



Red Hat Decision Manager 7.6

Installing and configuring Decision Server on
IBM WebSphere Application Server

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Abstract

This document describes how to configure IBM WebSphere Application Server for Decision Server and how to install Decision Server on that IBM server instance.

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PREFACE

As a system administrator, you can configure your IBM WebSphere Application Server for Red Hat Decision Server and install Decision Server on that IBM server instance.

Prerequisites

- An IBM WebSphere Application Server instance version 9.0 or later is installed. For complete installation instructions, see the [IBM WebSphere Application Server product page](#) .
- You have access to the WebSphere Integrated Solutions Console, usually at **`http://<HOST>:9060/ibm/console`**.

CHAPTER 1. DECISION SERVER

Decision Server is the server where the rules and other artifacts for Red Hat Decision Manager are stored and run. Decision Server is a standalone built-in component that can be used to instantiate and execute rules through interfaces available for REST, Java Message Service (JMS), or Java client-side applications, and Red Hat Business Optimizer functionality through solvers.

Created as a web deployable WAR file, Decision Server can be deployed on any web container. The current version of the Decision Server is included with default extensions for both Red Hat Decision Manager and Red Hat Process Automation Manager.

Decision Server has a low footprint with minimal memory consumption and therefore can be deployed easily on a cloud instance. Each instance of this server can open and instantiate multiple containers, which enables you to execute multiple rule services in parallel.

Decision Server can be integrated with other application servers, such as Oracle WebLogic Server or IBM WebSphere Application Server, to streamline Red Hat Decision Manager application management.

CHAPTER 2. IBM WEBSHERE APPLICATION SERVER

IBM WebSphere Application Server is a flexible and secure web application server that hosts Java-based web applications and provides Java EE-certified run time environments. IBM WebSphere 9.0 supports Java SE 8 and is fully compliant with Java EE 7.

CHAPTER 3. INSTALLING AND RUNNING IBM WEBSHERE APPLICATION SERVER

IBM WebSphere Application Server must be installed and running for you to apply many of the configurations that accommodate Decision Server. This section describes how to install and start IBM WebSphere.

For the most up-to-date and detailed installation instructions, see the [IBM Knowledge Center](#).

Procedure

1. Download IBM Installation Manager version 1.8.5 or later from the [IBM Installation Manager and Packaging Utility download links](#) page. IBM Installation Manager is required for installing IBM WebSphere.
2. Extract the downloaded archive and run the following command as the root user in the new directory:

```
sudo ./install
```

The **IBM Installation Manager** opens.

3. Go to **File** → **Preferences** and click **Add Repository**.
4. In the **Add Repository** window, enter the repository URL for IBM WebSphere 9.0. You can find all the repository URLs in the [Online product repositories for IBM WebSphere Application Server offerings](#) page of the IBM Knowledge Center.
5. In your command terminal, navigate to the IBM WebSphere Application Server folder location that you specified during the installation.
6. Change to the **/bin** directory and run a command similar to the following example to create an IBM WebSphere profile, user name, and password. A profile defines the run time environment. The profile includes all the files that the server processes in the runtime environment and that you can change. The user is required for login.

```
sudo ./manageprofiles.sh -create -profileName testprofile -profilePath /profiles/testprofile -adminUserName websphere -adminPassword password123
```

7. In your command terminal, navigate to the **bin** directory within the profile that you created (for example, **/profiles/testprofile/bin**) and run the following command to start the IBM WebSphere Application Server instance:

```
sudo ./startServer.sh <SERVER_NAME>
```

<SERVER_NAME> is the IBM WebSphere Application Server name defined in **Servers** → **Server Types** → **IBM WebSphere Application Servers** of the WebSphere Integrated Solutions Console.

8. Open the following URL in a web browser:

```
http://<HOST>:9060/ibm/console
```

<HOST> is the system name or IP address of the target server.

For example, to start the WebSphere Integrated Solutions Console for a local instance of IBM WebSphere running on your system, enter the following URL in a web browser:

| `http://localhost:9060/ibm/console`

9. When the login page of the WebSphere Integrated Solutions Console appears, enter your administrative credentials.

CHAPTER 4. CONFIGURING IBM WEBSHERE APPLICATION SERVER FOR DECISION SERVER

Before you deploy Decision Server with IBM WebSphere Application Server, you must configure system properties, security settings, JMS requirements, and other properties on IBM WebSphere. These configurations promote an optimal integration with Decision Server.

Prerequisites

- IBM WebSphere Application Server is installed and running.
- You are logged in to the WebSphere Integrated Solutions Console.

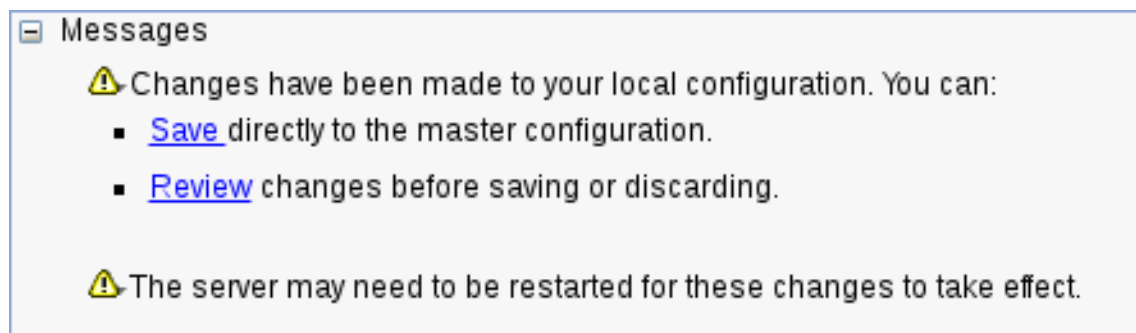
4.1. ENABLING ADMINISTRATIVE SECURITY

You must enable administrative security in the WebSphere Integrated Solutions Console so that you have the required permissions to create users and groups.

Procedure

1. In the WebSphere Integrated Solutions Console, click **Security** → **Global Security** and ensure that the option **Enable Application Security** is selected. This may already be selected and overridden at the server level.
2. Click **Security Configuration Wizard** and click **Next**.
3. Select the repository that contains the user information. For example, select **Federated repositories** for local configurations.
4. Click **Next**
5. Enter the **Primary administrative user name** and **Password**.
6. Click **Next** and then click **Finish**.
7. Click **Save** in the **Messages** window to save your changes to the master configuration.

Figure 4.1. Save security changes



8. In your command terminal, navigate to the IBM WebSphere Application Server **/bin** directory location that you specified during installation, and run the following commands to stop and restart IBM WebSphere to apply the security changes:

```
sudo ./stopServer.sh <SERVER_NAME>
```

```
sudo ./startServer.sh <SERVER_NAME>
```

<SERVER_NAME> is the IBM WebSphere Application Server name defined in **Servers → Server Types → IBM WebSphere Application Servers** of the WebSphere Integrated Solutions Console.

4.2. CONFIGURING JAVA MESSAGE SERVICE (JMS)

The Java Message Service (JMS) is a Java API that Decision Server uses to exchange messages with other application servers such as Oracle WebLogic Server and IBM WebSphere Application Server. You must configure your application server to send and receive JMS messages through Decision Server to ensure proper collaboration between the two servers.

4.2.1. Create a service bus and add IBM WebSphere

You must create a service bus and add the IBM WebSphere Application Server as a member of it in order to use JMS.

Procedure

1. In the WebSphere Integrated Solutions Console, navigate to **Service Integration → Buses → New**.
2. Enter a new bus name and clear the **Bus Security** option.
3. Click **Next** and then **Finish** to create the service bus.
4. Select the service bus that you have created.
5. Under **Topology**, click **Bus Members → Add**.
6. In the **Add a New Bus Member** wizard, choose the IBM WebSphere Application Server and the type of message store for persistence. You can also specify the properties of the message store.
7. Click **Finish** to add the new bus member.

4.2.2. Create JMS connection factories

To enable messaging with Decision Server, you must create certain JMS connection factories for sending and receiving messages.

Prerequisites

- You have created a service bus for IBM WebSphere Application Server.

Procedure

1. In the WebSphere Integrated Solutions Console, navigate to **Resources → JMS → Connection Factories**.
2. Select the correct scope and click **New**.
3. Select the **Default Messaging Provider** option and click **OK**.

4. For each of the following required connection factories, enter the name of the connection factory (for example, **KIE.SERVER.REQUEST**) and the JNDI name (for example, **jms/cf/KIE.SERVER.REQUEST**), and then select the service bus from the **Bus Name** drop-down list. Leave the default values for the remaining options.
5. Click **Apply** and **Save** to save the changes to the master configuration, and repeat for each required factory.

4.2.2.1. JMS connection factories for Decision Server

The following are the required Java Message Service (JMS) connection factories that enable JMS messaging with Decision Server:

Table 4.1. Required JMS connection factories for Decision Server

Name	Default value	Used for
KIE.SERVER.REQUEST	jms/cf/KIE.SERVER.REQUEST	Sending all requests to Decision Server
KIE.SERVER.RESPONSE	jms/cf/KIE.SERVER.RESPONSE	Receiving all responses produced by Decision Server

4.2.3. Create JMS queues

JMS queues are the destination end points for point-to-point messaging. You must create certain JMS queues to enable JMS messaging with Decision Server.

Prerequisites

- You have created a service bus for IBM WebSphere Application Server.

Procedure

1. In the WebSphere Integrated Solutions Console, navigate to **Resources** → **JMS** → **Queues**.
2. Select the correct scope and click **New**.
3. Select the **Default Messaging Provider** option and click **OK**.
4. For each of the following required queues, enter the name of the queue (for example, **KIE.SERVER.REQUEST**) and the JNDI name (for example, **jms/KIE.SERVER.REQUEST**), and then select the service bus from the **Bus Name** drop-down list.
5. From the **Queue Name** drop-down list, select the **Create Service Integration Bus Destination** enter a unique identifier, and select the bus member that you created previously.
6. Click **Apply** and **Save** to save the changes to the master configuration, and repeat for each required queue.

4.2.3.1. JMS queues for Decision Server

The following are the required Java Message Service (JMS) queues that enable JMS messaging with Decision Server:

Table 4.2. Required JMS queues for Decision Server

Name	Default value	Used for
KIE.SERVER.REQUEST	jms/KIE.SERVER.REQUEST	Sending all requests to Decision Server
KIE.SERVER.RESPONSE	jms/KIE.SERVER.RESPONSE	Receiving all responses produced by Decision Server

4.2.4. Create JMS activation specifications

A JMS activation specification is required in order to bridge the queue and the message-driven bean that enables JMS.

Prerequisites

- You have created a service bus for IBM WebSphere Application Server.
- You have created JMS queues.

Procedure

1. In the WebSphere Integrated Solutions Console, navigate to **Resources** → **JMS** → **Activation Specifications**.
2. Select the correct scope and click **New**.
3. Select the **Default Messaging Provider** option and click **OK**.
4. For each of the following required activation specifications, enter the name of the activation specification (for example, **KIE.SERVER.REQUEST**) and the JNDI name (for example, **jms/activation/KIE.SERVER.REQUEST**), and then select the service bus from the **Bus Name** drop-down list.
5. From the **Destination Type** drop-down list, select **Queue** and enter the name of the corresponding queue as a **Destination lookup** (for example, **jms/KIE.SERVER.REQUEST**).
6. Click **Apply** and **Save** to save the changes to the master configuration, and repeat for each required activation specification.

4.2.4.1. JMS activation specifications for Decision Server

The following are the required Java Message Service (JMS) activation specifications that enable JMS messaging with Decision Server:

Table 4.3. Required JMS activation specifications for Decision Server

Name	Default value	Used for
KIE.SERVER.REQUEST	jms/activation/KIE.SERVER.REQUEST	Sending all requests to Decision Server

Name	Default value	Used for
KIE.SERVER.RESPONSE	jms/activation/KIE.SERVER.RESPONSE	Receiving all responses produced by Decision Server

4.3. SETTING SYSTEM PROPERTIES IN IBM WEBSHERE APPLICATION SERVER

Set the system properties listed in this section on your IBM WebSphere Application Server before you deploy Decision Server.

Procedure

1. In the WebSphere Integrated Solutions Console, navigate to **Servers** → **Server Types** → **IBM WebSphere Application Servers**.
2. In the list of application servers, choose the server on which you are going to deploy Decision Server.
3. Under the **Server Infrastructure**, click **Java and Process Management** → **Process Definition**.

Figure 4.2. WebSphere configuration page

Application servers > **server1**

Use this page to configure an application server. An application server is a server that provides services required to run enterprise applications.

Runtime | **Configuration**

General Properties

Name:

Node name:

Run in development mode

Parallel start

Start components as needed

Access to internal server classes:

Server-specific Application Settings

Classloader policy:

Class loading mode:

Container Settings

- Session management
- SIP Container Settings
- Web Container Settings
- Portlet Container Settings
- EJB Container Settings
- Container Services
- Business Process Services

Applications

- Installed applications

Server messaging

- Messaging engines
- Messaging engine inbound transports
- WebSphere MQ link inbound transports
- SIB service

Server Infrastructure

- Java and Process Management
 - Class loader
 - Process definition**
 - Process execution
- Administration
 - Java SDKs

- Under **Additional Properties**, click **Java Virtual Machine**

Figure 4.3. Process definition configuration page

Application servers > server1 > Process definition

Use this page to configure a process definition. A process definition defines the command line information necessary to start or initialize a process.

Configuration

General Properties

Executable name

Executable arguments

Start command

Start command arguments

Stop command

Stop command arguments

Working directory

Executable target type

Executable target

Additional Properties

- Java Virtual Machine
- Environment Entries
- Process execution
- Process Logs
- Logging and tracing

Apply OK Reset Cancel

This opens the configuration properties for the JVM that is used to start IBM WebSphere.

- Set both the **Initial heap size** and **Maximum heap size** to **2048** and click **Apply** to increase the Java Virtual Machine (JVM) memory size. Decision Server has been tested with these values. If you do not increase the JVM memory size, IBM WebSphere Application Server freezes or causes deployment errors when deploying Decision Server.
- Under **Additional Properties**, click **Custom Properties**.
- Click **New** → **Custom JVM Properties** and add the following properties to IBM WebSphere:

Table 4.4. System properties for Decision Server

Name	Value	Description
kie.server.jms.queues.response	jms/KIE.SERVER.RESPONSE	The JNDI name of JMS queue for responses used by Decision Server.

Name	Value	Description
org.kie.server.domain	WSLogin	JAAS LoginContext domain used to authenticate users when using JMS.
org.jbpm.server.ext.disabled	true	Disables Business Central features, which are not supported in RHDM. If not set, Decision Server will work, but will show error messages during start up.
org.jbpm.ui.server.ext.disabled	true	Disables Business Central features, which are not supported in RHDM. If not set, Decision Server will work, but will show error messages during start up.
org.jbpm.case.server.ext.disabled	true	Disables Business Central features, which are not supported in RHDM. If not set, Decision Server will work, but will show error messages during start up.
org.jboss.logging.provider	jdk	This property is only required where a CA SiteMinder TAI (SMTAI) is installed in the environment. Using this property forces Hibernate to use JDK instead of log4j for logging within Dashbuilder. CA SiteMinder TAI (SMTAI) contains an old version of log4j , which causes conflicts.

- Click **Save** to save the changes to the master configuration.

4.4. STOPPING AND RESTARTING IBM WEBSHERE APPLICATION SERVER

After you have configured all required system properties in IBM WebSphere Application Server, stop and restart the IBM server to ensure that the configurations are applied.

Procedure

In your command terminal, navigate to the IBM WebSphere Application Server **/bin** directory location that you specified during installation, and run the following commands to stop and restart IBM WebSphere to apply the configuration changes:

```
sudo ./stopServer.sh <SERVER_NAME>
```

```
sudo ./startServer.sh <SERVER_NAME>
```

<SERVER_NAME> is the IBM WebSphere Application Server name defined in **Servers → Server Types → IBM WebSphere Application Servers** of the WebSphere Integrated Solutions Console.

CHAPTER 5. INSTALLING AND RUNNING DECISION SERVER WITH IBM WEBSHERE APPLICATION SERVER

After you have configured all required system properties in IBM WebSphere Application Server, you can install Decision Server with IBM WebSphere to streamline Red Hat Decision Manager application management.

Prerequisites

- An IBM WebSphere Application Server instance is configured as described in [Chapter 4, Configuring IBM WebSphere Application Server for Decision Server](#).

Procedure

1. Navigate to the [Software Downloads](#) page in the Red Hat Customer Portal (login required), and select the product and version from the drop-down options:
 - **Product:** Decision Manager
 - **Version:** 7.6
2. Download **Red Hat Decision Manager 7.6.0 Decision Server for All Supported EE7 Containers**.
3. Extract the **rhdm-7.6.0-kie-server-ee7.zip** archive to a temporary directory. In the following examples this directory is called **TEMP_DIR**.
4. Repackage the **kie-server.war** directory:
 - a. Navigate to the **TEMP_DIR/rhdm-7.6.0-kie-server-ee7/kie-server.war** directory.
 - b. Select the contents of the **TEMP_DIR/rhdm-7.6.0-kie-server-ee7/kie-server.war** directory and create the **kie-server.zip** file.
 - c. Rename **kie-server.zip** to **kie-server.war**. This is the file that you will use to deploy Decision Server.
 - d. Optionally, copy the new **kie-server.war** file to a location that is more convenient to deploy from.
5. In the WebSphere Integrated Solutions Console, navigate to **Applications → Application Types → WebSphere Enterprise Applications**.
6. Click **Install**.
7. Navigate to the **kie-server.war** file that you repackaged and select it to upload.
8. Select **Fast Path** and click **Next**.
The **Install New Application** wizard opens.
9. Change the **Application Name** to **kie-server** and click **Next**.
10. Map the Decision Server modules to servers according to your specific requirements and click **Next**.
11. For **Bind Listeners for Message-Driven Beans**, select **Activation Specification** for both

beans, enter **jms/activation/KIE.SERVER.REQUEST** in the **Target Resource JNDI Name** field, and enter the **jms/cf/KIE.SERVER.REQUEST** JNDI name for the **KIE.SERVER.REQUEST** connection factory.

12. In the **Map Virtual Hosts for Web Modules** section, keep the default values and click **Next**.
13. Set the context root to **kie-server**.
14. In the **Metadata for Modules** section, keep the default values and click **Next**.
15. Click **Finish** to install Decision Server and click **Save** to save the changes to the master configuration.

5.1. CREATING THE DECISION SERVER GROUP AND ROLE

After Decision Server is installed, you must create the **kie-server** group and a user.

Prerequisites

- Decision Server is installed on the IBM WebSphere Application Server instance.

Procedure

1. In the WebSphere Integrated Solutions Console, click **Users and Groups** → **Manage Groups**.
2. In the **Manage Groups** screen, click **Create**.
3. In the **Create a Group** screen, enter **kie-server** in the **Group name** box, then click **Create**.
4. To create a user to add to the **kie-server** group, click **Users and Groups** → **Manage Users**.
5. In the **Create a User** screen, complete the required information.
6. Click **Group Membership**.
7. In the **Group Membership** screen, click **kie-server**, move it to **Mapped To**, and click **Close**.
8. On the **Create a User** screen click **Create**.

5.2. MAPPING THE DECISION SERVER GROUP AND ROLE

After Decision Server is installed, you must map the **kie-server** role to the **kie-server** group in the WebSphere Integrated Solutions Console to run Decision Server.

Prerequisites

- Decision Server is installed on the IBM WebSphere Application Server instance.
- IBM WebSphere Application Server has the **kie-server** group with at least one user.

Procedure

1. In the WebSphere Integrated Solutions Console, navigate to **Applications** → **Application Types** → **WebSphere Enterprise Applications** and select the newly installed **kie-server** application.

2. Under **Detail Properties**, click **Security Role to User/Group Mapping**
3. Select the **kie-server** role and click **Map Groups** to search for the **kie-server** group.
4. Move the **kie-server** group from the **Available** list to the **Selected** list and click **OK**.
This mapping gives users in the IBM WebSphere Application Server **kie-server** group access to Decision Server.
5. Click **Save** to complete the mapping.

5.3. CONFIGURING CLASS LOADING FOR DECISION SERVER

After Decision Server is installed, you must configure class loading to set parent classes to load last.

Procedure

1. Navigate to **Applications** → **Application Types** → **WebSphere Enterprise Applications** and click **kie-server**.
2. Click **Class Loading and Update Detection** under the **Detail Properties** heading on the left.
3. In the properties, change *Class Loader Order* to **Classes loaded with local class loader first (parent last)** and *WAR Class Loader Policy* to **Single class loader for application**
4. Save the changes to the master configuration.

5.4. VERIFYING THE INSTALLATION

After you install Decision Server and define the Decision Server group mapping, verify that the server is running.

Prerequisites

- Decision Server is installed on the IBM WebSphere Application Server instance.
- You have set all required system properties for the headless Decision Manager controller.
- You have defined the Decision Server group mapping in IBM WebSphere Application Server.

Procedure

Navigate to the Decision Server URL **http://<HOST>:<PORT>/kie-server** to verify that the server is running, or send a **GET** request to **http://<HOST>:<PORT>/kie-server/services/rest/server** to check whether the Decision Server REST API responds.

<HOST> is the ID or name of the Decision Server host, for example, **localhost** or **192.7.8.9**.

<PORT> is the port of the Decision Server host, for example, **9060**.

If Decision Server is not running, stop and restart the IBM WebSphere Application Server instance and try again to access the Decision Server URL or API.

CHAPTER 6. INSTALLING AND RUNNING THE HEADLESS DECISION MANAGER CONTROLLER WITH IBM WEBSHERE APPLICATION SERVER

To use the Decision Server REST API or Java Client API to interact with Decision Server, install the headless Decision Manager controller with IBM WebSphere Application Server. The headless Decision Manager controller manages Decision Server configuration in a centralized way so that you can use the headless Decision Manager controller to create and maintain containers and perform other server-level tasks.



NOTE

For optimal results, install Decision Server and the headless Decision Manager controller on different servers in production environments. In development environments, you can install Decision Server and the headless Decision Manager controller on the same server.

Prerequisites

- The IBM WebSphere Application Server instance is configured as described in [Chapter 4, Configuring IBM WebSphere Application Server for Decision Server](#).
- Decision Server is installed on the IBM WebSphere Application Server instance.
- You have sufficient user permissions to complete the installation.

Procedure

1. Navigate to the [Software Downloads](#) page in the Red Hat Customer Portal (login required), and select the product and version from the drop-down options:
 - **Product:** Decision Manager
 - **Version:** 7.6
2. Download **Red Hat Decision Manager 7.6.0 Add-Ons**
3. Extract the downloaded **rhdm-7.6.0-add-ons.zip** file to a temporary directory.
4. Extract the **rhdm-7.6.0-add-ons.zip** file to a temporary directory. In the following examples this directory is called **TEMP_DIR**.
5. Extract the **rhdm-7.6.0-add-ons/rhdm-7.6.0-controller-ee7.zip** file.
6. Repackage the **controller.war** directory:
 - a. Navigate to the **TEMP_DIR/rhdm-7.6.0-add-ons/rhdm-7.6.0-controller-ee7/controller.war** directory.
 - b. Select the contents of the **TEMP_DIR/rhdm-7.6.0-add-ons/rhdm-7.6.0-controller-ee7/controller.war** directory and create the **controller.zip** file.
 - c. Rename **controller.zip** to **controller.war**. This is the file that you will use to deploy the headless Decision Manager controller.

- d. Optionally, copy the new **controller.war** file to a location that is more convenient to deploy from.
7. In the WebSphere Integrated Solutions Console, navigate to **Applications → Application Types → WebSphere Enterprise Applications**.
8. Click **Install**.
9. Navigate to the **controller.war** file that you repackaged and select it to upload.
10. Select **Fast Path** and click **Next**.
The **Install New Application** wizard opens.
11. Change the **Application Name** to **controller** and click **Next**.
12. Map the headless Decision Manager controller modules to servers according to your specific requirements and click **Next**.
13. For **Bind Listeners for Message-Driven Beans**, select **Activation Specification** for both beans, enter **jms/activation/KIE.SERVER.REQUEST** in the **Target Resource JNDI Name** field, and enter the **jms/cf/KIE.SERVER.REQUEST** JNDI name for the **KIE.SERVER.REQUEST** connection factory.
14. In the **Map Virtual Hosts for Web Modules** section, keep the default values and click **Next**.
15. Set the context root to **controller**.
16. In the **Metadata for Modules** section, keep the default values and click **Next**.
17. Click **Finish** to install the headless Decision Manager controller and click **Save** to save the changes to the master configuration.

6.1. CONFIGURING CLASS LOADING FOR THE HEADLESS DECISION MANAGER CONTROLLER

After the headless Decision Manager controller is installed, you must configure Decision Server class loading to set parent classes to load last.

Procedure

1. Navigate to **Applications → Application Types → WebSphere Enterprise Applications** and click **kie-server**.
2. Click **Class Loading and Update Detection** under the **Detail Properties** heading on the left.
3. In the properties, change *Class Loader Order* to **Classes loaded with local class loader first (parent last)** and *WAR Class Loader Policy* to **Single class loader for application**.
4. Save the changes to the master configuration.

6.2. SETTING SYSTEM PROPERTIES FOR THE HEADLESS DECISION MANAGER CONTROLLER

After you install the headless Decision Manager controller, set the system properties listed in this section on your application server or servers to enable proper interaction with the headless Decision Manager controller.



NOTE

For optimal results, install Decision Server and the headless Decision Manager controller on different servers in production environments. In development environments, you can install Decision Server and the headless Decision Manager controller on the same server. In either case, be sure to make these property changes on all application servers where the headless Decision Manager controller is installed.

Prerequisites

- Decision Server and the headless Decision Manager controller are installed on the application server instance.

Procedure

1. Specify the following JVM property values on the application server instance where the headless Decision Manager controller is installed:

Table 6.1. Required properties for the headless Decision Manager controller

Name	Requirement
org.kie.server.user	A user with the kie-server role
org.kie.server.pwd	The password for the user specified in the org.kie.server.user property

2. Specify the following JVM property values on the application server instance where Decision Server is installed:

Table 6.2. Required properties for Decision Server when headless Decision Manager controller is installed

Name	Requirement
org.kie.server.controller.user	A user with the kie-server role
org.kie.server.controller.pwd	The password for the user specified for the org.kie.server.controller.user property
org.kie.server.id	The ID or name of the Decision Server installation, such as rhdm700-decision-server-1
org.kie.server.location	The URL of the Decision Server, http://<HOST>:<PORT>/kie-server/services/rest/server

Name	Requirement
org.kie.server.controller	The URL of the headless Decision Manager controller, http://<HOST>:<PORT>/controller/rest/controller

<HOST> is the ID or name of the Decision Server host, for example, **localhost** or **192.7.8.9**.

<PORT> is the port of the Decision Server host, for example, **7001**.

6.3. MAPPING THE HEADLESS DECISION MANAGER CONTROLLER GROUP AND ROLE

After the headless Decision Manager controller is installed, in the WebSphere Integrated Solutions Console, you must create the **kie-server** group and then map the **kie-server** role to the **kie-server** group.

Prerequisites

- The headless Decision Manager controller is installed on the IBM WebSphere Application Server instance.

Procedure

1. In the WebSphere Integrated Solutions Console, create the **kie-server** group and a user for that group, as described in [Creating the Decision Server group and role](#).
2. Navigate to **Applications** → **Application Types** → **WebSphere Enterprise Applications** and select the newly installed headless Decision Manager controller.
3. Under **Detail Properties**, click **Security Role to User/Group Mapping**
4. Select the **kie-server** role and click **Map Groups** to search for the **kie-server** group.
5. Move the **kie-server** group from the **Available** list to the **Selected** list and click **OK**. This mapping gives the previously created administrator user access to Decision Manager.
6. Click **Save** to complete the mapping.

6.4. VERIFYING THE INSTALLATION

After you install the headless Decision Manager controller and define the required system properties and role requirements on the application server, verify that the headless Decision Manager controller works correctly.

Prerequisites

- Decision Server and the headless Decision Manager controller are installed on the application server instance.
- You have set all required system properties and role requirements for the headless Decision Manager controller on the application server.

Procedure

In your command terminal, enter the following command to verify that the headless Decision Manager controller is working:

```
curl -X GET "http://<HOST>:<PORT>/controller/rest/controller/management/servers" -H "accept: application/xml" -u '<CONTROLLER>:<CONTROLLER_PWD>'
```

<HOST> is the ID or name of the Decision Server host, for example, **localhost** or **192.7.8.9**.

<PORT> is the port of the Decision Server host, for example, **7001**.

<CONTROLLER> and <CONTROLLER_PWD> are the user credentials that you created in this section.

The command should return information about the Decision Server instance.



NOTE

Alternatively, you can use the Decision Server Java API Client to access the headless Decision Manager controller.

If the headless Decision Manager controller is not running, stop and restart the application server instance and try again to access the headless Decision Manager controller URL or API.

CHAPTER 7. CONFIGURING AN EMBEDDED DECISION ENGINE IN IBM WEBSHERE APPLICATION SERVER

A decision engine is a light-weight rule engine that enables you to execute your decisions and business processes. A decision engine can be part of a Red Hat Decision Manager application or it can be deployed as a service through OpenShift, Kubernetes, and Docker. You can embed a decision engine in a Red Hat Decision Manager application through the API or as a set of contexts and dependency injection (CDI) services.

If you intend to use an embedded engine with your Red Hat Decision Manager application, you must add Maven dependencies to your project by adding the Red Hat Business Automation bill of materials (BOM) files to the project's **pom.xml** file. The Red Hat Business Automation BOM applies to a Red Hat Decision Manager. For more information about the Red Hat Business Automation BOM, see [What is the mapping between Red Hat Decision Manager and the Maven library version?](#).

Procedure

1. Declare the Red Hat Business Automation BOM in the **pom.xml** file:

```
<dependencyManagement>
  <dependencies>
    <dependency>
      <groupId>com.redhat.ba</groupId>
      <artifactId>ba-platform-bom</artifactId>
      <version>7.6.0.redhat-00004</version>
      <type>pom</type>
      <scope>import</scope>
    </dependency>
  </dependencies>
</dependencyManagement>
<dependencies>
  <!-- Your dependencies -->
</dependencies>
```

2. Declare dependencies required for your project in the **<dependencies>** tag. After you import the product BOM into your project, the versions of the user-facing product dependencies are defined so you do not need to specify the **<version>** sub-element of these **<dependency>** elements. However, you must use the **<dependency>** element to declare dependencies which you want to use in your project.
 - For a basic Red Hat Decision Manager project, declare the following dependencies, depending on the features that you want to use:

Embedded decision engine dependencies

```
<dependency>
  <groupId>org.drools</groupId>
  <artifactId>drools-compiler</artifactId>
</dependency>

<!-- Dependency for persistence support. -->
<dependency>
  <groupId>org.drools</groupId>
  <artifactId>drools-persistence-jpa</artifactId>
</dependency>
```

```

<!-- Dependencies for decision tables, templates, and scorecards.
For other assets, declare org.drools:business-central-models-* dependencies. -->
<dependency>
  <groupId>org.drools</groupId>
  <artifactId>drools-decisiontables</artifactId>
</dependency>
<dependency>
  <groupId>org.drools</groupId>
  <artifactId>drools-templates</artifactId>
</dependency>
<dependency>
  <groupId>org.drools</groupId>
  <artifactId>drools-scorecards</artifactId>
</dependency>

<!-- Dependency for loading KJARs from a Maven repository using KieScanner. -->
<dependency>
  <groupId>org.kie</groupId>
  <artifactId>kie-ci</artifactId>
</dependency>

```

- To use the Decision Server, declare the following dependencies:

Client application Decision Server dependencies

```

<dependency>
  <groupId>org.kie.server</groupId>
  <artifactId>kie-server-client</artifactId>
</dependency>

```

- To create a remote client for Red Hat Decision Manager, declare the following dependency:

Client dependency

```

<dependency>
  <groupId>org.uberfire</groupId>
  <artifactId>uberfire-rest-client</artifactId>
</dependency>

```

- When creating a JAR file that includes assets, such as rules and process definitions, specify the packaging type for your Maven project as **kjar** and use **org.kie:kie-maven-plugin** to process the **kjar** packaging type located under the **<project>** element. In the following example, **#{kie.version}** is the Maven library version listed in [What is the mapping between Red Hat Decision Manager and the Maven library version?](#):

```

<packaging>kjar</packaging>
<build>
  <plugins>
    <plugin>
      <groupId>org.kie</groupId>
      <artifactId>kie-maven-plugin</artifactId>
      <version>#{kie.version}</version>
      <extensions>>true</extensions>
    </plugin>
  </plugins>
</build>

```

```
</plugin>  
</plugins>  
</build>
```

3. If you use a decision engine with persistence support in your project, you must declare the following hibernate dependencies in the **dependencyManagement** section of your **pom.xml** file by copying the **version.org.hibernate-4ee7** property from the Red Hat Business Automation BOM file:

Hibernate dependencies in decision engine with persistence

```
<!-- hibernate dependencies -->  
<dependencyManagement>  
  <dependencies>  
    <dependency>  
      <groupId>org.hibernate</groupId>  
      <artifactId>hibernate-entitymanager</artifactId>  
      <version>${version.org.hibernate-4ee7}</version>  
    </dependency>  
  
    <dependency>  
      <groupId>org.hibernate</groupId>  
      <artifactId>hibernate-core</artifactId>  
      <version>${version.org.hibernate-4ee7}</version>  
    </dependency>  
  </dependencies>  
</dependencyManagement>
```

CHAPTER 8. SECURING PASSWORDS WITH A KEYSTORE

You can use a keystore to encrypt passwords that are used for communication between Business Central and Decision Server. You should encrypt both controller and Decision Server passwords. If Business Central and Decision Server are deployed to different application servers, then both application servers should use the keystore.

Use Java Cryptography Extension KeyStore (JCEKS) for your keystore because it supports symmetric keys.



NOTE

If Decision Server is not configured with JCEKS, Decision Server passwords are stored in system properties in plain text form.

Prerequisites

- Decision Server is installed in IBM WebSphere Application Server.
- A Decision Server user with the **kie-server** role has been created, as described in [Section 5.1, “Creating the Decision Server group and role”](#).
- Java 8 or higher is installed.

Procedure

1. Create a JCEKS keystore.
2. When prompted, enter the password for the Decision Server user that you created.
3. Set the system properties listed in the following table:

Table 8.1. System properties used to load a Decision Server JCEKS

System property	Placeholder	Description
kie.keystore.keyStoreURL	<KEYSTORE_URL>	URL for the JCEKS that you want to use, for example file:///home/kie/keystores/keystore.jceks
kie.keystore.keyStorePwd	<KEYSTORE_PWD>	Password for the JCEKS
kie.keystore.key.server.alias	<KEY_SERVER_ALIASES>	Alias of the key for REST services where the password is stored
kie.keystore.key.server.pwd	<KEY_SERVER_PASSWORD>	Password of the alias for REST services with the stored password
kie.keystore.key.ctrl.alias	<KEY_CONTROL_ALIASES>	Alias of the key for default REST Process Automation Controller where the password is stored

System property	Placeholder	Description
kie.keystore.key.ctrl.pwd	<KEY_CONTROL_PWD>	Password of the alias for default REST Process Automation Controller with the stored password

4. Start Decision Server to verify the configuration.

CHAPTER 9. NEXT STEPS

- *Getting started with decision services*
- *Designing a decision service using guided decision tables*

APPENDIX A. VERSIONING INFORMATION

Documentation last updated on Friday, May 22, 2020.