through roles. For more information, see *IBM SPSS Collaboration and Deployment Services 5 Administrator's Guide*.

If problems occur during post-installation steps, see *IBM SPSS Collaboration and Deployment Services 5 Troubleshooting Guide*.

## **Starting the repository**

The repository can run either on a console or in the background. Running on a console allows viewing of processing messages and can be useful for diagnosing unexpected behavior. However, the repository typically runs in the background, handling requests from clients such as IBM® SPSS® Modeler or the IBM® SPSS® Collaboration and Deployment Services Deployment Manager.

*Note:* Running other applications simultaneously may reduce system performance and startup speed.

On the Windows platform, running on a console corresponds to running in a command window. Running in the background corresponds to running as a Windows service. In contrast, on a UNIX platform, running on a console corresponds to running in a shell, and running in the background corresponds to running as a daemon.

*Note:* To avoid permissions conflicts on UNIX systems, the repository must always be started under the same credentials, preferably *root*.

The repository is started by starting the application server. This can be accomplished with the scripts provided with the repository installation or native application server administration tools. For more information, see the application server vendor documentation.

### **WebSphere**

Use WebSphere administration tools. For more information, see WebSphere documentation.

### **JBoss**

Use the following scripts with the repository installation:

```
<repository installation directory>/bin/startserver.cmd
```

```
<repository installation directory>/bin/startserver.sh
```

Alternatively, you can also use JBoss administration tools to start the server. For more information, see JBoss documentation.

### **WebLogic**

For single WebLogic server configurations, use the following scripts provided with the repository installation:

```
<repository installation directory>/bin/startserver.cmd
```

```
<repository installation directory>/bin/startserver.sh
```

The WebLogic application server can also be started using your preferred mechanism, but you must ensure the correct environment variables and Java properties are set. To assist with this process, the configuration process creates the following scripts in the *toDeploy/current* directory:

- *setCDSEnv.cmd* or *setCDSEnv.sh*
- *startCDSWebLogic.cmd* or *startCDSWebLogic.sh*
- *startManagedCDSWebLogic.cmd* or *startManagedCDSWebLogic.sh*

If you selected automatic deployment during the configuration, the files are also copied to the domain and *<domain>/bin* directory. Inspect these files to determine which environment and Java properties must be set. The specific properties will vary depending on installed IBM SPSS adapters. If you are starting your server using a startup script, you can call *setCDSEnv.cmd/setCDSEnv.sh* from that script. If you are using node manager or some other mechanism to start the server, make sure to define the equivalent settings.

### **Verifying connectivity**

You can verify that IBM® SPSS® Collaboration and Deployment Services Repository is running by accessing browser-based IBM® SPSS® Collaboration and Deployment Services Deployment Manager using one of the following supported Web browsers:

- Internet Explorer 9
- Internet Explorer 8
- Firefox 10 ESR
- Safari 5
- Safari 4

#### **To access browser-based IBM SPSS Collaboration and Deployment Services Deployment Manager**

1. Navigate to the login page at *http://<repository host>:<port number>/security/login*.
2. Specify the administrator login credentials. The credentials are established during repository configuration.

## 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.

Notes:

- If WebLogic application server is used with the repository, the password must be changed in IBM® SPSS® Collaboration and Deployment Services before it is changed in the database.
- On IBM i, WebSphere AdminServer must be running for the IBM SPSS Collaboration and Deployment Services Password Utility to work properly.

To run the password utility:

1. Execute

Windows:

```
<repository installation directory>/bin/clidbpassword.bat
```

UNIX:

```
<repository installation directory>/bin/clidbpassword.sh
```

System i:

```
<repository installation directory>/bin/clidbpassword.qsh
```

2. Specify and confirm the new password using the command prompt.

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 can be converted to an encrypted string by running *encrypt.bat/encrypt.sh* with the password as command line argument. When you use WebLogic console to change the password, WebLogic will automatically encrypt it.

## JDBC drivers

IBM® SPSS® Collaboration and Deployment Services includes a set of IBM Corp. JDBC drivers for all major database systems: IBM DB2, Microsoft SQL Server, and Oracle. These JDBC drivers are installed by default with the repository.

If IBM SPSS Collaboration and Deployment Services does not include a driver for a needed database, you can update your environment to include a third-party driver for the database. For example, if access to a Netezza or Teradata database is needed for IBM® SPSS® Collaboration and Deployment Services Enterprise View, scheduled jobs, or reports, obtain the appropriate driver from the vendor and update your system. Third party drivers can be used by augmenting your repository installation with the driver files.

Depending on the application server, the directory location of the JDBC drivers is as follows:

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

**JBoss.** *<JBoss installation directory>/server/<server name>/lib*

**Oracle WebLogic.** *<repository installation directory>/<domain name>/lib*

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

To add a JDBC driver to the IBM® SPSS® Collaboration and Deployment Services Deployment Manager and BIRT Report Designer for IBM® SPSS® clients:

1. Close the client application if it is running.
2. Create a folder named JDBC at the root level of the client installation directory.
3. Place the driver files in the JDBC folder

After adding the driver files to your environment, the driver can be used in a data source definition. In the JDBC Name and URL dialog box, type the name and URL for the driver. Consult the vendor documentation for the driver to obtain the correct class name and URL format.

## ***IBM SPSS products compatibility***

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

Table 3-4  
*Supported versions of IBM SPSS applications*

<b>IBM Corp. Product</b>	<b>Version</b>
IBM® SPSS® Modeler	14.2, 15
IBM® SPSS® Statistics	20
IBM® Analytical Decision Management	6.2, 7
IBM® ShowCase®	9
IBM® SPSS® Data Collection	6

*Note:*

- For some products, patches may need to be applied. Check with IBM Corp. support to determine that correct patch level.
- You must verify that the installation and runtime requirements for IBM SPSS applications (for example, application servers and databases) are compatible with the requirements for IBM® SPSS® Collaboration and Deployment Services Repository. For detailed information, consult [Software product compatibility reports \(http://publib.boulder.ibm.com/infocenter/prodguid/v1r0/clarity/index.jsp\)](http://publib.boulder.ibm.com/infocenter/prodguid/v1r0/clarity/index.jsp) and the documentation for individual IBM SPSS products.

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 for jobs containing SPSS Statistics, SPSS Modeler, or ShowCase objects to be executed.

By default, the repository is installed without adapters for other IBM SPSS products and users must install the adapter packages corresponding to their versions of products. The packages are included on the products' distribution media.

Note that you should avoid storing IBM SPSS product objects in the repository until you first install the required adapter packages. If you do so, the object will not be a recognized type even after installing the adapter packages and you will need to delete the objects and add them to the repository again. For example, if an SPSS Modeler stream is stored in the repository before the SPSS Modeler adapter is installed, the MIME type will not be known and will instead be set to a generic type, resulting in an unusable stream file.

## Uninstalling

In the event that an installation is no longer required, the current version can be uninstalled.

To uninstall the repository:

1. Stop the repository.
2. If the Manual option was used when configuring the repository, undeploy the repository resources from the application server:
  - WebSphere standalone server
 

```
<WAS profile root>/bin/wsadmin -lang jython -connType none -f
<repository installation directory>/toDeploy/<time stamp>/delCDS.py
```
  - WebSphere managed server or cluster
 

```
<WAS profile root>/bin/wsadmin -lang jython -f
<repository installation directory>/toDeploy/<time stamp>/delCDS.py
```
  - JBoss
 

```
<repository installation directory>/setup/ant/bin/ant -lib "<repository installation directory>/setup/lib"
-Dinstall.dir="<repository installation directory>" -Doutput.dir="."
-f <repository installation directory>/setup/resources/scripts/JBoss/delete-resources.xml
```
  - WebLogic
 

```
<repository installation directory>/toDeploy/current/deploy[.sh]
-user <user ID> -password <password> -undeploy
```
3. To delete all data in the repository database, open *<repository installation directory>/uninstall/uninstall.properties* configuration file and set the `cds.uninstall.remove.user.data` property to true. Note that some data may still be left in the database after IBM Installation Manager uninstall is run, and it must be deleted manually.

*Important!* Do not perform this step if you plan on using the repository again for new installs, or need to preserve the audit or logging data. You should also consider using the database vendor tools to create a database backup before using this option.

4. Run IBM Installation Manager (GUI or command line), select the option to uninstall IBM® SPSS® Collaboration and Deployment Services, and follow the prompts. IBM Installation Manager can also be run in the silent mode. For more information, see IBM Installation Manager documentation: <http://publib.boulder.ibm.com/infocenter/install/v1r5/index.jsp>.
5. Manually delete the root installation directory for the repository.

*Important!* If you intend to reuse repository data, it is recommended to save the keystore file, which can be found in `<repository installation directory>/keystore`.

# ***Migration***

IBM® SPSS® Collaboration and Deployment Services Repository migration preserves the contents configuration settings of an existing repository including the following:

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

The following migration scenarios are supported:

- Migration from an earlier version of the repository.
- Migration to a different host, application server, or database server.

The following paths can be used for migration:

- Installation with a copy of the repository database. This is the recommended way to migrate.
- Installation of the repository with an existing repository database.

Before selecting a migration path, review this entire chapter, including the information on additional migration considerations.

Regardless of the selected migration path, you must follow these guidelines:

- IBM SPSS Collaboration and Deployment Services Repository application files must be installed in a different location from the original installation. Do not overwrite the files in the original location.
- A new J2EE server instance must be created. Do not reuse the profile (WebSphere), server (JBoss), or domain (WebLogic) already used to run the old instance of the repository.
- Migration process does not preserve repository package configuration, so any additional packages for IBM SPSS products such as IBM® SPSS® Modeler and IBM® SPSS® Statistics must be reinstalled. The packages must be at a level that is compatible with the given version of IBM® SPSS® Collaboration and Deployment Services. For more information, see the topic [IBM SPSS products compatibility](#) in Chapter 3 on p. 36.

For IBM SPSS Collaboration and Deployment Services 5, migration from version 4.0, 4.1, 4.2, 4.2.1, and 5 is supported.

## ***Installing with a copy of the repository database***

Using a copy of an existing repository database allows the existing instance to remain online until the new installation is ready to go live. This procedure is for migration with a copy of the repository database where the source and target databases are the same, for example, DB2 LUW to DB2 LUW. For information about switching database systems, see [Migrating to a different database](#)

- Make a copy of the existing repository database. The database copy can be performed using the database vendor or third-party tools.
- Run IBM® SPSS® Collaboration and Deployment Services configuration utility and point it to the new copy of the repository database. Make sure that the Preserve Existing Data option is selected to retain all existing data.
- Reinstall additional packages.

### ***Creating database copy for DB2 for IBM i migration***

To create a database copy for IBM® SPSS® Collaboration and Deployment Services Repository migration on IBM i:

1. Create the target schema using the SQL command CREATE SCHEMA.
2. Save the source library using the SAVLIB command. Specify that:
  - Access paths must be included
  - The following types do not need to be included: \*LOCALE, \*USRSPC, \*JRNRCV, \*JRN.
3. Create a data area in the target library called QDFTJRN. This will contain values to enable automatic journaling by the restore command.
  - First 10 characters are the target schema name,
  - Next 10 characters are QSQJRN
  - Next 10 characters are the \*ALL option
  - Last 10 characters are the \*RSTOVRJRN option

```
CRDTAARA DTAARA(target/QDFTJRN) TYPE(*CHAR) LEN(40) VALUE('target QSQJRN')
CHGDTAARA DTAARA(target/QDFTJRN (21 20)) VALUE('*ALL *RSTOVRJRN')
```

4. Restore the source into the target schema using the RSTLIB command.
  - Use the OPTION(\*NEW) option so that only new objects are restored.

## ***Installing with an existing repository database***

You can also upgrade to IBM® SPSS® Collaboration and Deployment Services Repository by installing the system with an existing repository database.

- Stop the repository.
- Backup the existing repository database.



- Install IBM® SPSS® Collaboration and Deployment Services and run the configuration utility. Make sure that the Preserve Existing Data option is selected to retain all existing data.
- Reinstall additional packages.

## ***Migrating to a different database***

Migrating to a different database can include moving to a different database vendor, for example, SQL Server to IBM DB2 or Oracle to DB2, migrating to a database on a different operating system, for example from Windows to Linux IBM DB2 LUW, or switching from DB2 for i to DB2 LUW.

Transferring repository objects to a different vendor's database can be accomplished using different methods. If the amount of data needing moved is small, customers can use export/import from an existing IBM® SPSS® Collaboration and Deployment Services Repository instance. Export/import does not preserve repository configuration and security settings, but is effective for moving subsets of objects, for example, from a proof of concept installation to production environment. Alternatively, the object promotion feature can be used to transfer objects, for example, from a development environment to production. For more information, see the "Export, import, and promotion" chapter of *IBM® SPSS® Collaboration and Deployment Services Deployment Manager 5 User's Guide*.

If an entire large-scale production repository must be moved, export/import and promotion features may not be adequate, and data must be copied directly following these guidelines:

- Create the target database following the instructions provided with the release of IBM® SPSS® Collaboration and Deployment Services you are migrating from.
- Install a temporary instance of IBM SPSS Collaboration and Deployment Services release you are migrating from. Specify the target database created in the previous step. This will ensure the database and all its objects (SQL views, UDFs, integrity rules, etc.) are configured correctly.
- Make sure the temporary IBM SPSS Collaboration and Deployment Services Repository instance is stopped.
- Use the database vendor tools to move the data from the source repository database to the target repository database. The database should already be configured, so it is only necessary to move the data in the IBM SPSS Collaboration and Deployment Services tables. See database vendor documentation for more information.
- Install IBM SPSS Collaboration and Deployment Services and run the configuration utility. Specify target database as the repository database and make sure to select the Preserve Existing Data option is selected to retain all existing data.
- Reinstall any additional packages.

Note that because of differences between database environments and vendor copy tools, such as DB2 backup, MS-SQL Server backup, Oracle RMAN, etc, you must verify during migration that the following database features are supported by the tool you have selected:

- XML tables (*SPSSDMRESPONSE\_LOG* and *SPSSSCORE\_LOG*)

- Binary data/BLOB, CLOB
- Special date formats

For example, Oracle 11g Data Pump does not support XML tables. Therefore, it can be used for restoring all repository tables except the two XML tables. The XML tables can be migrated using Oracle Export. Review all database vendor requirements, like XML schema registration in MS SQL Server and Oracle. It is recommended to consult IBM Corp. support prior to database migration.

## ***Additional migration considerations***

Depending on your setup, the following additional tasks may be required for a successful migration of the following:

- Passwords
- JMS data store
- Notification templates
- Cache settings

When planning the migration, note that some of these tasks may need to be performed before the configuration utility is run with an existing database or a database copy.

## ***Migrating passwords***

When migrating to a new IBM® SPSS® Collaboration and Deployment Services instance, it is best to use a Java environment from the same vendor and with the same bit size (32-bit or 64-bit) as the original installation. This is because the passwords that are stored in the repository are encrypted based on a keystore key that is provided by the Java runtime. A different Java bit size or vendor implementation will have a different keystore key which will not be able to decrypt the passwords correctly. In some cases, it is necessary to change Java vendors or bit size (for example, when moving from WebLogic to WebSphere).

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 the configuration utility 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. The export/import utility will migrate passwords, but when reusing an existing database, the export must be performed from the source installation before importing the credential resources to the target installation.

If you need to use a different Java environment, you can replace the passwords in credential resource definitions and IBM® SPSS® Modeler job steps after IBM® SPSS® Collaboration and Deployment Services Repository configuration:

- Export the jobs and/or credential resource definitions from the source repository instance and import them into the target repository using Deployment Manager.

or

- Manually update each password in job steps and each credential in the target repository using Deployment Manager.

## ***JMS store migration on WebSphere***

When IBM® SPSS® Collaboration and Deployment Services Repository is installed with a WebSphere application server, the default WebSphere JMS provider, System Integration Bus (SIB), is configured to use the repository database as the JMS message store. When the repository is started, it will automatically create the required JMS tables in the database if they do not already exist. Note that when using WebSphere on z/OS with DB2, you must manually create the JMS message store tables.

When using database copy to migrate the content of a repository to a new instance running on WebSphere, you must delete the JMS message store tables (the tables with the names starting with SIB\*) from the database before you start IBM® SPSS® Collaboration and Deployment Services. The tables will then be automatically created, with the exception of WebSphere on z/OS.

To manually create WebSphere JMS message store tables on z/OS with DB2, use WebSphere *sibDDLGenerator* command to generate the DDL and then apply the DDL to the database to create the tables. For more information about *sibDDLGenerator*, see WebSphere documentation.

## ***Migrating notification templates***

To preserve the customizations made to notifications templates in an existing repository, you must copy the templates from *<repository installation directory>/components/notification/templates* to the same directory of the new installation, after the new installation has been initially configured. For more information about notifications templates, see *IBM® SPSS® Collaboration and Deployment Services Repository 5 Administrator's Guide*.

## ***Cache settings migration***

When IBM® SPSS® Collaboration and Deployment Services Repository is migrated, object caching settings are inherited by the new repository installation. Therefore, if you are using a non-default cache provider in the source repository, such as WebSphere eXtreme Scale or Oracle Coherence, the target server must have an identical caching infrastructure set up. The following additional steps are required, following IBM SPSS Collaboration and Deployment Services Repository installation and configuration but prior to starting the application server:

### ***WebSphere eXtreme Scale***

- Copy *<repository installation directory>/components/notification/providers/repository-server.jar* to *<WebSphere xTreme Scale installation path>/ObjectGrid/gettingstarted*.

- Copy *<WebSphere xTreme Scale installation path>/ObjectGrid/lib/wsogclient.jar* to *<repository installation directory>/setup/resources/websphere* (*websphere* subfolder must be created manually).

**Oracle Coherence**

- Copy Coherence JAR files and all prerequisites to *<repository installation path>/components/cache-provider*.
- Install *coherence\_cache\_provider.package* from *<repository installation path>/packages/optional* using IBM® SPSS® Collaboration and Deployment Services Package Manager. For more information, see the topic [Package management](#) in Chapter 5 on p. 45.

# Package management

Updates and optional components are deployed to the repository server as compressed files with \*.*package* extension in the <repository installation directory>/staging/ directory using IBM® SPSS® Collaboration and Deployment Services Package Manager. Optional packages are available in the <repository installation directory>/packages/optional.

## Installing packages

IBM® SPSS® Collaboration and Deployment Services Package Manager is a command line application. It can also be called in batch mode by other applications to install their package files into the repository.

If IBM® SPSS® Collaboration and Deployment Services Repository was initially deployed automatically, during package installation the application server must be in the following state:

- **WebSphere:** For a standalone server, the server must be stopped. For a managed server, the server must be stopped, while the Deployment Manager node must be running. For a cluster, all cluster members must be stopped with the Deployment Manager node running.
- **JBoss:** Stopped.
- **WebLogic:** For a standalone server, the server must be stopped. For a managed server or clusters, the WebLogic administration server must be running and the target server/cluster stopped.

*Important!* If the repository was initially manually deployed, the deployment must be manually updated after running IBM SPSS Collaboration and Deployment Services Package Manager. For more information, see the topic [Manual deployment](#) in Chapter 3 on p. 26. The resources that are manually created do not change when running package manager, so it is not necessary to update them.

The user must have administrator-level privileges to be able to install packages.

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. It is possible to override the checks, for example, to install an older version of the package.

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

To install a package:

1. Navigate to <repository installation directory>/bin/.
2. Depending on the operating system, execute *cliPackageManager.bat* on Windows, *cliPackageManager.sh* on UNIX, or *cliPackageManager* on IBM i.

3. When prompted, enter the user name and password.
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'
```

To install multiple packages at the same time, enter multiple package names separated by a space, for example:

```
install 'C:\dir one\package1.package' 'C:\dir one\package2.package'
```

An alternative way to install multiple packages is to use the `-dir` or `-d` parameter with the path of a directory containing the packages to install

```
install -dir 'C:\cds_packages'
```

In the case of failed dependencies or version checks, you will be brought back to the main package manager prompt. To install ignoring non-fatal failures, rerun the install command using the `-ignore` or `-i` parameter.

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

### ***Silent mode***

To automate package installation, IBM SPSS Collaboration and Deployment Services Package Manager can be run in silent mode:

```
<repository installation directory>/bin/cliPackageManager[.sh] -silent
-user <administrator> -password <administrator password>
install <package path> [<additional_package_path>]
```

### ***Logging***

IBM SPSS Collaboration and Deployment Services Package Manager logs (main and Ant log) can be found in `<repository installation directory>/log`.

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

The packages can be downloaded from IBM Passport Advantage portal; for download information, see <http://www.ibm.com/support/docview.wss?uid=swg24031011> (<http://www.ibm.com/support/docview.wss?uid=swg24031011>). The packages can also be found in the */WebInstallers* and */RemoteProcessServer* directories of IBM SPSS Collaboration and Deployment Services distribution Disk 2.

For information about installing IBM SPSS Collaboration and Deployment Services Enterprise View Driver, see *IBM SPSS Collaboration and Deployment Services Enterprise View Driver 5 Guide*.

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

In order to enable Web installations of IBM® SPSS® Collaboration and Deployment Services Deployment Manager, BIRT Report Designer for IBM® SPSS®, and IBM® SPSS® Collaboration and Deployment Services Enterprise View Driver, the following EAR files must be deployed into the application server running IBM® SPSS® Collaboration and Deployment Services Repository:

- Deployment Manager—*DeploymentManagerWebInstall.ear*
- BIRT Report Designer for IBM SPSS—*BIRTSPSSWebInstall.ear*
- IBM SPSS Collaboration and Deployment Services Enterprise View Driver—*EVDriverWebInstall.ear*

### ***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.

The installation executables can be found on the Disk 2 in the */RemoteProcessServer/<operating system>/NoVM* directory. If you are using an installation package downloaded from IBM Passport Advantage, the executables can be found in the *Remote\_Process\_Server/NoVM* directory after the archive is expanded.

When executing the installation programs provided on the media, the user installing the application must have permissions to install software under the operating system.

### **Graphical installation wizard**

1. When the disk menu opens, click Install Remote Process Server, or execute the program to start the installation wizard. For Windows, this is *install.exe*. For Unix-based systems, the setup file is *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 installation program 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 1.6 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.



**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 instance name, access port, and secure connection option 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.

**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)

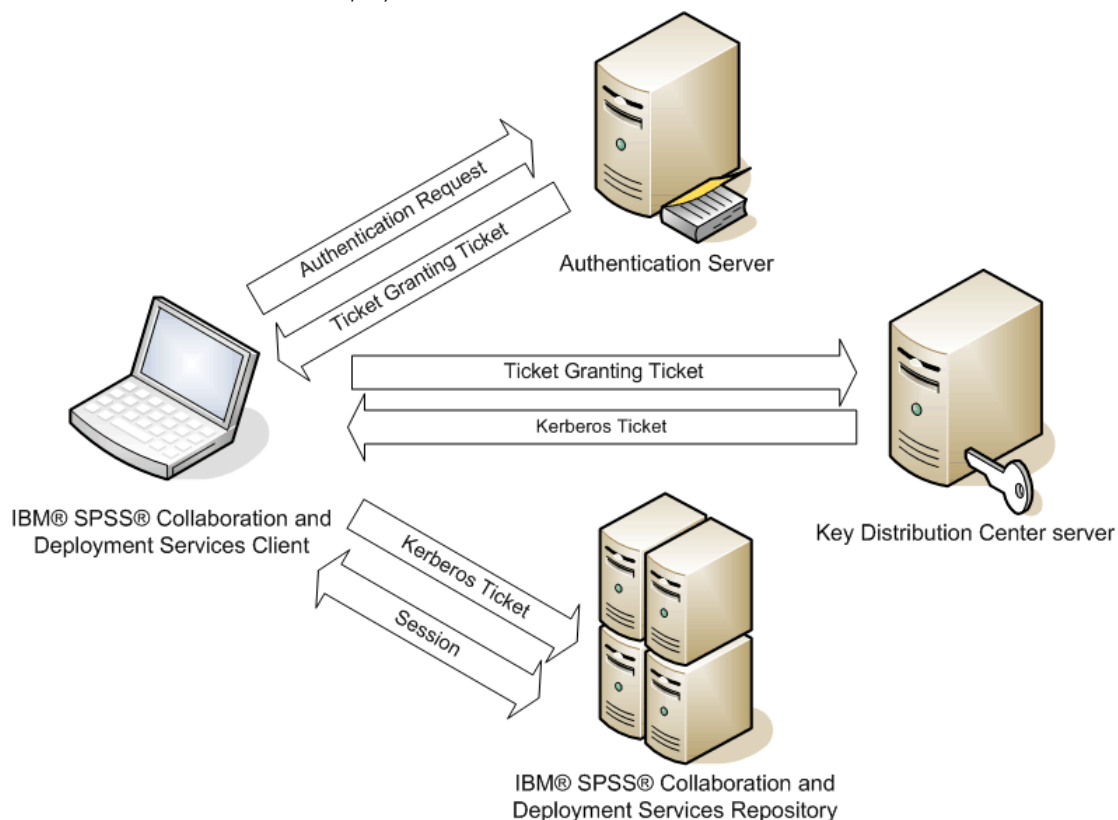
```
<remote process server installation directory>/shutdown.sh
```

# 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 7-1  
IBM SPSS Collaboration and Deployment Services SSO architecture



For example, when 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.
- Configuring the application server for single sign-on.
- For Windows client systems, the registry must be updated for Kerberos LSA access.
- 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, see the topic [Updating Windows registry for single sign-on](#) on p. 56.
- 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.

Additional configuration steps are also required to enable the repository Server Process Credential. For more information, see the topic [Server Process Credential configuration](#) on p. 57.

## **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:

- OpenLDAP directory
- IBM i profile directory
- Microsoft Active Directory

### **OpenLDAP**

The overall configuration includes the following steps:

- Configuring OpenLDAP security provider. For more information, see *IBM® SPSS® Collaboration and Deployment Services5 Administrator's Guide*.
- Kerberos server-specific changes to OpenLDAP configuration depending on the Kerberos server being used.

#### **OpenLDAP with Windows Kerberos Server**

If OpenLDAP directory is used with Windows Kerberos server, where OpenLDAP is the IBM SPSS Collaboration and Deployment Services security provider and Windows Kerberos server is the single sign-on provider, you must make sure that your OpenLDAP schema matches your Active Directory schema. If the schema does not match, you must change the user mapping on the OpenLDAP server.

#### **MIT Kerberos Server**

If MIT Kerberos Server is used with OpenLDAP, it may be necessary to set up SSL on the OpenLDAP server and client to ensure secure communication when the KDC service and LDAP server are on different host. Consult release-specific MIT Kerberos Server documentation for updated information.

### **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.

## **Active Directory**

The following instructions are for Windows Server 2003 domain controller. The steps will be similar for Windows Server 2008 systems.

- ▶ Create a user profile that will be used as Kerberos service principal
- ▶ Map this user profile to IBM® SPSS® Collaboration and Deployment Services host system.
- ▶ Configure encryption type and Kerberos credential delegation
- ▶ Create Kerberos keytab file and place it on IBM SPSS Collaboration and Deployment Services host system.

After these steps have been completed, you can use Deployment Manager to configure Active Directory as a security provider, and then configure a Kerberos single sign-on provider.

### ***To create a user profile for Kerberos principal:***

- ▶ Using the Active Directory users and computers management console, create one service principal account for the selected domain, for example, user *krb5.principal* in domain *spss*.
- ▶ Make sure to specify a last name parameter for this user. It is required by some application servers.
- ▶ Select the option for password to never expire.

### ***To map user profile to IBM SPSS Collaboration and Deployment Services host system:***

Download and install an appropriate version of Windows Support Tools and then use *setspn* utility to map the profile to the host.

- ▶ Run *setspn* with the IBM SPSS Collaboration and Deployment Services server fully qualified host name as argument as in the following example:

```
C:\Program Files\Support Tools>setspn -A HTTP/cdserver.spss.com krb5.principal
Registering ServicePrincipalNames for CN=krb5.principal,CN=Users,DC=spss,DC=com HTTP/cdserver.spss.com
Updated object
```

- ▶ Run *setspn* with IBM SPSS Collaboration and Deployment Services server host name as argument as in the following example:

```
C:\Program Files\Support Tools>setspn -A HTTP/cdserver krb5.principal
Registering ServicePrincipalNames for CN=krb5.principal,CN=Users,DC=spss,DC=com HTTP/cdserver
Updated object
```

### ***To map configure encryption type and credential delegation:***

- ▶ On the Account tab of the user properties dialog, select the option to use AES encryption.

- ▶ On the Delegation tab of the user properties dialog, select the option to trust the user with for delegation to any service.

**To create a Kerberos keytab file:**

- ▶ Run the *ktpass* Support Tools utility as in the following example:

```
C:\Program Files\Support Tools>ktpass -out c:\temp\krb5.prin.keytab -princ HTTP/cdserver.spss.com@SPSS.COM  
-mapUser krb5.principal -mapOp set -pass Pass1234 -crypto AES256-SHA1 -ptype KRB5_NT_PRINCIPAL
```

- ▶ Place the generated keytab file (in the example above, *c:\temp\krb5.prin.keytab*) on the file system of your IBM SPSS Collaboration and Deployment Services host.

## ***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 7 and 8 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 keytab file path.

#### ***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

## ***JBoss***

For JBoss application server, at least one JAAS (Java Authentication and Authorization Service) configuration for *JGSSServer* must be provided. The template for single sign-on application policy is located in the *JGSSServer* element of *<JBoss installation directory>/server/<deploy-dir>/conf/login-config.xml*. It may be necessary to change Kerberos login module name to correspond to the application server JRE.

At a minimum, at least one JAAS configuration for *JGSSServer* must be provided with the following parameters:

- **JGSSServer** required
  - **KerberosLocalUser** optional
  - **JDBC\_DRIVER\_01** optional
- ▶ For Sun JRE, the following default *JGSSServer* configuration is created:

```
JGSSServer {
  com.sun.security.auth.module.Krb5LoginModule required
  storeKey="true"
  doNotPrompt="true"
  realm=<realm name>
  useKeyTab="true"
  principal=<name>
  keyTab=<path>
  debug=false;
};
```

- ▶ Optional **KerberosLocalUser** configuration is used to allow NTLM bypass. This configuration allows the user to create a Kerberos credential when client browser sends a NTLM token (instead of a Kerberos token) during the negotiation challenge. Note that on Windows system, browsers on the same machine, where IBM® SPSS® Collaboration and Deployment Services server is installed, will always send NTLM token. All NTLM requests to IBM SPSS Collaboration and Deployment Services may be disabled by omitting this configuration from their JAAS configuration file.

For IBM JRE:

```
KerberosLocalUser {  
    com.ibm.security.auth.module.Krb5LoginModule required  
    useDefaultCcache=true  
    debug=false;  
};
```

For Sun JRE:

```
KerberosLocalUser {  
    com.sun.security.auth.module.Krb5LoginModule required  
    useTicketCache="true"  
    debug=false;  
};
```

- Optional JDBC\_DRIVER\_01 configuration is used for Kerberos authentication to database servers.

For IBM JRE:

```
JDBC_DRIVER_01 {  
    com.ibm.security.auth.module.Krb5LoginModule required  
    useDefaultCcache=true  
    debug=false;  
};
```

For Sun JRE:

```
JDBC_DRIVER_01 {  
    com.sun.security.auth.module.Krb5LoginModule required  
    useTicketCache="true"  
    debug=false;  
};
```

- It is also possible to specify appropriate login module class name, requirement type, and other options that the login module requires for each JAAS configuration. The login module class must be in class path. For more information, see JRE and application server vendor documentation.

## **WebLogic**

No additional configuration to the WebLogic Application Server is necessary. However, you must make sure that the J2EE application server is using a more recent JRE. Using an outdated JRE will result in various Kerberos errors.

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

IBM® SPSS® Collaboration and Deployment Services installation media include registry update files for configuring Windows XP SP2, Windows Vista, and Windows 2003 systems for Kerberos-based single sign-on. The files can be found in the



*/Documentation/Utility\_Files/Windows/registry* directory of the documentation package (downloaded from IBM Passport Advantage) or the */Administration/Windows/registry* directory of Disk 1. 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.

## ***Server Process Credential configuration***

Server Process Credential is the built-in credentials definition of the user profile under which the repository server is run. In Active Directory or OpenLDAP-based single sign-on environment, Server Process Credential can be used instead of regular repository user credentials to:

- Run reporting job steps and schedule time-based jobs
- Query a security provider for a list of user and group profiles

For more information on using the Server Process Credential, see IBM® SPSS® Collaboration and Deployment Services Deployment Manager documentation.

After the repository has been configured for single sign-on, the following additional steps are required for enabling the Server Process Credential:

- Configure the middle tier user login configuration for the application server.
- Create the Kerberos ticket cache on the repository host.

To use the server process credential with reporting job steps:

- Add the data source database server to the domain/realm.
- Configure the data source database server to accept single sign-on connections from the domain/realm.
- Configure the data source database to provide the appropriate permissions to the Server Process Credential.

### ***To configure the middle tier user login on WebSphere:***

1. Using WebSphere administration console, open Security > Global security > JAAS - Application logins
2. Define login configuration *CaDSMiddleTier*.
3. For *CaDSMiddleTier*, define a JAAS module with class name *com.ibm.security.auth.module.Krb5LoginModule*.
4. For *com.ibm.security.auth.module.Krb5LoginModule*, define the following custom properties:
  - **useDefaultCache** true

- **renewTGT** true
- **debug** false

**To configure the middle tier user login on JBoss:**

Add the following application policy to `<JBoss installation directory>/server/<Server Name>/conf/login-config.xml`:

```
<application-policy name="CaDSMiddleTier">
  <authentication>
    <login-module code="com.sun.security.auth.module.Krb5LoginModule" flag="required">
      <module-option name="useTicketCache">true</module-option>
      <module-option name="realm">###DOMAIN#NAME###</module-option>
      <module-option name="kdc">###KDC#SERVER#HOST###</module-option>
      <module-option name="renewTGT">true</module-option>
    </login-module>
  </authentication>
</application-policy>
```

**To configure the middle tier user login on WebLogic:**

Add the following application policy to JAAS login configuration file (`jaas.conf`).

```
CaDSMiddleTier
{
  com.sun.security.auth.module.Krb5LoginModule required
  useTicketCache=true
  renewTGT=true
  debug=false;
};
```

If the file does not exist, it must be created and specified as the `-Djava.security.auth.login.config` startup argument for the WebLogic server.

**Creating Kerberos ticket cache**

The Kerberos Ticket Cache will be used to store the Kerberos Ticket used to authenticate the Server Process Credential. To create the ticket cache perform the following steps:

1. Update the Kerberos configuration file on the repository host server, for example `c:\windows\krb5.ini`. This file identifies the default realm/domain, default encoding types, renewable ticket, and KDC address, and will be used by the `kinit` application to generate our ticket cache. The following is an example of the Kerberos configuration file:

```
[[libdefaults]
  default_realm = ACSS0.COM
  default_tkt_enctypes = rc4-hmac
  default_tgs_enctypes = rc4-hmac
  renewable = true
```

```
[realms]
```

```
ACSSO.COM = {  
    kdc = acKDC.ACSSO.COM:88  
    default_domain = ACSSO.COM  
}
```

2. Login to the repository host using the domain credentials that will be used for the Server Process Credential. Make sure that these credentials have appropriate permissions on the host.
3. Run *kinit* from the directory of the JRE used by the repository application server with the options to create a renewable ticket and a ticket cache.
4. Enter the password for the user for the Server Process Credential.

## **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.

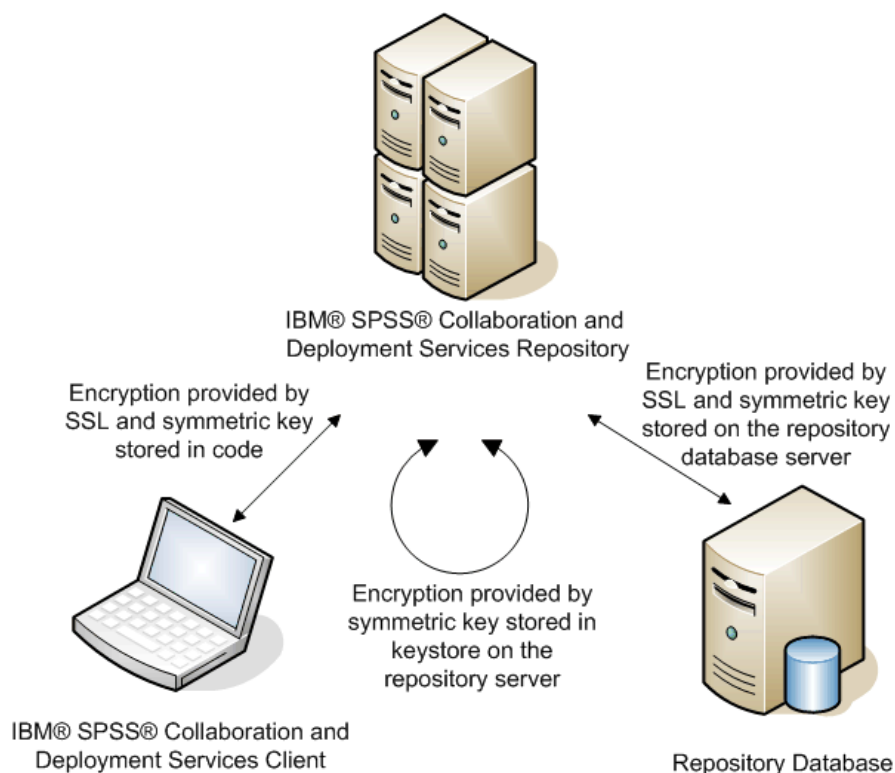
## ***FIPS 140–2 compliance***

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 9 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 8-1  
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.
- 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***

Secure 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, or you can search the Internet for instructions on creating a self-signed SSL certificate.
- ▶ 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.

#### ***IBM J9***

- ▶ Download the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files for your version of the SDK from the IBM.com Web site.
- ▶ Extract the unlimited jurisdiction policy files that are packaged in the ZIP file. The ZIP file contains a *US\_export\_policy.jar* file and a *local\_policy.jar* file. In your WebSphere Application Server installation, go to the *\$JAVA\_HOME/jre/lib/security* directory and back up your *US\_export\_policy.jar* and *local\_policy.jar* files.
- ▶ Replace your *US\_export\_policy.jar* and *local\_policy.jar* files with the two files that you downloaded.
- ▶ Enable security in the WebSphere Application Server administration console. Make sure that all node agents within the cell are active beforehand. For more information, see WebSphere documentation. Note that you must select an available realm definition from the list in Security > Secure administration, applications, and infrastructure, and then click Set as current so that security is enabled upon a server restart.
- ▶ Log off the administrative console.
- ▶ Stop the server.
- ▶ Restart the server.

#### ***Sun Java***

- ▶ Download the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files for your version of the SDK from Sun Java Web site.
- ▶ 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 an IBM® SPSS® Collaboration and Deployment Services 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.

# Logging

Logging is essential when troubleshooting application 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 for analysis at a later time.

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

## **Logging configuration file**

The location of IBM SPSS Collaboration and Deployment Services Repository logging configuration file varies depending on the host application server:

- **WebSphere:** <repository installation directory>/platform/log4j.properties.
- **JBoss:** <JBoss server directory>/deploy/jboss-logging.xml.
- **WebLogic:** <repository installation directory>/toDeploy/current/log4j.properties.

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.

The following default loggers are defined:

Table 10-1  
Loggers

<b>Logger</b>	<b>Description</b>
<i>log4j.rootCategory</i>	Root logger
<i>log4j.logger.com.spss</i>	All IBM® SPSS® Collaboration and Deployment Services events
<i>log4j.com.spss.cmor</i> , <i>log4j.com.spss.cmor.in-</i> <i>ternal.MetaObjectIm-</i> <i>portEngine</i>	Repository events
<i>log4j.com.spss.security</i>	Security events
<i>log4j.com.spss.process</i>	Job scheduling events
<i>log4j.com.spss.reporting</i> , <i>log4j.com.spss.reportser-</i> <i>vice</i>	Reporting events
<i>log4j.com.spss.notification</i>	Notification events

---

Logger	Description
<i>log4j.logger.org.springframework.jdbc.core.JdbcTemplate</i>	Spring framework JDBC events
<i>log4j.log4j.logger.com.spss.repository.internal.transfer</i>	Export-import events

The following appenders are defined:

- Console
- Main log (*cds.log*)
- Export-import transactions log (*cds\_transfer.log*)

The default location of the log files varies depending on the host application server:

- **WebSphere:** <WebSphere profile directory>/logs/
- **JBoss:** <JBoss server directory>/log/
- **WebLogic:** <WebLogic domain directory>/servers/<server name>/logs/

# Scoring Server deployment and configuration

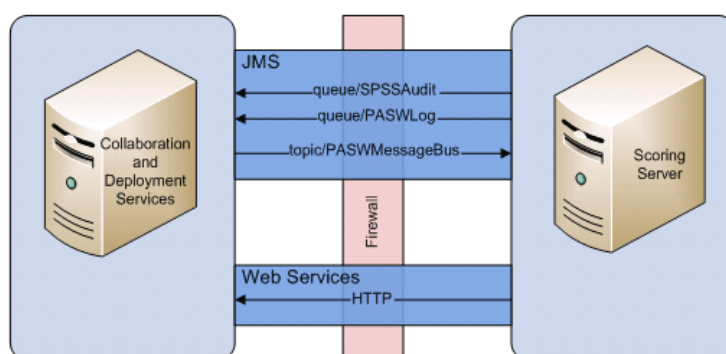
IBM® SPSS® Collaboration and Deployment Services Scoring Service is also available as a separately deployable application, the Scoring Server. The Scoring Server improves deployment flexibility in several key areas:

- Scoring performance can be scaled independently from other services
- Scoring Server(s) can be independently configured to dedicate computing resources to one or any number IBM SPSS Collaboration and Deployment Services scoring configurations
- Scoring Server operating system and processor architecture does not need match the IBM® SPSS® Collaboration and Deployment Services Repository or other Scoring Servers
- Scoring Server application server does not need match the application server used for IBM SPSS Collaboration and Deployment Services Repository or other Scoring Servers

To achieve the greatest flexibility, the Scoring Server communicates with the IBM SPSS Collaboration and Deployment Services Repository using only standard web service calls and JMS messages. There is no need for a shared file system or for a JDBC connection to the repository database. The network infrastructure must allow HTTP and JMS traffic between the repository server and Scoring Server(s).

Figure A-1

IBM SPSS Collaboration and Deployment Services with Scoring Server



### Important!

- When the Scoring Server is started, the repository must be available, so that the scoring configuration settings and related repository resources can be loaded. Once started, however, the Scoring Server will continue to run even if IBM SPSS Collaboration and Deployment Services Repository becomes unavailable.
- The Scoring Server runs outside IBM SPSS Collaboration and Deployment Services Repository server environment, so IBM SPSS Collaboration and Deployment Services security roles cannot be enforced on the Scoring Server. Instead, the Scoring Server, as a

JAX-WS application, can be secured by using standard application server security policy sets. Please refer to the application server Web services security documentation for more details.

## ***Before you begin***

Due to a large number of operating system and application server combinations, the procedure below is intended to provide only a general outline for possible deployment scenarios. Changes to accommodate IT infrastructure and business requirements will likely require additional technical information that is beyond the scope of this document. For example, the deployment steps provided below in this document may configure the Scoring Server for a basic quality of service, which may not be sufficient in some situations. Refer to the appropriate product documentation for additional information.

## ***WebSphere***

To determine the correct procedure for Scoring Server deployment on WebSphere, the following must be considered:

- Deployment scenario/WebSphere server topology
- Endpoint provider triplet for the service integration bus

### ***Deployment scenarios***

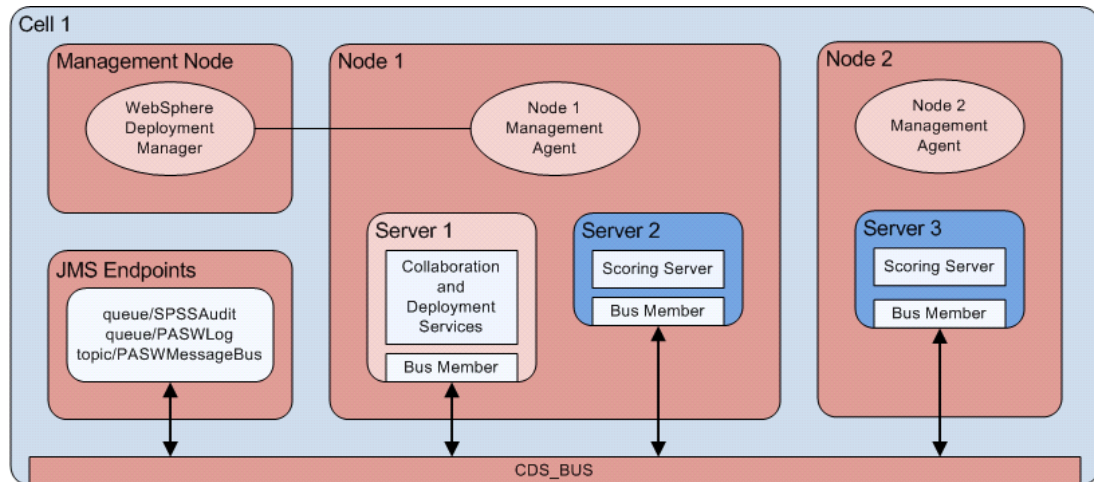
When IBM® SPSS® Collaboration and Deployment Services Repository and/or the Scoring Server are running on WebSphere, there two main deployment scenarios that determine the further procedure for JMS configuration:

- IBM SPSS Collaboration and Deployment Services Repository and Scoring Server profiles running in the same WebSphere cell
- IBM SPSS Collaboration and Deployment Services Repository and Scoring Server profiles running in different WebSphere cells

#### ***Servers in the same cell***

The “same cell” topology is defined by IBM SPSS Collaboration and Deployment Services Repository and the Scoring Server application running within the same WebSphere cell. For example, in the diagram below, the repository is in *Cell1-Node1-Server1*. The Scoring Server application can be deployed into the same node (*Cell1-Node1-Server2*), a different node (*Cell1-Node2-Server3*), or both. The Scoring Server does not place a limit on the number of nodes and servers that can be involved.

**Figure A-2**  
 IBM SPSS Collaboration and Deployment Services Repository and Scoring Server profiles running in the same WebSphere cell

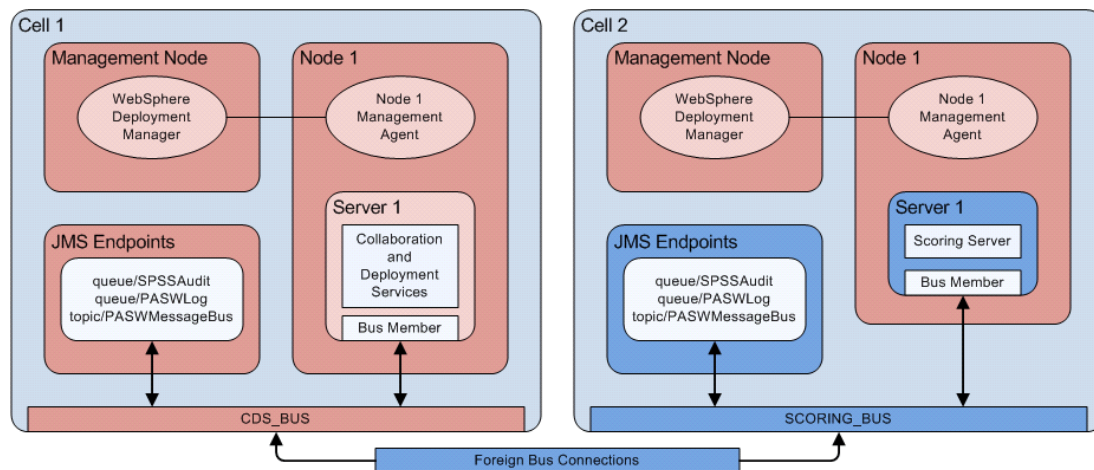


### **Servers in different cells**

The “different cells” topology is defined by the IBM SPSS Collaboration and Deployment Services Repository and the Scoring Server application running in different WebSphere cells. For example, in the diagram below, the repository is in *Cell1-Node1-Server1*. The Scoring Server is deployed into a different cell (*Cell2-Node1-Server1*). During the deployment, the two cells are connected using a service integration bus (for example, *SCORING\_BUS*), so that JMS traffic generated from one cell is visible to the other cell. Another example of this topology includes running the Scoring Server application in an unmanaged WebSphere profile. The Scoring Server application does not place a limit on the number of cells, nodes, and servers that can be involved. However, each cell running the Scoring Server application requires a unique service integration bus connection to the *CDS\_BUS* in the IBM SPSS Collaboration and Deployment Services Repository cell. Using a large number of cells could be difficult to manage.



**Figure A-3**  
 IBM SPSS Collaboration and Deployment Services Repository and Scoring Server profiles running in different WebSphere cells



### Determining endpoint provider triplet for a service integration bus

1. From the WebSphere Integrated Solutions Console (ISC), locate the service integration bus port number:  
 Servers > Server Types > WebSphere Application Servers > [server name] > Configuration > Communications > Ports > SIB\_ENDPOINT\_ADDRESS > Port
2. The endpoint triplet reference for this service integration bus is in the following format:  
 <HOST>:<SIB-ENDPOINT-ADDRESS-PORT>:BootstrapBasicMessaging

where <HOST> is the host name or IP address running the WebSphere server;  
 <SIB-ENDPOINT-ADDRESS-PORT> is the Service Integration Bus port number specified in Step 1. For example:

server.example.com:7276:BootstrapBasicMessaging

### Running Jython scripts

A number of Jython scripts are provided with the Scoring Server distribution to assist deployment, for example, to create the application server resources, deploy artifacts, etc.

#### WebSphere

All Jython scripts for WebSphere are located in

<SCORING\_HOME>\appServer\WebSphere\bin

The scripts assume that the current working directory is set to the directory containing the script file. When invoking the Jython script, change the current working directory to the directory containing the script file and specify the full path to the script processor. The Jython scripts are executed using the WebSphere *wsadmin* tool located within the WebSphere profile directory.

There are two types of command line parameters for the *wsadmin*:

- Parameters passed to the *wsadmin*
- Parameters passed to the Jython script

The *wsadmin* parameters vary depending on the topology of WebSphere is managed or unmanaged.

For unmanaged topologies, the WebSphere server must be stopped when running a script. If you need to manually change something in the WebSphere console, start the server, perform the action, and shut down the server before proceeding. The command must be run from the WebSphere profile into which the Scoring Server is being installed. The `-connType none` option must be used. For following is an example of the command:

```
<PROFILE_HOME>/bin/wsadmin.(bat/sh) -lang jython -connType none -f <PYTHON_SCRIPT_FILE_NAME> [script parameters]
```

For managed topologies, the WebSphere Deployment Manger and associated node managers must be running, but the servers should all be stopped. The command must be run from the WebSphere profile running the WebSphere Deployment Manager (DMGR). For following is an example of the command:

```
<DMGR_PROFILE_HOME>/bin/wsadmin.(bat/sh) -lang jython -f <SCRIPT_FILE_NAME> [script parameters]
```

If administrative security is enabled for the WebSphere profile, the administrative user ID and password parameters must also be passed to *wsadmin*:

```
-user <USER> -password <PASSWORD>
```

If the Scoring Server is being deployed into a non-clustered server, the node and server parameters must be passed to the Jython script:

```
-node <NODE> -server <SERVER>
```

If the Scoring Server is being deployed into a clustered server, the cluster parameter must be passed to the Jython script:

```
-cluster <CLUSTER_NAME>
```

All *wsadmin* examples presented in this document assume a standalone unmanaged and non-clustered WebSphere server with administrative security disabled.

### **WebLogic**

All Jython scripts for WebLogic are located in

```
<SCORING_HOME>/appServer/WebLogic/bin
```

The scripts assume that the current working directory is set to the directory containing the script file. When invoking the Jython script, change the current working directory to the directory containing the script file and specify the full path to the script processor. The Jython scripts are executed using the WebLogic *WLS* tool located in the `<WebLogic home>/common/bin` directory. When running a script, WebLogic Administration Server must be running but the target servers must be stopped.

## Deployment process overview

The installation steps for a Scoring Server can be broken down into two categories:

- Steps taken on the IBM® SPSS® Collaboration and Deployment Services Repository application server
- Steps taken on the Scoring Server

### Repository application server configuration

1. Install IBM® SPSS® Collaboration and Deployment Services Repository and content adapters (IBM® SPSS® Modeler, IBM® Analytical Decision Management, IBM® SPSS® Modeler Text Analytics, IBM® SPSS® Statistics, etc.) The Scoring Server is essentially a subset of the IBM® SPSS® Collaboration and Deployment Services services, so installing the Scoring Server begins with installing the IBM SPSS Collaboration and Deployment Services Repository. Do not attempt to deploy a Scoring Server until the IBM SPSS Collaboration and Deployment Services server is installed and fully functional. Consult IBM SPSS Collaboration and Deployment Services Repository installation guide for more information.
2. IBM SPSS Collaboration and Deployment Services Repository server changes to support the Scoring Server. For more information, see the topic [Application server preparation to support Scoring Server](#) on p. 78.
3. Copy `<repository home>/toDeploy/<most recent timestamp>/Scoring` directory to the Scoring Server host file system. Each time the IBM SPSS Collaboration and Deployment Services Repository or related adapters are installed or updated, a new subdirectory is created under the `<repository home>/toDeploy` directory. The directory name is derived from the date and time when the directory was created. Inside this directory is a *Scoring* subdirectory containing all of the Scoring Server files. The contents of the *Scoring* subdirectory must be copied to each system that will run a Scoring Server instance.

### Scoring Server deployment

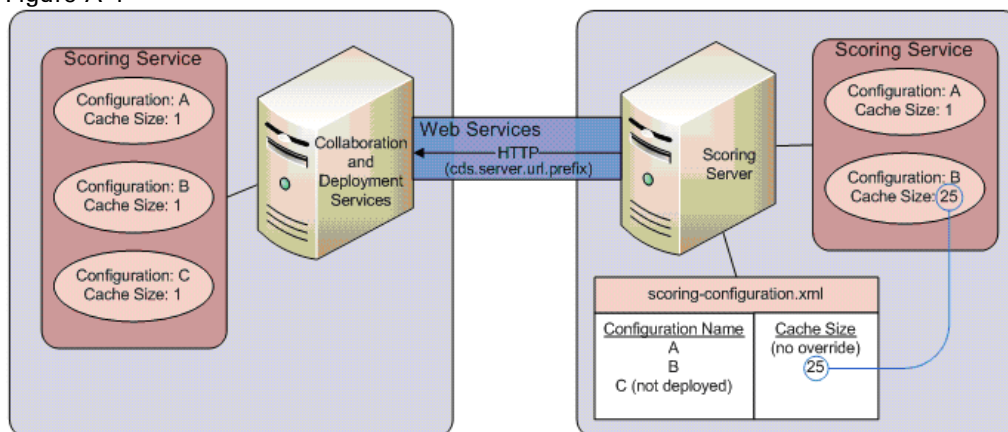
This section describes the general steps for installing the Scoring Server with all actions taking place on the Scoring Server host system. For detailed steps with application server-specific instructions, see Scoring Server deployment . Note that in the following steps the `SCORING_HOME` alias specifies the path of the *Scoring* directory on the Scoring Server host file system.

1. Configure the Scoring Server environment. After the *Scoring* directory has been copied to the Scoring Service host file system, the script `<SCORING_HOME>/bin/setupScoringEnv.(bat/sh)` must be run. This script initializes the contents of the *Scoring* directory with the Scoring Server system information.
2. Prepare the `scoring-configuration.xml` configuration file. The `scoring-configuration.xml` file is divided into two sections: `serviceProperties` and `configurationSelectors`. For additional information, please refer to the documentation in the comments block of the `scoring-configuration.xml` file.

The *serviceProperties* section is used to define property name/value pairs that control the runtime behavior of the Scoring Server. The Scoring Server uses the *cds.server.url.prefix* property to initiate web service calls to the IBM® SPSS® Collaboration and Deployment Services Repository; it must match the URL prefix of the IBM SPSS Collaboration and Deployment Services Repository server. Other properties may also be defined in this section, but should generally not be required.

The *configurationSelectors* section is used to control which scoring configurations are deployed on the Scoring Server. The list of selectors is processed, in order to determine if a particular scoring configuration on the IBM SPSS Collaboration and Deployment Services Repository server should be deployed to the Scoring Server. The first selector to match the configuration name will control if/how the scoring configuration is deployed to the Scoring Server. The selector definition has additional options to customize the scoring configuration behavior on the Scoring Server. For example, setting the *cacheSize* option will override the setting loaded from IBM SPSS Collaboration and Deployment Services Repository server, allowing the cache size to be tailored to the Scoring Server's resources. By default, this file is designed to deploy all scoring configurations with settings identical to IBM SPSS Collaboration and Deployment Services Repository server.

Figure A-4



At startup, the Scoring Server reads the contents of a *scoring-configuration.xml* configuration file. The Scoring Server searches for the *scoring-configuration.xml* file in the following order:

- Path given in Java system property, if property is defined:

```
-Dcom.spss.scoring.configuration.file=C:/ScoringFiles/scoring-configuration.xml
```

- Inside the Scoring EAR. This option may be useful to configure the Scoring Server in a clustered environment. To employ this option, the scoring configuration file must be manually added to root folder of the Scoring Server EAR.

- Default relative path from SCORING\_HOME variable:

```
<SCORING_HOME>/configuration/scoring-configuration.xml
```

3. Install the adapters. The Scoring directory, when copied from the IBM SPSS Collaboration and Deployment Services Repository server, contains only the platform-independent parts of the adapters. For the Scoring Server to function properly, the platform-dependent parts of the adapters must be installed on the Scoring Server system. Follow the same IBM SPSS Collaboration and

Deployment Services Repository adapter installation steps, except substitute *SCORING\_HOME* for any references to the repository installation directory. The adapter versions used on the Scoring Server should match the versions used on the IBM SPSS Collaboration and Deployment Services Repository server.

4. JMS provisioning. The Scoring Server interacts with the IBM® SPSS® Collaboration and Deployment Services server using several JMS queues and one JMS topic. IBM SPSS Collaboration and Deployment Services Repository server and the Scoring Server are designed to continue functioning if the other server becomes unavailable, for example, in the event of network outage, shutdown, or system crash. If the IBM SPSS Collaboration and Deployment Services Repository server becomes unavailable, any JMS messages generated by the Scoring Server will be handled (queued or discarded) as determined by the Scoring Server JMS configuration. Conversely, IBM SPSS Collaboration and Deployment Services Repository server does not depend on any Scoring Server resources, and is unaffected by the Scoring Server becoming unavailable.

The Scoring Server is designed to listen to IBM SPSS Collaboration and Deployment Services Repository server for updates to scoring configurations and related Content Repository dependencies. The IBM SPSS Collaboration and Deployment Services Repository server produces update event messages on the *topic/PASWMessageBus* JMS topic. The Scoring Server is designed to consume these update events and take appropriate actions. It is through this mechanism that the Scoring Server is kept up-to-date with the changes occurring on the IBM SPSS Collaboration and Deployment Services server.

The Scoring Server also produces JMS messages of its own. In the same manner as the IBM SPSS Collaboration and Deployment Services Scoring Service, the Scoring Server generates scoring log and audit messages that are written to the respective queues on the Scoring Server. The instructions in this document are to configure JMS to forward these messages to IBM SPSS Collaboration and Deployment Services Repository server, where they are processed identically to the messages produced by the IBM SPSS Collaboration and Deployment Services Repository server.

Destination name	Producer	Consumer	Latency Requirements	Quality of Service
<i>topic/PASWMessageBus</i>	IBM SPSS Collaboration and Deployment Services Repository	Scoring Server	Immediate delivery (low latency)	Duplicate okay
<i>queue/SPSSAudit</i>	Scoring Server	IBM SPSS Collaboration and Deployment Services Repository	None (batch OK)	At most once
<i>queue/PASWLog</i>	Scoring Server	IBM SPSS Collaboration and Deployment Services Repository	None (batch OK)	At most once
<i>queue/PASWScoring</i>	Scoring Server	Scoring Server	Immediate delivery (low latency)	At most once

5. Deploy the Scoring Server EAR (*scoringserver50.ear*) into the application server.

6. IBM SPSS Collaboration and Deployment Services Repository Credential Definition. The Scoring Server must provide a IBM SPSS Collaboration and Deployment Services credential when calling IBM SPSS Collaboration and Deployment Services web services. In this step, an application server credential is defined inside application server security mechanism and connected to the Scoring Server *security-jca.rar* resource adapter. The Scoring Server uses this credential when making web service calls to the IBM SPSS Collaboration and Deployment Services server.

*Important!* The IBM SPSS Collaboration and Deployment Services credential used by the Scoring Server must have the *Configure Model* action and read permission to all repository files referenced by the scoring configurations.

7. Scoring Server startup. Several system properties and Java properties must be defined for the Scoring Server to operate correctly. This step provides special instructions that must be followed when starting the Scoring Server.

## ***Application server preparation to support Scoring Server***

The following steps include configuration changes to IBM® SPSS® Collaboration and Deployment Services Repository application server environment required to support the Scoring Server. The steps must be completed before installing any Scoring Servers.

### ***Repository on WebSphere***

The following are the procedures for configuring the WebSphere application server running IBM® SPSS® Collaboration and Deployment Services Repository to work with the Scoring Server. Note that the procedures are different depending on the application server used to run the Scoring Server:

- Scoring Server running on WebSphere with Scoring Server and IBM® SPSS® Collaboration and Deployment Services in different cells
- Scoring Server running on WebSphere with Scoring Server and IBM SPSS Collaboration and Deployment Services running the same cell
- Scoring Server running on JBoss or WebLogic

*Note:* In order to correctly configure the messaging infrastructure of WebSphere application server, it is strongly recommended to review the Messaging Administration Guide Redbook before proceeding with the Scoring Server installation.

### ***Scoring Server on WebSphere***

The changes to IBM® SPSS® Collaboration and Deployment Services Repository WebSphere application server to support the Scoring Server vary depending upon the topology of application server(s) being used to run the Scoring Server.

**Profiles in the same cell**

No IBM SPSS Collaboration and Deployment Services Repository application server changes are needed.

**Profiles in the different cells**

Several JMS resources in the cell running the Scoring Server must be connected to the corresponding JMS resources in the cell running IBM SPSS Collaboration and Deployment Services Repository. This is accomplished by creating a uniquely named service integration bus (for example, *SCORING\_BUS*) in the cell running the Scoring Server. The service integration bus is then connected to the bus in the repository WebSphere server cell using two foreign bus connections (one in each direction). This must be done for every cell running a Scoring Server that is not also running IBM SPSS Collaboration and Deployment Services Repository. Every Scoring Server service integration bus connecting to the repository server bus must have a unique name.

1. In the Scoring Server cell, create a new Service Integration Bus with a unique bus name.

Service Integration > Buses > New Field Name

Field name	Field value
Bus Name	Unique name (for example, <i>SCORING_BUS</i> )
Bus Security	Unchecked (disabled)

2. The unique service integration bus, created in the prior step, requires a bus member and an associated message store. Consult WebSphere documentation for detailed information about creating a new bus member.

Service Integration > > Buses > [*SCORING\_BUS*] > Bus members > Add

When creating the bus member, note that the Scoring Server is not sensitive to the message store type. If using a data store, do not use the IBM SPSS Collaboration and Deployment Services Repository database because it may conflict with the *CDS\_BUS* message store.

3. In the Scoring Server cell, create a foreign bus connection from Scoring Server service integration bus (for example, *SCORING\_BUS*) to the bus in IBM SPSS Collaboration and Deployment Services Repository cell (for example, *CDS\_BUS*).

Service Integration > Buses > [*SCORING\_BUS*] > Foreign bus connections > New

Table A-1

Bus connection type

Field name	Field value
Bus connection type	Direct connection

Table A-2

Foreign bus type

Field name	Field value
Foreign bus type	Service integration bus

**Table A-3**  
Local bus details

Field name	Field value
Messaging engine to host the connection	Local messaging engine hosting <i>SCORING_BUS</i> (for example, <i>Scoring-Node01.server1-SCORING_BUS</i> )
Inbound user ID	

**Table A-4**  
Foreign bus details > Configure a foreign bus in a remote cell

Field name	Field value
Name of Service integration bus to connect to	CDS_BUS
Gateway messaging engine in the foreign bus	This value can be found on the repository cell: Service Integration > Buses > CDS_BUS > Messaging engines (for example, <i>CDS-Node01.server1-CDS_BUS</i> )
Service integration bus link name	<i>CDS_SCORING_INTEGRATION</i>
Target inbound transport chain	<i>InboundBasicMessaging</i>
Bootstrap service integration bus provider endpoints	Service integration bus endpoint triplet for the repository server. For more information, see the topic <a href="#">Before you begin</a> on p. 71. (for example, <i>cds.server.example.com:7276:BootstrapBasicMessaging</i> )

- Adjust the Scoring Server foreign bus connection to pass all traffic between *CDS\_BUS* and *SCORING\_BUS*.

Service Integration > Buses > [SCORING\_BUS] > Foreign bus connections > CDS\_BUS > Service integration bus link routing properties > Topic space map entries > New > General Properties

**Table A-5**  
Local bus details

Field name	Field value
Local topic space	Default.Topic.Space
Remote topic space	Default.Topic.Space

- In the IBM SPSS Collaboration and Deployment Services Repository server cell, create a foreign bus connection from *CDS\_BUS* to the Scoring Server cell's *SCORING\_BUS*.  
Service Integration > Buses > [CDS\_BUS] > Foreign bus connections > New

**Table A-6**  
Bus connection type

Field name	Field value
Bus connection type	Direct connection

**Table A-7**  
Foreign bus type

Field name	Field value
Foreign bus type	Service integration bus



Table A-8  
Local bus details

Field name	Field value
Messaging engine to host the connection	Local messaging engine hosting <i>SCORING_BUS</i> (for example, <i>CDS-Node01.server1-CDS_BUS</i> )
Inbound user ID	

Table A-9  
Foreign bus details > Configure a foreign bus in a remote cell

Field name	Field value
Name of Service integration bus to connect to	<i>SCORING_BUS</i>
Gateway messaging engine in the foreign bus	This value can be found on the repository cell: Service Integration > Buses > <i>CDS_BUS</i> > Messaging engines (for example, <i>Scoring-Node01.server1-SCORING_BUS</i> )
Service integration bus link name	<i>CDS_SCORING_INTEGRATION</i>
Target inbound transport chain	<i>InboundBasicMessaging</i>
Bootstrap service integration bus provider endpoints	Service integration bus endpoint triplet for the repository server. For more information, see the topic <a href="#">Before you begin</a> on p. 71. (for example, <i>scoring.server.example.com:7276:BootstrapBasicMessaging</i> )

6. Adjust IBM SPSS Collaboration and Deployment Services Repository server foreign bus connection to pass all traffic between *CDS\_BUS* and *SCORING\_BUS*.

Service Integration > Buses > *CDS\_BUS* > Foreign bus connection > [*SCORING\_BUS*] > Service integration bus link routing properties > Topic space map entries > New

Table A-10  
General properties

Field name	Field value
Local topic space	Default.Topic.Space
Remote topic space	Default.Topic.Space

7. The Scoring Server cell uses the unique service integration bus to communicate with the *CDS\_BUS* in the repository server cell. Define the JMS endpoints and connect them to the service integration bus by running the *CrtScoringJMS.py* script and passing the unique name of the service integration bus as a parameter:

```
-busName <UNIQUE_BUS>
```

For example:

```
cd <SCORING_HOME>/appServer/WebSphere/bin
<PROFILE_HOME>/bin/wsadmin.(bat/sh) -lang jython -conntype none -f CrtScoringJMS.py
-node Scoring-Node01 -server server1 -busName <UNIQUE_BUS>
```

### **Scoring Server on JBoss or WebLogic**

The *Provider endpoints* setting on the IBM® SPSS® Collaboration and Deployment Services Repository server JMS queue and JMS topic connection factories must be configured to allow connections from external JMS clients.

1. Find the repository application server Service Integration Bus endpoint triplet. For more information, see the topic [WebSphere](#) on p. 71.
2. In WebSphere console, add the endpoint triplet to *CDSQueueConnFactory*:  
Resources > JMS > Queue connection factories > CDSQueueConnFactory > Provider endpoints
3. In WebSphere console, add the endpoint triplet to *CDSTopicConnFactory*:  
Resources > JMS > Topic connection factories > CDSTopicConnFactory > Provider endpoints
4. Restart all nodes in the repository WebSphere application server cell.

### **Repository on JBoss**

No repository application server adjustments are needed.

### **Repository on WebLogic**

No repository application server adjustments are needed.

## **Scoring Server deployment**

The following steps must be taken on the Scoring Server host. Different steps apply to different application servers.

### **WebSphere**

This following section provides instructions for installing the Scoring Server with a WebSphere application server.

#### **Setting up the environment**

1. Run `<SCORING_HOME>/bin/setupScoringEnv.(bat/sh)`.
2. Prepare *scoring-configuration.xml*. For more information, see the topic [Deployment process overview](#) on p. 75.
3. Run the `<SCORING_HOME>/appServer/WebSphere/bin/CrtScoringResources.py` script.

```
cd <SCORING_HOME>/appServer/WebSphere/bin
<PROFILE_HOME>/bin/wsadmin.(bat/sh) -lang jython -conntype none -f CrtScoringResources.py
-node Scoring-Node01 -server server1
```

**JMS Provisioning**

Each WebSphere server running the Scoring Server application must have a bus member (and an associated message store) to the Service Integration Bus and associated JMS endpoints. Consult WebSphere documentation for detailed information about creating a new bus member. The Scoring Server application is not sensitive to the message store type. If using a data store, do not use IBM® SPSS® Collaboration and Deployment Services Repository database as it may conflict with the *CDS\_BUS* message store.

**Profiles in same cell:** Scoring Servers running in the same cell as the repository server will connect directly to the repository server *CDS\_BUS*. Create a bus member between the WebSphere server running the Scoring Server application and the *CDS\_BUS* service integration bus.

Service Integration > Buses > *CDS\_BUS* > Bus members > Add

**Profiles in separate cells:** Scoring Servers running in a different cell from the repository server must connect to the unique service integration bus created as part of WebSphere application server preparation. For more information, see the topic [Repository on WebSphere](#) on p. 78. Create a bus member between the WebSphere server running the Scoring Server application and the unique service integration bus.

Service Integration > Buses > [*SCORING\_BUS*] > Bus member > Add

**Deploy the Scoring Server EAR**

Run the `<SCORING_HOME>/appServer/WebSphere/bin/DeployScoring.py` script.

```
cd <SCORING_HOME>/appServer/WebSphere/bin
<PROFILE_HOME>/bin/wsadmin.(bat/sh) -lang jython -conntype none -f DeployScoring.py -node Scoring-Node01 -server server1
```

**IBM SPSS Collaboration and Deployment Services Credential definition**

1. In WebSphere console, browse to the Security JCA Resource page.  
Applications > IBM SPSS Scoring Server > Manage Modules > security-jca.rar > resource adapters > J2C connection factories > *IBM\_SPSS\_SECURITY-JCA* > JAAS - J2C authentication data > new
2. Create a JAAS entry *CDS\_Security\_Auth\_Alias*. Use the user name and password for on the IBM SPSS Collaboration and Deployment Services Repository server.
3. Return to *IBM\_SPSS\_SECURITY-JCA*.  
Applications > IBM SPSS Scoring Server > Manage Modules > security-jca.rar > resource adapters > J2C connection factories > *IBM\_SPSS\_SECURITY-JCA*
4. Change the Component-managed Authentication alias to be *CDS\_Security\_Auth\_Alias*.
5. Change the Authentication Preference to *BASIC\_PASSWORD*.

**Scoring Server startup**

Start the WebSphere profile normally; no special startup scripts are needed.

## JBoss

This following section provides instructions for installing the Scoring Server with a JBoss application server.

### Setting up the environment

1. Run `<SCORING_HOME>/bin/setupScoringEnv.(bat/sh)`.
2. Prepare `scoring-configuration.xml`. For more information, see the topic [Scoring Server deployment](#) on p. 75.

### JMS configuration

1. Modify `<jboss-6.0.0.Final>/server/<server_name>/deploy/hornetq/hornetq-jms.xml` as follows:
  - Add the following elements to each of the `connection-factory`.

```
<pre-acknowledge>true</pre-acknowledge>
<reconnect-attempts>-1</reconnect-attempts>
```

The elements should be added as peers to the other elements inside the “connection-factory” element.

```
<connection-factory>
.
.
  <entries>
.
.
  </entries>

  <pre-acknowledge>true</pre-acknowledge>
  <reconnect-attempts>-1</reconnect-attempts>
</connection-factory>
```

Normally, there are three `connection-factory` elements that must be updated: `NettyConnectionFactory`, `NettyThroughputConnectionFactory`, and `InVMConnectionFactory`

- Add entries for the `ScoringServer` JMS destinations as shown:

```
<queue name="SPSSAudit">
  <entry name="/queue/SPSSAudit"/>
</queue>
<queue name="PASWScoring">
  <entry name="/queue/PASWScoring"/>
</queue>
<queue name="PASWLog">
  <entry name="/queue/PASWLog"/>
</queue>
<topic name="PASWMessageBus">
  <entry name="/topic/PASWMessageBus"/>
</topic>
```

2. Modify `<jboss-6.0.0.Final>/server/<server_name>/deploy/hornetq/hornetq-configuration.xml`:

- Update the *host* attributes of all *connector* and *acceptor* elements (under *connectors* and *acceptors*) from

```
<param key="host" value="${jboss.bind.address:localhost}"/>
```

to

```
<param key="host" value="${jboss.qualified.host.name}"/>
```

Normally, there are four *connector* and *acceptor* elements *netty* and *netty-throughput* that must be updated.

- Inside the main *configuration* element, add the *security-enabled* element as follows:

```
<configuration>
...
...
<address-settings>
...
...
</address-settings>
  <security-enabled>false</security-enabled>
</configuration>
```

3. Define the JMS bridge between the Scoring Server and IBM® SPSS® Collaboration and Deployment Services Repository system.

- Copy the provided HornetQ bridge configuration from

```
<SCORING_HOME>/appServer/JBoss/resources/jms-bridge-jboss-beans.xml
```

to

```
<jboss-6.0.0.Final>/server/<server name>/deploy/hornetq/jms-bridge-jboss-beans.xml
```

- Modify `<jboss-6.0.0.Final>/server/default/deploy/hornetq/jms-bridge-jboss-beans.xml` using the comments embedded in the file. Search the file for “REVIEW” to locate each section that may need to be modified.

#### **Additional step for connecting to the repository running on WebSphere**

1. Copy the WebSphere Thin Client for JMS files from the repository WebSphere installation into `<jboss-6.0.0.Final>/server/<server name>/lib`. The files, listed below, are typically located in the *runtimes* subdirectory of the WebSphere installation.

- `com.ibm.ws.sib.client.thin.jms_<version_number>.jar`
- `com.ibm.ws.ejb.thinclient_<version_number>.jar`
- `com.ibm.ws.orb_<version_number>.jar`

For more information, refer to the “Thin Client for JMS” topic of WebSphere documentation.

2. The WebSphere Thin Client for JMS contains Java classes which conflict with JBoss. To prevent the conflict, the conflicting classes must be removed from the copy of the thin client JARs in the

<jboss-6.0.0.Final>/server/<server name>/lib directory. Check all three thin client JARs and remove the following package (directory inside the JARs), if present:

```
javax/security/*
```

### **Additional step for connecting to the repository running on WebLogic**

1. Use the WebLogic JAR Builder Tool to create the *wlfullclient.jar* file.

```
cd <WL_HOME>/server/lib
java -jar wljarbuilder.jar
```

For more information, refer to the “Developing a WebLogic Full Client” topic of the WebLogic documentation.

2. Copy the generated *wlfullclient.jar* to <jboss-6.0.0.Final>/server/<server name>/lib.
3. The *wlfullclient.jar* file contains several Java packages which conflict with JBoss. To prevent the conflict, remove the following packages (directories inside the JAR) from the <jboss-6.0.0.Final>/server/<server name>/lib/wlfullclient.jar file.

```
javax/*
weblogic/xml/saaj/*
```

### **Deploying the Scoring Server EAR**

Copy <SCORING\_HOME>/appServer/JBoss/deployables/scoringserver.ear to <jboss-6.0.0.Final>/server/default/deploy .

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

1. Encode the password used for the IBM® SPSS® Collaboration and Deployment Services connection using the following command from the <jboss-6.0.0.Final> directory:

Windows

```
java -cp client/jboss-logging.jar;lib/jbosssx.jar org.jboss.resource.security.SecureIdentityLoginModule <password>
```

UNIX

```
java -cp client/jboss-logging.jar:lib/jbosssx.jar org.jboss.resource.security.SecureIdentityLoginModule <password>
```

For example:

```
java -cp client/jboss-logging.jar;lib/jbosssx.jar org.jboss.resource.security.SecureIdentityLoginModule spss
Encoded password: 511e80469be20f0a
```

2. Open <jboss-6.0.0.Final>/server/<server name>/conf/login-config.xml and add the application policy for the RepositoryConnectionRealm, using the user name and encoded password generated above.

```
<application-policy name="ResourceSecurityConnectionRealm">
  <authentication>
    <login-module code="org.jboss.resource.security.SecureIdentityLoginModule" flag="required">
```

```

<module-option name="principal">ScoringServer</module-option>
<module-option name="userName">USERNAME</module-option>
<module-option name="password">ENCODED_PASSWORD</module-option>
<module-option name="managedConnectionFactoryName">
  jboss.jca:service=NoTxCM,name=ResourceSecurityConnectionFactory</module-option>
</login-module>
</authentication>
</application-policy>

```

### **Scoring Server startup**

The Scoring Server distribution provides the *setScoringEnv.(bat/sh)* script to configure the JBoss runtime environment for the Scoring Server application. The application server can also be started using other methods, but the environment variables and Java properties set in *setScoringEnv.(bat/sh)* must be set regardless of the startup method used.

1. Set `JAVA_HOME` environment variable to point to the version of Java used to run the Scoring Server. For example:

Windows:

```
set JAVA_HOME= C:/Program Files/Java
```

UNIX:

```
JAVA_HOME=/usr/java; export JAVA_HOME
```

2. Call `<SCORING_HOME>/appServer/JBoss/bin/setScoringEnv.(bat/sh)` to initialize the Scoring Server environment variables. For example:

Windows:

```
<SCORING_HOME>/appServer/JBoss/bin/setScoringEnv.bat
```

UNIX (The leading “dot space” is necessary to inherit the environment settings made by the *setScoringEnv.sh* script):

```
. <SCORING_HOME>/appServer/JBoss/bin/setScoringEnv.sh
```

3. The `com.spss.scoring.configuration.file` Java system property can optionally be used to direct the Scoring Server application to load the scoring configuration file from an explicit location. For more information, see the topic [Scoring Server deployment](#) on p. 75. The system property can optionally be set before calling the JBoss *run* script.

Windows:

```
SET JAVA_OPTS=%JAVA_OPTS% -Dcom.spss.scoring.configuration.file=C:/ScoringFiles/scoring-configuration.xml
```

UNIX:

```
JAVA_OPTS="${JAVA_OPTS} -Dcom.spss.scoring.configuration.file=/usr/ScoringFiles/scoring-configuration.xml";
export JAVA_OPTS
```

4. Start the application server using the JBoss-provided command in the `<jboss-6.0.0.Final>` directory. Pass any additional parameters as required by JBoss.

Windows:

```
<jboss-6.0.0.Final>/bin/run.bat -host=0.0.0.0
```

UNIX:

```
<jboss-6.0.0.Final>/bin/run.sh -host=0.0.0.0
```

*Note:* The above steps can be automated by placing the steps inside a single script. For example:

Windows (*startScoringServer.bat*):

```
SET JAVA_HOME=C:/Program Files/Java
CALL <SCORING_HOME>/appServer/JBoss/bin/setScoringEnv.bat
CALL <jboss-6.0.0.Final>/bin/run.bat -host=0.0.0.0
```

UNIX (*startScoringServer.sh*):

```
JAVA_HOME=/usr/java; export JAVA_HOME
. <SCORING_HOME>/appServer/JBoss/bin/setScoringEnv.sh
<jboss-6.0.0.Final>/bin/run.sh -host=0.0.0.0
```

## WebLogic

This following section provides instructions for installing the Scoring Server with a WebLogic application server.

*Important!* The Scoring Server can be installed into the same domain or different domain from IBM® SPSS® Collaboration and Deployment Services Repository. If installed into the same domain, the Scoring Server must be targeted to different servers/clusters than the ones used by the repository to avoid resource conflicts.

### Setting up the environment

1. Run `<SCORING_HOME>/bin/setupScoringEnv.(bat/sh)`.
2. Prepare `scoring-configuration.xml`. For more information, see the topic [Scoring Server deployment](#) on p. 75.

### JMS configuration

Several JMS resources in the server running the Scoring Server application must be connected to the corresponding JMS resources on the IBM SPSS Collaboration and Deployment Services Repository system. This is accomplished by creating a JMS bridge from the server running the Scoring Server application to the repository system. JMS provisioning for the Scoring Server involves creating the JMS server, deploying the Scoring Server JMS module, creating the JMS destinations, and creating the bridges. A Jython script is provided to automates these tasks; the tasks are also documented in the subsection on manual configuration.



## Automated JMS Provisioning

Use the WebLogic Scripting Tool to run the Jython script to create the required JMS resources for the Scoring Server.

*Important!* If connecting multiple Scoring Servers to the same IBM SPSS Collaboration and Deployment Services Repository server, the names of the JMS servers must be unique. Use a unique *nodeSuffix* value to have the script create unique names for the JMS resources.

1. Change into the script directory:

```
cd <SCORING_HOME>/appServer/WebLogic/bin
```

2. Execute the *CrtScoringJMS.py* script:

```
<WL_HOME>/common/bin/wlst CrtScoringJMS.py [parameters]
```

The script takes several parameters that specify how to connect to the WebLogic administration server and several additional configuration options.

Table A-11  
*CrtScoringJMS.py* parameters

Parameter	Description
-adminURL	WebLogic administration server connection URL, for example, admin.server.example.com:7001
-user	User name used to connect to WebLogic administration server, for example, weblogic
-password	Password used to connect to WebLogic administration server, for example, weblogic1
-targetServer	WebLogic server or cluster name to target, for example, scoringServer
-scoringURL	The URL of the WebLogic server running the Scoring Server, for example, t3://scoring.server.example.com:7001
-cdsURL	The URL of the WebLogic server running the repository, for example, t3://cds.server.example.com:7001
-wlHome	WebLogic installation location, for example, /Oracle/Middleware/wlserver_10.3
-nodeSuffix	Suffix appended to resources that require unique names, for example, 1

For example:

```
<WL_HOME>/common/bin/wlst CrtScoringJMS.py -adminURL admin.server.example.com:7001
-user weblogic -password weblogic1 -targetServer scoringServer
-scoringURL t3://scoring.server.example.com:7001 -cdsURL t3://cds.server.example.com:7001
-wlHome /Oracle/Middleware/wlserver_10.3 -nodeSuffix 1
```

## Manual JMS Provisioning

1. Open the WebLogic Administration Console for the domain in which the Scoring Server will be deployed.

2. Enable clear text passwords.

[Domain] > Advanced options > Security > General settings

*Note:* This option is not available (or required) and some older versions of WebLogic.

3. Create a JMS server in the WebLogic domain.

Services > Messaging > JMS Servers > New

- Specify a unique server name, for example, *ScoringJMS*Server.
- Do not specify a persistent store.
- Target the JMS server to the server instance running the Scoring Server.

*Important!* If connecting multiple remote servers, the names of the JMS servers must be unique.

4. Deploy the JMS resources into WebLogic domain.

Deployments > Control

- The scoring JMS resources are located in the `<SCORING_HOME>/appServer/WebLogic/deployables/scoring-jms.xml` file. Select this file to install as an application.
- Depending on the complexity of the WebLogic domain, you may need to select targets for the deployment. If prompted, target the *scoring-jms.xml* to the server running scoring and target the submodule to the JMS server created in the previous step.

5. Verify that the resources have been deployed.

- Verify that the three JMS queues and one JMS topic have been deployed.
- Verify *scoring-jms* has been deployed.

6. Create the JMS bridge destinations (to connect the repository JMS server and the Scoring Server JMS server) using WebLogic administration console.

Services > Messaging > Bridges > JMS Bridge Destinations > New

- Replace `<repository host>:<port>` with the address and port of the IBM SPSS Collaboration and Deployment Services Repository server.
- Replace `<scoring host>:<scoring port>` with the address and port of the host running the Scoring Server.

Bridge Name	Connection URL	Connection Factory JNDI Name	Destination JNDI Name
Audit Destination – CDS	t3://<repository host>:<port>	ConnectionFactory	queue/SPSSAudit
Audit Destination – Local	t3://<scoring server host>:<port>	ConnectionFactory	queue/SPSSAudit
Log Destination – CDS	t3://<repository host>:<port>	ConnectionFactory	queue/PASWLog
Log Destination – Local	t3://<Scoring host>:<port>	ConnectionFactory	queue/PASWLog

Bridge Name	Connection URL	Connection Factory JNDI Name	Destination JNDI Name
MessageBus Destination – CDS	t3://<repository host>:<port>	ConnectionFactory	topic/PASWMessageBus
MessageBus Destination - Local	t3://<scoring server host>:<Scoring port>	ConnectionFactory	topic/PASWMessageBus

7. Modify the JMS bridge destination settings
  - Verify the Destination Type matches the Destination JNDI name, i.e., *queue/SPSSAudit* and *queue/PASWLog* are JMS queues, *topic/PASWMessageBus* is a JMS topic.
  - Enter the user ID and password. For Local destinations, this must be a valid user/password for the server running the Scoring Server. For the IBM SPSS Collaboration and Deployment Services Repository destinations, this is a WebLogic user/password for the server running the repository.
8. Create the JMS bridges.

*Note:*

- If connecting multiple remote servers, the names of these bridges need to be unique.
- WebLogic automatically deploys *jms-notran-adp.rar* to support the bridges during this step. If this is the first time the RAR is deployed, it may require the server(s) to be restarted to take effect. If this occurs, you may get additional messages until the restart is done.
- Pay close attention to the direction of the bridges: Audit and Log flow from Local to IBM SPSS Collaboration and Deployment Services Repository, while Message flows from the repository to Local.

Bridge Name	Source Destination	Target Destination	Quality of Service
Audit Bridge Audit	Destination – Local	Audit Destination – CDS	At most once
Log Bridge	Log Destination – Local	Log Destination – CDS	At most once
MessageBus Bridge	MessageBus Destination – CDS	MessageBus Destination – Local	Duplicate Okay

9. After the bridges are created, adjust the bridge transaction sizes as listed below. The setting is found in WebLogic administration console under Bridge Setting.  
Configuration > Transactions > Batch Size
  - Audit Bridge – Batch size of 1
  - MessageBus Bridge – Batch size of 1
10. Confirm that the bridges are forwarding messages. Each bridge’s description should indicate successful operation with a message similar to “Forwarding messages.” If the status is inactive or messages are not being forwarded, check the WebLogic logs and adjust the settings as necessary. The bridge status is found in the WebLogic Administration Console under:  
Services > Messaging > Bridge > Monitoring

### **Deploy the Scoring Server EAR**

Deploy the Scoring application to the Weblogic server.

### Automated deployment

Use the WebLogic Scripting Tool to run the Jython script to deploy the Scoring Server EAR.

1. Change into the script directory:

```
cd <SCORING_HOME>/appServer/WebLogic/bin
```

2. Execute the *DeployScoring.py* script:

```
<WL_HOME>/common/bin/wlst DeployScoring.py [parameters]
```

The script takes several parameters that specify how to connect to the WebLogic administration server and several additional configuration options.

Table A-12  
*DeployScoring.py* parameters

Parameter	Description
-adminURL	WebLogic administration server connection URL, for example, admin.server.example.com:7001
-user	User name used to connect to WebLogic administration server, for example, weblogic
-password	Password used to connect to WebLogic administration server, for example, weblogic1
-targetServer	WebLogic server to target, for example, scoringServer
-targetCluster	WebLogic cluster to target, for example, scoringServer
-cdsURL	The URL of the WebLogic server running the repository, for example, t3://cds.server.example.com:7001
-scoringURL	The URL of the WebLogic server running the Scoring Server, for example, t3://scoring.server.example.com:7001
-wlHome	WebLogic installation location, for example, /Oracle/Middleware/wlserver_10.3
-nodeSuffix	Suffix appended to resources that require unique names, for example, 1
-jmsTarget	Optional target for JMS server in a cluster.
-cdsUser	Optional user name for IBM SPSS Collaboration and Deployment Services Repository server JMS bridge destination.
-cdsPassword	Optional password for IBM SPSS Collaboration and Deployment Services Repository server JMS bridge destination.
-scoringUser	Optional user name for the Scoring Server JMS bridge destination.
-scoringPassword	Optional password for the Scoring Server JMS bridge destination.

For example:

```
<WL_HOME>/common/bin/wlst DeployScoring.py -adminURL t3://admin.server.example.com:7001  
-user weblogic -password weblogic1 -targetServer scoringServer
```

## Manual deployment

In WebLogic administration console select  
Deployments > Control > Install

The Scoring Server EAR is located in  
<SCORING\_HOME>/appServer/WebLogic/deployables/scoringserver50.ear. Select this file to install as an application. Depending on the complexity of the WebLogic domain, you may need to select targets for the deployment. If prompted, target the application to the WebLogic server designated to run the Scoring Server.

## IBM SPSS Collaboration and Deployment Services Credential Definition

The credential is specified by configuring a J2C security alias for the Scoring Server using the *security-jca.jar* module.

- In the WebLogic Administration Console under the Deployments section, expand the Scoring Server application (scoringserver50.ear). Select:  
security-jca > Security > Credential Mappings
- Create a new Credential Mapping with the following properties:

Property name	Value
Outbound Connection Pool	ResourceSecurityConnectionFactory
WebLogic Server User	Unauthenticated WebLogic user
EIS User Name	Repository user name
EIS Password	Repository user password

## Scoring Server startup

The Scoring Server distribution provides the *setScoringEnv.(bat/sh)* script to configure the JBoss runtime environment for the Scoring Server application. The application server can also be started using other methods, but the environment variables and Java properties set in *setScoringEnv.(bat/sh)* must be set regardless of the startup method used.

1. Set JAVA\_HOME environment variable to point to the version of Java used to run the Scoring Server. For example:

Windows:

```
SET JAVA_HOME=<WL_HOME>/jdk160
```

UNIX:

```
JAVA_HOME=<WL_HOME>/jdk160;  
export JAVA_HOMEJ
```

2. Set `DOMAIN_HOME` environment variable for the domain running the Scoring Server. For example:

Windows:

```
SET DOMAIN_HOME=<WL_HOME>/user_projects/domains/scoringDomain
```

UNIX:

```
DOMAIN_HOME=<WL_HOME>/user_projects/domains/scoringDomain;
export DOMAIN_HOME
```

3. Call `<SCORING_HOME>/appServer/WebLogic/bin/setScoringEnv.(bat/sh)` to initialize the Scoring Server environment variables. For example:

Windows:

```
<SCORING_HOME>/appServer/WebLogic/bin/setScoringEnv.bat
```

UNIX (The leading “dot space” is necessary to inherit the environment settings made by the `setScoringEnv.sh` script):

```
. <SCORING_HOME>/appServer/WebLogic/bin/setScoringEnv.sh
```

4. The `com.spss.scoring.configuration.file` Java system property can optionally be used to direct the Scoring Server application to load the scoring configuration file from an explicit location. For more information, see the topic [Scoring Server deployment](#) on p. 75. The system property can optionally be set before calling the WebLogic `start` script.

Windows:

```
SET JAVA_OPTIONS=%JAVA_OPTIONS% -Dcom.spss.scoring.configuration.file=C:/ScoringFiles/scoring-configuration.xml
```

UNIX:

```
JAVA_OPTIONS="{JAVA_OPTIONS} -Dcom.spss.scoring.configuration.file=/usr/ScoringFiles/scoring-configuration.xml";
export JAVA_OPTIONS
```

5. Start the application server using the WebLogic provided command in the `<DOMAIN_HOME>` directory. Pass any additional parameters as required by WebLogic.

Windows:

```
<DOMAIN_HOME>/startWebLogic.cmd
```

UNIX:

```
<DOMAIN_HOME>/startWebLogic.sh
```

*Note:* The steps can be automated by placing the steps inside a single script. For example:

Windows (*startScoringServer.bat*):

```
SET JAVA_HOME=<WL_HOME>/jdk160
SET DOMAIN_HOME=<WL_HOME>/user_projects/domains/scoringDomain
CALL <SCORING_HOME>/appServer/WebLogic/bin/setScoringEnv.bat
```

```
CALL <DOMAIN_HOME>/startWebLogic.cmd
```

UNIX (*startScoringServer.sh*):

```
JAVA_HOME=<WL_HOME>/jdk160; export JAVA_HOME
DOMAIN_HOME=<WL_HOME>/user_projects/domains/scoringDomain; export DOMAIN_HOME
.<SCORING_HOME>/appServer/WebLogic/bin/setScoringEnv.sh
<DOMAIN_HOME>/startWebLogic.sh
```

## Troubleshooting

### **JBoss**

The WebSphere Thin Client for JMS contains Java classes which conflict with JBoss. For more information, see the topic [JBoss](#) on p. 84. Failure to remove the conflicting classes from the thin client JARs will result in errors similar to:

DEPLOYMENTS IN ERROR:

Deployment "vfs:///C:/jboss-6.0.0.Final/server/default/deploy/http-invoker.sar" is in error due to the following reason(s):

java.lang.ClassNotFoundException: Property javax.security.jacc.PolicyConfigurationFactory.provider not set

Deployment "RemotingSslConnector" is in error due to the following reason(s):

**\*\*ERROR\*\***, java.security.KeyStoreException: IBMKeyManager: Problem accessing key store java.security.PrivilegedActionException: java.io.IOException

### **WebLogic**

If using multiple domains (IBM® SPSS® Collaboration and Deployment Services Repository server in one WebLogic domain, Scoring Server in a different WebLogic domain) may require cross-domain security to be enabled. Exceptions caused by domain security are written to the WebLogic logs, and may appear similar to:

```
### <ScoringServer> <[ACTIVE] ExecuteThread: '0' for queue: 'weblogic.kernel.Default (self-tuning)'>
<<WLS Kernel>> <> <> <1327347663888> <BEA-080003> <RuntimeException thrown by rmi server: dispatch
java.lang.SecurityException: [Security:090398]Invalid Subject: principals=[weblogic, Administrators].
java.lang.SecurityException: [Security:090398]Invalid Subject: principals=[weblogic, Administrators]
  at weblogic.security.service.SecurityServiceManager.seal(Unknown Source)
  at weblogic.security.service.SecurityServiceManager.getSealedSubjectFromWire(Unknown Source)
  at weblogic.rjvm.MsgAbbrevInputStream.getSubject(MsgAbbrevInputStream.java:315)
  at weblogic.messaging.dispatcher.DispatcherServerRef.handleRequest(DispatcherServerRef.java:137)
  at weblogic.messaging.dispatcher.DispatcherServerRef.access$000(DispatcherServerRef.java:34)
  at weblogic.messaging.dispatcher.DispatcherServerRef$2.run(DispatcherServerRef.java:111)
  at weblogic.work.ExecuteThread.execute(ExecuteThread.java:201)
  at weblogic.work.ExecuteThread.run(ExecuteThread.java:173)
```

WebLogic appears to be sensitive to the JAX-WS client embedded inside the Scoring Server, and produces warnings similar to the example below. Although the messages indicate this to be a severe issue, the Scoring Server operates normally and the messages can safely be ignored.

```
weblogic.wsee.jaxws.framework.policy.advertisementimpl.AdvertisementHelperImpl registerExtension
WARNING: Registering oracle.j2ee.ws.wSDL.extensions.addressing.AddressingExtensionRegistry extension failed;
```

```
java.lang.ClassNotFoundException: oracle.j2ee.ws.wSDL.extensions.addressing.AddressingExtensionRegistry
Feb 8, 2012 2:54:17 PM weblogic.wsee.jaxws.spi.WLSServiceDelegate addWsdDefinitionFeature
SEVERE: Failed to create WsdDefinitionFeature for wsdl location:
zip://WL_Domain/servers/ScoringServer/tmp/_WL_user/scoringserver50/bwn62o/lib/data-client.jar!/WEB-INF/wsdl/scoring.wsdl,
error: com.sun.xml.ws.wSDL.parser.InaccessibleWSDLException, message: 2 counts of InaccessibleWSDLException.
```



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