

IBM SPSS Collaboration and Deployment Services
Repository
Version 6 Release 0

Installation and Configuration Guide



Note

Before using this information and the product it supports, read the information in "Notices" on page 65.

Product Information

This edition applies to version 6, release 0, modification 0 of IBM SPSS Collaboration and Deployment Services and to all subsequent releases and modifications until otherwise indicated in new editions.

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Chapter 1. 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 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 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 correct 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.

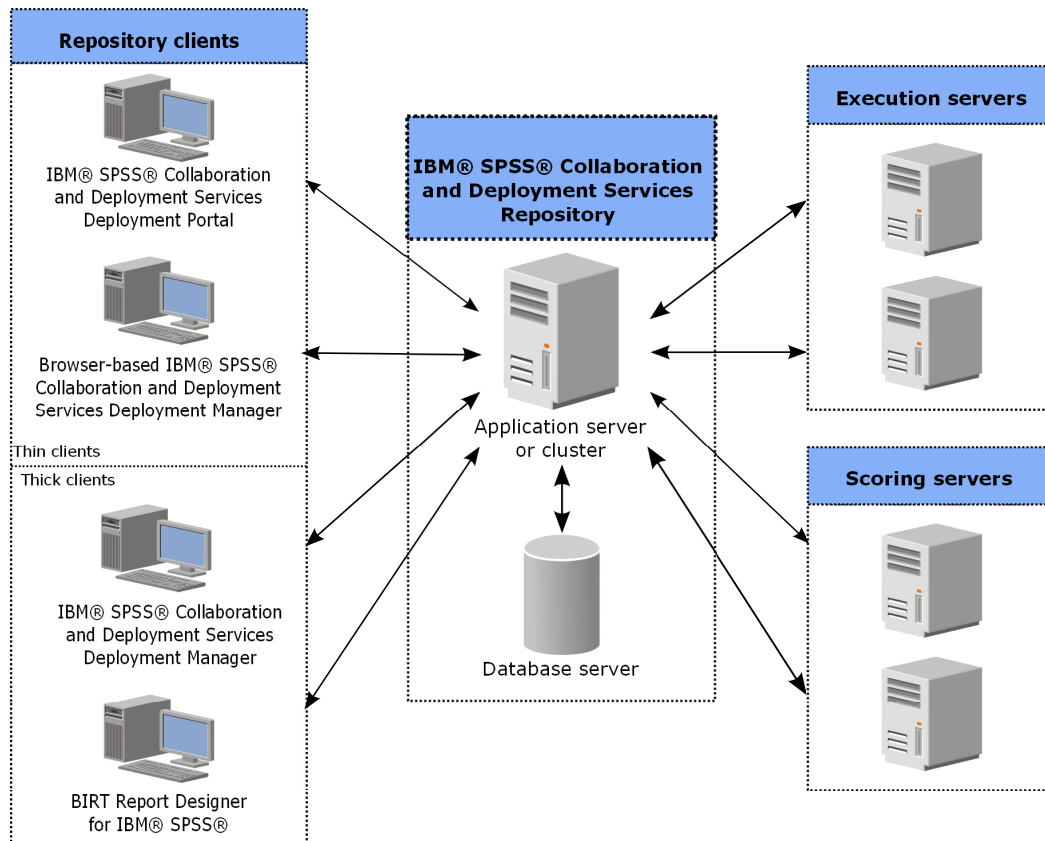


Figure 1. IBM SPSS Collaboration and Deployment Services Architecture

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

The repository includes facilities for:

- Security
- Version control
- Searching
- Auditing

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 perform the following tasks:

- 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
- Determine the status of a job
- Specify email 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.

You typically access the browser-based IBM SPSS Collaboration and Deployment Services Deployment Manager at the following URL:

`http://<host IP address>:<port>/security/login`

Note: An IPv6 address must be enclosed in square brackets, such as `[3ffe:2a00:100:7031::1]`.

If your environment is configured to use a custom context path for server connections, include that path in the URL.

`http://<host IP address>:<port>/<context path>/security/login`

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, IBM SPSS Collaboration and Deployment Services 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 email address and password, general options, subscriptions, and options for output file formats

You typically access the home page at the following URL:

`http://<host IP address>:<port>/peb`

Note: An IPv6 address must be enclosed in square brackets, such as `[3ffe:2a00:100:7031::1]`.

If your environment is configured to use a custom context path for server connections, include that path in the URL.

`http://<host IP address>:<port>/<context path>/peb`

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 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.

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

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

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

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.

Chapter 2. What is new for installers

IBM SPSS Collaboration and Deployment Services Repository 6 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 6 includes support for new versions of operating systems, application servers, databases, virtualization environments, and Web browsers.

Installation

The following IBM SPSS Collaboration and Deployment Services components have a new installation utility based on IBM Installation Manager:

- IBM SPSS Collaboration and Deployment Services Remote Process Server
- IBM SPSS Collaboration and Deployment Services - Essentials for Python
- IBM SPSS Collaboration and Deployment Services Scoring Server
- IBM SPSS Collaboration and Deployment Services Scoring Adapter for PMML

PMML scoring

The ability to generate scores for PMML models is now an optional adapter that must be installed separately to enable that functionality.

What has changed in this release

The following are no longer supported:

- Windows Server Standard 2003 R2 32-bit
- Windows Server Standard 2003 R2 64-bit
- HP-UX 11i v3
- Oracle WebLogic 10 (10.3.0)
- IBM DB2 Enterprise LUW 9.1 32-bit
- IBM DB2 Enterprise LUW 9.1 64-bit
- Oracle Database 10g (10.2) 32-bit
- Oracle Database 10g (10.2) 64-bit
- Microsoft SQL Server 2008 32-bit
- Microsoft SQL Server 2008 64-bit

Chapter 3. 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 application server or server cluster, making sure the server(s) meet all hardware and software requirements, configuring the 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. See the topic Chapter 9, "Using SSL to secure data transfer," on page 59 for more information.
- FIPS 140-2 security and secure repository database connection. See the topic Chapter 8, "FIPS 140-2 compliance," on page 57 for more information.
- Single sign-on. See the topic Chapter 6, "Single sign-on," on page 43 for more information.

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 an 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 application 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 application server or cluster.
- Configure the database. If necessary, migrate the content from the previous installation to the new database using database copy tools. See the topic Chapter 4, "Migration," on page 35 for more information.

Planning your installation

Before 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 an 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. See the topic “Host system requirements” for more information. 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 stand-alone 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

Before 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:

Component	Requirement
Processor	A current-generation multi-core processor, for example, Power, Xeon, Itanium, or SPARC, compatible with a supported server operating system
Disk space	At least 10 GB free space
Memory	2 GB dedicated RAM

Component	Requirement
Server operating system	AIX 7.1 AIX 6.1 IBM i 7.1 IBM i 6.1 Windows Server 2012 Standard Edition x86-64 Windows Server 2008 R2 x86-64 Windows Server 2008 x86-32 Windows Server 2008 x86-64 Red Hat Enterprise Linux 5 Advanced Platform System z Red Hat Enterprise Linux 5 Advanced Platform x86-64 Red Hat Enterprise Linux 5 Server x86-64 Red Hat Enterprise Linux Server 6 System z Red Hat Enterprise Linux Server 6 x86-64 SUSE Linux Enterprise Server 11 x86-64 SUSE Linux Enterprise Server 10 x86-64 SUSE Linux Enterprise Server 11 Linux for System z SUSE Linux Enterprise Server 10 SP1 for System z Solaris 11 SPARC Solaris 10 SPARC
JDK/JRE	1.7 1.6 Note: The choice of JDK vendor must be determined by the application server selected for the installation. For more information, see your application server documentation.

Important: 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.

Additional requirements

IBM Installation Manager (for all operating systems)

IBM Installation Manager 1.6.2 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 on 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 1.6 from IBM Corp. support site (<http://www.ibm.com/support>). For download location and user information, see IBM Installation Manager documentation: .

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 Window System 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.

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 seeing 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.

Important: If you install IBM SPSS Collaboration and Deployment Services Repository on Windows by using an administrator account, you will need to use the administrator privilege to run all accompanying utilities and scripts, such as the configuration utility.

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. See the topic “Host system requirements” on page 10 for more information.

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 1. Supported virtualization environments for IBM SPSS Collaboration and Deployment Services.

Product
IBM PowerVM Hypervisor (LPAR, DPAR, Micro-Partition) any supported version
IBM PowerVM VIOS any version

Table 1. Supported virtualization environments for IBM SPSS Collaboration and Deployment Services (continued).

Product
IBM PR/SM any version
VMware ESXi 5.0
VMWare ESXi 4.1
VMWare ESX 3.5

Note that additional restrictions on deployment into virtualized environments may exist if the application server 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 re-create 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. 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.

The application server must be set up with an appropriate JRE. Verify that you are running Java in 64-bit mode and that your application server is working properly in 64-bit mode before you attempt to install IBM SPSS Collaboration and Deployment Services Repository. For example, if you are using JBoss and have both a 32-bit and a 64-bit JDK installed, you need to configure the JVM to run in 64-bit mode by specifying the `-d64` option for the Java command. For more information, see the application server vendor documentation.

WebSphere

IBM SPSS Collaboration and Deployment Services Repository can be run with a stand-alone WebSphere server, a managed server, or a cluster.

The following applications servers are supported:

- WebSphere 8.5.5, Base or ND version
- WebSphere 8, Base or ND version, Fix Pack 4 (8.0.0.4)
- WebSphere 7, Base or ND version, Fix Pack 29 (7.0.0.29)

Before installing with a stand-alone WebSphere server

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

Before 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.

Before installing with a WebSphere cluster

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

JBoss

IBM SPSS Collaboration and Deployment Services Repository can be run only with a stand-alone JBoss server.

The following applications servers are supported:

- Red Hat JBoss EAP 6.1.0
- Community edition JBoss EAP 6.1.0 (EAP built from JBoss AS 7.2)
- Red Hat JBoss EAP 6.0.0

Before installing with JBoss

- Create a new server for every repository installation.

Note:

- 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:\jboss-eap-6.1`.

WebLogic

IBM SPSS Collaboration and Deployment Services Repository can be run with a stand-alone WebLogic server or a cluster.

The following applications servers are supported:

- Oracle WebLogic Server 12cR1 (12.1.2)
- Oracle WebLogic Server 11gR1 (10.3.6)

Before installing with a stand-alone WebLogic server

- Create a new server for every repository installation.

Before installing with a managed WebLogic server

- Created a new managed server for every repository installation.

Before installing with a WebLogic cluster

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

Note:

- If WebLogic is used with JRockit JRE on a Linux system, copy the content of `<WEBLOGIC_HOME>/endorsed` directory to `<JAVA_HOME>/jre/lib/endorsed`. For more information about WebLogic JRE configuration, see Oracle documentation.
- If WebLogic is used 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.

Databases
DB2 10 for z/OS VUE 10.1

Databases
DB2 Enterprise Server Edition 10.1
DB2 Enterprise Server Edition 9.7
DB2 Enterprise Server Edition 9.5
DB2 Enterprise DB2 for Linux, UNIX, and Windows
DB2 for i 7.1
DB2 for i 6.1
DB2 for z/OS
Microsoft SQL Server 2012
Microsoft SQL Server 2008 R2
Oracle Database 11g Enterprise Edition Release 2

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 before 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 have the following general database permissions to configure and start 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, and other permissions might be required.

Important: The sets of permissions that are used for configuring and starting IBM SPSS Collaboration and Deployment Services Repository can be different.

The following examples illustrate the permissions for specific database systems.

Example: DB2 9.7 for Linux, Windows, and UNIX

- BINDADD
- CONNECT
- CREATETAB
- CREATE_EXTERNAL_ROUTINE
- CREATE_NOT_FENCED_ROUTINE
- DATAACCESS
- EXPLAIN
- IMPLICIT_SCHEMA
- DBADM

Note: DBADM provides explicit create schema privilege that is needed for configuring IBM SPSS Collaboration and Deployment Services Repository.

Example: Microsoft SQL Server 2008

- ALTER ANY SCHEMA
- CONNECT
- CREATE FUNCTION
- CREATE PROCEDURE
- CREATE TABLE
- CREATE VIEW
- CREATE XML SCHEMA COLLECTION
- DELETE
- EXECUTE
- INSERT
- REFERENCES
- SELECT
- UPDATE

Example: Oracle 11gR2

The following permissions are required for configuring IBM SPSS Collaboration and Deployment Services Repository with Oracle 11gR2 database:

- CREATE SESSION
- ALTER SESSION
- CREATE TYPE
- CREATE TABLE
- CREATE PROCEDURE
- CREATE VIEW
- CREATE TRIGGER

The following permissions are required for starting IBM SPSS Collaboration and Deployment Services Repository with Oracle 11gR2 database:

- CREATE SESSION
- ALTER SESSION

DB2

DB2 for Linux, UNIX, and Windows

When using DB2 for Linux, UNIX, and Windows database, the default database creation parameters are not sufficient. The following additional parameters must be specified:

- UTF-8 code set
- 8 KB page sized buffer pool (in the sample script *CDS8K*) for the tables that are wider than 4 KB
- 8 KB table space using the 8 KB buffer pool
- 32 KB buffer pool (*CDSTEMP* in the sample script)
- 32 KB temporary table space 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;
```

DB2 on IBM i

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

DB2 on z/OS

- When using DB2 z/OS database, you must ensure that DB2 z/OS 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, Service 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 Internet Protocol 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 a 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 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. 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 stand-alone 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 stand-alone server are also applicable to clustered installation, installing on a cluster topology requires additional steps. See the topic “Cluster configuration” on page 25 for more information.

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. See the topic “User and file system permissions” on page 12 for more information.

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.

Note: To successfully access an installation repository, the repository location path must not contain an ampersand (&).

4. On the main menu, select **Install**.
5. Select IBM SPSS Collaboration and Deployment Services as the package to be installed.

Note: You can also select adapters or components to be installed with the IBM SPSS Collaboration and Deployment Services server, such as the IBM SPSS Collaboration and Deployment Services Scoring Adapter for PMML, provided those adapters or components are available in the installation repositories.

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. See the topic “Configuration” for more information. 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: .

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 Java programs into the application server
- Configures encryption and security

While configuration with a stand-alone application server is the last required installation step, additional steps will be required in a clustered environment. See the topic “Cluster configuration” on page 25 for more information.

Before configuration

1. 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 stand-alone:** 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 stand-alone:** 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.
2. Verify that the database is accessible.
3. 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 as an option at the end of the installation step. See the topic “Installation” on page 19 for more information.

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 stand-alone 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: Stand-alone, 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. Specify a value of `standalone`.
- **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. The prefix value must be externally resolvable if external clients will connect to the IBM SPSS Collaboration and Deployment Services Repository.

- WebLogic

- **WebLogic Domain Root Directory** The directory location of the WebLogic domain. Other WebLogic settings, such as server directory path, domain topology (stand-alone 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 in to the repository for the first time.
9. Select deployment mode (automatic or manual):
 - Automatic deployment will create application server resources and deploy the application files.
 - Manual deployment will generate the application file 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. See the topic “Post-installation” on page 28 for more information.
 - If you have chosen the manual deployment mode, you can proceed to the manual steps. See the topic “Manual deployment” on page 23 for more information.
 - If you are installing the repository with an application server cluster, you can proceed to configuring the other cluster nodes. See the topic “Cluster configuration” on page 25 for more information.

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. Deployable application files, 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” on page 32.

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. See the topic “Configuration” on page 20 for more information.

- 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 flags.

2. Verify that the application server is in the following state:

- **WebSphere stand-alone:** 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 stand-alone WebSphere server, `-connType NONE` option must be used:

```
<WAS profile root>/bin/wsadmin -lang jython -connType NONE  
-wsadmin_classpath <repository installation directory>/setup/lib/crypto-server.jar  
-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>  
-wsadmin_classpath <repository installation directory>/setup/lib/crypto-server.jar  
-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. See the topic “WebSphere cluster” on page 26 for more information.

To manually deploy 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. See the topic “Configuration” on page 20 for more information.
 - 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 flags.
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. See the topic “Configuration” on page 20 for more information.
 - 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 files.
 - a. Verify that the application server is in the following state:
 - **WebLogic stand-alone:** Started.
 - **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 can be found 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. See the topic “WebLogic cluster” on page 26 for more information.

Cluster configuration

IBM SPSS Collaboration and Deployment Services Repository can be deployed into an environment of clustered 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.

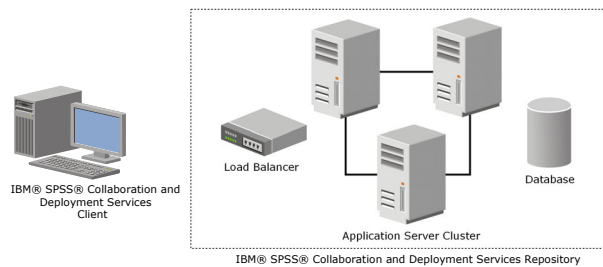


Figure 2. Clustered deployment architecture

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. See the topic “Installation and configuration” on page 19 for more information.
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 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. See the topic “Load balancer configuration” on page 27 for more information.
7. Start the cluster.

WebLogic cluster

1. Make sure all prerequisites have been met.
2. Perform the installation and configuration. You can chose to deploy the application either automatically or manually. See the topic “Installation and configuration” on page 19 for more information.
3. Configure the installation directory to be shared so that it is accessible to all members of in 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. See the topic “Load balancer configuration” on page 27 for more information.

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 plug-in 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. See the topic “Configuration” on page 20 for more information.

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. See the topic “WebSphere cluster” on page 26 for more information.
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.
- If necessary, enable component installation by connecting to IBM SPSS Collaboration and Deployment Services Repository with a Web browser. For more information, see “Web installations from the repository” on page 32.
- If necessary, install 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 *IBM SPSS Collaboration and Deployment Services Remote Process Server 6 Installation Instructions*, *IBM SPSS Collaboration and Deployment Services Enterprise View Driver 6 Guide*, and *IBM SPSS Collaboration and Deployment Services - Essentials for Python 6 Installation Instructions*.
- 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 6 Administrator’s Guide*.

If problems occur during post-installation steps, see *IBM SPSS Collaboration and Deployment Services 6 Troubleshooting Guide*.

Starting the repository server

The repository server 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 server 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.

Important: To avoid permissions conflicts, the repository server must always be started under the same credentials, preferably a user with sudo (UNIX) or administrator-level (Windows) privileges.

The repository server is started by starting the application server. This can be accomplished with the scripts provided with the repository server 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 server installation:

```
<repository installation directory>/bin/startserver.bat  
<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 server installation:

```
<repository installation directory>/bin/startserver.bat  
<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 10
- 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.

Managing the database password

The database password provided during IBM SPSS Collaboration and Deployment Services Repository configuration is stored as part of the data source definition in the application server settings. Additional steps may be required to ensure the database password security.

Testing the database connection

The IBM SPSS Collaboration and Deployment Services Repository database connection can be tested using the data source management facilities in the application server administrative console.

Application server	Data source object name
WebSphere	CDS_DataSource
JBoss	jdbc/spss/PlatformDS
WebLogic	CDS_DataSource

JAAS object security

The credentials for IBM SPSS Collaboration and Deployment Services data source created in the application server are persisted as a JAAS object.

Important: When the repository is configured on WebSphere or WebLogic application server using either the automatic deployment (with the configuration utility) or manual deployment with scripts generated by the configuration utility, the password is passed to the application server as clear text and then persisted according to the application server settings. Although the default WebSphere and WebLogic settings provide for storing passwords in encrypted form, it may be necessary to verify that the password is not stored as clear text. See application server documentation for additional information about password security.

Changing the database password

For security reasons, it may be necessary to change the database password following IBM SPSS Collaboration and Deployment Services Repository installation. In such cases, the stored database password can be changed by using IBM SPSS Collaboration and Deployment Services Password Utility.

Note:

- 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/cliUpdateDBPassword.bat
```

UNIX:

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

System i:

```
<repository installation directory>/bin/cliUpdateDBPassword.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 `cliEncrypt.bat/cliEncrypt.sh` with the password as command line argument. When you use WebLogic console to change the password, WebLogic will automatically encrypt it.

JDBC drivers

Adding driver support to IBM SPSS Collaboration and Deployment Services Repository

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
- Oracle WebLogic: <repository installation directory>/<domain name>/lib

For JBoss, you need to install the JDBC driver as a JBoss core module and register the module as global. For details, see the JBoss documentation.

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

Adding driver support to client applications

To add a JDBC driver to the IBM SPSS Collaboration and Deployment Services Deployment Manager:

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.

To add a JDBC driver to BIRT Report Designer for IBM SPSS, use the application interface. For more information, see BIRT Report Designer for IBM SPSS documentation.

IBM SPSS products compatibility

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

Table 4. Supported versions of IBM SPSS applications.

IBM Corp. Product	Version
IBM SPSS Modeler	16
IBM SPSS Statistics	22
IBM Analytical Decision Management	8
IBM SPSS Data Collection	7

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 and the documentation for individual IBM SPSS products.

IBM SPSS Statistics client and IBM SPSS Modeler client 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 IBM SPSS Statistics or IBM SPSS Modeler 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 IBM SPSS Modeler stream is stored in the repository before the IBM 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.

Web installations from the repository

An optional Web installation module allows you to install IBM SPSS Collaboration and Deployment Services Deployment Manager by connecting to the IBM SPSS Collaboration and Deployment Services Repository server using your browser.

In order to enable the Web installations, the `DeploymentManagerWebInstall.ear` file must be deployed into the application server running IBM SPSS Collaboration and Deployment Services Repository.

The EAR file can be downloaded from IBM Passport Advantage portal. The file can also be found on the IBM SPSS Collaboration and Deployment Services distribution disk.

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 stand-alone 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 remain 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: .
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*.



---

## Chapter 4. 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 application 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 in the target instance must be at the same level or higher than the packages in the source repository; and they should reference the DB table for that. The packages must be at a level that is compatible with the given target version of IBM SPSS Collaboration and Deployment Services. See the topic “IBM SPSS products compatibility” on page 31 for more information.

**Note:** The packages in the target instance must be at the same version level or higher than the packages in the source instance. The information about installed packages and their versions can be found in the SPSSSETUP\_PLUGINS table of the source instance database.

For IBM SPSS Collaboration and Deployment Services 6, migration from version 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 to DB2. 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

```
CRTDTAARA DTAARA(CADSLIB/QDFTJRN) TYPE(*CHAR) LEN(40) VALUE('CADSLIB QSQJRN ')
CHGDTAARA DTAARA(CADSLIB/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), or migrating to a database on a different operating system (for example from DB2 for i to DB2 for Linux, UNIX, and Windows).

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 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 chapter of *IBM SPSS Collaboration and Deployment Services Deployment Manager 6 User's Guide* on export, import, and promotion.



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 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, or Oracle RMAN, 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 before database migration.

---

## Additional migration considerations

Depending on your setup, additional tasks may 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 credential resource definitions from the source repository instance and import them into the target repository using IBM SPSS Collaboration and Deployment Services Deployment Manager.

or

- Manually update each password in job steps and each credential in the target repository using IBM SPSS Collaboration and Deployment Services 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, Service 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.

## JMS store migration on WebLogic

Special considerations apply when migrating the JMS message store of IBM SPSS Collaboration and Deployment Services Repository installed with WebLogic.

When using database copy to migrate the content of a repository to a new instance running on WebLogic, you must delete the contents of the JMS message store table *SPSSWLStore* from the database before you start IBM SPSS Collaboration and Deployment Services.

## 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 6 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 after IBM SPSS Collaboration and Deployment Services Repository installation and configuration but before 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. See the topic Chapter 5, “Package management,” on page 41 for more information.



---

## Chapter 5. Package management

Updates, optional components, and content adaptors for IBM SPSS products are installed into the IBM SPSS Collaboration and Deployment Services Repository server as packages with IBM Installation Manager.

For details, see the installation instructions for individual components.

You can also use IBM SPSS Collaboration and Deployment Services Package Manager utility for troubleshooting IBM SPSS Collaboration and Deployment Services package configuration and installing additional components, for example, custom content adaptors and security providers.

---

### 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 stand-alone 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 stand-alone 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. See the topic “Manual deployment” on page 23 for more information. 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.

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`.

---

## Chapter 6. Single sign-on

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.

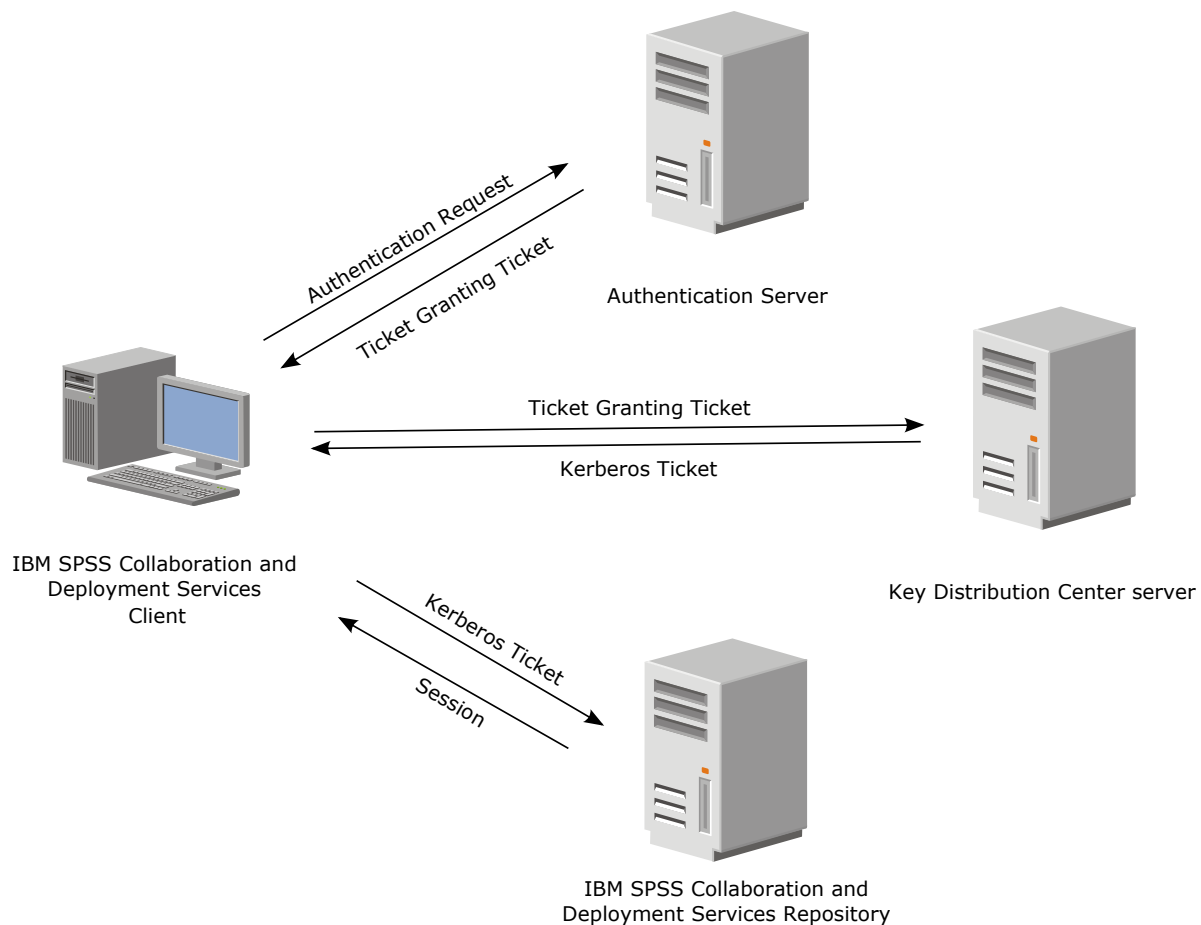


Figure 3. IBM SPSS Collaboration and Deployment Services SSO architecture

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 IBM SPSS Collaboration and Deployment Services 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 IBM SPSS Collaboration and Deployment Services 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. See the topic “Updating Windows registry for single sign-on” on page 48 for more information.
- For thin-client access to the repository (for example, with IBM SPSS Collaboration and Deployment Services 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. See the topic “Server Process Credential configuration” on page 49 for more information.

---

## 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 Services 6 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 IBM SPSS Collaboration and Deployment Services Deployment Manager.

## Active Directory

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

1. Create a user profile that will be used as Kerberos service principal
2. Map this user profile to IBM SPSS Collaboration and Deployment Services host system.
3. Configure encryption type and Kerberos credential delegation
4. 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

1. 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`.
2. Specify a surname parameter for this user. It is required by some application servers.
3. Select the option for password to never expire.

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

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

1. 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/cdsserver.spss.com krb5.principal
Registering ServicePrincipalNames for CN=krb5.principal,CN=Users,DC=spss,DC=com HTTP/cdsserver.spss.com
Updated object
```

2. 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/cdsserver krb5.principal
Registering ServicePrincipalNames for CN=krb5.principal,CN=Users,DC=spss,DC=com HTTP/cdsserver
Updated object
```

## To configure encryption type and credential delegation

1. On the Account tab of the user properties dialog, select the option to use AES encryption.
2. 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

1. 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/cdsserver.spss.com@SPSS.COM
-mapUser krb5.principal -mapOp set -pass Pass1234 -crypto AES256-SHA1 -ptype KRB5_NT_PRINCIPAL
```

2. Place the generated keytab file (in the example, *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

Depending on the application server used with the repository, it may be necessary to update the application server settings.

## 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

1. In the administrative console, choose:  
**Servers > Application Servers > <Server Name> > Server Infrastructure > Process Definition > Java Virtual Machine > Custom Properties**
2. Add custom property *KRB5\_KTNAME* with the value of the keytab file path.

### Defining JAAS-JGSS policy

1. In the administrative console, choose:  
**Security > Secure Administration, application and infrastructure > Java Authentication and Authorization Service > Applications logins**
2. Define a property *JGSSServer*.
3. In Additional Properties for *JGSSServer*, define the module class *com.ibm.security.auth.module.Krb5LoginModule* with authentication strategy **REQUIRED**.

4. Define the following custom properties for *com.ibm.security.auth.module.Krb5LoginModule*.

| Property name | Value                                                                   |
|---------------|-------------------------------------------------------------------------|
| credType      | both                                                                    |
| principal     | <principal name>, for example, <i>HTTP/cdssserver.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 can be found 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

1. 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;
};
```

2. 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;
};
```

3. 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;
};
```

4. 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

If you are running WebLogic 12c using JDK7, additional configuration is needed.

1. Create a JAAS configuration file, `jaas.conf`, on the server machine. The content should be similar to the following:

```
JGSSServer {
 com.sun.security.auth.module.Krb5LoginModule required
 useKeyTab=true
 storeKey=true
 keyTab="C:/sso/winwlpriin.keytab"
 principal="HTTP/winwlsrv.myssso.com@MYSSO.COM"
 debug=true;
};
```

2. Edit the file `C:\Oracle12c\Middleware\Oracle_Home\user_projects\d omain\c60b246\bin\setDomainEnv.cmd` to include the following Java property, replacing `<conf_path>` with the path for your configuration file:

```
-Djava.security .auth.login.config="<conf_path>/jaas.conf"
```

3. When you configure single sign-on in IBM SPSS Collaboration and Deployment Services Deployment Manager, specify a Key table URL parameter of:

```
C:/sso/winwlpriin.keytab
```

**Note:** If you encounter Kerberos errors in your configuration, verify that the application server is using a recent JRE.

---

## 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.

---

## Configuring one-way trust relationships

You can configure your environment for cross-realm authentication to control user access.

For example, suppose you have two domains, `AppDomain` and `UserDomain`. The two domains have a one-way trust relationship, with `AppDomain` configured for outgoing trust and `UserDomain` configured for incoming trust. You install the IBM SPSS Collaboration and Deployment Services server in the `AppDomain` domain and install IBM SPSS Collaboration and Deployment Services Deployment Manager in the `UserDomain` domain.

To configure IBM SPSS Collaboration and Deployment Services for one-way trust, you need to modify both the IBM SPSS Collaboration and Deployment Services server and IBM SPSS Collaboration and Deployment Services Deployment Manager.

## Configuring the IBM SPSS Collaboration and Deployment Services server

1. Stop the IBM SPSS Collaboration and Deployment Services server.
2. Create a valid `krb5.conf` Kerberos configuration file on the server file system. The file should have content similar to the following lines, with the domains replaced with values corresponding to your system:

```
[libdefaults]
default_realm = APPDOMAIN.COM

[realms]
APPDOMAIN.COM = {
 kdc = your_kdc.appdomain.com:88
 default_domain = your_kdc.appdomain.com
}
[domain_realm]
.appdomain.com = APPDOMAIN.COM
```

3. Set the Java system property `java.security.krb5.conf` to the location of the `krb5.conf` file. For example:

```
-Djava.security.krb5.conf="c:/windows/krb5.conf"
```

See your application server documentation for instructions on setting Java system properties.

4. Start the IBM SPSS Collaboration and Deployment Services server.

## Configuring IBM SPSS Collaboration and Deployment Services Deployment Manager

1. Close IBM SPSS Collaboration and Deployment Services Deployment Manager.
2. Create a valid `krb5.ini` Kerberos configuration file in the `c:\windows\` folder. The file should have content valid for cross-realm authentication similar to the following lines, with the domains replaced with values corresponding to your system:

```
[libdefaults]
default_realm = USERDOMAIN.COM

[realms]
USERDOMAIN.COM = {
 kdc = userdc.userdomain.com:88
 default_domain = userdc.userdomain.com
}
APPDOMAIN.COM = {
 kdc = your_kdc.appdomain.com:88
 default_domain = your_kdc.appdomain.com
}

[domain_realm]
.userdomain.com = USERDOMAIN.COM
.appdomain.com = APPDOMAIN.COM
```

3. Start IBM SPSS Collaboration and Deployment Services Deployment Manager.

---

## 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 administrative 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">###DOMAINNAME###</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.

## To create the 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 = ACSSO.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.

**Note:** On the Windows operating system, **kinit** may not create a renewable ticket. To overcome this problem, add the following registry setting:

```
\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Lsa\Kerberos\Parameters\allowtgtsessionkey=0x01
(DWORD)
```

For more information, see the Kerberos documentation for your operating system.

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.





---

## Chapter 7. Application context roots

The context root for an application defines the location at which the module can be accessed. The context root is part of the URL you use to connect to the application.

A URL reference to an IBM SPSS Collaboration and Deployment Services application includes the following elements:

### URL prefix

Consists of the protocol, the server name or IP address, and the port number

### Context root

Determines the location at which the application is accessed. By default, the context root is the server root itself, denoted as a single forward slash.

### Application root

Specifies the root of the application itself

For example, the IBM SPSS Collaboration and Deployment Services Deployment Portal has the following URL when the repository server is running locally on port 8080:

```
http://localhost:8080/peb
```

The URL prefix is `http://localhost:8080` and the context root is the application server root. The application root is `peb`.

There is nothing in the URL that identifies the web module as being part of IBM SPSS Collaboration and Deployment Services. If you add other applications to your server, managing the many modules available at the server root becomes increasingly difficult.

If you configure the repository server to use a context root, you can isolate the IBM SPSS Collaboration and Deployment Services components from other applications. For example, you can define a context root of `ibm/spss` for the IBM SPSS Collaboration and Deployment Services modules. In this case, the URL for the IBM SPSS Collaboration and Deployment Services Deployment Portal interface is:

```
http://localhost:8080/ibm/spss/peb
```

**Important:** If you use a context root for your repository server, all client applications must include the same context root when they connect to the server. The URL for any application running within the IBM SPSS Collaboration and Deployment Services environment, such as IBM Analytical Decision Management, must be updated accordingly.

---

## Configuring application context roots

You must update the system URL prefix and modify the individual context root specifications to configure context roots.

### Procedure

1. If the use of a URL prefix is enabled, add the context root to the URL prefix.
2. Update the context root for each application. The steps depend on the application server.
  - “Updating context roots for WebSphere” on page 54
  - “Updating context roots for JBoss” on page 55
  - “Updating context roots for WebLogic” on page 55

## Results

You can access the browser-based IBM SPSS Collaboration and Deployment Services Deployment Manager and the IBM SPSS Collaboration and Deployment Services Deployment Portal by using URL values that include your context root.

## What to do next

Update any references to the repository server, such as those defined using IBM SPSS Collaboration and Deployment Services Deployment Manager, to include the context root in the server URL.

## Adding a context root to the URL Prefix

If your system uses a custom URL prefix for accessing the IBM SPSS Collaboration and Deployment Services Repository, add the context root to the URL prefix specification.

### Before you begin

- Your login credentials must be associated with the Configuration action.
- Use of the URL Prefix setting must be enabled by using the browser-based IBM SPSS Collaboration and Deployment Services Deployment Manager.

### Procedure

1. Log in to the browser-based IBM SPSS Collaboration and Deployment Services Deployment Manager.
2. On the **Configuration** panel, click the **URL Prefix** option in the **Setup** group.
3. Add the context root to the **URL Prefix** definition. For example, if your URL prefix is `http://myserver:8080` and you want to use a context root of `ibm/spss`, the new value is `http://myserver:8080/ibm/spss`.

**Restriction:** Do not end the URL specification with a slash. For example, specify a value of `http://myserver:8080/myroot` instead of `http://myserver:8080/myroot/`.

4. Restart the application server.

## What to do next

Update the context root for each application. The steps depend on the application server.

## Updating context roots for WebSphere

Modify the location at which applications deployed on WebSphere are accessed by using the administrative console.

### Before you begin

“Adding a context root to the URL Prefix”

### Procedure

1. Log in to the WebSphere console.
2. Access the IBM SPSS Collaboration and Deployment Services application.
3. Update the **Context Root For Web Modules** settings to include your root value. If the URL prefix is enabled for your system, the root value for each module must be the same as the value you added to the URL Prefix. The application root must be unchanged. For example: `/IBM/SPSS/CDS/admin`
4. Restart the WebSphere nodes where IBM SPSS Collaboration and Deployment Services is deployed

## Updating context roots for JBoss

Modify the location at which applications deployed on JBoss are accessed by updating the ear file that contains the location definitions.

### Before you begin

“Adding a context root to the URL Prefix” on page 54

### Procedure

1. Make a backup copy of the cds60.ear file in the toDeploy/timestamp directory of your JBoss installation.
2. Use an archive utility to modify the META-INF/application.xml file in the original ear file. Prefix the application root value for each context-root element with the new context root. You must add the same value to each context-root element.
3. Copy the ear file that contains the updated application.xml file to the deploy directory of the application server.
4. Restart the application server.

### Example

Suppose the application.xml file contains the following specifications:

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

To add a context root of ibm/spss, update the context-root definitions with the following values:

```
<module>
 <web>
 <web-uri>admin.war</web-uri>
 <context-root>ibm/spss/admin</context-root>
 </web>
</module>
<module>
 <web>
 <web-uri>peb.war</web-uri>
 <context-root>ibm/spss/peb</context-root>
 </web>
</module>
```

## Updating context roots for WebLogic

Modify the location at which applications deployed on WebLogic are accessed by updating the ear file that contains the location definitions.

### Before you begin

“Adding a context root to the URL Prefix” on page 54

## Procedure

1. Make a backup copy of the `cds60.ear` file in the `toDeploy/current` directory of your WebLogic installation.
2. Use an archive utility to modify the `META-INF/application.xml` file in the original ear file. Prefix the application root value for each `context-root` element with the new context root. You must add the same value to each `context-root` element.
3. Use the WebLogic console to redeploy the ear file that contains the updated `application.xml` file.
4. Restart the application server.

---

## Chapter 8. FIPS 140–2 compliance

The Federal Information Processing Standard (FIPS) Publication 140-2, FIPS PUB 140-2, is a US 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 US 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. See the topic Chapter 9, “Using SSL to secure data transfer,” on page 59 for more information.
- 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.

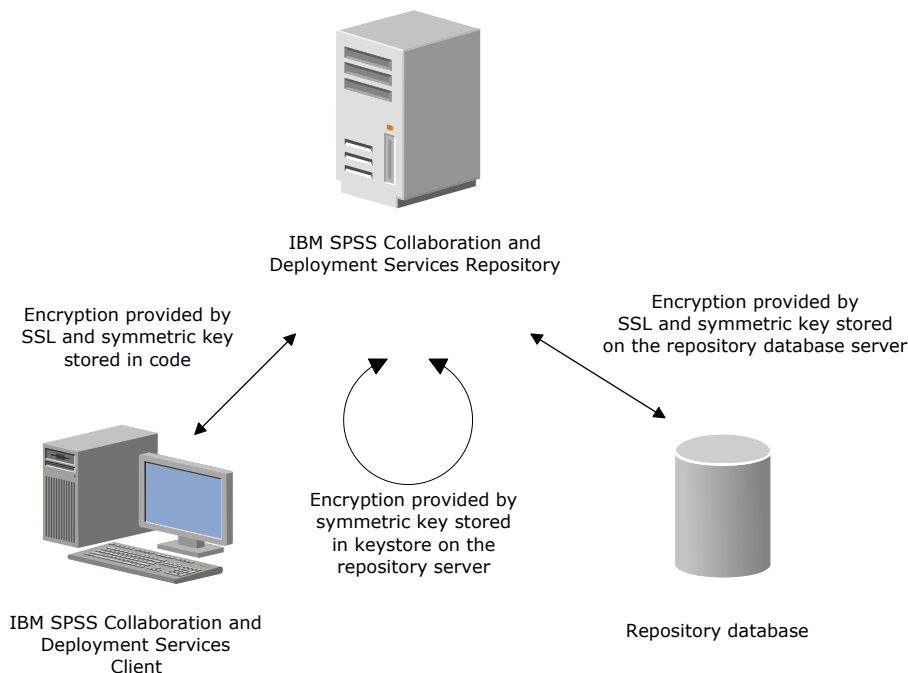


Figure 4. IBM SPSS Collaboration and Deployment Services FIPS 140-2-compliant security setup

---

### 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 .
- Internet Explorer configuration requires enabling Windows cryptography and modifying the browser settings. For more information, see .
- Apple Safari cannot be used in FIPS 140-2 compliant mode.

---

## Chapter 9. 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.

1. When a client connects to a server, the client authenticates the server with the public key certificate.
2. 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.
3. The server decrypts the random number with its private key.
4. 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:

1. Obtain and install the SSL certificate and keys.
2. If necessary, install unlimited strength encryption on the client computers.
3. Add the certificate to the client keystore.
4. Instruct 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, IBM SPSS Statistics Server is the *client*.

### Obtaining and installing SSL certificate and keys

1. 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.
2. 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, upgrading to unlimited-strength encryption is recommended.

## IBM J9

1. Download the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files for your version of the SDK from the IBM.com website.
2. Extract the unlimited jurisdiction policy files that are packaged in the compressed file. The compressed 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.
3. Replace your *US\_export\_policy.jar* and *local\_policy.jar* files with the two files that you downloaded.
4. 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.
5. Log off the administrative console.
6. Stop the server.
7. Restart the server.

## Sun Java

1. Download the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files for your version of the SDK from Sun Java website.
2. Extract the downloaded file.
3. 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.

## 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.

1. 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
```

2. Enter the following command:

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

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

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

## Importing the certificate file for browser-based client connections

When you connect to IBM SPSS Collaboration and Deployment Services Repository through SSL with a browser-based client, for example, IBM SPSS Collaboration and Deployment Services Deployment Portal, the browser either prompts you to accept the unsigned, untrusted certificate, or displays a message that the site is unsafe and provides a link to import the certificate into the browser truststore. This process is different for different browsers, and it might be different depending on the browser configuration. You can also manually install the certificate into the browser truststore.



## Instructing users to enable SSL

When 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 in to 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 IBM SPSS Collaboration and Deployment Services 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.



---

## Chapter 10. 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 Java 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 website .

### 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 5. Loggers.*

Logger	Description
<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, log4j.com.spss.cmor.internal.MetaObjectImportEngine</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, log4j.com.spss.reportservice</i>	Reporting events
<i>log4j.com.spss.notification</i>	Notification events
<i>log4j.logger.org.springframework.jdbc.core.JdbcTemplate</i>	Spring framework JDBC events
<i>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/*

---

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