Installation and Upgrade Guide (Printable)

Sun Role Manager 5.0.3 Installation and Upgrade Guide

About This Guide

This guide describes how to install Sun™ Role Manager software as well as how to upgrade from an older version of Sun Role Manager to a newer version.

Who Should Read This Guide

This guide is intended for system administrators, system deployers, database administrators, and system integrators who need to install or upgrade the Sun Role Manager software.

Part I - Compatibility Matrix

Part I is the compatibility matrix, which shows the products that the Sun™ Role Manager software (Role Manager) supports.

Sun Role Manager 5.0.3 Compatibility Matrix

Operating Systems and Servers

Sun Role Manager 5.0.3 is supported on the following platforms.

Operating System	Supported Versions
UNIX Environment	
HP-UX	11iv2 (11.23) 11iv3 (11.31)
IBM AIX	5.2 5.3 6.1
Red Hat Enterprise Linux Server	3 with Update 5 4 with Update 2

	- 5
Solaris	- 9 - 10
OpenSolaris	- 2008.05 - 2008.11 - 2009.06
SuSE Linux Enterprise Server	- 9 with SP 2 - 10 - 11
Windows Environment	
Windows NT	- 4.0
Windows 2000 Server Standard/Enterprise/Web Edition	- 5.0
Windows XP Professional	- 5.1
Windows 2003 Server Standard/Enterprise/Web Edition	- 5.2
Windows Vista Business/Enterprise/Ultimate	- 6.0
Windows 2008 Server Standard/Enterprise/Web	- 6.1
Windows 7 Professional/Enterprise/Ultimate	- 6.1
Mainframe	
z/OS	- V1.6 - V1.7 - V1.8 - V1.9 - V1.10 - V1.11

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Supported Databases

Sun Role Manager 5.0.3 is is compatible with the following databases.

Database Management System	Supported Versions
IBM DB2	9.1 9.5 9.7
Microsoft SQL Server	2000 with SP3 2005 2008
MySQL	5.0 5.1
Oracle	10g 11g

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Supported Application Servers

Sun Role Manager 5.0.3 is supported on the following application servers.
Note - Application servers should be J2EE™ 5 compliant.

Application Server	Supported Versions
Apache Tomcat	5.5.12+
BEA WebLogic Server	10.0
IBM WebSphere	6.1
Oracle WebLogic Server	10g R3 (10.3.0)
Sun Java System Application Server	9.1
Sun GlassFish Enterprise Server	2.1

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Supported HTTP Servers

Sun Role Manager 5.0.3 is supported on the following HTTP servers.
Note - Application servers should be J2EE™ 5 compliant.

HTTP Server	Supported Versions
Apache HTTP Server	• 2.0+
IBM HTTP Server	• 6.0+
Microsoft IIS	• 5.0+

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Supported Browsers

The Sun Role Manager 5.0.3 user interface is compatible with the following browsers.

Browser	Supported Versions
Firefox	• 2.0 • 3.0 • 3.5
Internet Explorer	• 6 • 7 • 8

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Supported Languages

The Role Manager application supports the following languages:

- Spanish
- German
- French
- Korean
- Japanese
- English
- Simplified Chinese

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Part II - Installing Sun Role Manager

Part II contains instructions on how to install the Sun Role Manager software (Role Manager).

Preparing to Install Sun Role Manager

Architecture Overview

Sun Role Manager is a Java™ 2 Platform, Enterprise Edition (J2EE platform) web application. The J2EE platform consists of a set of industry-standard services, APIs, and protocols that provide the functionality for developing multitiered, web-based, enterprise applications. The Role Manager system architecture is distributed across three logical tiers:

- The presentation tier
- The logic tier
- The data tier

The Role Manager application resides on an application server and Role Manager's central repository of application data resides on a database server.

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Installing and Readying Your Application Server

For a list of supported application servers, see Supported Application Servers in the Sun Role Manager 5.0.3 Compatibility Matrix chapter.

Installing an Application Server

You can deploy Role Manager on any supported application server.

Configuring the Locale

The application server should be configured to use the same locale or encoding as the database and the Java Virtual Machine (JVM™ installation).

Inconsistent encodings can introduce certain globalization issues, such as the incorrect handling of multibyte characters. In globalized environments, UTF-8 should be implemented on all products.

Refer to your application server documentation for information about setting the locale and encoding.

Setting Up a Java Virtual Machine

A Java Virtual Machine (JVM) is required to run the Java classes that perform actions within Role Manager. At least a version 5.0 JDK™ or JRE™ is required to run Role Manager. To install Role Manager, however, you will need a JDK.

> **Tip**
>
> - Many application servers include JDK software bundled with their installation. The JDK version that is shipped with the application server is always preferred to any other JDK installed on your server.
>
> - The JVM software should be configured to use the same locale or encoding as the application server and the database.

Configuring JVM Options

- You should determine your memory need and set values in your application server's JVM accordingly. The recommended memory settings are as follows:

  `-Xmx2048m -Xms2048m`

  > **Note**
  >
  > - For a 32-bit system, Java heap size exceeding `1536MB` is not recommended.
  > - Depending on your specific implementation, you might need to increase these recommended values if you face performance issues with the web interface.

- IPv4 is required by Role Manager for network communication. Refer to your operating system documentation for instructions on how to enable the IPv4 stack. Add the following JVM option to enforce the IPv4 preference over IPv6:

  `-Djava.net.preferIPv4Stack=true`

Refer to your application server's documentation for information about configuring JVM options.

Configuring the RBACX_HOME Environment Variable

Before installing Sun Role Manager you need to configure the `RBACX_HOME` environment variable. The `RBACX_HOME` variable should be permanently set to the directory where you will install Sun Role Manager. To create a permanent environment variable, refer to your operating system documentation for instructions.

To temporarily set the `$RBACX_HOME` environment variable, type the following command at a command line. The `$RBACX_HOME` environment variable will remain valid for the length of your session.

- **Windows**:
  `set RBACX_HOME=`*Path to the Sun Role Manager installation directory*

- **UNIX**:
  `export RBACX_HOME=`*Path to the Sun Role Manager installation directory*

  > **Note**
  >
  > - A permanent `$RBACX_HOME` environment variable should be created under the application server's owner profile. Role Manager deployment will fail if `RBACX_HOME` is declared in a profile inaccessible by the application server.
  > - For a clustered deployment, the `$RBACX_HOME` environment variable needs to be created on every cluster member.

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Installing and Readying Your Database Server

Preparing DB2

Prior to running the Sun Role Manager installer, a blank database named `rbacx` and a user named `rbacxservice` need to be created.

Note - If it is necessary to use a database name other than `rbacx` and a user name other than `rbacxservice`, open the schema creation script and replace all instances of the default database name and default user name with the names that you will be using instead. See Installing Sun Role Manager for more information.

▼ To Create a Sun Role Manager Database and Database User Account on DB2

Before You Begin - To create the database, you should have either `sysadm` or `sysctrl` privileges. Your DB2 database server should be installed and started.

1. Create the *rbacxservice* user on the target system as follows:
   - **Windows:**
     Log in to the target system as an administrator, and type the following at a command prompt:
     ```
     C:\>net user rbacxservice rbacxservice /add
     ```
   - **UNIX:**
     Log in to the target system as root or super user and type:
     ```
     # useradd rbacxservice
     # passwd rbacxservice
     ```
     When prompted, type `rbacxservice` as the password.

Preparing MySQL, MS SQL Server and Oracle Database Server

Sun Role Manager version 5.0.3 is preconfigured to use MySQL and MS SQL Server. No further steps are required to prepare MySQL or MS SQL Server for use with Sun Role Manager.

For Oracle Database Server you will need to copy the JDBC driver JAR file (`ojdbc5.jar` or `ojdbc6.jar`, depending on which JDK you are using) into the appropriate location (`WEB-INF/lib` or your application server's global `lib` directory). See chapter 3 for more information.

Installing Sun Role Manager

Downloading Third-party Library Files

Third-party files need to be downloaded prior to upgrading. Downloaded files should be saved to a library folder, which will be referred to as `RM_LIB`. For example,

- **Windows**
  ```
  mkdir C:\RM_Lib
  set RM_LIB=Path to the downloaded third-party library files  (for example, set RM_LIB=C:\RM_Lib)
  ```

- **UNIX**
  ```
  mkdir /opt/RM_Lib
  export RM_LIB=Path to the downloaded third-party library files  (for example, export RM_LIB=/opt/RM_Lib)
  ```

The `jasper-jdt.jar` File

Download the `jasper-jdt.jar` file from this site:

http://dlc.sun.com/rolemanager/Certification_And_Reporting/

This file is required by the Role Manager certification and reporting feature.

JDBC Drivers

The JAR files for establishing a JDBC connection can be downloaded from this site:

http://dlc.sun.com/rolemanager/Database_Drivers/

The JAR files that are required for each database type are summarized in the following table.

Database Type	File Name
IBM DB2	`db2jcc.jar, db2jcc_license_cu.jar`
Microsoft SQL Server	MS SQL Server jTDS JDBC driver is included in the Sun Role Manager WAR file and does not need to be downloaded separately.
MySQL	MySQL drivers are included in the Sun Role Manager WAR file and do not need to be downloaded separately.
Oracle	`ojdbc5.jar` if using JDK 1.5 / `ojdbc6.jar` if using JDK 1.6. The JDBC driver file you choose needs to support both the JDK version you are running, as well as the backend Oracle DB instance version.

> **Note**
> Drivers for MS SQL Server (jTDS) and MySQL are bundled in the Sun Role Manager WAR file. Do not install jTDS or MySQL drivers in the Sun Role Manager `lib` directory.

Provisioning Server Connectivity Files

Depending on which third-party provisioning server you are using with Sun Role Manager (CA eTrust, IBM Tivoli Identity Manager, or Oracle Identity Manager), you need to download the corresponding library files for that provisioning server. You do not need to download library files if you are using Sun Identity Manager as your provisioning server.

Download provisioning server connectivity files from this site:

http://dlc.sun.com/rolemanager/Provisioning_Server_Connectivity/

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Installing Sun Role Manager

Follow the procedure in this section to install Sun Role Manager 5.0.3.

▼ To Create the Role Manager Folder Structure

Before You Begin - Prior to installing Sun Role Manager, verify that the following prerequisites have been met:

- You should have installed your database and completed the steps in Preparing Your Database in the Preparing to Install Sun Role Manager chapter.
- If your database is installed on the same machine on which you are installing Sun Role Manager, you should create an environment variable that maps to your database installation directory. For example, if you are using Oracle 10g, create an `$ORACLE_HOME` environment variable and map it to your Oracle installation directory.
- If installing on a UNIX® based system, you should have sufficient privileges to create and modify folders in the `/opt` directory of the file system.
- To execute the database schema on the target database, DBA privileges are required. Use `root` for MySQL, `system` for Oracle, `sa` for MS SQL Server, `db2admin` for DB2, or an account with equivalent privileges.

1. At a command prompt, type the following commands to create the necessary folder structure.
    - **Windows:**
      ```
      C:\> mkdir Sun\RM_5.0
      ```

    - **UNIX:**

```
$ mkdir -p /opt/Sun/RM_5.0
```

2. Unpack the Sun Role Manager installation package.
   - **Windows:**
     unzip *srm_install_package.zip* -d RM_5.0

   - **UNIX:**
     unzip *srm_install_package.zip* -d RM_5.0

3. Verify that the Role Manager folder structure was properly created.
   The directory that you installed Sun Role Manager to should consist of the following folders and files.

`.indexes`	*folder*
`conf`	*folder*
`db`	*folder*
`rbacx.war`	*file*
`reports`	*folder*
`sample`	*folder*

> **Note**
> The `sample` folder contains `import` and `export` folders that show the folder structure recommended for file and ETL imports.

4. Copy the `import` and `export` folders (located in the `sample` folder) to `$RBACX_HOME`. The `import` and `export` folders should be at the same level as `conf`, `.indexes`, and `reports`.

▼ Windows: To Create the Role Manager Schema on the Database Server

Before You Begin - Prior to creating the Role Manager Schema on the Database Server, review the following:

- You should have created the Role Manager folder structure as described in the previous section.
- Sun Role Manager utilizes an encrypted password when communicating with the database. To change the default database password, use the RBACx Encrypted Password Change Utility that is available from customer support.
- If it is necessary to use a database name other than `rbacx` and a user name other than `rbacxservice`, open the schema creation script and replace all instances of the default database name and default user name with the names that you will be using instead.

Go to the section that contains instructions for your database server.

Microsoft SQL Server
If SQL Server is installed locally, you can create the Role Manager schema using either the command prompt or the SQL Server Query Analyzer tool *or* the Management Studio tool. If SQL Server is not installed locally, use the SQL Server Query Analyzer tool or the Management Studio tool to create the schema.

- To create the schema and `rbacxservice` user from a command prompt, follow these steps:
  1. Navigate to `C:\Sun\RM_5.0\db` by typing:
     `C:\> cd Sun\RM_5.0\db`
  2. Run the following command(s) to execute the schema creation script:
     `C:\> sqlcmd -S localhost -i rbacx-`*version*`_mssql_schema.sql -U sa -P` *password*

- To create the schema using Query Analyzer or Management Studio, follow these steps:

1. Log in to the database server as `sa`.
2. Click the Open Query File menu and locate the `rbacx-`*version*`\mssql_schema.sql` file.
3. Execute the SQL file.
   This will create the `rbacx` database on the server.

Oracle

You can create the Role Manager schema using either the command prompt or the Oracle iSQL Plus Web Console (*available in Oracle 10g Database Server*). If the Oracle Database Server is not installed locally, use the iSQL Plus Web Console to create the schema.

- To create the schema and `rbacxservice` user from a command prompt, follow these steps:
  1. Navigate to `C:\Sun\RM_5.0\db` by typing:
     `C:\> cd Sun\RM_5.0\db`
  2. Run the following command(s) to execute the schema creation script:
     `C:\> sqlplus / as sysdba @rbacx-`*version*`_oracle_schema.sql`

- To create the schema using the iSQL Plus Web Console, follow these steps:
  1. Open the following URL in a web browser.
     The default port for the iSQL Plus Web Console is `5560`.
     `http://`*hostname*`:5560/isqlplus`
  2. Select Load Script and browse to `C:\Sun\RM_5.0\db`.
  3. Locate the file `rbacx-`*version*`_oracle_schema.sql` and click Load.
     The Role Manager schema creation script is loaded into the workspace window.
  4. Click Execute.
     The script is executed and the Role Manager schema is created on the system.

DB2

The following steps assume that the DB2 database server is installed locally and that you are logged in as the `rbacxservice` user. One of the following authorizations is required to create the database:
```
sysadm
sysctrl
```

To create the schema from a command prompt, follow these steps:

1. Create a database named `rbacx` by executing the following command as a DB2 administrator:
   `C:\ db2cmd db2 CREATE DATABASE rbacx`
2. Change directories to `C:\Sun\RM_5.0\db`.
   `C:\> cd C:\Sun\RM_5.0\db`
3. Run the following command(s) to execute the schema creation script:
   `C:\> db2cmd db2 -tvf rbacx-`*version*`_db2_schema.sql`

MySQL

The following assumes that the MySQL database server is installed locally.

To create the schema from a command prompt, run the following command(s) to execute the schema creation script:
`C:\> mysql --user=`*account*` --password=`*password*` < rbacx-`*version*`_mysql_schema.sql`

> **Note**
> If you are using MySQL 5.0, `lower_case_table_names` variable needs to be changed from its default value.
> Make the following change to `lower_case_table_names` in MySQL's configuration file.
> `lower_case_table_names=1`

▼ UNIX: To Create the Role Manager Schema on the Database Server

Before You Begin - Prior to creating the Role Manager Schema on the Database Server, review the following:

- You should have created the Role Manager folder structure as described in the <u>To Create the Role Manager Folder Structure</u> section, earlier in this chapter.
- Sun Role Manager utilizes an encrypted password when communicating with the database. To change the default database password, use the RBACx Encrypted Password Change Utility that is available from customer support.
- If it is necessary to use a database name other than `rbacx` and a user name other than `rbacxservice`, open the schema creation script and replace all instances of the default database name and default user name with the names that you will be using instead.

Oracle

You can create the Role Manager schema using either the command prompt or the Oracle iSQL Plus Web Console (*available in Oracle 10g Database Server*). If the Oracle Database Server is not installed locally under the `/opt` directory, use the iSQL Plus Web Console to create the schema.

- To create the schema and `rbacxservice` user from a command prompt, follow these steps:
    1. Type:
        ```
        $ su - oracle
        $ export ORACLE_HOME=/opt/oracle/product/10.2.0
        $ cd /opt/Sun/RM_5.0/db
        ```
    2. Run the following command(s) to execute the schema creation script:
        ```
        $ sqlplus / as sysdba @rbacx-version_oracle_schema.sql
        ```

- To create the schema using the iSQL Plus Web Console, follow these steps:
    1. Open the following URL in a web browser.
        The default port for the iSQL Plus Web Console is 5560.
        ```
        http://hostname:5560/isqlplus
        ```
    2. Select Load Script and browse to `/opt/Sun/RM_5.0/db`.
    3. Locate the file `rbacx-version_oracle_schema.sql` and click Load.
        The Role Manager schema creation script is loaded into the workspace window.
    4. Click Execute.
        The script is executed and the Role Manager schema is created on the system.

DB2

The following steps assume that the DB2 database server is installed locally and that you are logged in as the `rbacxservice` user. One of the following authorizations is required to create the database:
```
sysadm
sysctrl
```

To create the schema using a terminal session, follow these steps:

1. Create a database named `rbacx` by executing the following command as a DB2 administrator:
    ```
    # db2 CREATE DATABASE rbacx
    ```
2. Change directories to `/opt/Sun/RM_5.0/db`.
    ```
    # cd /opt/Sun/RM_5.0/db
    ```
3. Run the following command(s) to execute the schema creation script:
    ```
    # db2 -tvf rbacx-version_db2_schema.sql
    ```

MySQL

The following assumes that the MySQL database server is installed locally.

To create the schema from a terminal session, run the following command(s) to execute the schema creation script:
```
$ mysql -user=account --password=password < rbacx-version_mysql_schema.sql
```

Note

If you are using MySQL 5.0, `lower_case_table_names` variable needs to be changed from its default value.

Make the following change to `lower_case_table_names` in MySQL's configuration file.

```
lower_case_table_names=1
```

▼ To Configure Sun Role Manager for Standalone Deployment

Follow these steps to build a custom `.war` file for your environment.

Before You Begin -

- Complete the steps in <u>To Create the Role Manager File Structure</u>.
- An installed JDK is required (Version 1.5, at minimum).
- You should have downloaded the JDBC connectivity JAR file for your database. See <u>Downloading and Installing JDBC Drivers</u> in the Preparing to Install Sun Role Manager chapter for more information.
- You should have created the Role Manager schema on the database server (<u>Windows instructions</u> and <u>UNIX instructions</u>).

1. Create a backup copy of the original `rbacx.war` file.
   - **Windows:**
     ```
     C:\> cd C:\Sun\RM_5.0
     C:\> mkdir rbacx_original
     C:\> copy rbacx.war rbacx_original
     ```
     A copy of the `rbacx.war` file is created under `C:\Sun\RM_5.0\rbacx_original`
   - **UNIX:**
     ```
     $ cd /opt/Sun/RM_5.0
     $ mkdir rbacx_original
     $ cp rbacx.war rbacx_original/.
     ```
     A copy of the `rbacx.war` file is created under `/opt/Sun/RM_5.0/rbacx_original`

2. Create an `rbacx_staging` folder under `$RBACX_HOME`.
   - **Windows:**
     ```
     C:> mkdir rbacx_staging
     C:> cd rbacx_staging
     ```
   - **UNIX:**
     ```
     $ mkdir rbacx_staging
     $ cd rbacx_staging
     ```

3. Extract `rbacx.war` to `rbacx_staging` so that configuration changes can be made.
   - **Windows:**
     ```
     C:> jar -xvf ../rbacx.war
     ```
   - **UNIX:**
     ```
     $ jar -xvf ../rbacx.war
     ```

4. Navigate to `rbacx_staging/WEB-INF`.
   - **Windows:**
     ```
     C:> cd WEB-INF
     ```
   - **UNIX:**
     ```
     $ cd WEB-INF
     ```

5. Update the `log4j.properties` file with the correct path for your environment.

> **Note**
> If the Role Manager log file is going to be created in any folder other than the default log folder as defined by the application server, complete the step. Otherwise, skip and go to the next step.

   a. In a text editor, open the `log4j.properties` file located in the `WEB-INF` folder.

   b. Locate the following line under `# File Appender`.

       `log4j.appender.file.file=logs/rbacx.log`

   c. Replace `logs/rbacx.log` with the full path to where the log file should be written.

     For example, the line should look like this:

      • **Windows:** `log4j.appender.file.file=C:/Sun/RM_5.0/logs/rbacx.log`

      • **UNIX:** `log4j.appender.file.file=/opt/Sun/RM_5.0/logs/rbacx.log`

6. Copy the downloaded third-party library files to the Role Manager library under the `WEB-INF/lib` directory

   • **Windows**

     `copy %RM_LIB%`

     `* WEB-INF\lib`

   • **UNIX**

     `cp $RM_LIB/* WEB-INF/lib`

7. Make the following changes if there are multiple instances of Role Manager, standalone or clustered, on the same subnet.

   a. Navigate to `rbacx_staging/WEB-INF` directory.

   b. In a text editor, open `application-context.xml`, find bean id `commManager`, and examine the `constructor-arg` value.

   c. Set the `constructor-arg` value with a unique instance name, e.g. `value="SRM-Instance-1"`.

   d. In a text editor, open `search-context.xml`, find bean id `searchConfiguration`, and examine the `constructor-arg` value.

     • The deployment is a standalone, `constructor-arg` defaults to a value of `0`, which is specified as `value="0"`.

   e. Navigate to `rbacx_staging/WEB-INF/classes` directory and do the following:

     i. In a text editor, open `oscache.properties` (located in the `rbacx_staging/WEB-INF/classes` directory), and find the `cache.cluster.multicast.ip` property.

     ii. Uncomment `cache.cluster.multicast.ip` by removing the `#` at the start of the line. Each Role Manager instance requires a unique `cache.cluster.multicast.ip` value.

8. Run the following commands from the `rbacx_staging` folder to repack the newly modified `rbacx.war` file.

  The expanded folder structure is repackaged to a `.war` file, which is required for deployment on the application server.

   • **Windows:**

     `C:\> cd C:\Sun\RM_5.0\rbacx_staging`

     `C:\> jar -cvfM ../rbacx.war .`

     The new `rbacx.war` file is located in `C:\Sun\RM_5.0`.

   • **UNIX:**

     `$ cd /opt/Sun/RM_5.0/rbacx_staging`

     `$ jar -cvfM ../rbacx.war .`

     The new `rbacx.war` file is located in `/opt/Sun/RM_5.0`.

9. Delete the `rbacx_staging` folder.

   • **Windows:**

     `C:\> rmdir /s rbacx_staging`

   • **UNIX:**

     `$ /usr/bin/rm -r rbacx_staging`

10. Copy the `jdbc.properties` file for your database to the Sun Role Manager `conf` directory, located as follows.

- **Windows:**
  ```
  C:\>Sun\RM_5.0\conf
  ```
- **UNIX:**
  ```
  /opt/Sun/RM_5.0/conf
  ```
  For example, to establish connectivity with MySQL, copy `jdbc.properties` from the `mysql` directory to the `conf` directory.

11. In a text editor, open the `jdbc.properties` file and edit the following lines, substituting `$SERVER_NAME` and `$PORT_NUMBER` with the host name and connectivity port of the target database.

    Oracle
    ```
    # JDBC driver URL
    jdbc.url=jdbc:oracle:thin:@$SERVER_NAME:$PORT_NUMBER:rbacx
    ```
    The default port number for JDBC connectivity on the Oracle server is `1521` and it is assumed that the default SID is `rbacx`.

    MS SQL Server
    ```
    # JDBC driver URL
    jdbc.url=jdbc:jtds:sqlserver://$SERVER_NAME:$PORT_NUMBER/rbacx;tds=8.0;
    lastupdatecount=true
    ```
    The default port number for JDBC connectivity on MS SQL Server is `1433`.

    DB2
    ```
    # JDBC driver URL
    jdbc.url=jdbc:db2://$SERVER_NAME:$PORT_NUMBER/rbacx
    ```
    The default port number for JDBC connectivity on DB2 is `50000`.

    MySQL
    ```
    # JDBC driver URL
    jdbc.url=jdbc:mysql://$SERVER_NAME:$PORT_NUMBER/rbacx
    ```
    The default port number for JDBC connectivity on MySQL Server is `3306`.

12. Do the following:
    a. Go to the following location and open `iam.properties` in a text editor.
       - **Windows:**
         ```
         C:\>Sun\RM_5.0\conf
         ```
       - **UNIX:**
         ```
         /opt/Sun/RM_5.0/conf
         ```
    b. Edit the following lines, replacing `$RBACX_HOME` with the path to the directory where Sun Role Manager is installed:

    ```
    com.vaau.rbacx.iam.file.import.completeLocation=$RBACX_HOME/import/complete
    com.vaau.rbacx.iam.file.import.schemaLocation=$RBACX_HOME/import/schema
    com.vaau.rbacx.iam.file.import.dropLocation=$RBACX_HOME/import/in
    com.vaau.rbacx.etl.import.dropLocation=$RBACX_HOME/import/etl/in
    com.vaau.rbacx.etl.import.graphsLocation=$RBACX_HOME/import/etl/graphs
    com.vaau.rbacx.etl.import.completeLocation=$RBACX_HOME/import/etl/complete
    com.vaau.rbacx.etl.import.outputLocation=$RBACX_HOME/import/in
    com.vaau.rbacx.iam.file.export.dropLocation=$RBACX_HOME/export/etl/in
    com.vaau.rbacx.iam.file.export.schemaLocation=$RBACX_HOME/export/schema
    com.vaau.rbacx.etl.export.dropLocation=$RBACX_HOME/export/etl/in
    com.vaau.rbacx.etl.export.graphsLocation=$RBACX_HOME/export/etl/graphs
    com.vaau.rbacx.etl.export.completeLocation=$RBACX_HOME/export/etl/complete
    com.vaau.rbacx.etl.export.outputLocation=$RBACX_HOME/export/out
    ```

▼ To Configure Sun Role Manager for Clustered Deployment

Follow these steps to build a custom `.war` file for your environment.

Before You Begin -

- Complete the steps in <u>To Create the Role Manager File Structure</u>.
- An installed JDK is required (Version 1.5, at minimum).
- You should have downloaded the JDBC connectivity JAR file for your database. See <u>Downloading and Installing JDBC Drivers</u> in the Preparing to Install Sun Role Manager chapter for more information.
- You should have created the Role Manager schema on the database server (<u>Windows instructions</u> and <u>UNIX instructions</u>).

1. Create a backup copy of the original `rbacx.war` file.
   - **Windows:**
     ```
     C:\> cd C:\Sun\RM_5.0
     C:\> mkdir rbacx_original
     C:\> copy rbacx.war rbacx_original
     ```
     A copy of the `rbacx.war` file is created under `C:\Sun\RM_5.0\rbacx_original`
   - **UNIX:**
     ```
     $ cd /opt/Sun/RM_5.0
     $ mkdir rbacx_original
     $ cp rbacx.war rbacx_original/.
     ```
     A copy of the `rbacx.war` file is created under `/opt/Sun/RM_5.0/rbacx_original`

2. Create an `rbacx_staging` folder under `$RBACX_HOME`.
   - **Windows:**
     ```
     C:> mkdir rbacx_staging
     C:> cd rbacx_staging
     ```
   - **UNIX:**
     ```
     $ mkdir rbacx_staging
     $ cd rbacx_staging
     ```

3. Extract `rbacx.war` to `rbacx_staging` so that configuration changes can be made.
   - **Windows:**
     ```
     C:> jar -xvf ../rbacx.war
     ```
   - **UNIX:**
     ```
     $ jar -xvf ../rbacx.war
     ```

4. Navigate to `rbacx_staging/WEB-INF`.
   - **Windows:**
     ```
     C:> cd WEB-INF
     ```
   - **UNIX:**
     ```
     $ cd WEB-INF
     ```

5. Update the `log4j.properties` file with the correct path for your environment.

   > **Note**
   > If the Role Manager log file is going to be created in any folder other than the default log folder as defined by the application server, complete the step. Otherwise, skip and go to the next step.

   a. In a text editor, open the `log4j.properties` file located in the `WEB-INF` folder.
   b. Locate the following line under `# File Appender`.
      ```
      log4j.appender.file.file=logs/rbacx.log
      ```

   c. Replace `logs/rbacx.log` with the full path to where the log file should be written.

For example, the line should look like this:

- **Windows:** `log4j.appender.file.file=C:/Sun/RM_5.0/logs/rbacx.log`
- **UNIX:** `log4j.appender.file.file=/opt/Sun/RM_5.0/logs/rbacx.log`

6. Copy the downloaded third-party library files to the Role Manager library under the `WEB-INF/lib` directory

   - **Windows**
     ```
     copy %RM_LIB%
     * WEB-INF\lib
     ```
   - **UNIX**
     ```
     cp $RM_LIB/* WEB-INF/lib
     ```

7. Make the following changes to enable Sun Role Manager 5.0.3 support for clustered application server deployments.

   a. Navigate to `rbacx_staging/WEB-INF` directory.

   b. In a text editor, open `application-context.xml`, find bean id `commManager`, and examine the `constructor-arg` value.

   c. Set the `constructor-arg` value as the cluster name---for example, `value="Prod-1-Cluster"`.

      - If Role Manager is deployed on multiple clusters within the same subnet, you should define unique `constructor-arg` values for each deployment. For example, if both clusters `Prod-Cluster` and `QA-Cluster` have Role Manager deployed, the `constructor-arg` values of each should be set to `Prod-Cluster` and `QA-Cluster` respectively.
      - Members of the same cluster should have the same `constructor-arg` value.

   d. In a text editor, open `search-context.xml`, find bean id `searchConfiguration`, and examine the `constructor-arg` value.

      - If the deployment is a clustered deployment, `constructor-arg` defaults to a value of `1` or `2` depending on the location of the `.indexes` directory.
        i. To set the `constructor-arg` value, do the following:
           - If each clustered node will be accessing *local* individual `.indexes` directories, set `constructor-arg` to `1`. For example, `value="1"`
           - If clustered nodes will be accessing *a shared* `.indexes` directory, set `constructor-arg` to `2`. For example, `value="2"`. The `.indexes` directory needs to be located on an NFS share location where each clustered node has read-write permission. Edit `indexLocation` such that the NFS share location replaces `$RBACX_HOME` in the `value` field.

   e. If multiple instances of Role Manager, standalone or clustered, exist on the same subnet, navigate to the `rbacx_staging/WEB-INF/classes` directory and do the following:

      i. In a text editor, open `oscache.properties` (located in the `rbacx_staging/WEB-INF/classes` directory), and find the `cache.cluster.multicast.ip` property.

      ii. Uncomment `cache.cluster.multicast.ip` by removing the `#` at the start of the line. Each non-member instance requires a unique `cache.cluster.multicast.ip` value.

8. Run the following commands from the `rbacx_staging` folder to repack the newly modified `rbacx.war` file.
   The expanded folder structure is repackaged to a `.war` file, which is required for deployment on the application server.

   - **Windows:**
     ```
     C:\> cd C:\Sun\RM_5.0\rbacx_staging
     C:\> jar -cvfM ../rbacx.war .
     ```
     The new `rbacx.war` file is located in `C:\Sun\RM_5.0`.
   - **UNIX:**
     ```
     $ cd /opt/Sun/RM_5.0/rbacx_staging
     $ jar -cvfM ../rbacx.war .
     ```
     The new `rbacx.war` file is located in `/opt/Sun/RM_5.0`.

9. Delete the `rbacx_staging` folder.

   - **Windows:**
     ```
     C:\> rmdir /s rbacx_staging
     ```
   - **UNIX:**

```
$ /usr/bin/rm -r rbacx_staging
```

10. Copy the `jdbc.properties` file for your database to the Sun Role Manager `conf` directory, located as follows.
    - **Windows:**
      `C:\>Sun\RM_5.0\conf`
    - **UNIX:**
      `/opt/Sun/RM_5.0/conf`
      For example, to establish connectivity with MySQL, copy `jdbc.properties` from the `mysql` directory to the `conf` directory.

11. In a text editor, open the `jdbc.properties` file and edit the following lines, substituting `$SERVER_NAME` and `$PORT_NUMBER` with the host name and connectivity port of the target database.
    Oracle
    ```
    # JDBC driver URL
    jdbc.url=jdbc:oracle:thin:@$SERVER_NAME:$PORT_NUMBER:rbacx
    ```
    The default port number for JDBC connectivity on the Oracle server is `1521` and it is assumed that the default SID is `rbacx`.

    MS SQL Server
    ```
    # JDBC driver URL
    jdbc.url=jdbc:jtds:sqlserver://$SERVER_NAME:$PORT_NUMBER/rbacx;tds=8.0;
    lastupdatecount=true
    ```
    The default port number for JDBC connectivity on MS SQL Server is `1433`.

    DB2
    ```
    # JDBC driver URL
    jdbc.url=jdbc:db2://$SERVER_NAME:$PORT_NUMBER/rbacx
    ```
    The default port number for JDBC connectivity on DB2 is `50000`.

    MySQL
    ```
    # JDBC driver URL
    jdbc.url=jdbc:mysql://$SERVER_NAME:$PORT_NUMBER/rbacx
    ```
    The default port number for JDBC connectivity on MySQL Server is `3306`.

12. Make the following change to `jdbc.properties` for clustered Quartz support, and save the file:
    ```
    jdbc.quartz.isClustered=true
    ```

13. Do the following:
    a. Go to the following location and open `iam.properties` in a text editor.
       - **Windows:**
         `C:\>Sun\RM_5.0\conf`
       - **UNIX:**
         `/opt/Sun/RM_5.0/conf`
    b. Edit the following lines, replacing `$RBACX_HOME` with the path to the directory where Sun Role Manager is installed:

```
com.vaau.rbacx.iam.file.import.completeLocation=$RBACX_HOME/import/complete
com.vaau.rbacx.iam.file.import.schemaLocation=$RBACX_HOME/import/schema
com.vaau.rbacx.iam.file.import.dropLocation=$RBACX_HOME/import/in
com.vaau.rbacx.etl.import.dropLocation=$RBACX_HOME/import/etl/in
com.vaau.rbacx.etl.import.graphsLocation=$RBACX_HOME/import/etl/graphs
com.vaau.rbacx.etl.import.completeLocation=$RBACX_HOME/import/etl/complete
com.vaau.rbacx.etl.import.outputLocation=$RBACX_HOME/import/in
com.vaau.rbacx.iam.file.export.dropLocation=$RBACX_HOME/export/etl/in
com.vaau.rbacx.iam.file.export.schemaLocation=$RBACX_HOME/export/schema
com.vaau.rbacx.etl.export.dropLocation=$RBACX_HOME/export/etl/in
com.vaau.rbacx.etl.export.graphsLocation=$RBACX_HOME/export/etl/graphs
com.vaau.rbacx.etl.export.completeLocation=$RBACX_HOME/export/etl/complete
com.vaau.rbacx.etl.export.outputLocation=$RBACX_HOME/export/out
```

Note
When the application server is clustered, the nodes can maintain localized import/export directories, or utilize import/export directories on a NFS share. If the nodes use a shared NFS location for import/export, substitute `$RBACX_HOME` with the path to the NFS share.

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Deploying Sun Role Manager

Follow the appropriate procedure on this page to deploy Sun Role Manager to your application server.

Before You Begin -

- Verify that your JVM Maximum and Minimum Heap Size configuration meets the minimum values recommended for Sun Role Manager 5.0.3. See Configuring Memory Settings in "Preparing to Install Sun Role Manager" for further information about these values.

- These instructions are for a stand-alone (non-clustered) Sun Role Manager deployment.

Deploying on Tomcat

Follow the procedure in this section to deploy Sun Role Manager on Tomcat. Before you begin, you should have already completed the procedures in the Installing Sun Role Manager chapter.

▼ To Deploy Sun Role Manager on Tomcat

1. Stop the Tomcat application server.
2. Browse to the `tomcat install` directory.
3. Copy the configured WAR file to the `webapps` directory that is located in the `tomcat install` directory.
4. Start the Tomcat application server.

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Deploying on WebSphere

Follow the procedure in this section to deploy Sun Role Manager on WebSphere. Before you begin, you should have already completed the procedures in the Installing Sun Role Manager chapter.

▼ To Configure WebSphere to Run Role Manager

1. In a browser, open the WebSphere Administrative Console:

   `http://`*Hostname*`:`*Port-Number*`/ibm/console/`
2. Choose Application Servers > *Server Name* > Process Definition > Java Virtual Machine.
3. Specify the following value under Generic JVM requirements, and save your changes.

   `-Xverify:none`

   If using at least WebSphere 6.1.0.3, go to the next step. Otherwise restart the application server and skip to <u>To Deploy Sun Role Manager on WebSphere</u>.
4. If using at least WebSphere 6.1.0.3, choose Application Servers > *Server Name* > Web Container > Custom Properties.
5. Create a new custom property using the following parameters and save your changes.

   Name: `com.ibm.ws.webcontainer.invokefilterscompatibility`

   Value: `true`
6. Restart the application server.

▼ To Deploy Sun Role Manager on WebSphere

1. In a browser, log in to the WebSphere Administrative Console.

   `http://`*Hostname*`:`*Port-Number*`/ibm/console/`
2. Choose Application > Install New Application in the left panel.
   a. Specify the path to the `rbacx.war` file.
      - If the `rbacx.war` file is located on the local system, type its complete path under Local File System.
      - If the file is on a remote machine, specify the path for the remote file system.
   b. Enter `rbacx` as the context root.
   c. Select "Show me all installation options and parameters" and click Next.
3. On the page "Choose to generate default bindings and mappings," select the default configuration and click Next.
4. Click Continue on the Application Security Warning page.

   The "Select Installation Options" page opens.
5. Complete the form:
   a. To install the application to a location other than the default location, type the path in the Directory to Install Application field. For example, on UNIX systems:

      `/opt/IBM/Websphere/AppServer/installed Apps/Hostname`
   b. Verify that the following options are selected:
      - Precompile JavaServer Pages files
      - Distribute application
      - User binary configuration
      - Enable class reloading
   c. Enter the name of the application in the Application Name field, and click Next.

      The default application name is set to `rbacx`.
6. On page "Map modules to servers," verify that the Sun Role Manager application mapping is to the appropriate cluster/server and click Next.

   The "Provide options to compile JSPs" page opens.
7. Make the following changes and click Next:
   a. Select Web Module - Vaau RBACx.
   b. Change JDK Source Level to `15`.
8. Click Next on the "Map shared libraries" page.

   The "Map virtual hosts for Web modules" page opens.
9. Verify that the Sun Role Manager application mapping is set to the appropriate virtual host and click Next.
10. Verify that the context root is `rbacx` on the "Map context roots for Web modules" page, and click Next.
11. Review the summary and click Finish.
12. After WebSphere has completed installing Sun Role Manager, click Save to Master Configuration to save the configuration, then click Save and wait for the page to clear.
13. Choose Enterprise Applications > rbacx > Manage Modules, and do the following:
    a. Verify that the cluster/server mapping is correct.

b. Select Vaau RBACx > Class loader order.

c. Under Class loader order, select "Class loaded with application class loader first," and save your changes.

14. Select `rbacx` from the Enterprise Applications window and start services by clicking Start.

Sun Role Manager deployment on WebSphere is complete.

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Deploying on WebLogic

Follow the procedure in this section to deploy Sun Role Manager on WebLogic. Before you begin, you should have already completed the procedures in the Installing Sun Role Manager chapter.

▼ To Deploy Sun Role Manager on WebLogic

To deploy Sun Role Manager on WebLogic, you must first extract the `.war` file to a staging folder.

1. At the command line, navigate to `$RBACX_HOME`.

   Note
   The `$RBACX_HOME` environment variable denotes the path to the directory to which you installed Sun Role Manager.

2. Type the following commands at a command prompt to create a directory where the `.war` file would be exploded. These steps require a JDK.
   - **Windows:**
     ```
     C:\> mkdir rbacx_staging
     C:\> cd rbacx_staging
     C:\> jar -xvf ../rbacx.war
     ```
   - **UNIX:**
     ```
     $ mkdir rbacx_staging
     $ cd rbacx_staging
     $ jar -xvf ../rbacx.war
     ```

3. In a browser, log in to the WebLogic administration console.
   `http://`*Hostname*`:`*Port-Number*`/console/login/LoginForm.jsp`

4. In the administration console, go to the left panel and click Lock & Edit, located under Change Center.

5. Click Deployments, located under Domain Structure.

6. Click Install, located in the main panel under Deployments.
   The Install Application Assistant opens.

7. On the Locate Deployment To Install And Prepare For Deployment page, navigate to the `rbacx_staging` directory created in step two and select the folder such that it lists the contents of `rbacx.war`.

8. Select `rbacx`, and click Next.

9. Select the Install This Deployment As An Application option and click Next.

10. On the Optional Settings page, do the following:
    a. Ensure that the deployment is named `rbacx`.
    b. Under Security, select DDOnly: Use Only Roles And Policies That Are Defined In This Deployment.
    c. Under Source Accessibility, select Use The Defaults Defined By The Deployment's Targets.
    d. Click Next.

11. On the Review Your Choices And Click Finish page, select Yes, Take Me To The Deployments Configuration Screen.

12. Review the settings for the deployment, then click Next.

13. Click Deployments in the left panel.
    The Summary of Deployments panel opens.

14. Select `rbacx`, then click Start > Servicing All Requests.
    Select Yes to start the deployment.

A status of Start Running indicates that Sun Role Manager has been successfully deployed.

> **Note**
> If a `'Session Error'` alert box is observed when accessing Sun Role Manager, follow these steps.
>
> 1. Locate `dwr-context.xml` file within `/WEB-INF` directory of exploded `rbacx.war` file.
> 2. Replace `<dwr:controller debug="true" id="dwrController"/>` with the following
>
> ```
> <dwr:controller debug="true" id="dwrController">
>         <dwr:config-param name="allowScriptTagRemoting" value="false"/>
>         <dwr:config-param name="crossDomainSessionSecurity" value="false"/>
> </dwr:controller>
> ```
>
> - If the lines exist, change the value of `allowScriptTagRemoting` and `crossDomainSessionSecurity` to `false`.

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Deploying on GlassFish

Follow the procedure in this section to deploy Sun Role Manager on GlassFish™ application server. Before you begin, you should have already completed the procedure in the Installing Sun Role Manager chapter.

▼ To Deploy Sun Role Manager on GlassFish

1. In a browser, log in to the GlassFish Admin Console.
   `http://`*Hostname*`:`*Port-Number*`/login.jsf`
   The default port number for the admin console is `4848`.
2. Choose Common Tasks > Applications > Web Applications in the left panel.
3. Click Deploy under Web Applications.
4. Select "Web Application (.war)" as the Type.
5. Select Location and navigate to the `rbacx.war` file on the local system under Deploy Enterprise Applications/Modules.
6. Complete the form:
   a. For Application Name, type `rbacx`.
   b. For Context Root, type `rbacx`.
   c. Verify that Status is selected and that Run Verifier, Precompile JSPs is not selected.
   d. Click OK.

Upon deployment, the `rbacx` application will be listed on the Web Applications page.

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Verifying the Sun Role Manager Installation

Verifying That the Sun Role Manager Installation was

Successful

Use the following procedure to verify that your Sun Role Manager installation was successful and that the application is working properly.

▼ To Verify a Sun Role Manager Installation

1. Browse to your application server log files and verify that the `rbacx.log` file is present.
   This file is created when Sun Role Manager is deployed to the application server.
2. Open `rbacx.log` in a text editor and check for a message indicating that Sun Role Manager started successfully.
3. Using a browser, open the following URL: `http://`*Hostname:Port-Number*`/rbacx`
4. Use the following credentials to log in to the client:
     Username: `rbacxadmin`
     Password: `password`

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Part III - Upgrading Sun Role Manager

Part III provides detailed information and instructions to help you upgrade your Sun Role Manager installation.

Overview of the Upgrade Process

Why Upgrade?

There are several reasons to upgrade to the latest version of Sun Role Manager:

1. Access to the latest advanced features and functionality
2. Access to the latest security enhancements
3. Continued eligibility for full support and services

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Phases of the Upgrade Process

The upgrade process is divided into three major phases:

- **Phase 1 – Prepare to upgrade Sun Role Manager**
  In phase one you document your existing environment, choose an upgrade version, and document any custom components.
- **Phase 2 – Test the upgrade**
  In phase two you create a test environment, download third party library files, and deploy the upgrade in a test environment.
- **Phase 3 – Upgrade Role Manager in the production environment**
  In phase three you create a production rollout plan and deploy the upgrade in the production environment.

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A Recommended Task List for Upgrading

1. Read the release notes of both the version you are upgrading *from*, and the version you are upgrading *to*, in order to understand

important product changes.
2. Document your existing environment, which includes the following:
   - Platform - Be sure to document your application server and database server configuration.
   - Role Manager Installation - Document file folder locations and configuration settings.
   - Custom Components - Document custom configurations and utilities.
   - Custom Workflows - Document custom workflow approval steps.
   - Custom Reports - Create a backup of any custom reports. Custom reports include changes made to default Role Manager reports and any other reports uploaded into the application.
3. Create a backup of the existing database and Role Manager installation directory (including the contents), for example the `.indexes`, `conf`, `import`, `export`, and `reports` directories, the existing `.war` file and the exploded `.war` directory within the application server.
   This gives you the ability to reinstate the working environment back to the previous release, if necessary.
4. Create a test environment that mirrors the functionality of the production environment.
5. Develop a comprehensive test plan.
   The test plan's objective is to ensure that all currently utilized product functionality remains operational after the test and before deployment in the production environment.
6. Check the version level of the infrastructure components, for example the operating system, the JDK software, the application server, the database, all resources, and any provisioning systems.
   Confirm that support for your current environment is still provided in the latest version of Role Manager.
7. Rebuild any custom Java classes and utilities against the target product libraries.
8. Complete the entire upgrade before attempting to start the application server and resuming activity.

In addition, consider the following:

1. Upgrade the database schema if this step is required in the current release.
   The necessary files are provided in the distribution package inside the `db` folder.
2. If the `rm_idm_init.xml` file (located in the `$RBACX_HOME/conf` directory) is modified for customized Sun Identity Manager integration, extract and customize the file again to reflect the previous customizations.
3. If the `rbacxmessages.properties` file (located in the `WEB-INF/classes` directory) is modified for customized messages, extract and customize the file again to reflect the previous customizations.
4. If the `rbacxaudit-messages.properties` file (located in the `WEB-INF/classes` directory) is modified for customized messages, extract and customize the file again to reflect the previous customizations.
5. If a customized logo is required, create a backup of the `logo.gif` file located here: *exploded_rbacx.war_directory*/`images`
6. Back up any customized report(s) located in *Sun_Role_Manager_Installation_directory*/`reports`.
7. If the `jobs.xml` file was previously extracted from the *exploded_rbacx.war_directory*/`WEB-INF/` directory and updated with custom CRON expressions for any scheduled jobs, extract and customize the file again so as to retain the previous CRON expressions.
   Do not replace the `jobs.xml` file on the target release with a previous version because the `jobs.xml` file is likely to change with each new version of Sun Role Manager.
   Following is a sample CRON expression for user file import:

```
<bean id="usersImportTrigger" class="org.springframework.scheduling.quartz.CronTriggerBean">
    <property name="jobDetail">
        <ref bean="usersImportJob"/>
    </property>
    <property name="cronExpression">
        <value>0 0/5 * * * ?</value>
    </property>
</bean>
```

8. Sun recommends that you extract the `scheduling-context.xml` file, located in *exploded_rbacx.war_directory*/`WEB-INF/`.
   To retain any previous triggering/scheduling customizations, changes should also be made to the `scheduling-context.xml` file for the target release.
   Following is a file sample that would require changes to the `scheduling-context.xml` file in the target release.

```
<property name="jobDetails">
        <list>
                <!--ref bean="usersImportJob"/-->
                <!--ref bean="accountsImportJob"/-->
                <!--ref bean="rolesImportJob"/-->
                <!--ref bean="glossaryImportJob"/-->
                <!--ref bean="policiesImportJob"/-->
                <!--ref bean="businessStructureImportJob"/-->
                <ref bean="identityAuditContinuousViolationScanJob"/>
                <ref bean="identityAuditViolationReminderJob"/>
                <ref bean="certificationReminderJob"/>
                <!--ref bean="reportReminderJob"/-->
                <!--ref bean="stableFolderCleanUpJob"/-->
                <!--ref bean="accountsMaintenanceJob"/-->
                <!--ref bean="roleMembershipRuleJob"/-->
                <ref bean="fullTextIndexMaintenancedJob"/>
                <ref bean="workflowStepSLAJob"/>
                <ref bean="roleStatusAndMembershipMaintenanceJob"/>
                <ref bean="rmPreviewCleanUpJob"/>
                <ref bean="userApplicationMaintenanceJob"/>
                <ref bean="postImportJobsLauncherJob"/>
                <ref bean="certificationRemediationJob"/>
                <ref bean="rmScanArchivalJob"/>
                <ref bean="eventPublishingJob"/>
                <!--<ref bean="rmeRuleMigrationJob"/>-->
                <!--ref bean="identityAuditDataMigrationJob"/-->

        </list>
</property>

<property name="triggers">
        <list>
                <!--ref bean="usersImportTrigger"/-->
                <!--ref bean="accountsImportTrigger"/-->
                <!--ref bean="accountsImportTrigger_2"/-->
                <!--ref bean="accountsImportTrigger_3"/-->
                <!--ref bean="rolesImportTrigger"/-->
                <!--ref bean="glossaryImportTrigger"/-->
                <!--ref bean="policiesImportTrigger"/-->
                <!--ref bean="businessStructureImportTrigger"/-->
                <ref bean="identityAuditContinuousViolationScanTrigger"/>
                <ref bean="identityAuditViolationReminderTrigger"/>
                <ref bean="certificationReminderTrigger"/>
                <!--ref bean="reportReminderTrigger"/-->
                <!--ref bean="stableFolderCleanUpTrigger"/-->
                <!--ref bean="accountsMaintenanceTrigger"/-->
                <!--ref bean="roleMembershipRuleTrigger"/-->
                <ref bean="fullTextIndexMaintenanceTrigger"/>
                <ref bean="workflowStepSLATrigger"/>
                <ref bean="roleStatusAndMembershipMaintenanceJobTrigger"/>
                <ref bean="rmPreviewCleanUpJobTrigger"/>
                <ref bean="userApplicationMaintenanceTrigger"/>
                <ref bean="postImportJobsLauncherTrigger"/>
                <ref bean="certificationRemediationTrigger"/>
                <ref bean="rmScanArchivalJobTrigger"/>
                <ref bean="eventPublishingJobTrigger"/>
                <!--<ref bean="rmeRuleMigrationJobTrigger"/>-->
                <!--ref bean="identityAuditDataMigrationTrigger"/-->

        </list>
</property>
```

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Preparing to Upgrade Role Manager

In this phase of the upgrade process you will document your existing environment, document any custom components, and choose an upgrade version.

Documenting the Existing Environment

Document your existing environment, including the following items:

1. Application servers - Record the application server name and version number, including any service packs. Also, note the following:
   a. The operating system version number, including any service packs.
   b. The version number of the Java Development Kit (JDK) installed on the application server.
2. Database servers - Record the database server name and version number and any additional service packs.
3. Supported resources - Record the names of all supported resources, including version numbers, and any installed service packs.
   Supported resources also include integrated provisioning servers, such as Sun Identity Manager.
4. Web servers - Record the name and version number of any web servers, including any additional service packs.

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Documenting the Role Manager Installation

Document your Role Manager installation, including the release and build version number.

▼ To Obtain the Role Manager Release and Build Version

The Role Manager release version information can be obtained using any of the following steps.

- To obtain version information from the `rbacx.log` file
  1. Start Sun Role Manager.
  2. Open the `rbacx.log` file located in the `$RBACX_HOME/logs` folder.
  3. Search the log for the Role Manager version information.
     The Role Manager version number is written to the log when Role Manager is started, for example
     `Sun Role Manager (build: 5.0.0.200910016491-GA) Started`

- To obtain version information from `VERSION.txt` within the `.war` file
  1. Navigate to the *exploded_rbacx.war_directory*`/WEB-INF/classes` directory.
  2. Locate `VERSION.txt` and view the contents using a text-editor.
  3. Search for the `Implementation-Version` tag, which contains the release version number.
     For example,`Implementation-Version=5.0.0.200910016491-GA`.

- To obtain version information from `MANIFEST.MF` within the `.war` file
  1. Navigate to *exploded_rbacx.war_directory*`/META-INF` directory.
  2. Using a text-editor, open the `MANIFEST.MF` file.
  3. Search for the `Implementation-Version` tag, which contains the release version number.
     For example,`Implementation-Version=5.0.0.200910016491-GA`.

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Documenting Custom Components

Document any custom components, including the following:

- Custom File-System Objects
- Custom Repository Objects

Documenting Custom File-System Objects

Sun recommends upgrading custom file-system objects. File-system objects that may have been customized include the following:

- **Modified `iam.properties` file**
  Record any changes made to the default `iam.properties` file.
- **Modified `jdbc.properties` file**
  Record any changes made to the default `jdbc.properties` file.
- **Modified `ldap.properties` file**
  Record any changes made to the default `ldap.properties` file.
- **Modified `rm_idm_init.xml` file**
  Record any changes made to the default `rm_idm_init.xml` file.
- **Modified `log4j.properties` file**
  Record any changes made to default `log4j.properties` file for customized loggings.
- **Modified `rbacxmessages.properties` file**
  Record any changes made to the default `rbacxmessages.properties` file.
- **Modified `rbacxaudit-messages.properties` file**
  Record any changes made to the default `rbacxaudit-messages.properties` file.
- **Customized property files**
  Record any changes made to other property files on the system.
- **Customized resource adapters (and any other custom Java code)**
  Customized resource adapters may require recompilation depending on the target Role Manager version. All custom Java that uses Role Manager APIs (including custom resource adapters) requires a recompilation as part of an upgrade. Also, consider other Java classes that may use the Role Manager library.
- **Custom utilities**
  Custom Java utilities, pre-processors, and data parsers may require review and recompilation depending on the target Role Manager version. Plan to re-evaluate the code in these scripts to ensure that they align with database schema changes or application modifications.
- **Modified JavaServer Pages (JSP Files)**
  Recent Role Manager versions may include API changes. If JSP files were modified during installation, they need to be updated when upgrading. Any JSP file that shipped with the product and was modified during a deployment (or any custom JSP file that uses Role Manager APIs) should be updated so that it is compatible with the JSP structure and API in the target release.

Documenting Custom Repository Objects

Sun recommends upgrading custom repository objects. Repository objects that may have been customized include the following:

- **Modified Email Templates**
  Custom email templates may require an export to take advantage of current product enhancements.
- **Custom Repository Schema**
  If a schema change occurred since Role Manager was last installed or upgraded, a schema update is required.
- **Custom Reports**
  - Changes made to any reports in the `$RBACX_HOME/reports` directory should be incorporated into the reports present in the latest version of Role Manager.
  - Do not overwrite reports in the target release with previous versions because any changes made to the Role Manager schema will cause the reports to break.
  - Custom reports uploaded to Role Manager may require modification in order to comply with schema changes.
    Note - The `$RBACX_HOME` environment variable denotes the path to Sun Role Manager Installation directory.
- **Custom Workflow Steps**
  Document all custom workflow steps created during Role Manager implementation. These steps would need to be recreated in

the newer version of Role Manager.

- **Custom CRON Expression**
  Custom CRON expressions must be included in the latest version of the Role Manager `jobs.xml` file, otherwise the CRON expressions will be lost.
- **Custom Import Triggers**
  To retain previous triggering/scheduling customizations, changes should also be made in the target release `scheduling-context.xml` file

> **Note**
> Any occurrence of REPLACE_ME needs to be changed to FILE_SERVER for feeds imported through the Role Manager file importer module.

Choosing the Upgrade Version

After completing the inventory assessment, choose the version of Role Manager that fulfills your requirements. You may want the latest version, or you may want a more mature version that has service packs available. It is a recommended that you upgrade to the most recent Role Manager release that is available during your testing time frame.

After choosing the target Role Manager release, verify that your current platform is supported.

Also, do the following:

- Read the Release Notes for the target Role Manager release. Pay special attention to the Known Issues section to determine if you need to upgrade the operating system, the JDK software, the application server, or any resources.

Upgrading Sun Role Manager in a Test Environment

Creating a Test Environment

Create a test environment similar to the production environment. Replicate the following items from the production environment using the same hardware and software versions:

- Application server
- Database server
- Web server (optional component)
- Common client machine with the corporate image and browser
- Resources and other integrated applications
- Role Manager version and configuration

Downloading Third-party Library Files

Third-party files need to be downloaded prior to upgrading. Downloaded files should be saved to a library folder, which will be referred to as `RM_LIB`. For example,

- **Windows**
  ```
  C:\RM_Lib
  ```

- **UNIX**
  ```
  /opt/RM_Lib
  ```

The `jasper-jdt.jar` File

Download the `jasper-jdt.jar` file from this site:

http://dlc.sun.com/rolemanager/Certification_And_Reporting/

This file is required by the Role Manager certification and reporting feature.

JDBC Drivers

The JAR files for establishing a JDBC connection can be downloaded from this site:

http://dlc.sun.com/rolemanager/Database_Drivers/

The JAR files that are required for each database type are summarized in the following table.

Database Type	File Name
IBM DB2	`db2jcc.jar, db2jcc_license_cu.jar`
Microsoft SQL Server	MS SQL Server jTDS JDBC driver is included in the Sun Role Manager WAR file and does not need to be downloaded separately.
MySQL	MySQL drivers are included in the Sun Role Manager WAR file and do not need to be downloaded separately.
Oracle	`ojdbc14.jar` / `ojdbc5.jar` / `ojdbc6.jar`

> **Note**
> Drivers for MS SQL Server (jTDS) and MySQL are bundled in the Sun Role Manager WAR file. Do not install jTDS or MySQL drivers in the Sun Role Manager `lib` directory.

Provisioning Server Connectivity Files

Depending on which third-party provisioning server you are using with Sun Role Manager (CA eTrust, IBM Tivoli Identity Manager, or Oracle Identity Manager), you need to download the corresponding library files for that provisioning server. You do not need to download library files if you are using Sun Identity Manager as your provisioning server.

Download provisioning server connectivity files from this site:

http://dlc.sun.com/rolemanager/Provisioning_Server_Connectivity/

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Configuring the `RBACX_HOME` Environment Variable

Before upgrading Sun Role Manager you need to configure the `RBACX_HOME` environment variable. The `RBACX_HOME` variable should be permanently set to the directory where you will install Sun Role Manager. To create a permanent environment variable,

refer to your operating system documentation for instructions.

To temporarily set the `$RBACX_HOME` environment variable, type the following command at a command line. The `$RBACX_HOME` environment variable will remain valid for the length of your session.

- **Windows**:
  `set RBACX_HOME=`*Path to the Sun Role Manager installation directory*

- **UNIX**:
  `export RBACX_HOME=`*Path to the Sun Role Manager installation directory*

> **Note**
>
> - A permanent `$RBACX_HOME` environment variable should be created under the application server's owner profile. Role Manager deployment will fail if `RBACX_HOME` is declared in a profile inaccessible by the application server.
> - For a clustered deployment, the `$RBACX_HOME` environment variable needs to be created on every cluster member.

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Configuring JVM Options

- You should determine your memory need and set values in your application server's JVM accordingly.
  The recommended memory settings are as follows:
  `-Xmx2048m -Xms2048m`

  Depending on your specific implementation, you might need to increase these recommended values if you face performance issues with the web interface. Keeping a low minimum value minimizes garbage collection, whereas keeping a higher value decreases response time in the web interface.

- IPv4 is required by Role Manager for network communication. Refer to the operating system documentation for instructions to enable IPv4 stack. Add the following JVM option to enforce IPv4 preference over IPv6:
  `-Djava.net.preferIPv4Stack=true`

Refer to your application server's documentation for information about configuring JVM options.

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Preparing to Upgrade the Test Environment

Before upgrading the Role Manager installation in the test environment, do the following:

Before You Begin -
Shut down the Role Manager instance running on the system before backing up your files.

1. **Backup the current Role Manager installation**
   Before upgrading, backup the Role Manager database and the directory where Role Manager is installed. Use third-party backup software or a backup utility supplied with the operating system to backup the Role Manager file system. To backup the database, refer to the documentation provided by your database vendor.
2. **Backup customized Role Manager repository objects**
   Role Manager provides a set of database objects, such as workflow task definitions, that are usually customized for an

environment. The upgrade process replaces some of these objects in the database after saving them in the file system.

3. **Verify the environment**
   Before upgrading Role Manager in the test environment, verify the following:
   - All servers are present on the network
   - The schema is up-to-date
   - The location of the Role Manager application is correct

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Deploying the Upgrade in a Test Environment

Deploying an upgrade in a test environment includes the following tasks:

- Upgrading the database
- Upgrading the environment
- Restoring customizations after the upgrade

▼ To Upgrade the Role Manager Schema on the Database Server on a Windows Platform

Before You Begin - You should have created a backup of the Role Manager database.

Go to the section that contains instructions for your database server.

Microsoft SQL Server
If SQL Server is installed locally, you can upgrade the Role Manager schema using either the command prompt or the SQL Server Query Analyzer tool *or* the Management Studio tool. If SQL Server is not installed locally, use the SQL Server Query Analyzer tool or the Management Studio tool to upgrade the schema.

- To upgrade the schema from a command prompt, follow these steps:
  1. Navigate to directory containing the upgrade scripts, e.g. `C:\RM_Upgrade\db` by typing:
     `C:\> cd C:\RM_Upgrade\db`
  2. Run the following command(s) to execute the upgrade script(s):
     `C:\> sqlcmd -S localhost -i rbacx-`*previous_version*`_To_`*current_version*`_mssql.sql -U rbacxservice -P` *rbacxservice* `-d rbacx`

- To create the schema using Query Analyzer or Management Studio, follow these steps:
  1. Log in to the database server as `rbacxservice`.
  2. Click the Open Query File menu and locate the `rbacx-`*previous_version*`_To_`*current_version*`_mssql.sql` file.
  3. Execute the SQL file.
     This will upgrade the `rbacx` database on the server.

Oracle
You can upgrade the Role Manager schema using either the command prompt or the Oracle iSQL Plus Web Console (*available in Oracle 10g Database Server*). If the Oracle Database Server is not installed locally, use the iSQL Plus Web Console to upgrade the schema.

- To upgrade the schema from a command prompt, follow these steps:
  1. Navigate to directory containing the upgrade scripts, e.g. `C:\RM_Upgrade\db` by typing:
     `C:\> cd C:\RM_Upgrade\db`
  2. Run the following command(s) to execute the upgrade script(s):
     `C:\> sqlplus rbacxservice/rbacxservice @rbacx-`*previous_version*`_To_`*current_version*`_oracle.sql`

- To create the schema using the iSQL Plus Web Console, follow these steps:
  1. Open the following URL in a web browser.

The default port for the iSQL Plus Web Console is `5560`.

`http://`*hostname*`:5560/isqlplus`

2. Select Load Script and browse to `C:\RM_Upgrade\db`.
3. Locate the file `rbacx-`*previous_version*`_To_`*current_version*`_oracle.sql` and click Load.

   The Role Manager upgrade schema creation script is loaded into the workspace window.
4. Click Execute.

   The script is executed and the Role Manager schema is upgraded on the system.

DB2

The following steps assume that the DB2 database server is installed locally. One of the following authorizations is required to upgrade the database:

```
sysadm
sysctrl
```

To upgrade the schema from a command prompt, follow these steps:

1. Navigate to directory containing the upgrade scripts, e.g. `C:\RM_Upgrade\db` by typing:

   `C:\> cd C:\RM_Upgrade\db`
2. Run the following command(s) to execute the upgrade script(s):

   ```
   C:\> db2cmd
   db2 connect to rbacx user rbacxservice using rbacxservice
   db2 -tvf rbacx-previous_version_To_current_version_db2.sql
   ```

MySQL

The following assumes that the MySQL database server is installed locally.

To upgrade the schema from a command prompt, run the following command(s) to execute the upgrade script(s):

`C:\> mysql --user=rbacxservice --password=`*rbacxservice*` < rbacx-`
previous_version`_to_`*current_version*`_mysql.sql rbacx`

> **Note**
> If you are using MySQL 5.0, `lower_case_table_names` variable needs to be changed from its default value.
> Make the following change to `lower_case_table_names` in MySQL's configuration file.
> `lower_case_table_names=1`

▼ To Upgrade the Role Manager Schema on the Database Server on a UNIX Platform

Before You Begin - You should have created a backup of the Role Manager database.

Oracle

You can upgrade the Role Manager schema using either the command prompt or the Oracle iSQL Plus Web Console (*available in Oracle 10g Database Server*). If the Oracle Database Server is not installed locally under the `/opt` directory, use the iSQL Plus Web Console to upgrade the schema.

- To upgrade the schema from a command prompt, follow these steps:
  1. Navigate to directory containing the upgrade scripts, e.g. `/opt/RM_Upgrade/db` by typing:

     `$ su - oracle`
     `$ export ORACLE_HOME=/opt/oracle/product/10.2.0`
     `$ cd /opt/RM_Upgrade/db`
  2. Run the following command(s) to execute the upgrade script(s):

     `$ ./sqlplus rbacxservice/rbacxservice @rbacx-`*previous_version*`_To_`*current_version*`_oracle.sql`

     The Role Manager database schema is upgraded on Oracle Database server.

- To create the schema using the iSQL Plus Web Console, follow these steps:

1. Open the following URL in a web browser.
   The default port for the iSQL Plus Web Console is 5560.
   ```
   http://hostname:5560/isqlplus
   ```
2. Select Load Script and browse to `/opt/RM_Upgrade/db`.
3. Locate the file `rbacx-previous_version_To_current_version_oracle.sql` and click Load.
   The Role Manager schema upgrade script is loaded into the workspace window.
4. Click Execute.
   The script is executed and the Role Manager schema is upgraded on the system.

DB2

The following steps assume that the DB2 database server is installed locally. One of the following authorizations is required to upgrade the database:

```
sysadm
sysctrl
```

To upgrade the schemausing a terminal session, follow these steps:

1. Navigate to directory containing the upgrade scripts, e.g. `/opt/RM_Upgrade/db` by typing:
   ```
   # cd /opt/RM_Upgrade/db
   ```
2. Run the following command(s) to execute the upgrade script(s):
   ```
   db2 connect to rbacx user rbacxservice using rbacxservice
   db2 -tvf rbacx-previous_version_To_current_version_db2.sql
   ```

MySQL

The following assumes that the MySQL database server is installed locally.

To upgrade the schema from a command prompt, run the following command(s) to execute the upgrade script(s):

```
$ mysql --user=rbacxservice --password=rbacxservice < rbacx-previous_version_To_current_version_mysql.sql
rbacx
```

> **Note**
> If you are using MySQL 5.0, `lower_case_table_names` variable needs to be changed from its default value.
> Make the following change to `lower_case_table_names` in MySQL's configuration file.
> ```
> lower_case_table_names=1
> ```

▼ To Upgrade the Environment on a Windows Platform for a Standalone Deployment

Use the following steps to upgrade Role Manager manually on a supported Windows platform.

1. Stop the application server.

2. Update the Role Manager database.

3. Type the following commands in the test environment:
   `set INSPATH=Path to the upgrade software` (For example, `set INSPATH=C:\RM_Upgrade`)
   `set RBACXWAR=Path to the Sun Role Manager deployment directory` (For example, `set RBACXWAR=tomcat install directory\webapps`)
   `set RM_LIB=Path to the downloaded third-party library files` (For example, `set RM_LIB=C:\RM_Lib`)
   `set TEMP=Path to the temporary directory`

4. Run the pre-process commands:
   ```
   mkdir %TEMP%
   cd %TEMP%
   ```

```
jar -xvf %INSPATH%\rbacx.war
```

5. Copy the downloaded third-party library files to the Role Manager library directory.
   ```
   copy %RM_LIB%
   * %TEMP%\WEB-INF\lib
   ```

6. Remove report-related files from the *Role Manager Installation Directory*\reports directory
   ```
   rmdir /s /q %RBACX_HOME%\reports
   ```

7. Copy the target Role Manager version-specific reports based on the database server to the *Sun Role Manager Installation Directory*\reports folder.
   The following sample steps assume that the target database server is MySQL.
   ```
   xcopy %INSPATH%\reports %RBACX_HOME%\reports /I/E
   xcopy %RBACX_HOME%\reports\mysql
   * %RBACX_HOME%\reports
   ```

8. Remove search-related files from the *Role Manager Installation Directory*\.indexes directory
   ```
   rmdir /s /q %RBACX_HOME%\.indexes
   ```

9. Copy the files related to advanced search from the upgrade folder to the *Role Manager Installation Directory*\.indexes folder.
   ```
   xcopy %INSPATH%\.indexes %RBACX_HOME%\.indexes /I/E
   ```

10. Make changes to the following files located under %INSPATH%\conf directory to reflect customizations as documented in Documenting Custom File-System Objects.
    - **iam.properties** - In a text editor, replace any occurrences of $RBACX_HOME with the Sun Role Manager installation directory path.
    - **jdbc.properties** - In a text editor, edit the following lines, substituting $SERVER_NAME and $PORT_NUMBER with the host name and connectivity port of the target database. Refer To Configure Sun Role Manager for Standalone Deployment for instructions.
    - **ldap.properties** - Refer to Integrating With LDAP for instructions on LDAP customizations.
    - **rm_idm_init.xml** - This file is required by Role Manager to exchange and manage information with Identity Manager.

11. Remove the configuration related directory from *Role Manager Installation Directory* directory
    ```
    rmdir /s /q %RBACX_HOME%\conf
    ```

12. Copy configuration directory and files from the upgrade directory to the *Role Manager Installation Directory* directory.
    ```
    xcopy %INSPATH%\conf %RBACX_HOME%\conf /I/E
    ```

13. Apply any customizations necessary for the environment to the extracted .war file in the %TEMP% directory.

14. Make the following changes if there are multiple instances of Role Manager, standalone or clustered, on the same subnet.
    a. Navigate to %TEMP%\WEB-INF directory.
    b. In a text editor, open application-context.xml, find bean id commManager, and examine the constructor-arg value.
    c. Set the constructor-arg value with a unique instance name, e.g. value="SRM-Instance-1".
    d. In a text editor, open search-context.xml, find bean id searchConfiguration, and examine the constructor-arg value.
       - The deployment is a standalone, constructor-arg defaults to a value of 0, which is specified as value="0".
    e. Navigate to %TEMP%\WEB-INF\classes directory and do the following:
       i. In a text editor, open oscache.properties (located in the %TEMP%\WEB-INF\classes), and find the cache.cluster.multicast.ip property.
       ii. Uncomment cache.cluster.multicast.ip by removing # at the start of the line. Each Role Manager instance requires a unique cache.cluster.multicast.ip value.

15. To migrate `Role Provisioning` and `Identity Audit` rules, open `scheduling-context.xml` using a text editor and find bean id `quartzSchedulerFactoryBean`.
    a. Examine the `jobDetails` list. Uncomment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.
    b. Examine the `triggers` list. Uncomment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

16. Repackage the `.war` file in the `%TEMP%` directory if changes are made. Type the following commands in the test environment:
    ```
    cd %TEMP%
    jar -cvfM %RBACXWAR%\rbacx.war .
    ```

17. Uninstall Role Manager from the application server.

18. Deploy the rebuild Role Manager `.war` file on the target application server. Refer to <u>Deploying Sun Role Manager</u> for instructions on Sun Role Manager deployment.

19. Start the application server.

20. Go to the following address in a browser: `https://`*Hostname*`:`*Port-Number*`/rbacx/welcome.action`. When the Welcome screen appears, enter your `rbacxadmin` user name and password and verify that the installation is successful.

21. Open the `rbacx.log` file and check for errors.
    The installation is successful if the following message appears in the `rbacx.log` file:
    ```
    Sun Role Manager (build: 5.0.0.200910016491-GA) Started
    ```

22. `Role Provisioning` and `Identity Audit` rules are automatically migrated by Sun Role Manager 5.0 when started for the first time. The migration jobs should be disabled for any subsequent restarts. To disable the jobs, navigate to the `rbacx.war` directory exploded by the application server and locate `scheduling-context.xml` under `rbacx\WEB-INF`. Open it using a text editor and find bean id `quartzSchedulerFactoryBean`.
    a. Examine the `jobDetails` list. Comment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.
    b. Examine the `triggers` list. Comment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

▼ To Upgrade the Environment on a Unix Platform for a Standalone Deployment

Use the following steps to upgrade Role Manager manually on a supported UNIX platform.

1. Stop the application server.

2. Update the Role Manager database.

3. Type the following commands in the test environment:
   `export INSPATH=`*Path to the upgrade software* (For example, `export INSPATH=/opt/RM_Upgrade`)
   `export RBACXWAR=`*Path to the Sun Role Manager deployment directory* (For example, `export RBACXWAR=`*tomcat install directory*`/webapps`)
   `export RM_LIB=`*Path to the downloaded third-party library files* (For example, `export RM_LIB=/opt/RM_Lib`)
   `export TEMP=`*Path to the temporary directory*

4. Run the pre-process commands:
   ```
   mkdir $TEMP
   cd $TEMP
   ```

```
jar -xvf $INSPATH/rbacx.war
```

5. Copy the downloaded third-party library files to the Role Manager library directory.
```
cp $RM_LIB/* $TEMP/WEB-INF/lib
```

6. Remove report-related files from the *Role Manager Installation Directory*/reports directory.
```
/usr/bin/rm -f $RBACX_HOME/reports
```

7. Copy the target Role Manager version-specific reports based on the database server to the *Sun Role Manager Installation Directory*/reports folder.
The following sample steps assume that the target database server is MySQL.
```
cp -R $INSPATH/reports $RBACX_HOME/.
cp -R $RBACX_HOME/reports/mysql/* $RBACX_HOME/reports/.
```

8. Remove search-related files from the *Role Manager Installation Directory*/.indexes directory.
```
/usr/bin/rm -f $RBACX_HOME/.indexes
```

9. Copy the files related to advanced search from the upgrade folder to *Role Manager Installation Directory*/.indexes.
```
cp -R $INSPATH/.indexes $RBACX_HOME/.
```

10. Make changes to the following files located under $INSPATH/conf directory to reflect customizations as documented in Documenting Custom File-System Objects.
    - **iam.properties** - In a text editor, replace any occurrences of $RBACX_HOME with the Sun Role Manager installation directory path.
    - **jdbc.properties** - In a text editor, edit the following lines, substituting $SERVER_NAME and $PORT_NUMBER with the host name and connectivity port of the target database. Refer To Configure Sun Role Manager for Standalone Deployment for instructions.
    - **ldap.properties** - Refer to Integrating With LDAP for instructions on LDAP customizations.
    - **rm_idm_init.xml** - This file is required by Role Manager to exchange and manage information with Identity Manager.

11. Remove the configuration related directory from *Role Manager Installation Directory* directory
```
/usr/bin/rm -f $RBACX_HOME/conf
```

12. Copy configuration directory and files from the upgrade directory to the *Role Manager Installation Directory* directory.
```
cp -R $INSPATH/conf $RBACX_HOME/.
```

13. Apply any customizations necessary for the environment to the extracted .war file in the $TEMP directory.

14. Make the following changes if there are multiple instances of Role Manager, standalone or clustered, on the same subnet.
    a. Navigate to $TEMP/WEB-INF directory.
    b. In a text editor, open application-context.xml, find bean id commManager, and examine the constructor-arg value.
    c. Set the constructor-arg value with a unique instance name, e.g. value="SRM-Instance-1".
    d. In a text editor, open search-context.xml, find bean id searchConfiguration, and examine the constructor-arg value.
        - The deployment is a standalone, constructor-arg defaults to a value of 0, which is specified as value="0".
    e. Navigate to $TEMP/WEB-INF/classes directory and do the following:
        i. In a text editor, open oscache.properties (located in the $TEMP/WEB-INF/classes), and find the cache.cluster.multicast.ip property.
        ii. Uncomment cache.cluster.multicast.ip by removing # at the start of the line. Each Role Manager instance requires a unique cache.cluster.multicast.ip value.

15. To migrate Role Provisioning and Identity Audit rules, open scheduling-context.xml using a text editor and

find bean id `quartzSchedulerFactoryBean`.

    a. Examine the `jobDetails` list. Uncomment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.

    b. Examine the `triggers` list. Uncomment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

16. Repackage the `.war` file in the `$TEMP` directory if changes are made. Type the following commands in the test environment:
```
cd $TEMP
jar -cvfM $RBACXWAR/rbacx.war .
```

17. Uninstall Role Manager from the application server.

18. Deploy the rebuild Role Manager `.war` file on target application server.
Refer to <u>Deploying Sun Role Manager</u> for instructions on Sun Role Manager deployment.

19. Start the application server.

20. Go to the following address in a browser: `https://`*Hostname*`:`*Port-Number*`/rbacx/welcome.action`.
When the Welcome screen appears, enter your `rbacxadmin` user name and password and verify that the installation is successful.

21. Open the `rbacx.log` file and check for errors.
The installation is successful if the following message appears in the `rbacx.log` file:
```
Sun Role Manager (build: 5.0.0.200910016491-GA) Started
```

22. `Role Provisioning` and `Identity Audit` rules are automatically migrated by Sun Role Manager 5.0 when started for the first time. The migration jobs should be disabled for any subsequent restarts. To disable the jobs, navigate to the `rbacx.war` directory exploded by the application server and locate `scheduling-context.xml` under `rbacx/WEB-INF`. Open it using a text editor and find bean id `quartzSchedulerFactoryBean`.

    a. Examine the `jobDetails` list. Comment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.

    b. Examine the `triggers` list. Comment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

▼ To Upgrade the Environment on a Windows Platform for a Clustered Deployment

Use the following steps to upgrade Role Manager manually on a supported Windows platform.

1. Stop the application server.

2. Update the Role Manager database.

3. Type the following commands in the test environment:
`set INSPATH=`*Path to the upgrade software* (For example, `set INSPATH=C:\RM_Upgrade`)
`set RBACXWAR=`*Path to the Sun Role Manager deployment directory* (For example, `set RBACXWAR=`*tomcat install directory*`\webapps`)
`set RM_LIB=`*Path to the downloaded third-party library files* (For example, `set RM_LIB=C:\RM_Lib`)
`set TEMP=`*Path to the temporary directory*

4. Run the pre-process commands:
```
mkdir %TEMP%
cd %TEMP%
jar -xvf %INSPATH%\rbacx.war
```

5. Copy the downloaded third-party library files to the Role Manager library directory.
   ```
   copy %RM_LIB%
   * %TEMP%\WEB-INF\lib
   ```

6. Remove report-related files from the *Role Manager Installation Directory*\reports directory
   ```
   rmdir /s /q %RBACX_HOME%\reports
   ```

7. Copy the target Role Manager version-specific reports based on the database server to the *Sun Role Manager Installation Directory*\reports folder.
   The following sample steps assume that the target database server is MySQL.
   ```
   xcopy %INSPATH%\reports %RBACX_HOME%\reports /I/E
   xcopy %RBACX_HOME%\reports\mysql
   * %RBACX_HOME%\reports
   ```

8. Remove search-related files from the *Role Manager Installation Directory*\.indexes directory
   ```
   rmdir /s /q %RBACX_HOME%\.indexes
   ```

9. Copy the files related to advanced search from the upgrade folder to the *Role Manager Installation Directory*\.indexes folder.
   ```
   xcopy %INSPATH%\.indexes %RBACX_HOME%\.indexes /I/E
   ```

10. Make changes to the following files located under %INSPATH%\conf directory to reflect customizations as documented in
    Documenting Custom File-System Objects.
    - **iam.properties** - In a text editor, replace any occurrences of $RBACX_HOME with the Sun Role Manager installation directory path.

      > **Note**
      > When the application server is clustered, the nodes can maintain localized import/export directories, or utilize import/export directories on a NFS share. If the nodes use a shared NFS location for import/export, substitute $RBACX_HOME with the path to the NFS share.

    - **jdbc.properties**
      - In a text editor, edit the following lines, substituting $SERVER_NAME and $PORT_NUMBER with the host name and connectivity port of the target database. Refer To Configure Sun Role Manager for Clustered Deployment for instructions.
      - Make the following change to jdbc.properties for clustered Quartz support, and save the file:
        jdbc.quartz.isClustered=true
    - **ldap.properties** - Refer to Integrating With LDAP for instructions on LDAP customizations.
    - **rm_idm_init.xml** - This file is required by Role Manager to exchange and manage information with Identity Manager.

11. Remove the configuration related directory from *Role Manager Installation Directory* directory
    ```
    rmdir /s /q %RBACX_HOME%\conf
    ```

12. Copy configuration directory and files from the upgrade directory to the *Role Manager Installation Directory* directory.
    ```
    xcopy %INSPATH%\conf %RBACX_HOME%\conf /I/E
    ```

13. Apply any customizations necessary for the environment to the extracted .war file in the %TEMP% directory.

14. Make the following changes to enable Sun Role Manager 5.0 support for clustered application server deployments.
    a. Navigate to %TEMP%\WEB-INF directory.
    b. In a text editor, open application-context.xml, find bean id commManager, and examine the constructor-arg value.
    c. Set the constructor-arg value as the cluster name---for example, value="Prod-1-Cluster".

- If Role Manager is deployed on multiple clusters within the same subnet, you should define unique `constructor-arg` values for each deployment. For example, if both clusters `Prod-Cluster` and `QA-Cluster` have Role Manager deployed, the `constructor-arg` values of each should be set to `Prod-Cluster` and `QA-Cluster` respectively.
- Members of the same cluster should have the same `constructor-arg` value.

d. In a text editor, open `search-context.xml`, find bean id `searchConfiguration`, and examine the `constructor-arg` value.
- For a clustered deployment, `constructor-arg` defaults to a value of `1` or `2` depending on the location of the `.indexes` directory.
    i. To set the `constructor-arg` value, do the following:
    - If each clustered node will be accessing *local* individual `.indexes` directories, set `constructor-arg` to `1`. For example, `value="1"`
    - If clustered nodes will be accessing *a shared* `.indexes` directory, set `constructor-arg` to `2`. For example, `value="2"`. The `.indexes` directory needs to be located on an NFS share location where each clustered node has read-write permission. Edit `indexLocation` such that the NFS share location replaces `$RBACX_HOME` in the `value` field.

e. If multiple instances of Role Manager, standalone or clustered, exist on the same subnet, navigate to the `%TEMP%\WEB-INF\classes` directory and do the following:
    i. In a text editor, open `oscache.properties` (located in the `%TEMP%\WEB-INF\classes` directory), and find the `cache.cluster.multicast.ip` property.
    ii. Uncomment `cache.cluster.multicast.ip` by removing `#` at the start of the line. Each non-member instance requires a unique `cache.cluster.multicast.ip` value.

15. To migrate `Role Provisioning` and `Identity Audit` rules, open `scheduling-context.xml` using a text editor and find bean id `quartzSchedulerFactoryBean`.
    a. Examine the `jobDetails` list. Uncomment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.
    b. Examine the `triggers` list. Uncomment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

16. Repackage the `.war` file in the `%TEMP%` directory if changes are made. Type the following commands in the test environment:
```
cd %TEMP%
jar -cvfM %RBACXWAR%\rbacx.war .
```

17. Uninstall Role Manager from the application server.

18. Deploy the rebuild Role Manager `.war` file on the target application server. Refer to <u>Deploying Sun Role Manager</u> for instructions on Sun Role Manager deployment.

19. Start the application server.

20. Go to the following address in a browser: `https://`*Hostname*`:`*Port-Number*`/rbacx/welcome.action`.
    When the Welcome screen appears, enter your `rbacxadmin` user name and password and verify that the installation is successful.

21. Open the `rbacx.log` file and check for errors.
    The installation is successful if the following message appears in the `rbacx.log` file:
    ```
    Sun Role Manager (build: 5.0.0.200910016491-GA) Started
    ```

22. `Role Provisioning` and `Identity Audit` rules are automatically migrated by Sun Role Manager 5.0 when started for the first time. The migration jobs should be disabled for any subsequent restarts. To disable the jobs, navigate to the `rbacx.war` directory exploded by the application server and locate `scheduling-context.xml` under `rbacx\WEB-INF`. Open it using a text editor and find bean id `quartzSchedulerFactoryBean`.
    a. Examine the `jobDetails` list. Comment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.
    b. Examine the `triggers` list. Comment `rmeRuleMigrationJobTrigger` and

```
identityAuditDataMigrationTrigger.
```

▼ To Upgrade the Environment on a Unix Platform for a Clustered Deployment

Use the following steps to upgrade Role Manager manually on a supported UNIX platform.

1. Stop the application server.

2. Update the Role Manager database.

3. Type the following commands in the test environment:
   `export INSPATH=`*Path to the upgrade software* (For example, `export INSPATH=/opt/RM_Upgrade`)
   `export RBACXWAR=`*Path to the Sun Role Manager deployment directory* (For example, `export RBACXWAR=`*tomcat install directory*`/webapps`)
   `export RM_LIB=`*Path to the downloaded third-party library files* (For example, `export RM_LIB=/opt/RM_Lib`)
   `export TEMP=`*Path to the temporary directory*

4. Run the pre-process commands:
   ```
   mkdir $TEMP
   cd $TEMP
   jar -xvf $INSPATH/rbacx.war
   ```

5. Copy the downloaded third-party library files to the Role Manager library directory.
   ```
   cp $RM_LIB/* $TEMP/WEB-INF/lib
   ```

6. Remove report-related files from the *Role Manager Installation Directory*`/reports` directory.
   ```
   /usr/bin/rm -f $RBACX_HOME/reports
   ```

7. Copy the target Role Manager version-specific reports based on the database server to the *Sun Role Manager Installation Directory*`/reports` folder.
   The following sample steps assume that the target database server is MySQL.
   ```
   cp -R $INSPATH/reports $RBACX_HOME/.
   cp -R $RBACX_HOME/reports/mysql/* $RBACX_HOME/reports/.
   ```

8. Remove search-related files from the *Role Manager Installation Directory*`/.indexes` directory.
   ```
   /usr/bin/rm -f $RBACX_HOME/.indexes
   ```

9. Copy the files related to advanced search from the upgrade folder to *Role Manager Installation Directory*`/.indexes`.
   ```
   cp -R $INSPATH/.indexes $RBACX_HOME/.
   ```

10. Make changes to the following files located under `$INSPATH/conf` directory to reflect customizations as documented in Documenting Custom File-System Objects.
    - **iam.properties** - In a text editor, replace any occurrences of `$RBACX_HOME` with the Sun Role Manager installation directory path.

      > **Note**
      > When the application server is clustered, the nodes can maintain localized import/export directories, or utilize import/export directories on a NFS share. If the nodes use a shared NFS location for import/export, substitute `$RBACX_HOME` with the path to the NFS share.

    - **jdbc.properties**

- In a text editor, edit the following lines, substituting $SERVER_NAME and $PORT_NUMBER with the host name and connectivity port of the target database. Refer <u>To Configure Sun Role Manager for Clustered Deployment</u> for instructions.
- Make the following change to `jdbc.properties` for clustered Quartz support, and save the file:
  `jdbc.quartz.isClustered=true`
- **ldap.properties** - Refer to <u>Integrating With LDAP</u> for instructions on LDAP customizations.
- **rm_idm_init.xml** - This file is required by Role Manager to exchange and manage information with Identity Manager.

11. Remove the configuration related directory from *Role Manager Installation Directory* directory
    `/usr/bin/rm -f $RBACX_HOME/conf`

12. Copy configuration directory and files from the upgrade directory to the *Role Manager Installation Directory* directory.
    `cp -R $INSPATH/conf $RBACX_HOME/.`

13. Apply any customizations necessary for the environment to the extracted `.war` file in the `$TEMP` directory.

14. Make the following changes to enable Sun Role Manager 5.0 support for clustered application server deployments.
    a. Navigate to `$TEMP/WEB-INF` directory.
    b. In a text editor, open `application-context.xml`, find bean id `commManager`, and examine the `constructor-arg` value.
    c. Set the `constructor-arg` value as the cluster name---for example, `value="Prod-1-Cluster"`.
       - If Role Manager is deployed on multiple clusters within the same subnet, you should define unique `constructor-arg` values for each deployment. For example, if both clusters `Prod-Cluster` and `QA-Cluster` have Role Manager deployed, the `constructor-arg` values of each should be set to `Prod-Cluster` and `QA-Cluster` respectively.
       - Members of the same cluster should have the same `constructor-arg` value.
    d. In a text editor, open `search-context.xml`, find bean id `searchConfiguration`, and examine the `constructor-arg` value.
       - For a clustered deployment, `constructor-arg` defaults to a value of `1` or `2` depending on the location of the `.indexes` directory.
         i. To set the `constructor-arg` value, do the following:
            - If each clustered node will be accessing *local* individual `.indexes` directories, set `constructor-arg` to `1`. For example, `value="1"`
            - If clustered nodes will be accessing *a shared* `.indexes` directory, set `constructor-arg` to `2`. For example, `value="2"`. The `.indexes` directory needs to be located on an NFS share location where each clustered node has read-write permission. Edit `indexLocation` such that the NFS share location replaces `$RBACX_HOME` in the `value` field.
    e. If multiple instances of Role Manager, standalone or clustered, exist on the same subnet, navigate to the `$TEMP/WEB-INF/classes` directory and do the following:
       i. In a text editor, open `oscache.properties` (located in the `$TEMP/WEB-INF/classes` directory), and find the `cache.cluster.multicast.ip` property.
       ii. Uncomment `cache.cluster.multicast.ip` by removing `#` at the start of the line. Each non-member instance requires a unique `cache.cluster.multicast.ip` value.

15. To migrate `Role Provisioning` and `Identity Audit` rules, open `scheduling-context.xml` using a text editor and find bean id `quartzSchedulerFactoryBean`.
    a. Examine the `jobDetails` list. Uncomment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.
    b. Examine the `triggers` list. Uncomment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

16. Repackage the `.war` file in the `$TEMP` directory if changes are made. Type the following commands in the test environment:
    `cd $TEMP`
    `jar -cvfM $RBACXWAR/rbacx.war .`

17. Uninstall Role Manager from the application server.

18. Deploy the rebuild Role Manager `.war` file on target application server.
    Refer to <u>Deploying Sun Role Manager</u> for instructions on Sun Role Manager deployment.

19. Start the application server.

20. Go to the following address in a browser: `https://`*Hostname*`:`*Port-Number*`/rbacx/welcome.action`.
    When the Welcome screen appears, enter your `rbacxadmin` user name and password and verify that the installation is successful.

21. Open the `rbacx.log` file and check for errors.
    The installation is successful if the following message appears in the `rbacx.log` file:
    `Sun Role Manager (build: 5.0.0.200910016491-GA) Started`

22. `Role Provisioning` and `Identity Audit` rules are automatically migrated by Sun Role Manager 5.0 when started for the first time. The migration jobs should be disabled for any subsequent restarts. To disable the jobs, navigate to the `rbacx.war` directory exploded by the application server and locate `scheduling-context.xml` under `rbacx/WEB-INF`. Open it using a text editor and find bean id `quartzSchedulerFactoryBean`.
    a. Examine the `jobDetails` list. Comment `rmeRuleMigrationJob` and `identityAuditDataMigrationJob`.
    b. Examine the `triggers` list. Comment `rmeRuleMigrationJobTrigger` and `identityAuditDataMigrationTrigger`.

▼ To Restore Customization after the Upgrade

Once the upgrade process is complete, set up the customized repository objects to restore application customizations.

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Testing the Upgrade Deployment Package

Testing is a crucial step before deploying the upgraded image to the production environment.

▼ To Develop and Execute a Test Plan

Create and execute an effective test plan for the development package. A generic test plan should include the following items.

1. Introduction
   - Description of this document
   - Related documents
   - Schedule and milestones
2. Resource requirements
   - Hardware
   - Software (test tools)
3. Features to test / test approach
   - New features testing
   - Regression testing
4. Features not to test
5. Test deliverables
6. Dependencies / risk

▼ To Record All Changes

It is important to document all changes that occur during the test upgrade. Consider documenting the following during the test upgrade process:

- List the version control system in use
- Verify that all existing customizations are tagged and stored in the version
- Control system
- Check all new customizations after completing the test upgrade cycle
- Create an image that consists of all the changed objects that Role Manager stored in the test system during the test upgrade. Deploy this image into production after upgrading the production environment.

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Upgrading Sun Role Manager in a Production Environment

Upgrading Role Manager in the production environment involves the following two steps:

- Developing a production rollout plan
- Deploying the upgrade in a production environment

Developing a Production Rollout Plan

To develop a successful production rollout plan, incorporate the information gathered while upgrading the test environment based on the following guidelines:

1. Create and document the production deployment image. Import any upgraded objects and files (not the entire environment) from the test environment. Create a deployment image that is compatible with the development process
2. Create workflows and email templates
3. Document any amendments to the plan, including special procedures that apply to the production environment. For example:
   - Scheduling an outage for the application
   - Scheduling database administrator support
   - Notifying users before taking the system offline
   - Shutting down specific resources, processes, or applications that are used in production

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Before Beginning the Upgrade Process

Before starting to upgrade Role Manager in a production environment, create a backup of the production data.

▼ To Back Up Production Data

1. Stop all processes and all client access, and shut down Role Manager.
2. Take a baseline snapshot of the file system objects, the operating system, the JDK software, the repository, and the Web applications.
3. Clean up any unnecessary files and hotfixes.

Deploying the Upgrade in a Production Environment

This section provides instructions for deploying the Role Manager upgrade in a production environment.

▼ To Deploy the Upgrade

1. Deploy from the packaged development environment.
2. Import any modifications based on differences between the test and production environments.
3. Migrate a copy of `jdbc.properties` that is suitable for a production environment.
4. Upon successfully depoying Role Manager to the application server, go to the following address in a browser :
   `https://`*Hostname*`:`*Port-Number*`/rbacx/welcome.action`
   When the Welcome screen appears, enter your `rbacxadmin` user name and password and verify that the installation is successful.
5. Open the `rbacx.log` file and check for errors.
   The installation is successful if the following message appears in the `rbacx.log` file:
   `Sun Role Manager (build: 5.0.0.200910016491-GA) Started`

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