



## Red Hat Decision Manager 7.4

### Creating Red Hat Decision Manager business applications with Spring Boot



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## Abstract

This document describes how to create Red Hat Decision Manager business applications using Spring Boot starters.

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## PREFACE

As a developer, you can use Spring Boot starters through the [business applications](#) website to quickly create Red Hat Decision Manager business applications, configure those applications, and deploy them to an existing service or in the cloud.

## CHAPTER 1. RED HAT DECISION MANAGER BUSINESS APPLICATIONS

Spring Framework is a Java platform that provides comprehensive infrastructure support for developing Java applications. Spring Boot is a lightweight framework based on Spring Boot starters. Spring Boot starters are **pom.xml** files that contain a set of dependency descriptors that you can include in your application.

Red Hat Decision Manager business applications are flexible, UI-agnostic logical groupings of individual services that provide certain business capabilities. Business applications are based on Spring Boot starters. They are usually deployed separately and can be versioned individually. A complete business application enables a domain to achieve specific business goals, for example order management or accommodation management.

On the [business application](#) website you can create a Process Automation Manager, Decision Manager, or Business Optimizer business application. After you create and configure your business application, you can deploy it to an existing service or to the cloud, through OpenShift.

Business applications can contain one or more of the following projects and more than one project of the same type:

- Business assets (KJAR): Contains business processes, rules, and forms and are easily imported into Business Central.
- Data model: Data model projects provide common data structures that are shared between the service projects and business assets projects. This enables proper encapsulation, promotes reuse, and reduces shortcuts. Each service project can expose its own public data model.
- Service: A deployable project that provides the actual service with various capabilities. It includes the business logic that operates your business. In most cases, a service project includes business assets and data model projects. A business application can split services into smaller component service projects for better manageability.



## CHAPTER 2. CREATING A BUSINESS APPLICATION

You can use the [business application](https://start.jboss.org) website to quickly and easily create business applications using the Spring Boot framework. Doing this by-passes the need to install and configure Red Hat Decision Manager.

### Procedure

1. Enter the following URL in a web browser:

```
https://start.jboss.org
```

2. Click **Configure your business application**
3. Click **Decision Management** and click **Next**.
4. Enter a package and application name.
5. Select **Enterprise 7.4** from the **Version** menu and click **Next**.



### NOTE

You must select **Enterprise 7.4** to create a Red Hat Decision Manager business application.

6. Select the project types that you want to include in your project. You can include more than one project type.
  - **Business Assets:** Contains business processes, rules, and forms and are easily imported into Business Central. Select **Dynamic Assets** instead if you want to add adaptive and dynamic assets such as cases.
  - **Data Model:** Provides common data structures that are shared between the service projects and business assets projects. This enables proper encapsulation, promotes reuse, and reduces shortcuts. Each service project can expose its own public data model.
  - **Service:** Includes business logic that operates your business.
7. Click **Generate business application**  
The **<business-application>.zip** file downloads, where **<business-application>** is the name that you entered in the **Application Name** box.
8. Unzip the **<business-application>.zip** file.
9. Open the **<business-application>/business-application-service/src/main/docker/settings.xml** file in a text editor.
10. Add the following repository to the **repositories** element:

```
<repository>
  <id>jboss-enterprise-repository-group</id>
  <name>Red Hat JBoss Enterprise Maven Repository</name>
  <url>https://maven.repository.redhat.com/ga/</url>
  <layout>default</layout>
  <releases>
```

```
<updatePolicy>never</updatePolicy>
</releases>
<snapshots>
  <updatePolicy>daily</updatePolicy>
</snapshots>
</repository>
```

11. Add the following plug-in repository to the **pluginRepositories** element:

```
<pluginRepository>
  <id>jboss-enterprise-repository-group</id>
  <name>Red Hat JBoss Enterprise Maven Repository</name>
  <url>https://maven.repository.redhat.com/ga/</url>
  <layout>default</layout>
  <releases>
    <updatePolicy>never</updatePolicy>
  </releases>
  <snapshots>
    <updatePolicy>daily</updatePolicy>
  </snapshots>
</pluginRepository>
```

Doing this adds the productized Maven repository to your business application.

## CHAPTER 3. BUSINESS APPLICATION CONFIGURATION

### 3.1. BUSINESS APPLICATION AUTHENTICATION AND AUTHORIZATION

By default, business applications are secured by protecting all REST endpoints (URLs that contain **/rest/**). In addition, business applications have two sets of log in credentials that allow users to connect to Business Central in development mode: the user with the ID **user** and password **user** and the user with the ID **kieserver** and password **kieserver1!**.

Both authentication and authorization is based on Spring security. Alter this security configuration for all business applications used in production environments. You can make configuration changes in the

**<business-application>/<business-application>-**

**services/src/main/java/com/company/service/DefaultWebSecurityConfig.java** file:

```
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Configuration;
import
org.springframework.security.config.annotation.authentication.builders.AuthenticationManagerBuilder;

import org.springframework.security.config.annotation.web.builders.HttpSecurity;
import org.springframework.security.config.annotation.web.configuration.EnableWebSecurity;
import
org.springframework.security.config.annotation.web.configuration.WebSecurityConfigurerAdapter;

@Configuration("kieServerSecurity")
@EnableWebSecurity
public class DefaultWebSecurityConfig extends WebSecurityConfigurerAdapter {

    @Override
    protected void configure(HttpSecurity http) throws Exception {
        http
            .csrf().disable()
            .authorizeRequests()
            .antMatchers("/rest/*").authenticated()
            .and()
            .httpBasic();
    }

    @Autowired
    public void configureGlobal(AuthenticationManagerBuilder auth) throws Exception {
        PasswordEncoder encoder = PasswordEncoderFactories.createDelegatingPasswordEncoder();

        auth.inMemoryAuthentication().withUser("kieserver").password(encoder.encode("kieserver1!")).roles("kie-server")
            .and()
            .withUser("john").password(encoder.encode("john@pwd1")).roles("kie-server", "PM", "HR");
    }
}
```

### 3.2. CONFIGURING THE APPLICATION.PROPERTIES FILE

After you create your business application, you can configure several components through the **application.properties** file to customize your application.

## Prerequisites

- You have a **<business-application>.zip** file that you created using the [business application](#) website.

## Procedure

- Unzip the **<business-application>.zip** file and navigate to the **<business-application>/<business-application>-service/src/main/resources** folder.
- Open the **application.properties** file in a text editor.
- Configure the host, port, and path for the REST endpoints, for example:

```
server.address=localhost
server.port=8090

cxf.path=/rest
```

- Configure the Decision Server (**kieserver**) so that it can be easily identified, for example:

```
kieserver.serverId=<business-application>-service
kieserver.serverName=<business-application>-service
kieserver.location=http://localhost:8090/rest/server
kieserver.controllers=http://localhost:8080/jbpm-console/rest/controller
```

The following table lists the Decision Server parameters that you can configure in your business application:

**Table 3.1. kieserver parameters**

Parameter	Values	Description
<b>kieserver.serverId</b>	string	The ID used to identify the business application when connecting to the Decision Manager controller.
<b>kieserver.serverName</b>	string	The name used to identify the business application when connecting to the Decision Manager controller. Can be the same string used for the <b>kieserver.serverId</b> parameter.
<b>kieserver.location</b>	URL	Used by other components that use the REST API to identify the location of this server. Do not use the location as defined by <b>server.address</b> and <b>server.port</b> .
<b>kieserver.controllers</b>	URLs	A comma-separated list of controller URLs.

- If you selected **Business Automation** when you created your business application, specify which of the following components that you want to start at runtime:

Table 3.2. kieserver capabilities parameters

Parameter	Values	Description
<b>kieserver.drools.enabled</b>	<b>true, false</b>	Enables or disables the Decision Manager component.
<b>kieserver.dmn.enabled</b>	<b>true, false</b>	Enables or disables the Decision Model and Notation (DMN) component.

### 3.3. CONFIGURING THE BUSINESS APPLICATION WITH RED HAT SINGLE SIGN-ON

You can use Red Hat Single Sign-On (RH SSO) to enable single sign-on between your services and to have a central place to configure and manage your users and roles.

#### Prerequisites

- You have a **<business-application>.zip** file that you created using the [business applications](#) website.

#### Procedure

- Download and install RH SSO. For instructions, see the [Red Hat Single Sign-On Getting Started Guide](#).
- Configure RH SSO:
  - Either use the default master realm or create a new realm.
  - Create the **springboot-app** client and set the **AccessType** to public.
  - Set a valid redirect URI and web origin according to your local setup, for example:
    - Valid redirect URIs: **http://localhost:8090/\***
    - Web origin: **http://localhost:8090**
  - Create realm roles that are used in the application.
  - Create users that are used in the application and assign roles to them.
- Add the following dependencies to the service project **pom.xml** file:

```
<dependencyManagement>
  <dependencies>
    <dependency>
      <groupId>org.keycloak.bom</groupId>
      <artifactId>keycloak-adapter-bom</artifactId>
      <version>${version.org.keycloak}</version>
      <type>pom</type>
      <scope>import</scope>
    </dependency>
  </dependencies>
```

```

</dependencyManagement>

....

<dependency>
  <groupId>org.keycloak</groupId>
  <artifactId>keycloak-spring-boot-starter</artifactId>
</dependency>

```

4. Update the **application.properties** file:

```

# keycloak security setup
keycloak.auth-server-url=http://localhost:8100/auth
keycloak.realm=master
keycloak.resource=springboot-app
keycloak.public-client=true
keycloak.principal-attribute=preferred_username
keycloak.enable-basic-auth=true

```

5. Modify the **DefaultWebSecurityConfig.java** file to ensure that Spring Security works correctly with RH SSO:

```

import org.keycloak.adapters.KeycloakConfigResolver;
import org.keycloak.adapters.springboot.KeycloakSpringBootConfigResolver;
import org.keycloak.adapters.springsecurity.authentication.KeycloakAuthenticationProvider;
import org.keycloak.adapters.springsecurity.config.KeycloakWebSecurityConfigurerAdapter;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import
org.springframework.security.config.annotation.authentication.builders.AuthenticationManagerBuilder;
import org.springframework.security.config.annotation.web.builders.HttpSecurity;
import org.springframework.security.config.annotation.web.configuration.EnableWebSecurity;
import org.springframework.security.core.authority.mapping.SimpleAuthorityMapper;
import org.springframework.security.core.session.SessionRegistryImpl;
import
org.springframework.security.web.authentication.session.RegisterSessionAuthenticationStrategy;
import
org.springframework.security.web.authentication.session.SessionAuthenticationStrategy;

@Configuration("kieServerSecurity")
@EnableWebSecurity
public class DefaultWebSecurityConfig extends KeycloakWebSecurityConfigurerAdapter {

    @Override
    protected void configure(HttpSecurity http) throws Exception {
        super.configure(http);
        http
            .csrf().disable()
            .authorizeRequests()
                .anyRequest().authenticated()
            .and()
            .httpBasic();
    }
}

```

```

    }

    @Autowired
    public void configureGlobal(AuthenticationManagerBuilder auth) throws Exception {
        KeycloakAuthenticationProvider keycloakAuthenticationProvider =
        keycloakAuthenticationProvider();
        SimpleAuthorityMapper mapper = new SimpleAuthorityMapper();
        mapper.setPrefix("");
        keycloakAuthenticationProvider.setGrantedAuthoritiesMapper(mapper);
        auth.authenticationProvider(keycloakAuthenticationProvider);
    }

    @Bean
    public KeycloakConfigResolver KeycloakConfigResolver() {
        return new KeycloakSpringBootConfigResolver();
    }

    @Override
    protected SessionAuthenticationStrategy sessionAuthenticationStrategy() {
        return new RegisterSessionAuthenticationStrategy(new SessionRegistryImpl());
    }
}

```

### 3.4. CONFIGURING BUSINESS APPLICATION USER GROUP PROVIDERS

With Red Hat Decision Manager, you can manage human-centric activities. To provide integration with user and group repositories, you can use two KIE API entry points:

- **UserGroupCallback:** Responsible for verifying whether a user or group exists and for collecting groups for a specific user
- **UserInfo:** Responsible for collecting additional information about users and groups, for example email addresses and preferred language

You can configure both of these components by providing alternative code, either code provided out of the box or custom developed code.

For the **UserGroupCallback** component, retain the default implementation because it is based on the security context of the application. For this reason, it does not matter which backend store is used for authentication and authorisation (for example, RH-SSO). It will be automatically used as a source of information for collecting user and group information.

The **UserInfo** component is a separate component because it collects more advanced information.

#### Prerequisites

- You have a **<business-application>.zip** file that you created using the [business application](#) website and that contains a business automation project.

#### Procedure

1. To provide an alternative implementation of **UserGroupCallback**, add the following code to the Application class or a separate class annotated with **@Configuration**:

```
@Bean(name = "userGroupCallback")
public UserGroupCallback userGroupCallback(IdentityProvider identityProvider) throws
IOException {
    return new MyCustomUserGroupCallback(identityProvider);
}
```

- To provide an alternative implementation of **UserInfo**, add the following code to the Application class or a separate class annotated with **@Configuration**:

```
@Bean(name = "userInfo")
public UserInfo userInfo() throws IOException {
    return new MyCustomUserInfo();
}
```

### 3.5. ENABLING SWAGGER DOCUMENTATION

You can enable Swagger-based documentation for all endpoints available in the service project of your Red Hat Decision Manager business application.

#### Prerequisites

- You have a **<business-application>.zip** file that you created using the [business applications](#) website.

#### Procedure

- Unzip the **<business-application>.zip** file and navigate to the **<business-application>/<business-application>-service** folder.
- Open the service project **pom.xml** file in a text editor.
- Add the following dependencies to the service project **pom.xml** file and save the file.

```
<dependency>
  <groupId>org.apache.cxf</groupId>
  <artifactId>cxf-rt-rs-service-description-swagger</artifactId>
  <version>3.2.6</version>
</dependency>
<dependency>
  <groupId>io.swagger</groupId>
  <artifactId>swagger-jaxrs</artifactId>
  <version>1.5.15</version>
  <exclusions>
    <exclusion>
      <groupId>javax.ws.rs</groupId>
      <artifactId>jsr311-api</artifactId>
    </exclusion>
  </exclusions>
</dependency>
```

- To enable the Swagger UI (optional), add the following dependency to the **pom.xml** file and save the file.

```
<dependency>
```



```
<groupId>org.webjars</groupId>  
<artifactId>swagger-ui</artifactId>  
<version>2.2.10</version>  
</dependency>
```

5. Open the **<business-application>/<business-application>-service/src/main/resources/application.properties** file in a text editor.
6. Add the following line to the **application.properties** file to enable Swagger support:

```
kieserver.swagger.enabled=true
```

After you start the business application, you can view the Swagger document at **<http://localhost:8090/rest/swagger.json>**. The complete set of endpoints is available at **<http://localhost:8090/rest/api-docs?url=http://localhost:8090/rest/swagger.json>**.

## CHAPTER 4. BUSINESS APPLICATION EXECUTION

By default, business applications contain a single executable project, the service project. You can execute the service project on Windows or Linux, in standalone (unmanaged) or development (managed) mode. Standalone mode enables you to start your application without additional requirements. Applications started in development mode require Business Central to be available as the Decision Manager controller.

### 4.1. RUNNING BUSINESS APPLICATIONS IN STANDALONE MODE

Standalone (unmanaged) mode enables you to start your business application without additional requirements.

#### Prerequisites

- You have a **<business-application>.zip** file that you created using the [business applications](#) website.
- The business application is configured.

#### Procedure

1. Navigate to the **<business-application>/<business-application>-service** folder.
2. Enter one of the following commands:

**Table 4.1. Standalone launch options**

Command	Description
<b>./launch.sh clean install</b>	Launches in standalone mode on Linux or UNIX.
<b>./launch.bat clean install</b>	Launches in standalone mode on Windows.
<b>./launch.sh clean install -Pmysql</b>	Launches in standalone mode on Linux or UNIX if you have configured the application with a MySQL database.
<b>./launch.bat clean install -Pmysql</b>	Launches in standalone mode on Windows if you have configured the application with a MySQL database.
<b>./launch.sh clean install -Ppostgres</b>	Launches in standalone mode on Linux or UNIX if you have configured the application with a PostgreSQL database.
<b>./launch.bat clean install -Ppostgres</b>	Launches in standalone mode on Windows if you have configured the application with a PostgreSQL database.

The **clean install** argument directs Maven to build a fresh installation. The projects are then built in the following order:

- Data model
  - Business assets
  - Service
- The first time that you run the script, it might take a while to build the project because all dependencies of the project are downloaded. At the end of the build, the application starts.

3. Enter the following command to access your business application:

```
http://localhost:8090/
```

4. Enter the credentials **user/user** or **kieserver/kieserver1!**.

## 4.2. RUNNING BUSINESS APPLICATIONS IN DEVELOPMENT MODE

Development (managed) mode enables developers to work on a Red Hat Decision Manager business application business assets project and dynamically deploy changes to the business application without the need to restart it. In addition, development mode provides a complete monitoring environment for business automation capabilities, for example process instances, tasks, and jobs.

### Prerequisites

- You have a **<business-application>.zip** file that contains a business assets project, that you created using the [business applications](#) website.
- You configured the business application.
- Business Central is installed and running.

### Procedure

1. Navigate to the **<business-application>/<business-application>-service** folder.
2. Enter one of the following commands:

**Table 4.2. Managed launch options**

Command	Description
<b>./launch-dev.sh clean install</b>	Launches in development mode on Linux or UNIX.
<b>./launch-dev.bat clean install</b>	Launches in development mode on Windows.
<b>./launch-dev.sh clean install -Pmysql</b>	Launches in development mode on Linux or UNIX if you have configured the application with a MySQL database.
<b>./launch-dev.bat clean install -Pmysql</b>	Launches in development mode on Windows if you have configured the application with a MySQL database.

<code>./launch-dev.sh clean install -Ppostgres</code>	Launches in development mode on Linux or UNIX if you have configured the application with a PostgreSQL database.
<code>./launch-dev.bat clean install -Ppostgres</code>	Launches in development mode on Windows if you have configured the application with a PostgreSQL database.

The **clean install** argument directs Maven to build a fresh installation. The projects are then built in the following order:

- Data model
- Business assets
- Service

The first time that you run the script, it might take a while to build the project because all dependencies of the project are downloaded. At the end of the build, the application starts.

3. Enter the following command to access your business application:

```
http://localhost:8090/
```

4. Enter the credentials **user/user** or **kieserver/kieserver1!**. After the business application starts, it connects to the Decision Manager controller and is visible in **Menu → Deploy → Execution Servers** in Business Central.

## CHAPTER 5. IMPORTING BUSINESS ASSETS PROJECTS INTO AND DEPLOYING FROM BUSINESS CENTRAL

You can import a business assets project that is part of a Red Hat Decision Manager business application into Business Central and then deploy that project to a business application.

### Prerequisites

- You have a business application project running in development mode.
- Red Hat Decision Manager Business Central is installed.

### Procedure

1. Navigate to the **<business-application>/<business-application>-kjar** folder.
2. Execute the following following commands to initialize the Git repository for your project:

```
$ git init
$ git add -A
$ git commit -m "Initial project structure"
```

3. Log in to Business Central and go to **Menu → Design → Projects**.
4. Select **Import Project** and enter following URL:  

```
file:///<business-application-path>/<business-application-name>-kjar
```
5. Click **Import** and confirm the project to be imported.
6. After the business assets project is imported into Business Central, open the project and click **Add Assets** to add assets such as rules and decision tables to your business assets project.
7. Click **Deploy** on your project page to deploy your project to a running business application.



## NOTE

You can also select the **Build & Install** option to build the project and publish the KJAR file to the configured Maven repository without deploying to a Decision Server. In a development environment, you can click **Deploy** 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 is disabled and you can click **Deploy** only to deploy the built KJAR file to a new deployment unit (KIE container) on a Decision Server.

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

8. To verify the deployment, go to **Menu** → **Deploy** → **Execution Servers**.

## APPENDIX A. VERSIONING INFORMATION

Documentation last updated on Friday, June 05, 2020.