



## Red Hat Decision Manager 7.6

Deploying a Red Hat Decision Manager  
environment on Red Hat OpenShift Container  
Platform using Operators



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## Abstract

This document describes how to deploy a Red Hat Decision Manager 7.6 environment on Red Hat OpenShift Container Platform using Operators.

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## PREFACE

As a system engineer, you can deploy a Red Hat Decision Manager environment on Red Hat OpenShift Container Platform to provide an infrastructure to develop or execute processes and other business assets. You can use OpenShift Operators to deploy the environment defined in a structured YAML file and to maintain and modify this environment as necessary.

### Prerequisites

- A Red Hat OpenShift Container Platform environment is available. The Operator is supported on Red Hat OpenShift Container Platform version 4.1 and 4.2.
- At least four gigabytes of memory are available in the OpenShift environment.
- The OpenShift project for the deployment is created.
- You are logged in to the project using the OpenShift web console.
- Dynamic persistent volume (PV) provisioning is enabled. Alternatively, if dynamic PV provisioning is not enabled, enough persistent volumes must be available. By default, the deployed components require the following PV sizes:
  - By default, Business Central requires one 1Gi PV. You can change the PV size for Business Central persistent storage.
- If you intend to scale any of the Business Central pods, your OpenShift environment supports persistent volumes with **ReadWriteMany** mode. If your environment does not support this mode, you can use NFS to provision the volumes.



### IMPORTANT

**ReadWriteMany** mode is not supported on OpenShift Online and OpenShift Dedicated.

# CHAPTER 1. OVERVIEW OF RED HAT DECISION MANAGER ON RED HAT OPENSIFT CONTAINER PLATFORM

You can deploy Red Hat Decision Manager into a Red Hat OpenShift Container Platform environment.

In this solution, components of Red Hat Decision Manager are deployed as separate OpenShift pods. You can scale each of the pods up and down individually to provide as few or as many containers as required for a particular component. You can use standard OpenShift methods to manage the pods and balance the load.

The following key components of Red Hat Decision Manager are available on OpenShift:

- Decision Server, also known as *Execution Server* or *KIE Server*, is the infrastructure element that runs decision services and other deployable assets (collectively referred to as *services*). All logic of the services runs on execution servers.

You can scale up a Decision Server pod to provide as many copies as required, running on the same host or different hosts. As you scale a pod up or down, all of its copies run the same services. OpenShift provides load balancing and a request can be handled by any of the pods.

You can deploy a separate Decision Server pod to run a different group of services. That pod can also be scaled up or down. You can have as many separate replicated Decision Server pods as required.

- Business Central is a web-based interactive environment used for authoring services. It also provides a management console. You can use Business Central to develop services and deploy them to Decision Servers.

Business Central is a centralized application. However, you can configure it for high availability, where multiple pods run and share the same data.

Business Central includes a Git repository that holds the source for the services that you develop on it. It also includes a built-in Maven repository. Depending on configuration, Business Central can place the compiled services (KJAR files) into the built-in Maven repository or (if configured) into an external Maven repository.

You can arrange these and other components into various environment configurations within OpenShift.



## CHAPTER 2. PREPARING TO DEPLOY RED HAT DECISION MANAGER IN YOUR OPENSIFT ENVIRONMENT

Before deploying Red Hat Decision Manager in your OpenShift environment, you must complete several tasks. You do not need to repeat these tasks if you want to deploy additional images, for example, for new versions of decision services or for other decision services

### 2.1. ENSURING YOUR ENVIRONMENT IS AUTHENTICATED TO THE RED HAT REGISTRY

To deploy Red Hat Decision Manager components of Red Hat OpenShift Container Platform, you must ensure that OpenShift can download the correct images from the Red Hat registry.

OpenShift must be configured to authenticate with the Red Hat registry using your service account user name and password. This configuration is specific for a namespace, and if operators work, the configuration is already completed for the **openshift** namespace.

However, if the image streams for Red Hat Decision Manager are not found in the **openshift** namespace or if the operator is configured to update Red Hat Decision Manager to a new version automatically, the operator needs to download images into the namespace of your project. You must complete the authentication configuration for this namespace.

#### Procedure

1. Ensure you are logged in to OpenShift with the **oc** command and that your project is active.
2. Complete the steps documented in [Registry Service Accounts for Shared Environments](#). You must log in to Red Hat Customer Portal to access the document and to complete the steps to create a registry service account.
3. Select the **OpenShift Secret** tab and click the link under **Download secret** to download the YAML secret file.
4. View the downloaded file and note the name that is listed in the **name:** entry.
5. Run the following commands:

```
oc create -f <file_name>.yaml
oc secrets link default <secret_name> --for=pull
oc secrets link builder <secret_name> --for=pull
```

Replace **<file\_name>** with the name of the downloaded file and **<secret\_name>** with the name that is listed in the **name:** entry of the file.

### 2.2. CREATING THE SECRETS FOR DECISION SERVER

OpenShift uses objects called *secrets* to hold sensitive information such as passwords or keystores. For more information about OpenShift secrets, see [What is a secret](#) in the OpenShift documentation.

In order to provide HTTPS access, Decision Server uses an SSL certificate. The deployment can create a sample secret automatically. However, in production environments you must create an SSL certificate for Decision Server and provide it to your OpenShift environment as a secret.

## Procedure

1. Generate an SSL keystore with a private and public key for SSL encryption for Decision Server. For more information on how to create a keystore with self-signed or purchased SSL certificates, see [Generate a SSL Encryption Key and Certificate](#).



### NOTE

In a production environment, generate a valid signed certificate that matches the expected URL for Decision Server.

2. Save the keystore in a file named **keystore.jks**.
3. Record the name of the certificate. The default value for this name in Red Hat Decision Manager configuration is **jboss**.
4. Record the password of the keystore file. The default value for this name in Red Hat Decision Manager configuration is **mykeystorepass**.
5. Use the **oc** command to generate a secret named **kieserver-app-secret** from the new keystore file:

```
$ oc create secret generic kieserver-app-secret --from-file=keystore.jks
```

## 2.3. CREATING THE SECRETS FOR BUSINESS CENTRAL

In order to provide HTTPS access, Business Central uses an SSL certificate. The deployment can create a sample secret automatically. However, in production environments you must create an SSL certificate for Business Central and provide it to your OpenShift environment as a secret.

Do not use the same certificate and keystore for Business Central and Decision Server.

## Procedure

1. Generate an SSL keystore with a private and public key for SSL encryption for Decision Server. For more information on how to create a keystore with self-signed or purchased SSL certificates, see [Generate a SSL Encryption Key and Certificate](#).



### NOTE

In a production environment, generate a valid signed certificate that matches the expected URL for Business Central.

2. Save the keystore in a file named **keystore.jks**.
3. Record the name of the certificate. The default value for this name in Red Hat Decision Manager configuration is **jboss**.
4. Record the password of the keystore file. The default value for this name in Red Hat Decision Manager configuration is **mykeystorepass**.
5. Use the **oc** command to generate a secret named **decisioncentral-app-secret** from the new keystore file:

```
$ oc create secret generic decisioncentral-app-secret --from-file=keystore.jks
```

## 2.4. CREATING THE SECRETS FOR THE AMQ BROKER CONNECTION

If you want to connect any Decision Server to an AMQ broker and to use SSL for the AMQ broker connection, you must create an SSL certificate for the connection and provide it to your OpenShift environment as a secret.

### Procedure

1. Generate an SSL keystore with a private and public key for SSL encryption for Decision Server. For more information on how to create a keystore with self-signed or purchased SSL certificates, see [Generate a SSL Encryption Key and Certificate](#).



### NOTE

In a production environment, generate a valid signed certificate that matches the expected URL for the AMQ broker connection.

2. Save the keystore in a file named **keystore.jks**.
3. Record the name of the certificate. The default value for this name in Red Hat Decision Manager configuration is **jboss**.
4. Record the password of the keystore file. The default value for this name in Red Hat Decision Manager configuration is **mykeystorepass**.
5. Use the **oc** command to generate a secret named **broker-app-secret** from the new keystore file:

```
$ oc create secret generic broker-app-secret --from-file=keystore.jks
```

## 2.5. PROVISIONING PERSISTENT VOLUMES WITH READWRITEMANY ACCESS MODE USING NFS

If you want to deploy high-availability Business Central, your environment must provision persistent volumes with **ReadWriteMany** access mode.

If your configuration requires provisioning persistent volumes with **ReadWriteMany** access mode but your environment does not support such provisioning, use NFS to provision the volumes. Otherwise, skip this procedure.

### Procedure

Deploy an NFS server and provision the persistent volumes using NFS. For information about provisioning persistent volumes using NFS, see the "Persistent storage using NFS" section of the [OpenShift Container Platform 4.2 Storage](#) guide.

## 2.6. PREPARING A MAVEN MIRROR REPOSITORY FOR OFFLINE USE

If your Red Hat OpenShift Container Platform environment does not have outgoing access to the public Internet, you must prepare a Maven repository with a mirror of all the necessary artifacts and make this repository available to your environment.



## NOTE

You do not need to complete this procedure if your Red Hat OpenShift Container Platform environment is connected to the Internet.

## Prerequisites

- A computer that has outgoing access to the public Internet is available.

## Procedure

1. Prepare a Maven release repository to which you can write. The repository must allow read access without authentication. Your OpenShift environment must have access to this repository. You can deploy a Nexus repository manager in the OpenShift environment. For instructions about setting up Nexus on OpenShift, see [Setting up Nexus](#). Use this repository as a separate mirror repository.  
Alternatively, if you use a custom external repository (for example, Nexus) for your services, you can use the same repository as a mirror repository.

2. On the computer that has an outgoing connection to the public Internet, complete the following steps:
  - a. Download the latest version of the [Offliner tool](#).
  - b. Download the **rhdm-7.6.0-offliner.txt** product deliverable file from the [Software Downloads](#) page of the Red Hat Customer Portal.
  - c. Enter the following command to use the Offliner tool to download the required artifacts:

```
java -jar offliner-<version>.jar -r https://maven.repository.redhat.com/ga/ -r https://repo1.maven.org/maven2/ -d /home/user/temp rhdm-7.6.0-offliner.txt
```

Replace **/home/user/temp** with an empty temporary directory and **<version>** with the version of the Offliner tool that you downloaded. The download can take a significant amount of time.

- d. Upload all artifacts from the temporary directory to the Maven mirror repository that you prepared. You can use the [Maven Repository Provisioner](#) utility to upload the artifacts.
3. If you developed services outside Business Central and they have additional dependencies, add the dependencies to the mirror repository. If you developed the services as Maven projects, you can use the following steps to prepare these dependencies automatically. Complete the steps on the computer that has an outgoing connection to the public Internet.
    - a. Create a backup of the local Maven cache directory (**~/.m2/repository**) and then clear the directory.
    - b. Build the source of your projects using the **mvn clean install** command.
    - c. For every project, enter the following command to ensure that Maven downloads all runtime dependencies for all the artifacts generated by the project:

```
mvn -e -DskipTests dependency:go-offline -f /path/to/project/pom.xml --batch-mode -Djava.net.preferIPv4Stack=true
```

Replace **/path/to/project/pom.xml** with the correct path to the **pom.xml** file of the project.

- d. Upload all artifacts from the local Maven cache directory (**~/.m2/repository**) to the Maven mirror repository that you prepared. You can use the [Maven Repository Provisioner](#) utility to upload the artifacts.

## CHAPTER 3. DEPLOYMENT AND MANAGEMENT OF A RED HAT DECISION MANAGER ENVIRONMENT USING OPENSIFT OPERATORS

To deploy a Red Hat Decision Manager environment, the OpenShift Operator uses a YAML source that describes the environment. Red Hat Decision Manager provides an installer that you can use to form the YAML source and deploy the environment.

When the Business Automation operator deploys the environment, it creates a YAML description of the environment, and then ensures that the environment is consistent with the description at all times. You can edit the description to modify the environment.

### 3.1. SUBSCRIBING TO THE BUSINESS AUTOMATION OPERATOR

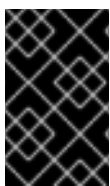
To be able to deploy Red Hat Decision Manager using operators, you must subscribe to the Business Automation operator in OpenShift.

#### Procedure

1. Enter your project in the OpenShift Web cluster console.
2. In the OpenShift Web console navigation panel, select **Catalog** → **OperatorHub** or **Operators** → **OperatorHub**.
3. Search for **Business Automation**, select it and click **Install**.
4. On the **Create Operator Subscription** page, select your target namespace and approval strategy and then click **Subscribe** to create a subscription.

### 3.2. DEPLOYING A RED HAT DECISION MANAGER ENVIRONMENT USING THE OPERATOR

After you subscribe to the Business Automation operator, you can use the installer wizard to configure and deploy a Red Hat Decision Manager environment.



#### IMPORTANT

In Red Hat Decision Manager 7.6, the operator installer wizard is for Technology Preview only. For more information on Red Hat Technology Preview features, see [Technology Preview Features Support Scope](#).

#### 3.2.1. Starting the deployment of a Red Hat Decision Manager environment using the Business Automation operator

To start deploying a Red Hat Decision Manager environment using the Business Automation operator, access the installer wizard. The installer wizard is deployed when you subscribe to the Operator.

#### Prerequisites

- You subscribed to the Business Automation operator. For instructions about subscribing to the Operator, see [Section 3.1, “Subscribing to the Business Automation operator”](#).

## Procedure

1. In the Red Hat OpenShift Container Platform web cluster console menu, select **Catalog** → **Installed operators** or **Operators** → **Installed operators**.
2. Click the name of the operator that contains **businessautomation**. Information about this operator is displayed.
3. Click the **Installer** link, located on the left side of the window in Red Hat OpenShift Container Platform version 4.1 or on the right side of the window in Red Hat OpenShift Container Platform version 4.2 or later.
4. If prompted, log in with your OpenShift credentials.

## Result

The **Installation** tab of the wizard is displayed.

### 3.2.2. Setting the basic configuration of the environment

After you start to deploy a Red Hat Decision Manager environment using the Business Automation operator, you must select the type of the environment and set other basic configuration.

## Prerequisites

- You started to deploy a Red Hat Decision Manager environment using the Business Automation operator and accessed the installer wizard according to the instructions in [Section 3.2.1, "Starting the deployment of a Red Hat Decision Manager environment using the Business Automation operator"](#).

## Procedure

1. In the **Application Name** field, enter a name for the OpenShift application. This name is used in the default URLs for all components.
2. In the **Environment** list, select the type of environment. This type determines the default configuration; you can modify this configuration as necessary. The following types are available for Red Hat Decision Manager:
  - **rhdm-trial**: A trial environment that you can set up quickly and use to evaluate or demonstrate developing and running assets. Includes Business Central and a Decision Server. This environment does not use any persistent storage, and any work you do in the environment is not saved.
  - **rhdm-authoring**: An environment for creating and modifying services using Business Central. It consists of pods that provide Business Central for the authoring work and a Decision Server for test execution of the services. You can also use this environment to run services for staging and production purposes. You can add Decision Servers to the environment and they are managed by the same Business Central.
  - **rhdm-authoring-ha**: An environment for creating and modifying services using Business Central. It consists of pods that provide Business Central for the authoring work and a Decision Server for test execution of the services. This version of the authoring environment supports scaling the Business Central pod to ensure high availability.



## IMPORTANT

In Red Hat Decision Manager 7.6, high-availability Business Central functionality is for Technology Preview only. For more information about Red Hat Technology Preview features, see [Technology Preview Features Support Scope](#).

- **rhdm-production-immutable:** An alternate environment for running existing services for staging and production purposes. You can configure one or more Decision Server replicated pods that build a service from source. In this environment, when you deploy a Decision Server pod, it builds an image that loads and starts a service or group of services. You cannot stop any service on the pod or add any new service to the pod. If you want to use another version of a service or modify the configuration in any other way, you deploy a new server image and displace the old one. In this system, the Decision Server runs like any other pod on the OpenShift environment. You can use any container-based integration workflows and do not need to use any other tools to manage the pods.
3. If you want to enable automatic upgrades to new versions, select the **Enable Upgrades** box. If this box is selected, when a new patch version of Red Hat Decision Manager 7.6 becomes available, the Operator automatically upgrades your deployment to this version. All services are preserved and normally remain available throughout the upgrade process. If you also want to enable the same automatic upgrade process when a new minor version of Red Hat Decision Manager 7.x becomes available, select the **Include minor version upgrades** box.
  4. If you want to use a custom image registry, under **Custom registry**, enter the URL of the registry in the **Image registry** field. If this registry does not have a properly signed and recognized SSL certificate, select the **Insecure** box.
  5. Under **Admin user**, enter the user name and password for the administrative user for Red Hat Decision Manager in the **Username** and **Password** fields. If you use RH-SSO or LDAP authentication, the same user must be configured in your authentication system with the **kie-server,rest-all,admin** roles for Red Hat Decision Manager.
  6. If you want to use a custom version tag for images, complete the following steps:
    - a. Click **Next** to access the **Security** tab.
    - b. Scroll to the bottom of the window.
    - c. Enter the image tag in the **Image tag** field.

### Next steps

If you want to deploy the environment with the default configuration, click **Finish** and then click **Deploy** to deploy the environment. Otherwise, continue to set other configuration parameters.

### 3.2.3. Setting the security configuration of the environment

After you set the basic configuration of a Red Hat Decision Manager environment using the Business Automation operator, you can optionally configure authentication (security) settings for the environment.

### Prerequisites



- You completed basic configuration of a Red Hat Decision Manager environment using the Business Automation operator in the installer wizard according to the instructions in [Section 3.2.2, "Setting the basic configuration of the environment"](#).
- If you want to use RH-SSO or LDAP for authentication, you created users with the correct roles in your authentication system. You must create at least the following users:
  - An administrative user (for example, **adminUser**) with the **kie-server,rest-all,admin** roles
  - A user named **controllerUser** with the **kie-server,rest-all,guest** roles.
  - A user named **executionUser** with the **kie-server,rest-all,guest** roles.
- If you want to use RH-SSO authentication, you created the clients in your RH-SSO system for all components of your environment, specifying the correct URLs. This action ensures maximum control. Alternatively, the deployment can create the clients.

## Procedure

1. If the **Installation** tab is open, click **Next** to view the **Security** tab.
2. In the **Authentication mode** list, select one of the following modes:
  - **Internal**: You configure the initial users when deploying the environment. The user can use Business Central to set up other users as necessary.
  - **RH-SSO**: Red Hat Decision Manager uses Red Hat Single Sign-On for authentication.
  - **LDAP**: Red Hat Decision Manager uses LDAP for authentication
3. Complete the security configuration based on the **Authentication mode** that you selected. If you selected **Internal**, you can optionally set the **KIE Server password** field. Applications can use the **executionUser** user name with this password to send REST API requests to Decision Servers in this environment.

If you selected **RH-SSO**, configure RH-SSO authentication:

- a. In the **RH-SSO URL** field, enter the RH-SSO URL.
- b. In the **Realm** field, enter the RH-SSO realm name.
- c. If you did not create RH-SSO clients for components of your environment enter the credentials of an administrative user for your RH-SSO system in the **SSO admin user** and **SSO admin password** fields.
- d. If your RH-SSO system does not have a proper signed SSL certificate, select the **Disable SSL cert validation** box.
- e. If you want to change the RH-SSO principal attribute used for the user name, in the **Principal attribute** field enter the name of the new attribute.
- f. In the **Controller password** field, enter the password that you configured in RH-SSO for the **controllerUser** user.
- g. In the **KIE Server password** field, enter the password that you configured in RH-SSO for the **executionUser** user.

If you selected **LDAP**, configure LDAP authentication:

- a. In the **LDAP URL** field, enter the LDAP URL.
  - b. Configure LDAP parameters that correspond to the settings of the LdapExtended Login module of Red Hat JBoss EAP. For instructions about using these settings, see [LdapExtended Login Module](#).
  - c. In the **Controller password** field, enter the password that you configured in LDAP for the **controllerUser** user.
  - d. In the **KIE Server password** field, enter the password that you configured in LDAP for the **executionUser** user.
4. Configure other passwords, if necessary:
- **AMQ password** and **AMQ cluster password** are passwords for interaction with ActiveMQ using the JMS API.
  - **Maven password** is the password for **mavenUser**. If your environment includes Business Central, you can use this user to access the built-in Maven repository.
  - **Keystore password** is the password for the keystore files used in secrets for HTTPS communication. Set this password if you created secrets according to instructions in [Section 2.2, "Creating the secrets for Decision Server"](#) or [Section 2.3, "Creating the secrets for Business Central"](#).
  - **Database password** is the password for database server pods that are a part of the environments.

## Next steps

If you want to deploy the environment with the default configuration of all components, click **Finish** and then click **Deploy** to deploy the environment. Otherwise, continue to set configuration parameters for Business Central and Decision Servers.

### 3.2.4. Setting the Business Central configuration of the environment

After you set the basic and security configuration of a Red Hat Decision Manager environment using the Business Automation operator, you can optionally configure settings for the Business Central or Business Central Monitoring component of the environment.

Do not change these settings for an immutable server environment, as this environment does not include Business Central or Business Central Monitoring.

#### Prerequisites

- You completed basic configuration of a Red Hat Decision Manager environment using the Business Automation operator in the installer wizard according to the instructions in [Section 3.2.2, "Setting the basic configuration of the environment"](#).
- If you want to use RH-SSO or LDAP for authentication, you completed security configuration according to the instructions in [Section 3.2.3, "Setting the security configuration of the environment"](#).

#### Procedure

1. If the **Installation** or **Security** tab is open, click **Next** until you view the **Console** tab.

2. If you created the secret for Business Central according to the instructions in [Section 2.3, "Creating the secrets for Business Central"](#), enter the name of the secret in the **Secret** field.
3. Optionally, enter the number of replicas for Business Central or Business Central monitoring in the **Replicas** field. Do not change this number in a **rhdm-authoring** environment.
4. Optionally, enter requested and maximum CPU and memory limits in the fields under **Resource quotas**.
5. If you selected RH-SSO authentication, configure RH-SSO for Business Central:
  - a. Enter the client name in the **Client name** field and the client secret in the **Client secret** field. If a client with this name does not exist, the deployment attempts to create a new client with this name and secret.
  - b. If the deployment is to create a new client, enter the HTTP and HTTPS URLs that will be used for accessing the Decision Server into the **SSO HTTP URL** and **SSO HTTPS URL** fields. This information is recorded in the client.
6. Optionally, depending on your needs, set environment variables. To set an environment variable, click **Add new Environment variable**, then enter the name and value for the variable in the **Name** and **Value** fields.
  - If you want to use an external Maven repository, set the following variables:
    - **MAVEN\_REPO\_URL**: The URL for the Maven repository
    - **MAVEN\_REPO\_ID**: An identifier for the Maven repository, for example, **repo-custom**
    - **MAVEN\_REPO\_USERNAME**: The user name for the Maven repository
    - **MAVEN\_REPO\_PASSWORD**: The password for the Maven repository



#### IMPORTANT

In an authoring environment, if you want Business Central to push a project into an external Maven repository, you must configure this repository during deployment and also configure exporting to the repository in every project. For information about exporting Business Central projects to an external Maven repository, see [Packaging and deploying a Red Hat Decision Manager project](#).

- If your OpenShift environment does not have a connection to the public Internet, configure access to a Maven mirror that you set up according to [Section 2.6, "Preparing a Maven mirror repository for offline use"](#). Set the following variables:
  - **MAVEN\_MIRROR\_URL**: The URL for the Maven mirror repository that you set up in [Section 2.6, "Preparing a Maven mirror repository for offline use"](#). This URL must be accessible from a pod in your OpenShift environment.
  - **MAVEN\_MIRROR\_OF**: The value that determines which artifacts are to be retrieved from the mirror. For instructions about setting the **mirrorOf** value, see [Mirror Settings](#) in the Apache Maven documentation. The default value is **external:\***. With this value, Maven retrieves every required artifact from the mirror and does not query any other repositories.  
If you configure an external Maven repository (**MAVEN\_REPO\_URL**), change **MAVEN\_MIRROR\_OF** to exclude the artifacts in this repository from the mirror, for

example, `external:*,!repo-custom`. Replace `repo-custom` with the ID that you configured in `MAVEN_REPO_ID`.

If your authoring environment uses a built-in Business Central Maven repository, change `MAVEN_MIRROR_OF` to exclude the artifacts in this repository from the mirror: `external:*,!repo-rhdmcentr`.

## Next steps

If you want to deploy the environment with the default configuration of Decision Servers, click **Finish** and then click **Deploy** to deploy the environment. Otherwise, continue to set configuration parameters for Decision Servers.

### 3.2.5. Setting custom Decision Server configuration of the environment

Every environment type in the Business Automation operator includes one or several Decision Servers by default.

Optionally, you can set custom configuration for Decision Servers. In this case, default Decision Servers are not created and only the Decision Servers that you configure are deployed.

#### Prerequisites

- You completed basic configuration of a Red Hat Decision Manager environment using the Business Automation operator in the installer wizard according to the instructions in [Section 3.2.2, "Setting the basic configuration of the environment"](#).
- If you want to use RH-SSO or LDAP for authentication, you completed security configuration according to the instructions in [Section 3.2.3, "Setting the security configuration of the environment"](#).

#### Procedure

1. If the **Installation**, **Security**, or **Console** tab is open, click **Next** until you view the **KIE Servers** tab.
2. Click **Add new KIE Server** to add a new Decision Server configuration.
3. In the **Id** field, enter an identifier for the Decision Server. If the Decision Server connects to a Business Central or Business Central Monitoring instance, this identifier determines which server group the server joins.
4. In the **Name** field, enter a name for the Decision Server.
5. In the **Deployments** field, enter the number of similar Decision Servers that are to be deployed. The installer can deploy several Decision Servers with the same configuration. The identifiers and names of the Decision Servers are modified automatically and remain unique.
6. If you created the secret for Decision Server according to the instructions in [Section 2.2, "Creating the secrets for Decision Server"](#), enter the name of the secret in the **Keystore secret** field.
7. Optionally, enter the number of replicas for the Decision Server in the **Replicas** field.
8. If you want to use a custom image for the Decision Server, complete the following additional steps:

- a. Click **Set KIE Server image**
  - b. If you want to use a Docker image name and not an OpenShift image stream tag, change the **Kind** value to **DockerImage**.
  - c. Enter the name of the image stream in the **Name** field.
  - d. If the image stream is not in the **openshift** namespace, enter the namespace in the **Namespace** field.
9. If you want to configure an immutable Decision Server, complete the following additional steps:
- a. Click **Set Immutable server configuration**
  - b. In the **KIE Server container deployment** field, enter the identifying information of the decision services (KJAR files) that the deployment must pull from the Maven repository. The format is **<containerId>=<groupId>:<artifactId>:<version>** or, if you want to specify an alias name for the container, **<containerId>(<aliasId>)=<groupId>:<artifactId>:<version>**. You can provide two or more KJAR files using the `|` separator, as illustrated in the following example: **containerId=groupId:artifactId:version|c2(alias2)=g2:a2:v2**.
  - c. If your OpenShift environment does not have a connection to the public Internet, enter the URL of the Maven mirror that you set up according to [Section 2.6, "Preparing a Maven mirror repository for offline use"](#) in the **Maven mirror URL** field.
  - d. In the **Artifact directory** field, enter the path within the project that contains the required binary files (KJAR files and any other necessary files) after a successful Maven build. Normally this directory is the target directory of the build. However, you can provide prebuilt binaries in this directory in the Git repository.
  - e. If you want to use a custom base Decision Server image for the S2I build, click **Set Base build image** and then enter the name of the image stream in the **Name** field. If the image stream is not in the **openshift** namespace, enter the namespace in the **Namespace** field. If you want to use a Docker image name and not an OpenShift image stream tag, change the **Kind** value to **DockerImage**.
  - f. If you want to create the immutable server from source in a Git repository using the Source to Image (S2I) process, click the **Set Git source** button and enter information in the following fields:
    - **S2I Git URI**The URI for the Git repository that contains the source for your services.
    - **Reference**: The branch in the Git repository.
    - **Context directory**: (Optional) The path to the source within the project downloaded from the Git repository. By default, the root directory of the downloaded project is the source directory.
  - g. If you are using S2I and want to set a Git Webhook so that changes in the Git repository cause an automatic rebuild of the Decision Server, click **Add new Webhook**. Then select the type of the Webhook in the **Type** field and enter the secret string for the Webhook in the **Secret** field.
10. Optionally, enter requested and maximum CPU and memory limits in the fields under **Resource quotas**. If you are configuring several Decision Servers, the limits apply to each server separately.
11. If you selected RH-SSO authentication, configure RH-SSO for the Decision Server:

- a. Enter the client name in the **Client name** field and the client secret in the **Client secret** field. If a client with this name does not exist, the deployment attempts to create a new client with this name and secret.
  - b. If the deployment is to create a new client, enter the HTTP and HTTPS URLs that will be used for accessing the Decision Server into the **SSO HTTP URL** and **SSO HTTPS URL** fields. This information is recorded in the client.
12. If you want to interact with the Decision Server through JMS API using an external AMQ message broker, enable the **Enable JMS Integration** setting. Additional fields for configuring JMS Integration are displayed and you must enter the values as necessary:
- **User name, Password:** The user name and password of a standard broker user, if user authentication in the broker is required in your environment.
  - **Executor:** Select this setting to disable the JMS executor. The executor is enabled by default.
  - **Executor transacted:** Select this setting to enable JMS transactions on the executor queue.
  - **Enable signal:** Select this setting to enable signal configuration through JMS.
  - **Enable audit** Select this setting to enable audit logging through JMS.
  - **Audit transacted:** Select this setting to enable JMS transactions on the audit queue.
  - **Queue executor, Queue request, Queue response, Queue signal, Queue audit** Custom JNDI names of the queues to use. If you set any of these values, you must also set the **AMQ queues** parameter.
  - **AMQ Queues:** AMQ queue names, separated by commas. These queues are automatically created when the broker starts and are accessible as JNDI resources in the JBoss EAP server. If you are using any custom queue names, you must enter the names of all the queues used by the server in this field.
  - **Enable SSL integration:** Select this setting if you want to use an SSL connection to the AMQ broker. In this case you must also provide the name of the secret that you created in [Section 2.4, "Creating the secrets for the AMQ broker connection"](#) and the names and passwords of the key store and trust store that you used for the secret.
13. Optionally, depending on your needs, set environment variables. To set an environment variable, click **Add new Environment variable**, then enter the name and value for the variable in the **Name** and **Value** fields.
- If you want to configure your Decision Server deployment to use Prometheus to collect and store metrics, set the **PROMETHEUS\_SERVER\_EXT\_DISABLED** environment variable to **false**. For instructions about configuring Prometheus metrics collection, see [Managing and monitoring Decision Server](#).
  - If you want to use an external Maven repository, set the following variables:
    - **MAVEN\_REPO\_URL:** The URL for the Maven repository
    - **MAVEN\_REPO\_ID:** An identifier for the Maven repository, for example, **repo-custom**
    - **MAVEN\_REPO\_USERNAME:** The user name for the Maven repository

- **MAVEN\_REPO\_PASSWORD**: The password for the Maven repository
- If your OpenShift environment does not have a connection to the public Internet, configure access to a Maven mirror that you set up according to [Section 2.6, “Preparing a Maven mirror repository for offline use”](#). Set the following variables:
  - **MAVEN\_MIRROR\_URL**: The URL for the Maven mirror repository that you set up in [Section 2.6, “Preparing a Maven mirror repository for offline use”](#). This URL must be accessible from a pod in your OpenShift environment. If you configured this Decision Server as S2I, you already entered this URL.
  - **MAVEN\_MIRROR\_OF**: The value that determines which artifacts are to be retrieved from the mirror. If you configured this Decision Server as S2I, do not set this value. For instructions about setting the **mirrorOf** value, see [Mirror Settings](#) in the Apache Maven documentation. The default value is **external:\***. With this value, Maven retrieves every required artifact from the mirror and does not query any other repositories. If you configure an external Maven repository (**MAVEN\_REPO\_URL**), change **MAVEN\_MIRROR\_OF** to exclude the artifacts in this repository from the mirror, for example, **external:\*,!repo-custom**. Replace **repo-custom** with the ID that you configured in **MAVEN\_REPO\_ID**.

If your authoring environment uses a built-in Business Central Maven repository, change **MAVEN\_MIRROR\_OF** to exclude the artifacts in this repository from the mirror: **external:\*,!repo-rhdmcentr**.

### Next steps

To configure additional Decision Servers, click **Add new KIE Server** again and repeat the procedure for the new server configuration.

Click **Finish** and then click **Deploy** to deploy the environment.

## 3.3. MODIFYING AN ENVIRONMENT THAT IS DEPLOYED USING OPERATORS

If an environment is deployed using operators, you cannot modify it using typical OpenShift methods. For example, if you delete a deployment configuration or a service, it is re-created automatically with the same parameters.

To modify the environment, you must modify the YAML description of the environment. You can change common settings such as passwords, add new Decision Servers, and scale Decision Servers.

### Procedure

1. Enter your project in the OpenShift web cluster console.
2. In the OpenShift Web console navigation panel, select **Catalog → Installed operators** or **Operators → Installed operators**.
3. Find the **Business Automation** operator line in the table and click **KieApp** in the line. Information about the environments that you deployed using this operator is displayed.
4. Click the name of a deployed environment.
5. Select the **YAML** tab. A YAML source is displayed.

6. If you want to change common settings, such as passwords, edit the values under **commonConfig**:
7. If you want to add new Decision Servers, add their descriptions at the end of the block under **servers**, as shown in the following examples:

- To add two servers named **server-a** and **server-a-2**, add the following lines:

```
- deployments: 2
  name: server-a
```

- To add an immutable Decision Server that includes services built from source in an S2I process, add the following lines:

```
- build:
  kieServerContainerDeployment: <deployment>
  gitSource:
    uri: <url>
    reference: <branch>
    contextDir: <directory>
```

Replace the following values:

- **<deployment>**: The identifying information of the decision service (KJAR file) that is built from your source. The format is **<containerId>=<groupId>:<artifactId>:<version>**. You can provide two or more KJAR files using the `|` separator, for example **containerId=groupId:artifactId:version|c2=g2:a2:v2**. The Maven build process must produce all these files from the source in the Git repository.
  - **<url>**: The URL for the Git repository that contains the source for your decision service.
  - **<branch>**: The branch in the Git repository.
  - **<directory>**: The path to the source within the project downloaded from the Git repository.
8. If you want to scale a Decision Server, find the description of the server in the block under **servers**: and add a **replicas**: setting under that description. For example, **replicas: 3** scales the server to three pods.
  9. Click **Save** and then wait for a **has been updated** pop-up message.
  10. Click **Reload** to view the new YAML description of the environment.



## APPENDIX A. VERSIONING INFORMATION

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