Red Hat Decision Manager 7.4

Managing and monitoring Decision Server
Abstract

This document explains how install, configure, and performance tune Red Hat Decision Manager 7.4
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PREFACE

As a systems administrator, you can install, configure, and upgrade Red Hat Decision Manager for production environments, quickly and easily troubleshoot system failures, and ensure that systems are running optimally.

Prerequisites

- Red Hat JBoss Enterprise Application Platform 7.2 is installed. For more information, see Red Hat JBoss Enterprise Application Platform 7.2 Installation Guide.

- Red Hat Decision Manager is installed. For more information, see Planning a Red Hat Decision Manager installation.

- Red Hat Decision Manager is running and you can log in to Business Central with the admin role. For more information, see Planning a Red Hat Decision Manager installation.
CHAPTER 1. RED HAT DECISION MANAGER COMPONENTS

Red Hat Decision Manager is made up of Business Central and Decision Server.

- Business Central is the graphical user interface where you create and manage business rules. You can install Business Central in a Red Hat JBoss EAP instance or on the Red Hat OpenShift Container Platform (OpenShift). Business Central is also available as a standalone JAR file. You can use the Business Central standalone JAR file to run Business Central without needing to deploy it to an application server.

- Decision Server is the server where rules and other artifacts are executed. It is used to instantiate and execute rules and solve planning problems. You can install Decision Server in a Red Hat JBoss EAP instance, on OpenShift, in an Oracle WebLogic server instance, in an IBM WebSphere Application Server instance, or as a part of Spring Boot application. You can configure Decision Server to run in managed or unmanaged mode. If Decision Server is unmanaged, you must manually create and maintain KIE containers (deployment units). A KIE container is a specific version of a project. If Decision Server is managed, the Decision Manager controller manages the Decision Server configuration and you interact with the Decision Manager controller to create and maintain KIE containers.
CHAPTER 2. SYSTEM INTEGRATION WITH MAVEN

Red Hat Decision Manager is designed to be used with Red Hat JBoss Middleware Maven Repository and Maven Central repository as dependency sources. Ensure that both the dependencies are available for projects builds.

Ensure that your project depends on specific versions of an artifact. **LATEST** or **RELEASE** are commonly used to specify and manage dependency versions in your application.

- **LATEST** refers to the latest deployed (snapshot) version of an artifact.
- **RELEASE** refers to the last non-snapshot version release in the repository.

By using **LATEST** or **RELEASE**, you do not have to update version numbers when a new release of a third-party library is released, however, you lose control over your build being affected by a software release.

2.1. PREEMPTIVE AUTHENTICATION FOR LOCAL PROJECTS

If your environment does not have access to the internet, set up an in-house Nexus and use it instead of Maven Central or other public repositories. To import JARs from the remote Maven repository of Red Hat Decision Manager server to a local Maven project, turn on pre-emptive authentication for the repository server. You can do this by configuring authentication for `guvnor-m2-repo` in the `pom.xml` file as shown below:

```xml
<server>
  <id>guvnor-m2-repo</id>
  <username>admin</username>
  <password>admin</password>
  <configuration>
    <wagonProvider>httpclient</wagonProvider>
    <httpConfiguration>
      <all>
        <usePreemptive>true</usePreemptive>
      </all>
    </httpConfiguration>
  </configuration>
</server>
```

Alternatively, you can set Authorization HTTP header with Base64 encoded credentials:

```xml
<server>
  <id>guvnor-m2-repo</id>
  <configuration>
    <httpHeaders>
      <property>
        <name>Authorization</name>
        <!-- Base64-encoded "admin:admin" -->
        <value>Basic YWRtaW46YWRtaW4=</value>
      </property>
    </httpHeaders>
  </configuration>
</server>
```
2.2. DUPLICATE GAV DETECTION IN BUSINESS CENTRAL

In Business Central, all Maven repositories are checked for any duplicated GroupId, ArtifactId, and Version (GAV) values in a project. If a GAV duplicate exists, the performed operation is canceled.

**NOTE**

Duplicate GAV detection is disabled for projects in Development Mode. To enable duplicate GAV detection in Business Central, go to project Settings → General Settings → Version and toggle the Development Mode option to OFF (if applicable).

Duplicate GAV detection is executed every time you perform the following operations:

- Save a project definition for the project.
- Save the pom.xml file.
- Install, build, or deploy a project.

The following Maven repositories are checked for duplicate GAVs:

- Repositories specified in the `<repositories>` and `<distributionManagement>` elements of the pom.xml file.
- Repositories specified in the Maven settings.xml configuration file.

2.3. MANAGING DUPLICATE GAV DETECTION SETTINGS IN BUSINESS CENTRAL

Business Central users with the admin role can modify the list of repositories that are checked for duplicate GroupId, ArtifactId, and Version (GAV) values for a project.

**NOTE**

Duplicate GAV detection is disabled for projects in Development Mode. To enable duplicate GAV detection in Business Central, go to project Settings → General Settings → Version and toggle the Development Mode option to OFF (if applicable).

Procedure

1. In Business Central, go to Menu → Design → Projects and click the project name.
2. Click the project Settings tab and then click Validation to open the list of repositories.
3. Select or clear any of the listed repository options to enable or disable duplicate GAV detection. In the future, duplicate GAVs will be reported for only the repositories you have enabled for validation.
NOTE

To disable this feature, set the `org.guvnor.project.gav.check.disabled` system property to `true` for Business Central at system startup:

```
$ ~/EAP_HOME/bin/standalone.sh -c standalone-full.xml
   -Dorg.guvnor.project.gav.check.disabled=true
```
CHAPTER 3. APPLYING PATCH UPDATES AND MINOR RELEASE UPGRADES TO RED HAT DECISION MANAGER

Automated update tools are often provided with both patch updates and new minor versions of Red Hat Decision Manager to facilitate updating certain components of Red Hat Decision Manager, such as Business Central, Decision Server, and the headless Decision Manager controller. Other Red Hat Decision Manager artifacts, such as the decision engine and standalone Business Central, are released as new artifacts with each minor release and you must re-install them to apply the update.

You can use the same automated update tool to apply both patch updates and minor release upgrades to Red Hat Decision Manager 7.4. Patch updates of Red Hat Decision Manager, such as an update from version 7.4 to 7.4.1, include the latest security updates and bug fixes. Minor release upgrades of Red Hat Decision Manager, such as an upgrade from version 7.4.x to 7.5, include enhancements, security updates, and bug fixes.

NOTE

Only updates for Red Hat Decision Manager are included in Red Hat Decision Manager update tools. Updates to Red Hat JBoss EAP must be applied using Red Hat JBoss EAP patch distributions. For more information about Red Hat JBoss EAP patching, see the Red Hat JBoss EAP patching and upgrading guide.

Prerequisites

- Your Red Hat Decision Manager and Decision Server instances are not running. Do not apply updates while you are running an instance of Red Hat Decision Manager or 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.
   Example:
   - **Product:** Decision Manager
   - **Version:** 7.4.1

   If you are upgrading to a new minor release of Red Hat Decision Manager, such as an upgrade from version 7.4.x to 7.5, first apply the latest patch update to your current version of Red Hat Decision Manager and then follow this procedure again to upgrade to the new minor release.

2. Click Patches, download the Red Hat Decision Manager [VERSION] Update Tool and extract the downloaded rhdm-$VERSION-update.zip file to a temporary directory. This update tool automates the update of certain components of Red Hat Decision Manager, such as Business Central, Decision Server, and the headless Decision Manager controller. Use this update tool first to apply updates and then install any other updates or new release artifacts that are relevant to your Red Hat Decision Manager distribution.

3. If you want to preserve any files from being updated by the update tool, navigate to the extracted rhdm-$VERSION-update folder, open the blacklist.txt file, and add the relative paths to the files that you do not want to be updated. When a file is listed in the blacklist.txt file, the update script does not replace the file with the new version but instead leaves the file in place and in the same location adds the new version with a .new suffix. If you blacklist files that are no longer being distributed, the update tool
create an empty marker file with a `.removed` suffix. You can then choose to retain, merge, or delete these new files manually.

Example files to be excluded in `blacklist.txt` file:

```plaintext
WEB-INF/web.xml  // Custom file
styles/base.css  // Obsolete custom file kept for record
```

The contents of the blacklisted file directories after the update:

```bash
$ ls WEB-INF
web.xml web.xml.new

$ ls styles
base.css base.css.removed
```

4. In your command terminal, navigate to the temporary directory where you extracted the `rhdm-$VERSION-update.zip` file and run the `apply-updates` script in the following format:

```bash
$ ./apply-updates.sh $DISTRO_PATH $DISTRO_TYPE
```

On Linux or Unix-based systems:

```bash
$ ./apply-updates.sh $DISTRO_PATH $DISTRO_TYPE
```

On Windows:

```bash
$ .\apply-updates.bat $DISTRO_PATH $DISTRO_TYPE
```

The `$DISTRO_PATH` portion is the path to the relevant distribution directory and the `$DISTRO_TYPE` portion is the type of distribution that you are updating with this update.

The following distribution types are supported in Red Hat Decision Manager update tool:

- **rhdm-decision-central-eap7-deployable**: Updates Business Central (`decision-central.war`)
- **rhdm-kie-server-ee8**: Updates Decision Server (`kie-server.war`)

**NOTE**

The update tool will update Red Hat JBoss EAP EE7 to Red Hat JBoss EAP EE8.

- **rhdm-kie-server-jws**: Updates Decision Server on Red Hat JBoss Web Server (`kie-server.war`)
- **rhdm-controller-ee7**: Updates the headless Decision Manager controller (`controller.war`)
• **rhdm-controller-jws**: Updates the headless Decision Manager controller on Red Hat JBoss Web Server (**controller.war**)

Example update to Business Central and Decision Server for a full Red Hat Decision Manager distribution on Red Hat JBoss EAP:

```
./apply-updates.sh ~EAP_HOME/standalone/deployments/decision-central.war rhdm-decision-central-eap7-deployable
./apply-updates.sh ~EAP_HOME/standalone/deployments/kie-server.war rhdm-kie-server-ee8
```

Example update to headless Decision Manager controller, if used:

```
./apply-updates.sh ~EAP_HOME/standalone/deployments/controller.war rhdm-controller-ee7
```

The update script creates a **backup** folder in the extracted **rhdm-$VERSION-update** folder with a copy of the specified distribution, and then proceeds with the update.

5. After the update tool completes, return to the **Software Downloads** page of the Red Hat Customer Portal where you downloaded the update tool and install any other updates or new release artifacts that are relevant to your Red Hat Decision Manager distribution.

   For files that already exist in your Red Hat Decision Manager distribution, such as .jar files for the decision engine or other add-ons, replace the existing version of the file with the new version from the Red Hat Customer Portal.

6. If you use the standalone **Red Hat Decision Manager 7.4.0 Maven Repository** artifact (**rhdm-7.4.0-maven-repository.zip**), such as in air-gap environments, download **Red Hat Decision Manager [VERSION] Incremental Maven Repository** and extract the downloaded **rhdm-$VERSION-incremental-maven-repository.zip** file to your existing ~:/maven-repository directory to update the relevant contents.

   Example Maven repository update:

   ```
   $ unzip -o rhdm-7.4.1-incremental-maven-repository.zip -d $REPO_PATH/rhdm-7.4.0-maven-repository/maven-repository/
   ```

7. After you finish applying all relevant updates, start Red Hat Decision Manager and Decision Server and log in to Business Central.

8. Verify that all project data is present and accurate in Business Central, and in the top-right corner of the Business Central window, click your profile name and click **About** to verify the updated product version number.

   If you encounter errors or notice any missing data in Business Central, you can restore the contents in the **backup** folder within the **rhdm-$VERSION-update** folder to revert the update tool changes. You can also re-install the relevant release artifacts from your previous version of Red Hat Decision Manager in the Red Hat Customer Portal. After restoring your previous distribution, you can try again to run the update.
CHAPTER 4. CONFIGURING AND STARTING DECISION SERVER

You can configure your Decision Server location, user name, password, and other related properties by defining the necessary configurations when you start Decision Server.

Procedure

Navigate to the Red Hat Decision Manager 7.4 bin directory and start the new Decision Server with the following properties. Adjust the specific properties according to your environment.

```bash
$ ~/EAP_HOME/bin/standalone.sh --server-config=standalone-full.xml
-Dorg.kie.server.id=myserver
-Dorg.kie.server.user=decision_server_username
-Dorg.kie.server.pwd=decision_server_password
-Dorg.kie.server.controller=http://localhost:8080/decision-central/rest/controller
-Dorg.kie.server.controller.user=controller_username
-Dorg.kie.server.controller.pwd=controller_password
-Dorg.kie.server.location=http://localhost:8080/kie-server/services/rest/server
-Dorg.kie.server.persistence.dialect=org.hibernate.dialect.PostgreSQLDialect
-Dorg.kie.server.persistence.ds=java:jboss/datasources/psjbpmDS
```

1. Start command with standalone-full.xml server profile
2. Server ID that must match the server configuration name defined in Business Central
3. User name to connect with Decision Server from the Decision Manager controller
4. Password to connect with Decision Server from the Decision Manager controller
5. Decision Manager controller location, Business Central URL with /rest/controller suffix
6. User name to connect to the Decision Manager controller REST API
7. Password to connect to the Decision Manager controller REST API
8. Decision Server location (on the same instance as Business Central in this example)
9. Hibernate dialect to be used
10. JNDI name of the data source used for your previous Red Hat JBoss BRMS database
NOTE

If Business Central and Decision Server are installed on separate application server instances (Red Hat JBoss EAP or other), use a separate port for the Decision Server location to avoid port conflicts with Business Central. If a separate Decision Server port has not already been configured, you can add a port offset and adjust the Decision Server port value accordingly in the Decision Server properties.

Example:

-Djboss.socket.binding.port-offset=150
-Dorg.kie.server.location=http://localhost:8230/kie-server/services/rest/server

If the Business Central port is 8080, as in this example, then the Decision Server port, with a defined offset of 150, is 8230.

Decision Server connects to the new Business Central and collects the list of deployment units (KIE containers) to be deployed.

NOTE

When you use a class inside a dependency JAR file to access Decision Server from Decision Server client, you get the ConversionException and ForbiddenClassException in Business Central. To avoid generating these exceptions in Business Central, do one of the following:

- If the exceptions are generated on the client-side, add following system property to the kie-server client:

  System.setProperty("org.kie.server.xstream.enabled.packages", "org.example.**");

- If the exceptions are generated on the server-side, open standalone-full.xml from the Red Hat Decision Manager installation directory, set the following property under the <system-properties> tag:

  <property name="org.kie.server.xstream.enabled.packages" value="org.example.**"/>

- Set the following JVM property:

  -Dorg.kie.server.xstream.enabled.packages=org.example.**

It is expected that you do not configure the classes that exists in KJAR using these system property. Ensure that only known classes are used in the system property to avoid any vulnerabilities.

The org.example is an example package, you can define any package that you want to use. You can specify multiple packages separated by comma , for example, org.example1.*, *, org.example2.*, *, org.example3.*.*.

You can also add specific classes, for example, org.example1.Mydata1, org.example2.Mydata2.
CHAPTER 5. CONFIGURING DECISION SERVER WITH THE INTEGRATED DECISION MANAGER CONTROLLER

NOTE

Only make the changes described in this section if Decision Server will be managed by Business Central and you installed Red Hat Decision Manager from the ZIP files. If you did not install Business Central, you can use the headless Decision Manager controller to manage Decision Server, as described in Chapter 6, Installing and running the headless Decision Manager controller.

Decision Server can be managed or it can be unmanaged. If Decision Server is unmanaged, you must manually create and maintain KIE containers (deployment units). If Decision Server is managed, the Decision Manager controller manages the Decision Server configuration and you interact with the Decision Manager controller to create and maintain KIE containers.

The Decision Manager controller is integrated with Business Central. If you install Business Central, you can use the Execution Server page in Business Central to interact with the Decision Manager controller.

If you installed Red Hat Decision Manager from the ZIP files, you must edit the standalone-full.xml file in both the Decision Server and Business Central installations to configure Decision Server with the integrated Decision Manager controller.

Prerequisites

- Business Central and Decision Server are installed in the base directory of the Red Hat JBoss EAP installation (EAP_HOME).

NOTE

You should install Business Central and Decision Server on different servers in production environments. However, if you install Decision Server and Business Central on the same server, for example in a development environment, make the changes described in this section in the shared standalone-full.xml file.

- On Business Central server nodes, a user with the rest-all role exists.

Procedure

1. In the Business Central EAP_HOME/standalone/configuration/standalone-full.xml file, uncomment the following properties in the <system-properties> section and replace <USERNAME> and <USER_PWD> with the credentials of a user with the kie-server role:

```xml
<property name="org.kie.server.user" value="<USERNAME>"/>
<property name="org.kie.server.pwd" value="<USER_PWD>"/>
```

2. In the Decision Server EAP_HOME/standalone/configuration/standalone-full.xml file, uncomment the following properties in the <system-properties> section:

```xml
<property name="org.kie.server.controller.user" value="<CONTROLLER_USER>"/>
<property name="org.kie.server.controller.pwd" value="<CONTROLLER_PWD>"/>
<property name="org.kie.server.id" value="<KIE_SERVER_ID>"/>
```
3. Replace the following values:

- Replace `<CONTROLLER_USER>` and `<CONTROLLER_PWD>` with the credentials of a user with the `rest-all` role.

- Replace `<KIE_SERVER_ID>` with the ID or name of the Decision Server installation, for example, `rhdm-7.4.0-decision_server-1`.

- Replace `<HOST>` with the ID or name of the Decision Server host, for example, `localhost` or `192.7.8.9`.

- Replace `<PORT>` with the port of the Decision Server host, for example, `8080`.

**NOTE**

The `<org.kie.server.location>` property specifies the location of Decision Server.

- Replace `<CONTROLLER_URL>` with the URL of Business Central. Decision Server connects to this URL during startup.
  - If you installed Business Central using the installer or Red Hat JBoss EAP zip installations, `<CONTROLLER_URL>` has this format:
    
    `http://<HOST>:<PORT>/decision-central/rest/controller`
  - If you are running Business Central using the `standalone.jar` file, `<CONTROLLER_URL>` has this format:
    
    `http://<HOST>:<PORT>/rest/controller`
CHAPTER 6. INSTALLING AND RUNNING THE HEADLESS DECISION MANAGER CONTROLLER

You can configure Decision Server to run in managed or unmanaged mode. If Decision Server is unmanaged, you must manually create and maintain KIE containers (deployment units). If Decision Server is managed, the Decision Manager controller manages the Decision Server configuration and you interact with the Decision Manager controller to create and maintain KIE containers.

Business Central has an embedded Decision Manager controller. If you install Business Central, use the Execution Server page to create and maintain KIE containers. If you want to automate Decision Server management without Business Central, you can use the headless Decision Manager controller.

6.1. USING THE INSTALLER TO CONFIGURE DECISION SERVER WITH THE DECISION MANAGER CONTROLLER

Decision Server can be managed by the Decision Manager controller or it can be unmanaged. If Decision Server is unmanaged, you must manually create and maintain KIE containers (deployment units). If Decision Server is managed, the Decision Manager controller manages the Decision Server configuration and you interact with the Decision Manager controller to create and maintain KIE containers.

The Decision Manager controller is integrated with Business Central. If you install Business Central, you can use the Execution Server page in Business Central to interact with the Decision Manager controller.

You can use the installer in interactive or CLI mode to install Business Central and Decision Server, and then configure Decision Server with the Decision Manager controller.

NOTE

If you do not install Business Central, see Chapter 6, Installing and running the headless Decision Manager controller for information about using the headless Decision Manager controller.

Prerequisites

- Two computers with backed-up Red Hat JBoss EAP 7.2 server installations are available.
- Sufficient user permissions to complete the installation are granted.

Procedure

1. On the first computer, run the installer in interactive mode or CLI mode. See Installing and configuring Red Hat Decision Manager on Red Hat JBoss EAP 7.2 for more information.

2. On the Component Selection page, clear the Decision Server box.

3. Complete the Business Central installation.

4. On the second computer, run the installer in interactive mode or CLI mode.

5. On the Component Selection page, clear the Business Central box.

7. Select Customize Decision Server properties and click Next.

8. Enter the controller URL for Business Central and configure additional properties for Decision Server. The controller URL has the following form where `<HOST:PORT>` is the address of Business Central on the second computer:

   `<HOST:PORT>/business-central/rest/controller`

9. Complete the installation.

10. To verify that the Decision Manager controller is now integrated with Business Central, go to the Execution Servers page in Business Central and confirm that the Decision Server that you configured appears under REMOTE SERVERS.

### 6.2. INSTALLING THE HEADLESS DECISION MANAGER CONTROLLER

You can install the headless Decision Manager controller and use the REST API or the Decision Server Java Client API to interact with it.

**Prerequisites**

- A backed-up Red Hat JBoss EAP installation version 7.2 is available. The base directory of the Red Hat JBoss EAP installation is referred to as `EAP_HOME`.
- Sufficient user permissions to complete the installation are granted.

**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**: 7.4

2. Download Red Hat Decision Manager 7.4.0 Add Ons (the `rhdm-7.4.0-add-ons.zip` file).

3. Unzip the `rhdm-7.4.0-add-ons.zip` file. The `rhdm-7.4-controller-ee7.zip` file is in the unzipped directory.

4. Extract the `rhdm-7.4-controller-ee7` archive to a temporary directory. In the following examples this directory is called `TEMP_DIR`.

5. Copy the `TEMP_DIR/rhdm-7.4-controller-ee7/controller.war` directory to `EAP_HOME/standalone/deployments/`

   **WARNING**

   Ensure that the names of the headless Decision Manager controller deployments you copy do not conflict with your existing deployments in the Red Hat JBoss EAP instance.
6. Copy the contents of the `{TEMP_DIR}/rhdm-7.4-controller-ee7/SecurityPolicy/` directory to `{EAP_HOME}/bin`. When asked to overwrite files, select Yes.

7. In the `{EAP_HOME}/standalone/deployments/` directory, create an empty file named `controller.war.dodeploy`. This file ensures that the headless Decision Manager controller is automatically deployed when the server starts.

### 6.2.1. Creating a headless Decision Manager controller user

Before you can use the headless Decision Manager controller, you must create a user that has the `kie-server` role.

**Prerequisites**

- The headless Decision Manager controller is installed in the base directory of the Red Hat JBoss EAP installation (`EAP_HOME`).

**Procedure**

1. In a terminal application, navigate to the `{EAP_HOME}/bin` directory.

2. Enter the following command and replace `<USER_NAME>` and `<PASSWORD>` with the user name and password of your choice.

   ```bash
   $ ./add-user.sh -a --user <username> --password <password> --role kie-server
   ```

   **NOTE**

   Make sure that the specified user name is not the same as an existing user, role, or group. For example, do not create a user with the user name `admin`.

   The password must have at least eight characters and must contain at least one number and one non-alphanumeric character, but not `&` (ampersand).

3. Make a note of your user name and password.

### 6.2.2. Configuring Decision Server and the headless Decision Manager controller

If Decision Server will be managed by the headless Decision Manager controller, you must edit the `standalone-full.xml` file in Decision Server installation and the `standalone.xml` file in the headless Decision Manager controller installation, as described in this section.

**Prerequisites**

- Decision Server is installed in the base directory of the Red Hat JBoss EAP installation (`EAP_HOME`).

- The headless Decision Manager controller is installed in an `EAP_HOME`. 
NOTE

You should install Decision Server and the headless Decision Manager controller on different servers in production environments. However, if you install Decision Server and the headless Decision Manager controller on the same server, for example in a development environment, make these changes in the shared `standalone-full.xml` file.

- On Decision Server nodes, a user with the `kie-server` role exists.
- On the server nodes, a user with the `kie-server` role exists.

Procedure

1. In the `EAP_HOME/standalone/configuration/standalone-full.xml` file, add the following properties to the `<system-properties>` section and replace `<USERNAME>` and `<USER_PWD>` with the credentials of a user with the `kie-server` role:

   ```xml
   <property name="org.kie.server.user" value="<USERNAME>">
   <property name="org.kie.server.pwd" value="<USER_PWD>">
   ```

2. In the Decision Server `EAP_HOME/standalone/configuration/standalone-full.xml` file, add the following properties to the `<system-properties>` section:

   ```xml
   <property name="org.kie.server.controller.user" value="<CONTROLLER_USER>">
   <property name="org.kie.server.controller.pwd" value="<CONTROLLER_PWD>">
   <property name="org.kie.server.id" value="<KIE_SERVER_ID>">
   <property name="org.kie.server.location" value="http://<HOST>:<PORT>/kie-server/services/rest/server"/>
   <property name="org.kie.server.controller" value="<CONTROLLER_URL>">
   ```

3. In this file, replace the following values:

   - Replace `<CONTROLLER_USER>` and `<CONTROLLER_PWD>` with the credentials of a user with the `kie-server` role.
   - Replace `<KIE_SERVER_ID>` with the ID or name of the Decision Server installation, for example, `rhdm-7.4.0-decision_server-1`.
   - Replace `<HOST>` with the ID or name of the Decision Server host, for example, `localhost` or `192.7.8.9`.
   - Replace `<PORT>` with the port of the Decision Server host, for example, `8080`.

   **NOTE**

   The `org.kie.server.location` property specifies the location of Decision Server.

   - Replace `<CONTROLLER_URL>` with the URL of the headless Decision Manager controller.

     1. Decision Server connects to this URL during startup.

6.3. RUNNING THE HEADLESS DECISION MANAGER CONTROLLER
After you have installed the headless Decision Manager controller on Red Hat JBoss EAP, use this procedure to run the headless Decision Manager controller.

**Prerequisites**

- The headless Decision Manager controller is installed and configured in the base directory of the Red Hat JBoss EAP installation (**EAP_HOME**).

**Procedure**

1. In a terminal application, navigate to **EAP_HOME/bin**.

2. If you installed the headless Decision Manager controller on the same Red Hat JBoss EAP instance as the Red Hat JBoss EAP instance where you installed the Decision Server, enter one of the following commands:
   - On Linux or UNIX-based systems:
     ```bash
     $ ./standalone.sh -c standalone-full.xml
     ```
   - On Windows:
     ```bash
     standalone.bat -c standalone-full.xml
     ```

3. If you installed the headless Decision Manager controller on a separate Red Hat JBoss EAP instance from the Red Hat JBoss EAP instance where you installed the Decision Server, you can start the headless Decision Manager controller with the **standalone.sh** script:
   - On Linux or UNIX-based systems:
     ```bash
     $ ./standalone.sh
     ```
   - On Windows:
     ```bash
     standalone.bat
     ```

4. To verify that the headless Decision Manager controller is working on Red Hat JBoss EAP, enter the following command where `<CONTROLLER>` and `<CONTROLLER_PWD>` is the user name and password. The output of this command provides information about the Decision Server instance.
   ```bash
   ```

   **NOTE**

   Alternatively, you can use the Decision Server Java API Client to access the headless Decision Manager controller.
6.4. CLUSTERING DECISION SERVERS WITH THE HEADLESS DECISION MANAGER CONTROLLER

The Decision Manager controller is integrated with Business Central. However, if you do not install Business Central, you can install the headless Decision Manager controller and use the REST API or the Decision Server Java Client API to interact with it.

Prerequisites

- A backed-up Red Hat JBoss EAP installation version 7.2 or later is available. The base directory of the Red Hat JBoss EAP installation is referred to as $EAP_HOME$.
- Sufficient user permissions to complete the installation are granted.
- An NFS server with a mounted partition is available.

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: 7.4

2. Download Red Hat Decision Manager 7.4.0 Add Ons (the $rhdm-7.4.0-add-ons.zip$ file).

3. Unzip the $rhdm-7.4.0-add-ons.zip$ file. The $rhdm-7.4-controller-ee7.zip$ file is in the unzipped directory.

4. Extract the $rhdm-7.4-controller-ee7$ archive to a temporary directory. In the following examples this directory is called $TEMP_DIR$.

5. Copy the $TEMP_DIR/rhdm-7.4-controller-ee7/controller.war$ directory to $EAP_HOME/standalone/deployments/$. 

6. Copy the contents of the $TEMP_DIR/rhdm-7.4-controller-ee7/SecurityPolicy/$ directory to $EAP_HOME/bin$. When asked to overwrite files, select Yes.

7. In the $EAP_HOME/standalone/deployments/$ directory, create an empty file named $controller.war.dodeploy$. This file ensures that the headless Decision Manager controller is automatically deployed when the server starts.

8. Open the $EAP_HOME/standalone/configuration/standalone.xml$ file in a text editor.

WARNING

Ensure that the names of the headless Decision Manager controller deployments you copy do not conflict with your existing deployments in the Red Hat JBoss EAP instance.
9. Add the following properties to the `<system-properties>` element and replace `<NFS_STORAGE>` with the absolute path to the NFS storage where the template configuration is stored:

```xml
<system-properties>
  <property name="org.kie.server.controller.templatefile.watcher.enabled" value="true"/>
  <property name="org.kie.server.controller.templatefile" value="<NFS_STORAGE>"/>
</system-properties>
```

If the value of the `org.kie.server.controller.templatefile.watcher.enabled` property is set to true, a separate thread is started to watch for modifications of the template file. The default interval for these checks is 30000 milliseconds and can be further controlled by the `org.kie.server.controller.templatefile.watcher.interval` system property. If the value of this property is set to false, changes to the template file are detected only when the server restarts.

10. To start the headless Decision Manager controller, navigate to `EAP_HOME/bin` and enter the following command:

- On Linux or UNIX-based systems:
  ```bash
  $ ./standalone.sh
  ```

- On Windows:
  ```bat
  standalone.bat
  ```

For more information about running Red Hat Decision Manager in a Red Hat JBoss Enterprise Application Platform clustered environment, see Installing and configuring Red Hat Decision Manager in a Red Hat JBoss EAP clustered environment.
CHAPTER 7. CONFIGURING A DECISION SERVER TO CONNECT TO BUSINESS CENTRAL

If a Decision Server is not already configured in your Red Hat Decision Manager environment, or if you require additional Decision Servers in your Red Hat Decision Manager environment, you must configure a Decision Server to connect to Business Central.

NOTE

If you are deploying Decision Server on Red Hat OpenShift Container Platform, see Deploying a Red Hat Decision Manager authoring or managed server environment on Red Hat OpenShift Container Platform for instructions about configuring it to connect to Business Central.

Prerequisites

- Decision Server is installed. For installation options, see Planning a Red Hat Decision Manager installation.

Procedure

1. In your Red Hat Decision Manager installation directory, navigate to the standalone-full.xml file. For example, if you use a Red Hat JBoss EAP installation for Red Hat Decision Manager, go to $EAP_HOME/standalone/configuration/standalone-full.xml.

2. Open standalone-full.xml and under the <system-properties> tag, set the following properties:

   - **org.kie.server.controller.user**: The user name of a user who can log in to the Business Central.
   - **org.kie.server.controller.pwd**: The password of the user who can log in to the Business Central.
   - **org.kie.server.controller**: The URL for connecting to the API of Business Central. Normally, the URL is http://<centralhost>:<centralport>/decision-central/rest/controller, where <centralhost> and <centralport> are the host name and port for Business Central. If Business Central is deployed on OpenShift, remove decision-central/ from the URL.
   - **org.kie.server.location**: The URL for connecting to the API of Decision Server. Normally, the URL is http://<serverhost>:<serverport>/kie-server/services/rest/server, where <serverhost> and <serverport> are the host name and port for Decision Server.
   - **org.kie.server.id**: The name of a server configuration. If this server configuration does not exist in Business Central, it is created automatically when Decision Server connects to Business Central.

   Example:

   ```xml
   <property name="org.kie.server.controller.user" value="central_user"/>
   <property name="org.kie.server.controller.password" value="central_password"/>
   <property name="org.kie.server.controller" value="http://central.example.com:8080/decision-central/rest/controller"/>
   ```
3. Start or restart the Decision Server.

<property name="org.kie.server.location" value="http://kieserver.example.com:8080/kie-server/services/rest/server"/>
<property name="org.kie.server.id" value="production-servers"/>
CHAPTER 8. CONFIGURING THE ENVIRONMENT MODE IN DECISION SERVER AND BUSINESS CENTRAL

You can set Decision Server to run in **production** mode or in **development** mode. Development mode provides a flexible deployment policy that enables you to update existing deployment units (KIE containers) while maintaining active process instances for small changes. It also enables you to reset the deployment unit state before updating active process instances for larger changes. Production mode is optimal for production environments, where each deployment creates a new deployment unit.

In a development environment, you can click **Deploy** in Business Central to deploy the built KJAR file to a Decision Server without stopping any running instances (if applicable), or click **Redeploy** to deploy the built KJAR file and stop any running instances. The next time you deploy or redeploy the built KJAR, the previous deployment unit (KIE container) is automatically updated in the same target Decision Server.

In a production environment, the **Redeploy** option in Business Central is disabled and you can click only **Deploy** to deploy the built KJAR file to a new deployment unit (KIE container) on a Decision Server.

Procedure

1. To configure the Decision Server environment mode, set the **org.kie.server.mode** system property to **org.kie.server.mode=development** or **org.kie.server.mode=production**.

2. To configure the deployment behavior for a project in Business Central, go to project **Settings → General Settings → Version** and toggle the **Development Mode** option.

---

**NOTE**

By default, Decision Server and all new projects in Business Central are in development mode.

You cannot deploy a project with **Development Mode** turned on or with a manually added **SNAPSHOT** version suffix to a Decision Server that is in production mode.
CHAPTER 9. CONFIGURING DECISION SERVER MANAGED BY BUSINESS CENTRAL

WARNING

This section provides a sample setup that you can use for testing purposes. Some of the values are unsuitable for a production environment, and are marked as such.

Use this procedure to configure Business Central to manage a Decision Server instance.

Prerequisites

- Users with the following roles exist:
  - In Business Central, a user with the role rest-all
  - On the Decision Server, a user with the role kie-server

NOTE

In production environments, use two distinct users, each with one role. In this sample situation, we use only one user named controllerUser that has both the rest-all and the kie-server roles.

Procedure

1. Set the following JVM properties.
   The location of Business Central and the Decision Server may be different. In such case, ensure you set the properties on the correct server instances.
   - On Red Hat JBoss EAP, modify the <system-properties> section in:
     - EAP_HOME/standalone/configuration/standalone*.xml for standalone mode.
     - EAP_HOME/domain/configuration/domain.xml for domain mode.

Table 9.1. JVM Properties for Managed Decision Server Instance

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>org.kie.server.id</td>
<td>default-kie-server</td>
<td>The Decision Server ID.</td>
</tr>
<tr>
<td>org.kie.server.controller.user</td>
<td>controllerUser</td>
<td>The user name with the role rest-all as mentioned in the previous step.</td>
</tr>
<tr>
<td>Property</td>
<td>Value</td>
<td>Note</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>org.kie.server.controller.pwd</td>
<td>controllerUser1234;</td>
<td>The password of the user mentioned in the previous step.</td>
</tr>
</tbody>
</table>

Table 9.2. JVM Properties for Business Central Instance

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>org.kie.server.user</td>
<td>controllerUser</td>
<td>The user name with the role kie-server as mentioned in the previous step.</td>
</tr>
<tr>
<td>org.kie.server.pwd</td>
<td>controllerUser1234;</td>
<td>The password of the user mentioned in the previous step.</td>
</tr>
</tbody>
</table>

2. Verify the successful start of the Decision Server by sending a GET request to http://SERVER:PORT/kie-server/services/rest/server/. Once authenticated, you get an XML response similar to this:

```xml
<response type="SUCCESS" msg="Kie Server info">
  <kie-server-info>
    <capabilities>KieServer</capabilities>
    <capabilities>BRM</capabilities>
    <capabilities>BPM</capabilities>
    <capabilities>CaseMgmt</capabilities>
    <capabilities>BPM-UI</capabilities>
    <capabilities>BRP</capabilities>
    <capabilities>DMN</capabilities>
    <capabilities>Swagger</capabilities>
    <location>http://localhost:8230/kie-server/services/rest/server</location>
    <messages>
      <content>Server KieServerInfo{serverId='first-kie-server', version='7.5.1.Final-redhat-1', location='http://localhost:8230/kie-server/services/rest/server', capabilities=[KieServer, BRM, BPM, CaseMgmt, BPM-UI, BRP, DMN, Swagger]}started successfully at Mon Feb 05 15:44:35 AEST 2018</content>
      <severity>INFO</severity>
      <timestamp>2018-02-05T15:44:35.355+10:00</timestamp>
    </messages>
    <name>first-kie-server</name>
    <id>first-kie-server</id>
    <version>7.5.1.Final-redhat-1</version>
  </kie-server-info>
</response>
```

3. Verify successful registration:
   a. Log in to Business Central.
b. Click **Menu → Deploy → Execution Servers**.
   If registration is successful, you can see the registered server ID.

### 9.1. CONFIGURING SMART ROUTER FOR TLS SUPPORT

You can now configure Smart Router (previously, KIE Server Router) for TLS support to allow HTTPS traffic.

**Procedure**

- Open a terminal and enter the following command to start the smart router with TLS support:

```
java -Dorg.kie.server.router.tls.keystore=PATH_TO_YOUR_KEYSTORE
     -Dorg.kie.server.router.tls.keystore.password=YOUR_KEYSTORE_PASSWD
     -Dorg.kie.server.router.tls.keystore.keyalias=YOUR_KEYSTORE_ALIAS
     -jar kie-server-router-proxy-YOUR_VERSION.jar
```

Replace `PATH_TO_YOUR_KEYSTORE`, `YOUR_KEYSTORE_PASSWD`, `YOUR_KEYSTORE_ALIAS`, and `YOUR_VERSION` with the relevant data.
CHAPTER 10. MANAGED DECISION SERVER

A managed instance requires an available Decision Manager controller to start the Decision Server.

A Decision Manager controller manages the Decision Server configuration in a centralized way. Each Decision Manager controller can manage multiple configurations at once, and there can be multiple Decision Manager controllers in the environment. Managed Decision Server can be configured with a list of Decision Manager controllers, but will only connect to one at a time.

IMPORTANT

All Decision Manager controllers should be synchronized to ensure that the same set of configuration is provided to the server, regardless of the Decision Manager controller to which it connects.

When the Decision Server is configured with a list of Decision Manager controllers, it will attempt to connect to each of them at startup until a connection is successfully established with one of them. If a connection cannot be established, the server will not start, even if there is a local storage available with configuration. This ensures consistence and prevents the server from running with redundant configuration.

NOTE

To run the Decision Server in standalone mode without connecting to Decision Manager controllers, see Chapter 11, Unmanaged Decision Server.
CHAPTER 11. UNMANAGED DECISION SERVER

An unmanaged Decision Server is a standalone instance, and therefore must be configured individually using REST/JMS API from the Decision Server itself. The configuration is automatically persisted by the server into a file and that is used as the internal server state, in case of restarts.

The configuration is updated during the following operations:

- Deploy KIE container
- Undeploy KIE container
- Start KIE container
- Stop KIE container

NOTE

If the Decision Server is restarted, it will attempt to re-establish the same state that was persisted before shutdown. Therefore, KIE containers (deployment units) that were running will be started, but the ones that were stopped will not.
CHAPTER 12. DEPLOYMENT DESCRIPTORS

Processes and rules are stored in Apache Maven based packaging and are known as knowledge archives, or KJAR. The rules, processes, assets, and other project artifacts are part of a JAR file built and managed by Maven. A file kept inside the META-INF directory of the KJAR called kmodule.xml can be used to define the KIE bases and sessions. This kmodule.xml file, by default, is empty.

Whenever a runtime component such as Business Central is about to process the KJAR, it looks up kmodule.xml to build the runtime representation.

Deployment descriptors supplement the kmodule.xml file and provide granular control over your deployment. The presence of these descriptors is optional and your deployment will proceed successfully without them. You can set purely technical properties using these descriptors, including meta values such as persistence, auditing, and runtime strategy.

These descriptors allow you to configure the Decision Server on multiple levels, including server level default, different deployment descriptor per KJAR, and other server configurations. You can use descriptors to make simple customizations to the default Decision Server configuration, possibly per KJAR.

You can define these descriptors in a file called kie-deployment-descriptor.xml and place this file next to your kmodule.xml file in the META-INF folder. You can change this default location and the file name by specifying it as a system parameter:

-Dorg.kie.deployment.desc.location=file:/path/to/file/company-deployment-descriptor.xml

12.1. DEPLOYMENT DESCRIPTOR CONFIGURATION

Deployment descriptors allow the user to configure the execution server on multiple levels:

- **Server level**: The main level and the one that applies to all KJARs deployed on the server.

- **KJAR level**: This enables you to configure descriptors on a per KJAR basis.

- **Deploy time level**: Descriptors that apply while a KJAR is being deployed.

The granular configuration items specified by the deployment descriptors take precedence over the server level ones, except in case of configuration items that are collection based, which are merged. The hierarchy works like this: deploy time configuration > KJAR configuration > server configuration.

**NOTE**

- The deploy time configuration applies to deployments done via the REST API.

For example, if the persistence mode (one of the items you can configure) defined at the server level is NONE but the same mode is specified as JPA at the KJAR level, the actual mode will be JPA for that KJAR. If nothing is specified for the persistence mode in the deployment descriptor for that KJAR (or if there is no deployment descriptor), it will fall back to the server level configuration, which in this case is NONE (or to JPA if there is no server level deployment descriptor).

**What Can You Configure?**

High level technical configuration details can be configured via deployment descriptors. The following table lists these along with the permissible and default values for each.
<table>
<thead>
<tr>
<th>Configuration</th>
<th>XML Entry</th>
<th>Permissible Values</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence unit name for runtime data</td>
<td>persistence-unit</td>
<td>Any valid persistence package name</td>
<td>org.jbpm.domain</td>
</tr>
<tr>
<td>Persistence unit name for audit data</td>
<td>audit-persistence-unit</td>
<td>Any valid persistence package name</td>
<td>org.jbpm.domain</td>
</tr>
<tr>
<td>Persistence mode</td>
<td>persistence-mode</td>
<td>JPA, NONE</td>
<td>JPA</td>
</tr>
<tr>
<td>Audit mode</td>
<td>audit-mode</td>
<td>JPA, JMS or NONE</td>
<td>JPA</td>
</tr>
<tr>
<td>Runtime Strategy</td>
<td>runtime-strategy</td>
<td>SINGLETON, PER_REQUEST or PER_PROCESS_INSTANCE</td>
<td>SINGLETON</td>
</tr>
<tr>
<td>List of Event Listeners to be registered</td>
<td>event-listeners</td>
<td>Valid listener class names as ObjectModel</td>
<td>No default value</td>
</tr>
<tr>
<td>List of Task Event Listeners to be registered</td>
<td>task-event-listeners</td>
<td>Valid listener class names as ObjectModel</td>
<td>No default value</td>
</tr>
<tr>
<td>List of Work Item Handlers to be registered</td>
<td>work-item-handlers</td>
<td>Valid Work Item Handler classes given as NamedObjectHandler</td>
<td>No default value</td>
</tr>
<tr>
<td>List of Globals to be registered</td>
<td>globals</td>
<td>Valid Global variables given as NamedObjectModel</td>
<td>No default value</td>
</tr>
<tr>
<td>Marshalling strategies to be registered (for pluggable variable persistence)</td>
<td>marshalling-strategies</td>
<td>Valid ObjectModel classes</td>
<td>No default value</td>
</tr>
<tr>
<td>Required Roles to be granted access to the resources of the KJAR</td>
<td>required-roles</td>
<td>String role names</td>
<td>No default value</td>
</tr>
<tr>
<td>Additional Environment Entries for KIE session</td>
<td>environment-entries</td>
<td>Valid NamedObjectModel</td>
<td>No default value</td>
</tr>
<tr>
<td>Additional configuration options of KIE session</td>
<td>configurations</td>
<td>Valid NamedObjectModel</td>
<td>No default value</td>
</tr>
</tbody>
</table>
### 12.2. MANAGING DEPLOYMENT DESCRIPTORS

Deployment descriptors can be configured in Business Central in **Menu → Design → $PROJECT_NAME → Settings → Deployments**.

Every time a project is created, a stock `kie-deployment-descriptor.xml` file is generated with default values.

It is not necessary to provide a full deployment descriptor for all KJARs. Providing partial deployment descriptors is possible and recommended. For example, if you need to use a different audit mode, you can specify that for the KJAR only, all other properties will have the default value defined at the server level.

When using **OVERRIDE_ALL** merge mode, all configuration items must be specified, because the relevant KJAR will always use specified configuration and will not merge with any other deployment descriptor in the hierarchy.

### 12.3. RESTRICTING ACCESS TO THE RUNTIME ENGINE

The **required-roles** configuration item can be edited in the deployment descriptors. This property restricts access to the runtime engine on a per-KJAR or per-server level by ensuring that access to certain processes is only granted to users that belong to groups defined by this property.

The security role can be used to restrict access to process definitions or restrict access at run time.

The default behavior is to add required roles to this property based on repository restrictions. You can edit these properties manually if required by providing roles that match actual roles defined in the security realm.

**Procedure**

1. To open the project deployment descriptors configuration in Business Central, open **Menu → Design → $PROJECT_NAME → Settings → Deployments**.

2. From the list of configuration settings, click **Required Roles**, then click **Add Required Role**.

---

### WARNING

Do not use the Singleton runtime strategy with the EJB Timer Scheduler (the default scheduler in Decision Server) in a production environment. This combination can result in Hibernate problems under load. For more information about this limitation, see Hibernate issues with Singleton strategy and EJBTimerScheduler.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>XML Entry</th>
<th>Permissible Values</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes used for serialization in the remote services</td>
<td>remoteable-class</td>
<td>Valid <strong>CustomClass</strong></td>
<td>No default value</td>
</tr>
</tbody>
</table>
3. In the **Add Required Role** window, type the name of the role that you want to have permission to access this deployment, then click **Add**.

4. To add more roles with permission to access the deployment, repeat the previous steps.

5. When you have finished adding all required roles, click **Save**.
CHAPTER 13. PROMETHEUS METRICS MONITORING IN RED HAT DECISION MANAGER

Prometheus is an open-source systems monitoring toolkit that you can use with Red Hat Decision Manager to collect and store metrics related to the execution of business rules, processes, Decision Model and Notation (DMN) models, and other Red Hat Decision Manager assets. You can access the stored metrics through a REST API call to the Decision Server, through the Prometheus expression browser, or using a data-graphing tool such as Grafana.

You can configure Prometheus metrics monitoring for an on-premise Decision Server instance, for Decision Server on Spring Boot, or for a Decision Server deployment on Red Hat OpenShift Container Platform.

For the list of available metrics that Decision Server exposes with Prometheus, download the Red Hat Decision Manager 7.4.0 Source Distribution from the Red Hat Customer Portal and navigate to ~/rhdm-7.4.0-sources/src/droolsjbpm-integration-$VERSION/kie-server-parent/kie-server-services/kie-server-services-prometheus/src/main/java/org/kie/server/services/prometheus.

13.1. CONFIGURING PROMETHEUS METRICS MONITORING FOR DECISION SERVER

You can configure your Decision Server instances to use Prometheus to collect and store metrics related to your business asset activity in Red Hat Decision Manager. For the list of available metrics that Decision Server exposes with Prometheus, download the Red Hat Decision Manager 7.4.0 Source Distribution from the Red Hat Customer Portal and navigate to ~/rhdm-7.4.0-sources/src/droolsjbpm-integration-$VERSION/kie-server-parent/kie-server-services/kie-server-services-prometheus/src/main/java/org/kie/server/services/prometheus.

Prerequisites

- Decision Server is installed.
- You have kie-server user role access to Decision Server.
- Prometheus is installed. For information about downloading and using Prometheus, see the Prometheus documentation page.

Procedure

1. In your Decision Server instance, set the org.kie.prometheus.server.ext.disabled system property to false to enable the Prometheus extension. You can define this property when you start Decision Server or in the standalone.xml or standalone-full.xml file of Red Hat Decision Manager distribution.

2. If you are running Red Hat Decision Manager on Spring Boot, add the following dependencies in the pom.xml file of your Maven project and configure the required key in the application.properties system property:

   Spring Boot pom.xml dependencies for Prometheus

   ```xml
   <dependency>
   <groupId>org.kie.server</groupId>
   <artifactId>kie-server-services-prometheus</artifactId>
   <version>${rhdm.version}</version>
   ```


3. In the `prometheus.yaml` file of your Prometheus distribution, add the following settings in the `scrape_configs` section to configure Prometheus to scrape metrics from Decision Server:

**Scrape configurations in prometheus.yaml file**

```yaml
scrape_configs:
  job_name: 'kie-server'
  metrics_path: /SERVER_PATH/services/rest/metrics
Basic_auth:
  username: USER_NAME
  password: PASSWORD
static_configs:
  - targets: ['HOST:PORT']
```

**Scrape configurations in prometheus.yaml file for Spring Boot (if applicable)**

```yaml
scrape_configs:
  job_name: 'kie'
  metrics_path: /rest/metrics
static_configs:
  - targets: ['HOST:PORT']
```

Replace the values according to your Decision Server location and settings.

4. Start the Decision Server instance.

**Example start command for Red Hat Decision Manager on Red Hat JBoss EAP**

```bash
$ cd ~/EAP_HOME/bin
$ ./standalone.sh --c standalone-full.xml
```

After you start the configured Decision Server instance, Prometheus begins collecting metrics and Decision Server publishes the metrics to the REST API endpoint `http://HOST:PORT/SERVER/services/rest/metrics` (or on Spring Boot, to `http://HOST:PORT/rest/metrics`).

5. In a REST client or curl utility, send a REST API request with the following components to verify that Decision Server is publishing the metrics:
For REST client:

- **Authentication**: Enter the user name and password of the Decision Server user with the `kie-server` role.

- **HTTP Headers**: Set the following header:
  - `Accept: application/json`

- **HTTP method**: Set to `GET`.

- **URL**: Enter the Decision Server REST API base URL and metrics endpoint, such as `http://localhost:8080/kie-server/services/rest/metrics` (or on Spring Boot, `http://localhost:8080/rest/metrics`).

For curl utility:

- `-u`: Enter the user name and password of the Decision Server user with the `kie-server` role.

- `-H`: Set the following header:
  - `accept: application/json`

- `-X`: Set to `GET`.

- **URL**: Enter the Decision Server REST API base URL and metrics endpoint, such as `http://localhost:8080/kie-server/services/rest/metrics` (or on Spring Boot, `http://localhost:8080/rest/metrics`).

```
curl -u 'baAdmin:password@1' -H "accept: application/json" -X GET "http://localhost:8080/kie-server/services/rest/metrics"
```

**Example server response**

```bash
# HELP kie_server_container_started_total Kie Server Started Containers
# TYPE kie_server_container_started_total counter
kie_server_container_started_total{container_id="task-assignment-kjar-1.0",} 1.0
# HELP solvers_running Number of solvers currently running
# TYPE solvers_running gauge
solvers_running 0.0
# HELP dmn_evaluate_decision_nanosecond DMN Evaluation Time
# TYPE dmn_evaluate_decision_nanosecond histogram
# HELP solver_duration_seconds Time in seconds it took solver to solve the constraint problem
# TYPE solver_duration_seconds summary
solver_duration_seconds_count{solver_id="100tasks-5employees.xml",} 1.0
solver_duration_seconds_sum{solver_id="100tasks-5employees.xml",} 179.828255925
solver_duration_seconds_count{solver_id="24tasks-8employees.xml",} 1.0
solver_duration_seconds_sum{solver_id="24tasks-8employees.xml",} 179.995759653
# HELP drl_match_fired_nanosecond Drools Firing Time
# TYPE drl_match_fired_nanosecond histogram
# HELP dmn_evaluate_failed_count DMN Evaluation Failed
# TYPE dmn_evaluate_failed_count counter
# HELP kie_server_start_time Kie Server Start Time
# TYPE kie_server_start_time gauge
kie_server_start_time{name="myapp-kieserver",server_id="myapp-"}
```
If the metrics are not available in Decision Server, review and verify the Decision Server and Prometheus configurations described in this section.

You can also interact with your collected metrics in the Prometheus expression browser at http://HOST:PORT/graph, or integrate your Prometheus data source with a data-graphing tool such as Grafana:

Figure 13.1. Prometheus expression browser with Decision Server metrics

Figure 13.2. Prometheus expression browser with Decision Server target

Figure 13.3. Grafana dashboard with Decision Server metrics for DMN models
13.2. CONFIGURING PROMETHEUS METRICS MONITORING FOR DECISION SERVER ON RED HAT OPENSSHIFT CONTAINER PLATFORM

You can configure your Decision Server deployment on Red Hat OpenShift Container Platform to use Prometheus to collect and store metrics related to your business asset activity in Red Hat Decision Manager. For the list of available metrics that Decision Server exposes with Prometheus, download the Red Hat Decision Manager 7.4.0 Source Distribution from the Red Hat Customer Portal and navigate to `~/rhdm-7.4.0-sources/src/droolsjbpm-integration-$VERSION/kie-server-parent/kie-server-services/kie-server-services-prometheus/src/main/java/org/kie/server/services/prometheus`.

**Prerequisites**

- Getting Started with Prometheus
- Grafana Support for Prometheus
- Using Prometheus in Grafana
Prerequisites

- Decision Server is installed and deployed on Red Hat OpenShift Container Platform. For more information about Decision Server on OpenShift, see the relevant OpenShift deployment option in the Product documentation for Red Hat Decision Manager 7.4.

- You have kie-server user role access to Decision Server.

- Prometheus Operator is installed. For information about downloading and using Prometheus Operator, see the Prometheus Operator project on GitHub.

Procedure

1. In the DeploymentConfig object of your Decision Server deployment on OpenShift, set the PROMETHEUS_SERVER_EXT_DISABLED environment variable to false to enable the Prometheus extension. You can set this variable in the OpenShift web console or use the oc command in a command terminal:

   oc set env dc/<dc_name> PROMETHEUS_SERVER_EXT_DISABLED=false -n <namespace>

   If you have not yet deployed your Decision Server on OpenShift, then in the OpenShift template that you plan to use for your OpenShift deployment (for example, rhdm74-prod-immutable-kieserver.yaml), you can set the PROMETHEUS_SERVER_EXT_DISABLED template parameter to false to enable the Prometheus extension.

   If you are using the OpenShift Operator to deploy Decision Server on OpenShift, then in your Decision Server configuration, set the PROMETHEUS_SERVER_EXT_DISABLED environment variable to false to enable the Prometheus extension:

   ```yaml
   apiVersion: app.kiegroup.org/v1
   kind: KieApp
   metadata:
     name: enable-prometheus
   spec:
     environment: rhpam-trial
     objects:
       servers:
         - env:
           - name: PROMETHEUS_SERVER_EXT_DISABLED
             value: "false"
   ```

2. Create a service-metrics.yaml file to add a service that exposes the metrics from Decision Server to Prometheus:

   ```yaml
   apiVersion: v1
   kind: Service
   metadata:
     name: rhdm-app-metrics
     annotations:
       description: RHDM Prometheus metrics exposed
     labels:
       app: myapp-kieserver
       application: myapp-kieserver
       template: myapp-kieserver
       metrics: rhdm
   ```
3. In a command terminal, use the `oc` command to apply the `service-metrics.yaml` file to your OpenShift deployment:

   ```bash
   oc apply -f service-metrics.yaml
   ```

4. Create an OpenShift secret, such as `metrics-secret`, to access the Prometheus metrics on Decision Server. The secret must contain the "username“ and "password" elements with Decision Server user credentials. For information about OpenShift secrets, see the Secrets chapter in the OpenShift Developer Guide.

5. Create a `service-monitor.yaml` file that defines the `ServiceMonitor` object. A service monitor enables Prometheus to connect to the Decision Server metrics service.

   ```yaml
   apiVersion: monitoring.coreos.com/v1
   kind: ServiceMonitor
   metadata:
     name: rhdm-service-monitor
     labels:
       team: frontend
   spec:
     selector:
       matchLabels:
         metrics: rhdm
     endpoints:
       - port: web
         path: /services/rest/metrics
         basicAuth:
           password:
             name: metrics-secret
             key: password
           username:
             name: metrics-secret
             key: username
   ```

6. In a command terminal, use the `oc` command to apply the `service-monitor.yaml` file to your OpenShift deployment:

   ```bash
   oc apply -f service-monitor.yaml
   ```

After you complete these configurations, Prometheus begins collecting metrics and Decision Server publishes the metrics to the REST API endpoint `http://HOST:PORT/kie-server/services/rest/metrics`. 

---

---
You can interact with your collected metrics in the Prometheus expression browser at http://HOST:PORT/graph, or integrate your Prometheus data source with a data-graphing tool such as Grafana.

The host and port for the Prometheus expression browser location http://HOST:PORT/graph was defined in the route where you exposed the Prometheus web console when you installed the Prometheus Operator. For information about OpenShift routes, see the Routes chapter in the OpenShift Architecture documentation.

Figure 13.5. Prometheus expression browser with Decision Server metrics

Figure 13.6. Prometheus expression browser with Decision Server target

Figure 13.7. Grafana dashboard with Decision Server metrics for DMN models
Figure 13.8. Grafana dashboard with Decision Server metrics for solvers

Additional resources

- Prometheus Operator
- Getting started with the Prometheus Operator
- Prometheus RBAC
- Grafana Support for Prometheus
- Using Prometheus in Grafana
- OpenShift deployment options in Product documentation for Red Hat Decision Manager 7.4
CHAPTER 14. CONFIGURING OPENSShift CONNECTION TIMEOUT

By default, the OpenShift route is configured to time out HTTP requests that are longer than 30 seconds. This may cause session timeout issues in Business Central resulting in the following behaviors:

- "Unable to complete your request. The following exception occurred: (TypeError) : Cannot read property 'indexOf' of null."
- "Unable to complete your request. The following exception occurred: (TypeError) : b is null."
- A blank page is displayed when clicking the Project or Server links in Business Central.

All Business Central templates already include extended timeout configuration.

To configure longer timeout on Business Central OpenShift routes, add the `haproxy.router.openshift.io/timeout: 60s` annotation on the target route:

```yaml
- kind: Route
  apiVersion: v1
  id: "$APPLICATION_NAME-rhdmcentr-http"
  metadata:
    name: "$APPLICATION_NAME-rhdmcentr"
    labels:
      application: "$APPLICATION_NAME"
    annotations:
      description: Route for Business Central's http service.
      haproxy.router.openshift.io/timeout: 60s
  spec:
    host: "$DECISION_CENTRAL_HOSTNAME_HTTP"
    to:
      name: "$APPLICATION_NAME-rhdmcentr"
```

For a full list of global route-specific timeout annotations, see the OpenShift Documentation.
CHAPTER 15. DEFINE THE LDAP LOGIN DOMAIN

When you are setting up Red Hat Decision Manager to use LDAP for authentication and authorization, define the LDAP login domain because the Git SSH authentication may use another security domain.

To define the LDAP login domain, use the `org.uberfire.domain` system property. For example, on Red Hat JBoss Enterprise Application Platform, add this property in the `standalone.xml` file as shown:

```xml
<system-properties>
  <!-- other system properties -->
  <property name="org.uberfire.domain" value="LDAPAuth"/>
</system-properties>
```

Ensure that the authenticated user has appropriate roles (`admin`, `analyst`, `reviewer`) associated with it in LDAP.
CHAPTER 16. AUTHENTICATING THIRD-PARTY CLIENTS THROUGH RH-SSO

To use the different remote services provided by Business Central or by Decision Server, your client, such as curl, wget, web browser, or a custom REST client, must authenticate through the RH-SSO server and have a valid token to perform the requests. To use the remote services, the authenticated user must have the following roles:

- **rest-all** for using Business Central remote services.
- **kie-server** for using the Decision Server remote services.

Use the RH-SSO Admin Console to create these roles and assign them to the users that will consume the remote services.

Your client can authenticate through RH-SSO using one of these options:

- Basic authentication, if it is supported by the client
- Token-based authentication

### 16.1. BASIC AUTHENTICATION

If you enabled basic authentication in the RH-SSO client adapter configuration for both Business Central and Decision Server, you can avoid the token grant and refresh calls and call the services as shown in the following examples:

- For web based remote repositories endpoint:
  
  ```
  curl http://admin:password@localhost:8080/decision-central/rest/repositories
  ```

- For Decision Server:

  ```
  curl http://admin:password@localhost:8080/kie-execution-server/services/rest/server/
  ```
CHAPTER 17. SUPPORTED PROPERTIES

The Business Central system properties listed in this section are passed to standalone*.xml files or when you install standalone Business Central, you can use the properties listed in this section in the following command:

```
java -jar rhdm-7.4.0-decision-central-standalone.jar -s application-config.yaml -D<property>=<value> -D<property>=<value>
```

In this command, `<property>` is a property from the following list and `<value>` is a value that you assign to that property:

- `org.uberfire.nio.git.dir`: Location of the Decision Server Git directory.
- `org.uberfire.nio.git.proxy.ssh.over.http`: Specifies whether SSH should use an HTTP proxy. Default: `false`
- `http.proxyHost`: Defines the host name of the HTTP proxy. Default: `null`
- `http.proxyPort`: Defines the host port (integer value) of the HTTP proxy. Default: `null`
- `org.uberfire.nio.git.proxy.ssh.over.https`: Specifies whether SSH should use an HTTPS proxy. Default: `false`
- `https.proxyHost`: Defines the host name of the HTTPS proxy. Default: `null`
- `https.proxyPort`: Defines the host port (integer value) of the HTTPS proxy. Default: `null`
- `org.uberfire.nio.git.http.enabled`: Enables or disables the HTTP daemon. Default: `true`
- `org.uberfire.nio.git.http.host`: If the HTTP daemon is enabled, it uses this property as the host identifier. This is an informative property that is used to display how to access the Git repository over HTTP. The HTTP still relies on the servlet container. Default: `localhost`
- `org.uberfire.nio.git.http.hostname`: If the HTTP daemon is enabled, it uses this property as the host name identifier. This is an informative property that is used to display how to access the Git repository over HTTP. The HTTP still relies on the servlet container. Default: `localhost`
- `org.uberfire.nio.git.http.port`: If the HTTP daemon is enabled, it uses this property as the port number. This is an informative property that is used to display how to access the Git repository over HTTP. The HTTP still relies on the servlet container. Default: `8080`
- `org.uberfire.nio.git.https.enabled`: Enables or disables the HTTPS daemon. Default: `false`
- `org.uberfire.nio.git.https.host`: If the HTTPS daemon is enabled, it uses this property as the host identifier. This is an informative property that is used to display how to access the Git repository over HTTPS. The HTTPS still relies on the servlet container. Default: `localhost`
- `org.uberfire.nio.git.https.hostname`: If the HTTPS daemon is enabled, it uses this property as the host name identifier. This is an informative property that is used to display how to access the Git repository over HTTPS. The HTTPS still relies on the servlet container. Default: `localhost`
- `org.uberfire.nio.git.https.port`: If the HTTPS daemon is enabled, it uses this property as the port number. This is an informative property that is used to display how to access the Git repository over HTTPS. The HTTPS still relies on the servlet container. Default: **8080**

- `org.uberfire.nio.git.daemon.enabled`: Enables or disables the Git daemon. Default value: **true**.

- `org.uberfire.nio.git.daemon.host`: If the Git daemon is enabled, it uses this property as the local host identifier. Default value: **localhost**.

- `org.uberfire.nio.git.daemon.hostname`: If the Git daemon is enabled, it uses this property as the local host name identifier. Default: **localhost**

- `org.uberfire.nio.git.daemon.port`: If the Git daemon is enabled, it uses this property as the port number. Default value: **9418**.

- `org.uberfire.nio.git.http.sslVerify`: Enables or disables SSL certificate checking for Git repositories. Default: **true**.

**NOTE**

If the default or assigned port is already in use, a new port is automatically selected. Ensure that the ports are available and check the log for more information.

- `org.uberfire.nio.git.ssh.enabled`: Enables or disables the SSH daemon. Default value: **true**.

- `org.uberfire.nio.git.ssh.host`: If the SSH daemon enabled, it uses this property as the local host identifier. Default value: **localhost**.

- `org.uberfire.nio.git.ssh.hostname`: If the SSH daemon is enabled, it uses this property as local host name identifier. Default: **localhost**

- `org.uberfire.nio.git.ssh.port`: If the SSH daemon is enabled, it uses this property as the port number. Default value: **8001**.

**NOTE**

If the default or assigned port is already in use, a new port is automatically selected. Ensure that the ports are available and check the log for more information.

- `org.uberfire.nio.git.ssh.cert.dir`: Location of the `.security` directory where local certificates are stored. Default: the working directory.

- `org.uberfire.nio.git.ssh.passphrase`: Pass phrase used to access the public key store of your operating system when cloning git repositories with SCP style URLs. Example: `git@github.com:user/repository.git`.

- `org.uberfire.nio.git.ssh.algorithm`: Algorithm used by SSH. Default value: **RSA**.

- `org.uberfire.nio.git.ssh.ciphers`: A comma-separated string of ciphers. The available ciphers are `aes128-ctr, aes192-ctr, aes256-ctr, arcfour128, arcfour256, aes192-cbc, aes256-cbc`. If the property is not used, all available ciphers are loaded.
- `org.uberfire.nio.git.ssh.macs`: A comma-separated string of message authentication codes (MACs). The available MACs are `hmac-md5`, `hmac-md5-96`, `hmac-sha1`, `hmac-sha1-96`, `hmac-sha2-256`, `hmac-sha2-512`. If the property is not used, all available MACs are loaded.

  NOTE
  If you plan to use RSA or any algorithm other than DSA, make sure you set up your application server to use the Bouncy Castle JCE library.

- `org.uberfire.metadata.index.dir`: Place where the Lucene .index directory is stored. Default: the working directory

- `org.uberfire.ldap.regex.role.mapper`: Regex pattern used to map LDAP principal names to the application role name. Note that the variable role must be part of the pattern because it is substituted by the application role name when matching a principal value to a role name. Default: Not used.

- `org.uberfire.sys.repo.monitor.disabled`: Disables the configuration monitor. Do not disable unless you are sure. Default value: `false`

- `org.uberfire.secure.key`: Password used by password encryption. Default value: `org.uberfire.admin`

- `org.uberfire.secure.alg`: Crypto algorithm used by password encryption. Default value: `PBEWithMD5AndDES`

- `org.uberfire.domain`: Security-domain name used by uberfire. Default value: `ApplicationRealm`

- `org.guvnor.m2repo.dir`: Place where the Maven repository folder is stored. Default value: `<working-directory>/repositories/kie`

- `org.guvnor.project.gav.check.disabled`: Disables group ID, artifact ID, and version (GAV) checks. Default value: `false`

- `org.kie.build.disable-project-explorer`: Disables automatic build of a selected project in Project Explorer. Default value: `false`

- `org.kie.verification.disable-dtable-realtime-verification`: Disables the real-time validation and verification of decision tables. Default value: `false`

- `org.kie.server.controller`: URL for connecting with a Decision Manager controller, for example: `ws://localhost:8080/decision-central/websocket/controller`

- `org.kie.server.user`: User name used to connect with the Decision Server nodes from the Decision Manager controller. This property is only required when using this Business Central installation as a Decision Manager controller.

- `org.kie.server.pwd`: Password used to connect with the Decision Server nodes from the Decision Manager controller. This property is only required when using this Business Central installation as a Decision Manager controller.

- `kie.maven.offline.force`: Forces Maven to behave as offline. If true, disable online dependency resolution. Default: `false`. 
NOTE

Use this property for Business Central only. If you share a runtime environment with any other component, isolate the configuration and apply it only to Business Central.

- **org.uberfire.gzip.enable**: Enables or disables Gzip compression on GzipFilter. Default: true
CHAPTER 18. ADDITIONAL RESOURCES

- Installing and configuring Red Hat Decision Manager on Red Hat JBoss EAP 7.2
- Planning a Red Hat Decision Manager installation
- Installing and configuring Red Hat Decision Manager on Red Hat JBoss EAP 7.2
- Deploying a Red Hat Decision Manager immutable server environment on Red Hat OpenShift Container Platform
- Deploying a Red Hat Decision Manager authoring or managed server environment on Red Hat OpenShift Container Platform
- Deploying a Red Hat Decision Manager environment on Red Hat OpenShift Container Platform using Automation Broker
- Deploying a Red Hat Decision Manager environment on Red Hat OpenShift Container Platform using Operators

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