Advanced Integration

EXERCISES

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Chapter 1. Deploy a simple server

1.1. Prerequisites

You need JAVA SDK 1.7 installed, and JAVA_HOME defined on it.

You must have Java ready for execution.

In command line try "java -version". You should read an answer similar to:

```
java version "1.7.0_80"
Java(TM) SE Runtime Environment (build 1.7.0_80-b15)
Java HotSpot(TM) 64-Bit Server VM (build 24.80-b11, mixed mode)
```

1.2. Objectives

The goal of this exercise is to deploy a server for testing and prototypes environments, to quickly and easily deploy Portal and generated applications, including pre-configured application server.

1.3. Instructions

- Download the Tomcat bundle from the download page in the customer portal. (Link provided by email or your trainer)
- Extract the Tomcat bundle.
- Install the license file.
- First start.
- Update configuration and restart.

1.4. Correction

1.4.1. Download the bundle from the download page in the customer portal.

To get the download page, access the customer portal, menu "Download", or ask to your trainer.

- In the section "Deploying Server Components"
- Choose your component, for this exercise we will take the **Tomcat bundle** (i.e BonitaBPMSubscription-<version>-Tomcat-<version>.zip)

1.4.2. Extract the bundle.

Just extract the archive in a folder without spaces or special characters (no accent).

Content of the Tomcat bundle

```
The Tomcat bundle is based on a standard Tomcat installation with the following
additions:

bin/setenv.bat: script to configure JVM system properties for Windows.
bin/setenv.sh: script to configure JVM system properties for Linux.
bonita-start.bat: script to start the bundle on Windows.
bonita-start.sh: script to start the bundle on Linux.
bonita-stop.bat: script to stop the bundle on Windows.
bonita-stop.sh: script to stop the bundle on Linux.
conf/Catalina/localhost/bonita.xml: Tomcat context configuration for Bonita web
application. Define data sources used by Bonita Engine.
conf/bitronix-*.properties: configuration files for Bitronix
catalina.properties: modified to include lib/bonita folder to Tomcat classpath.
context.xml: modified to add JTA support using Bitronix library.
logging.properties: modified to create a log file dedicated to Bonita.
server.xml: modified to add listener for Bitronix and h2 (see below for modification
needed if you want to switch to another RDBMS).
lib/bonita: extra libraries needed by Bonita. The following libraries are included:
Bitronix JTA Transaction Manager, h2, SLF4J (required by Bitronix).
request_key_utils: folder containing script to generate license request keys
(Subscription editions only).
webapps/bonita.war: the Bonita web application.
```

- Note the path to the extracted folder as "**TOMCAT_HOME**"

1.4.3. Install the license file.

A server needs a license to run, exactly like your Bonita Studio.

If the version (ex 7.x) is the same between the studio and your server, and if they are on the same machine, you can copy the studio license in TOMCAT_HOME/setup/platform_conf/licenses/.

Otherwise:

- Go in TOMCAT_HOME/request_key_utils/
- Execute the good version of the generator according to your OS and license type (ex : windows, development generateRequestKey.bat)
- Select option 2 - CPU core license
- Select option 1 - Development CPU core license (2 cores allowed).
- Copy the key (everything including the parenthesis)
- Generate a licence from your key (In training just send the key to your trainer)
- Copy the file of the licence in **TOMCAT_HOME/setup/platform_conf/licenses/**. This licence is a ***Development licence***, and then you need to follow the Customize chapter.

1.4.4. First start.

Customize startup script

For a server with a ***developement licence***, you should know that the licence limits the server to only two CPU, so we need to say to the server to use only two CPU. if you copy the licence from the studio, you use this type of licence.

- Go in **TOMCAT_HOME/**
- For Windows:
  - Copy the file bonita-start.bat to a file called **bonita-start_2cores.bat**
  - Change the last line of the file to:

```
start /AFFINITY 3 bonita-start.bat
```

```
Where 3 is the affinity mask expressed as a hexadecimal number
```

- For Linux:
  - Copy the file bonita-start.sh to a file called **bonita-start_2cores.sh**.
  - Change the last line of the file to:

```
taskset -c 0,1 bonita-start.sh 0,1
```

Performance Edition specification

If you are installing the Performance Subscription edition, you need to edit some file. Under the **TOMCAT_HOME**, you have a directory named "**setup**" : this directory is the working folder of the Platform Setup tool. This tool allow you to create bonita database and to manage Bonita configuration stored in that database. (more on this in Update Configuration chapter)

- Edit **setup/platform_conf/initial/platform_init_engine/bonita-platform-init-community-custom.properties**
- Change the value of the activeProfiles key to '**community,performance**'. No change is needed for the Community, Teamwork, or Efficiency edition. Result is

```
activeProfiles=community,performance
```

Run it.

Start the server:

- Open a shell (Linux) / cmd (Windows) prompt and go to **TOMCAT_HOME**

- Run bonita-start_2cores.bat (or .sh) if you specify a 2 core startup, or run bonita-start.bat (or .sh) from command line
- The console finish with the message : "INFOS: Server startup in xxxxx ms"

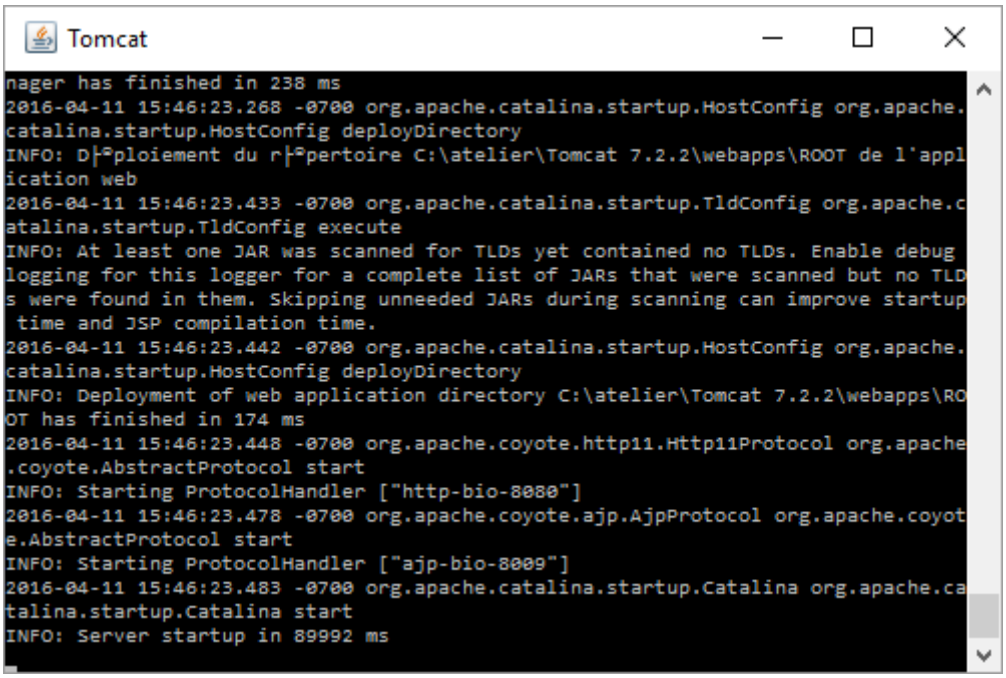


Figure 1. Server is started

- You can open your browser at the address : http://localhost:8080/bonita/

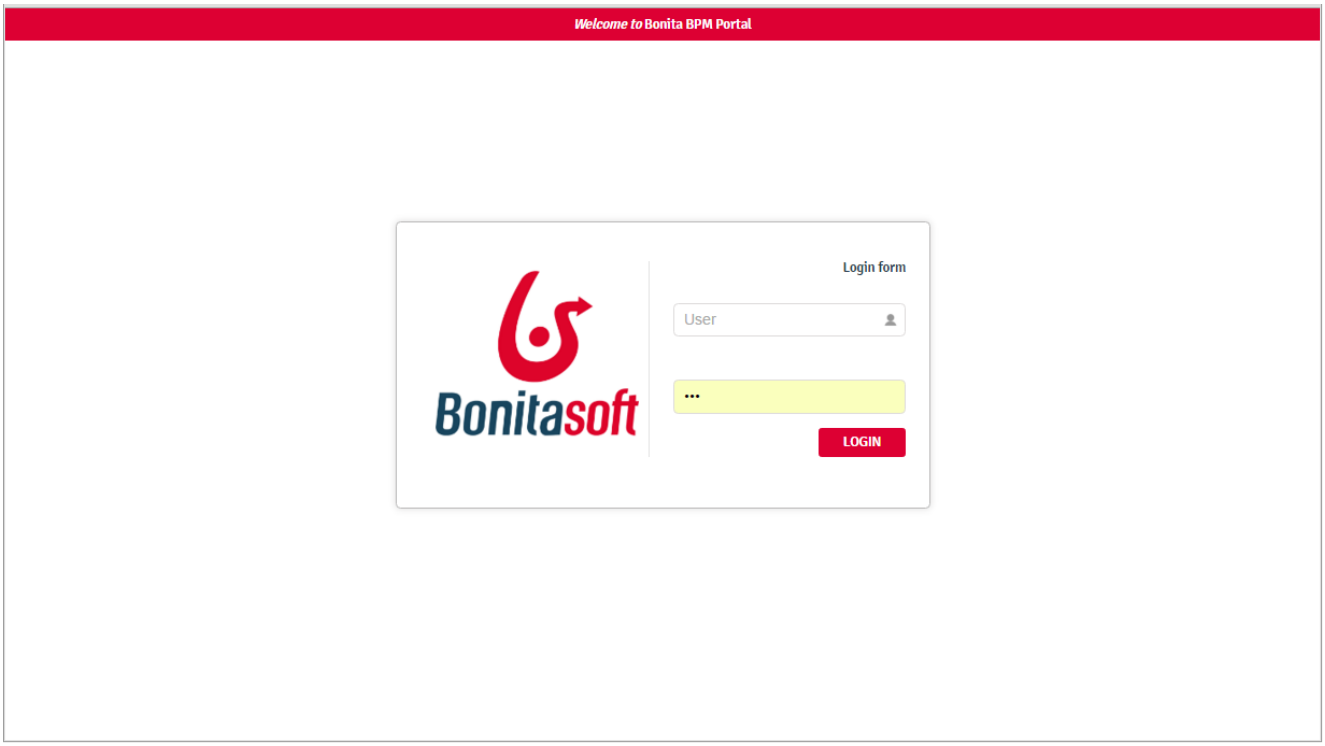


Figure 2. Home page

- Use the default tech user log : **install**, password : **install**

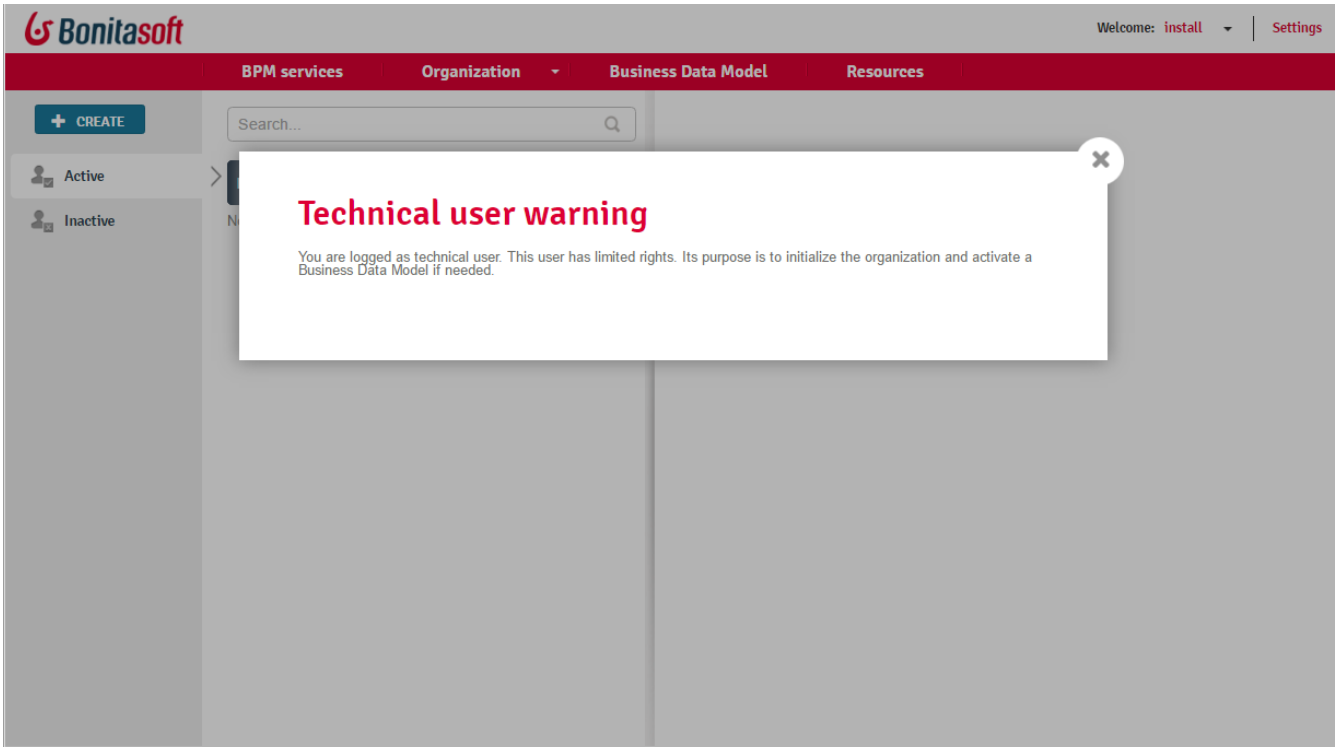


Figure 3. User install is logged

Troubleshooting

If something is not working properly you can check in **TOMCAT_HOME/logs/** for errors. One file name bonita.<Date of the day>.log and catalina.<Date of the day>.log Mains errors:

```
java.net.BindException: Address already in use: JVM_Bind <null>:8080
```

The server try to start on the port 8080, and this port is already used. Maybe the studio is started ? The Studio use the port 8080.

```
 org.bonitasoft.engine.exception.CreationException: The licence is not valid: License Error 51
Unexpected error(s). It might be due an environment issue.
License Error: No license file found.
```

You forgot to set the license, or the license is not correct.

1.4.5. Check your installation

Prepare organisation and process bar from the studio

- Close the server and open the Studio (they share ports and cannot run at the same time without changing configuration settings)
- Extract the organization from your studio (menu Organization/export)

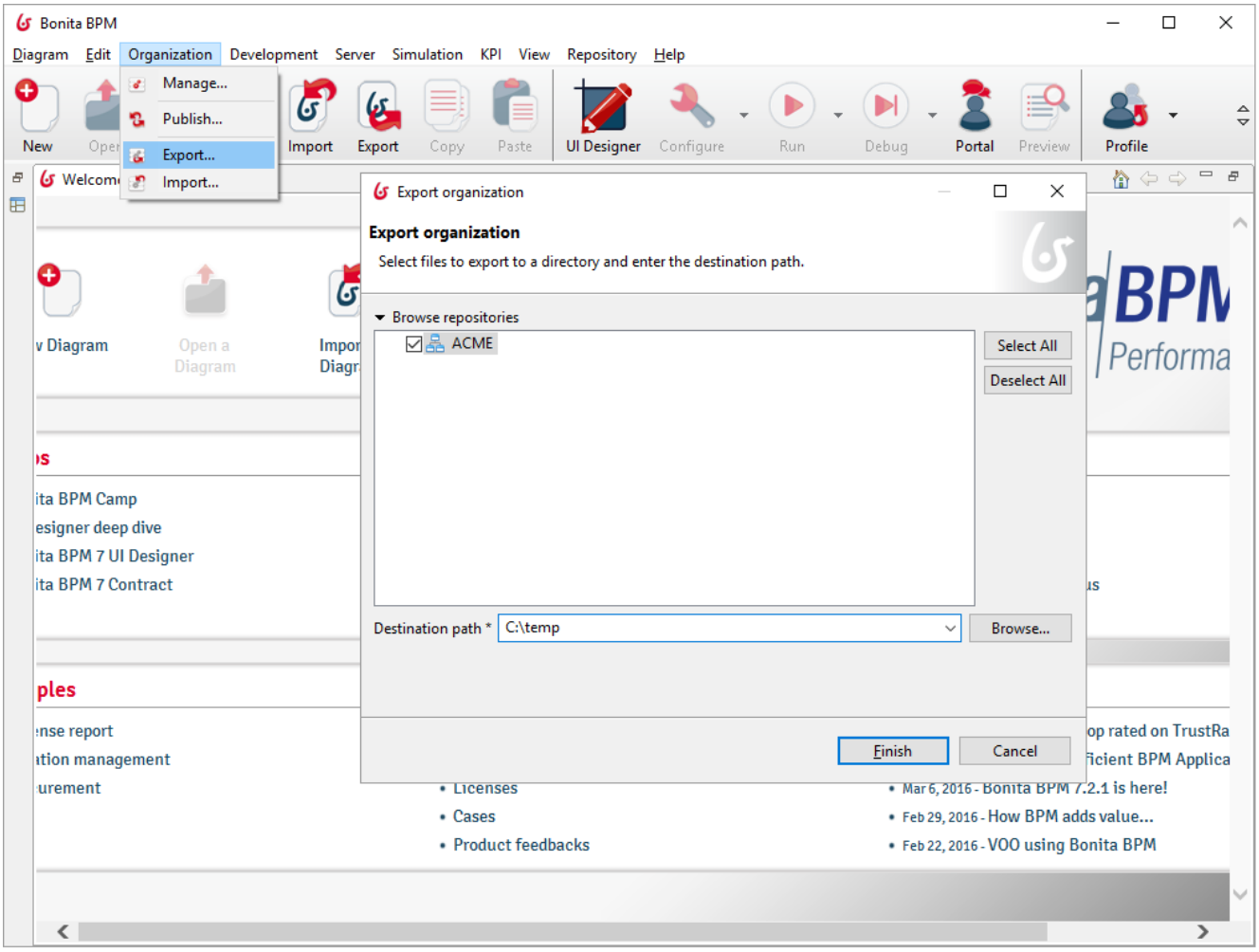


Figure 4. Export the organization

- Open one process developed with the studio and generate a bar file

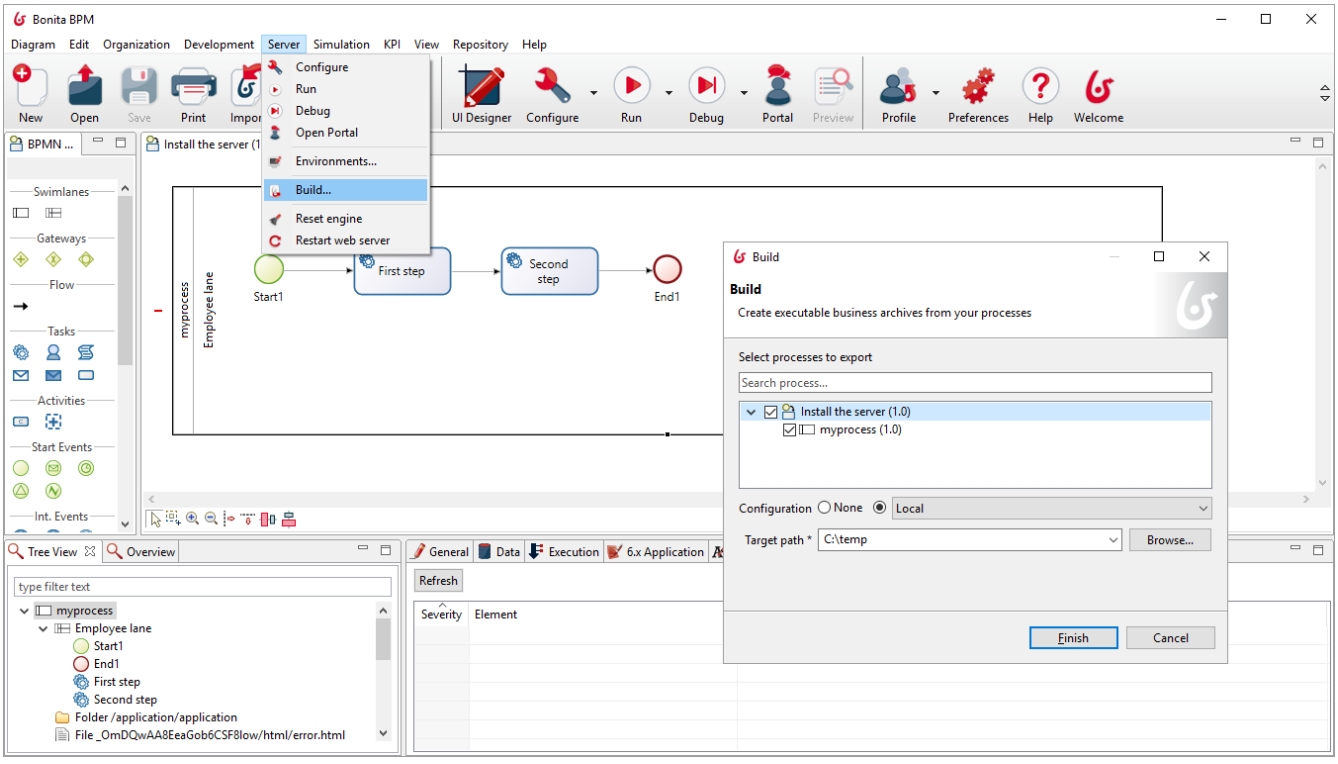


Figure 5. Export a simple process

Note : in this process, there are no human task and no overiew, then no form is included.

- Now you can close the studio and start again the server
- Install the organisation
- log as **Install** / **install**
- From the portal go to the menu **Organization**/Import-Export and import the file extracted from the Studio

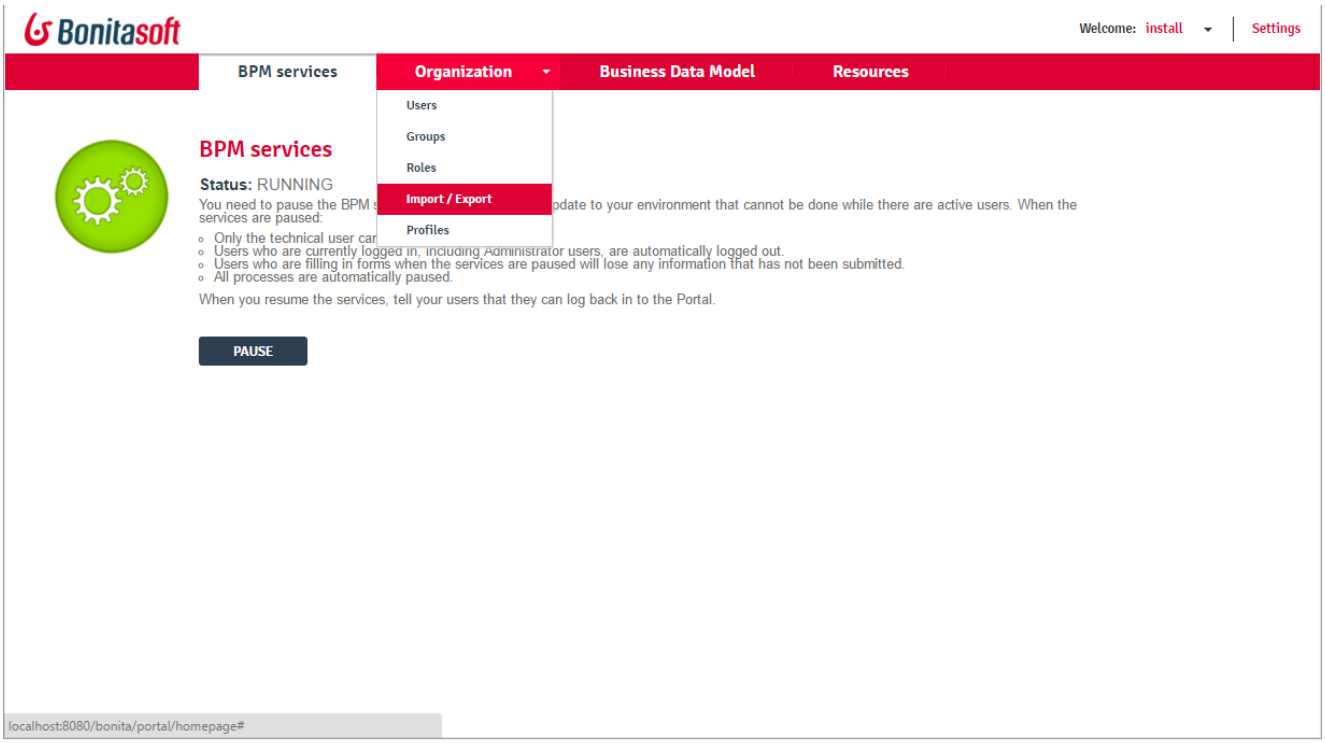


Figure 6. Load the organization

All users must be visible

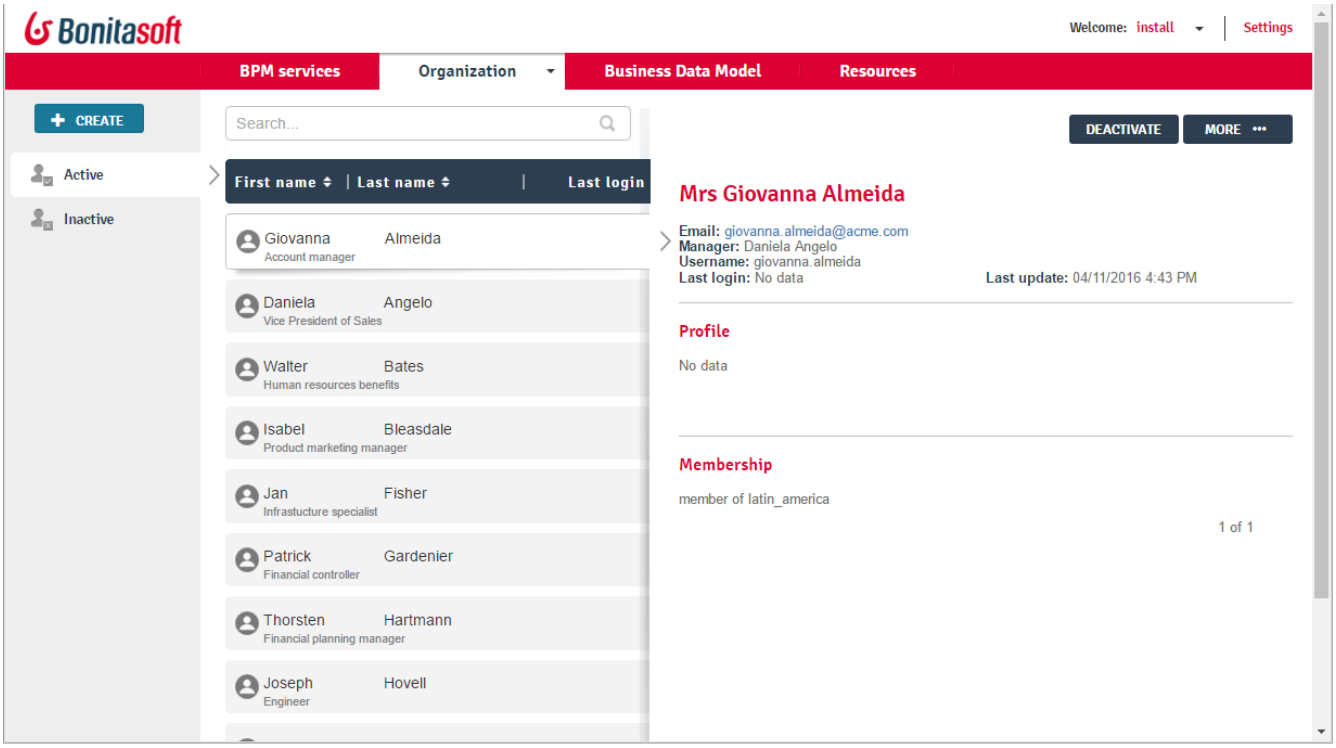


Figure 7. All users are loaded

- Associate User/Administrator profiles to Users. Go to Oranization / Profiles,

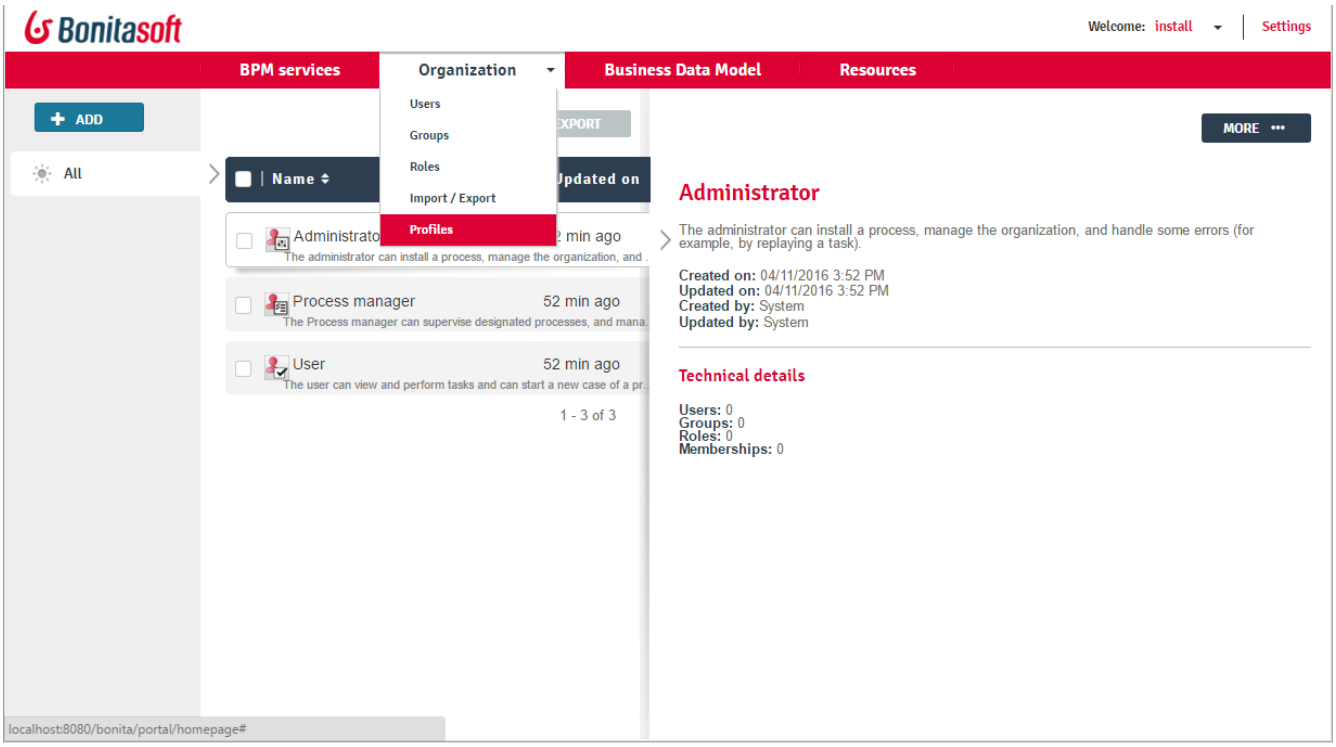


Figure 8. Profiles

Select the profile **Users**, click on **MORE**, and add all users (click on **ADD A USER**)

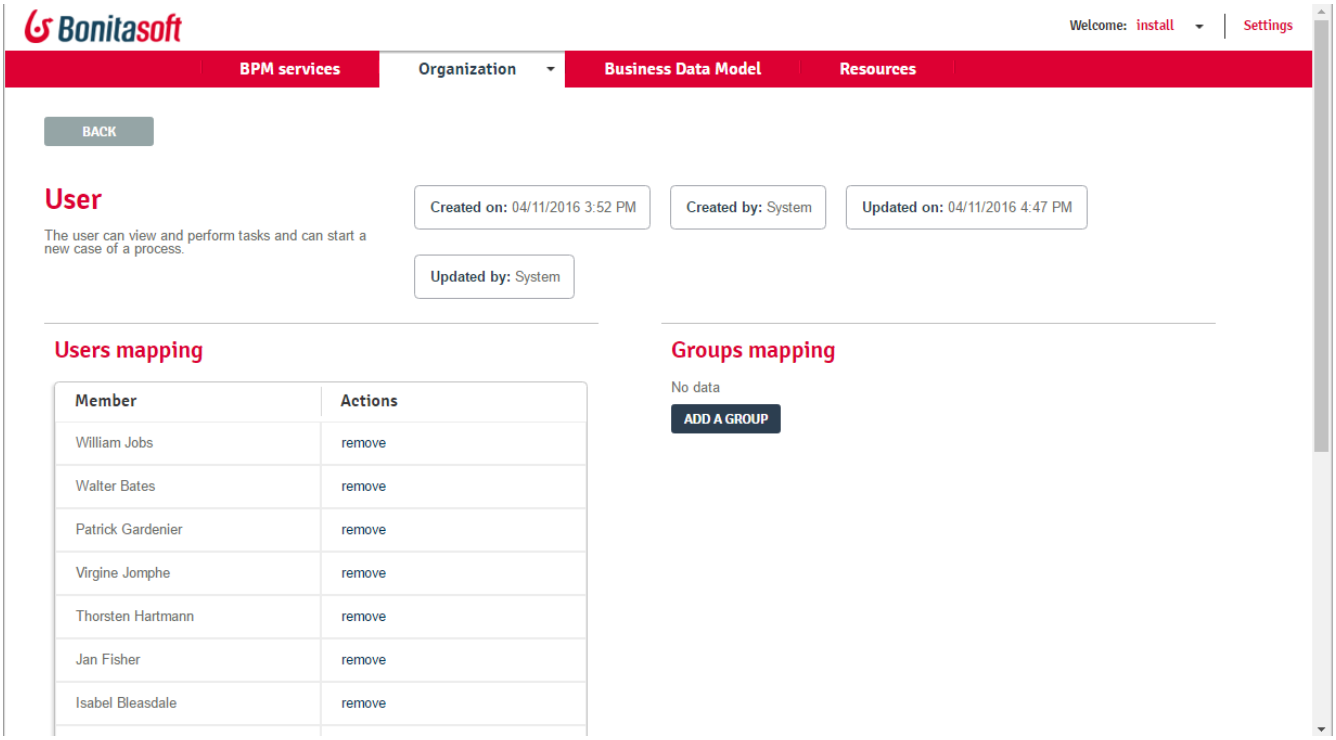


Figure 9. Users in the profile

- Go to profile Adminstator, and reference minimum **Walter.Bates** in this profile

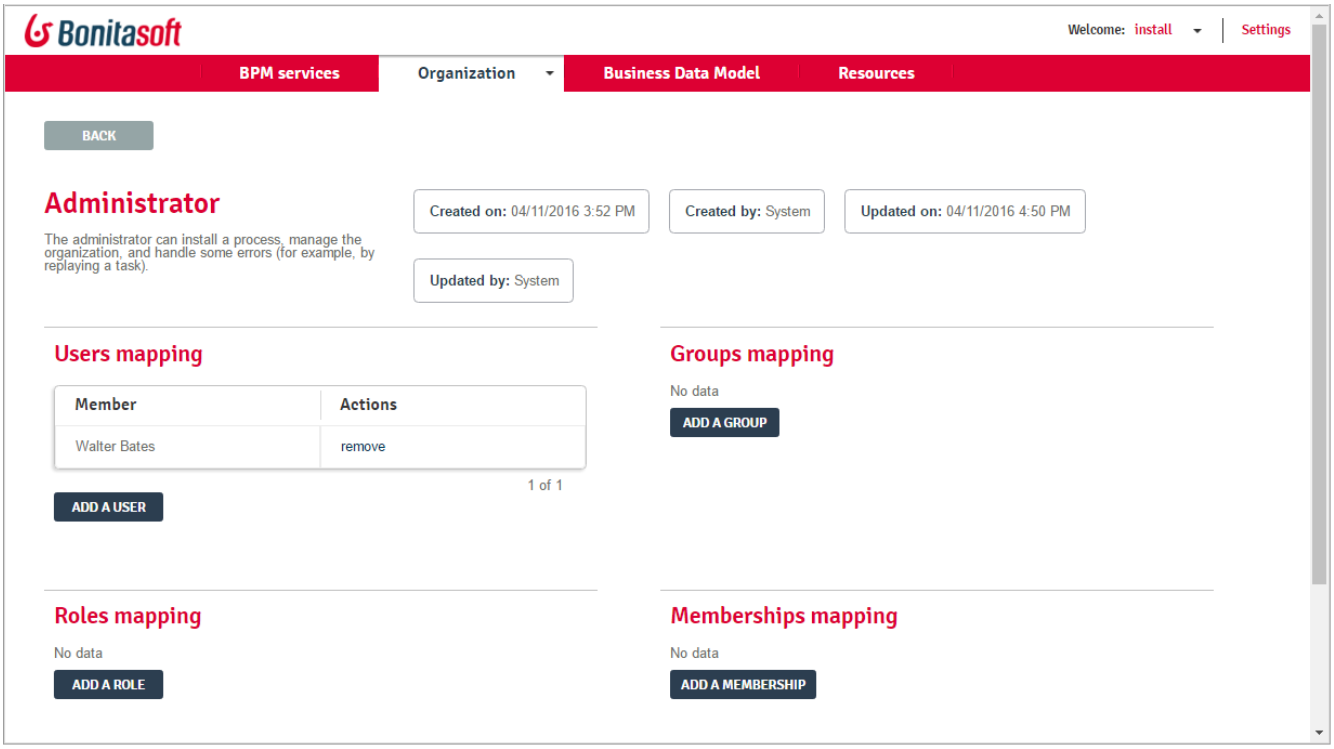


Figure 10. Users in the profile

- Logout and Login with **walter.bates**/ password **bpm**
- Install one process
- Choose the Administrator profile,

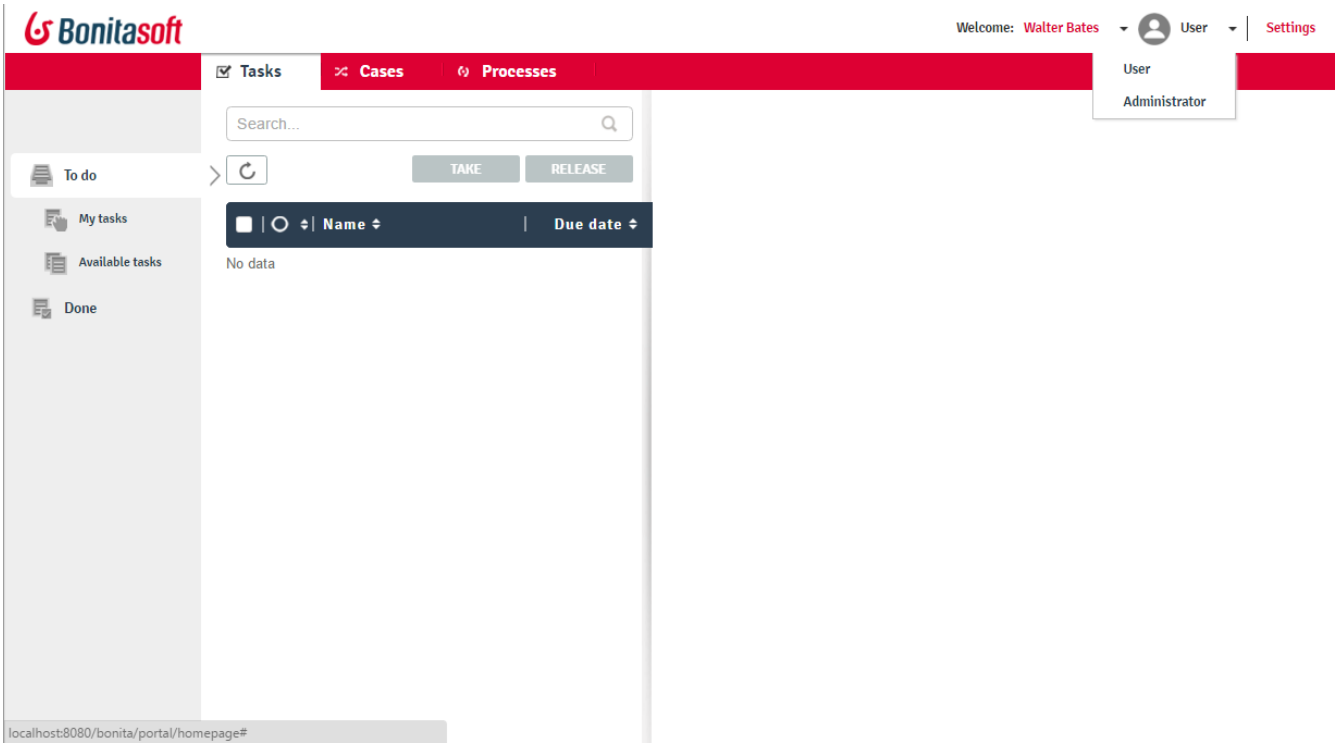


Figure 11. Choose the adminstrator profile

- Select **BPM/ Processes** tab and click on **INSTALL**

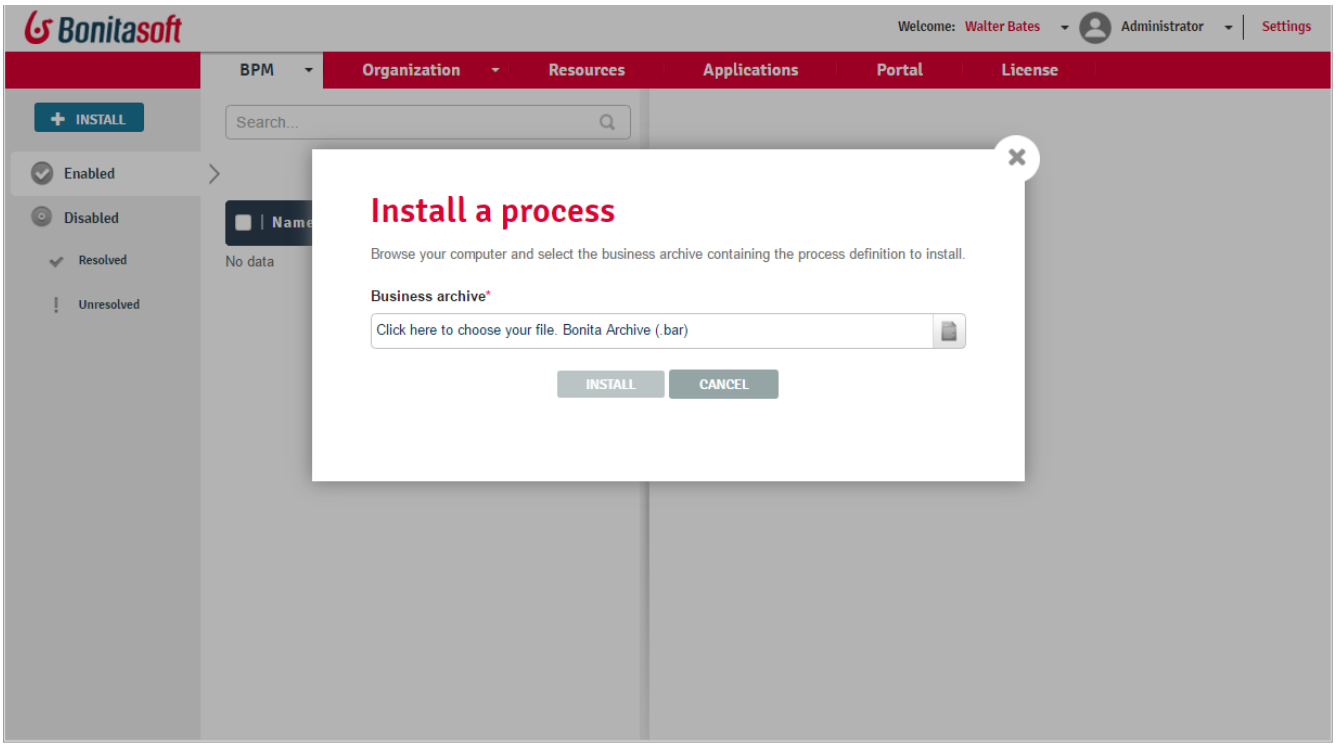


Figure 12. Install a process

- If needed resolve process actor mapping issues. Don't forget to ENABLE it

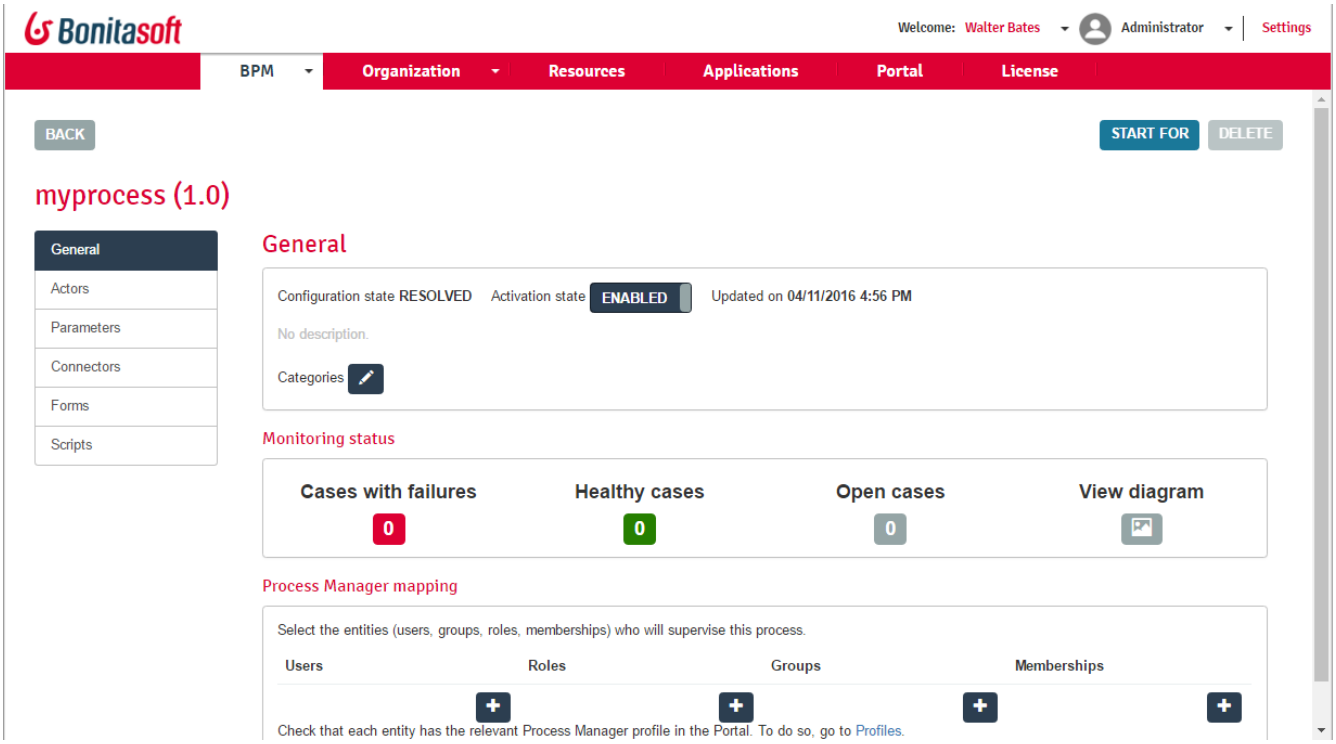


Figure 13. Check the process/ ENABLE it

- Choose the User process, go to Process Run the process and test it

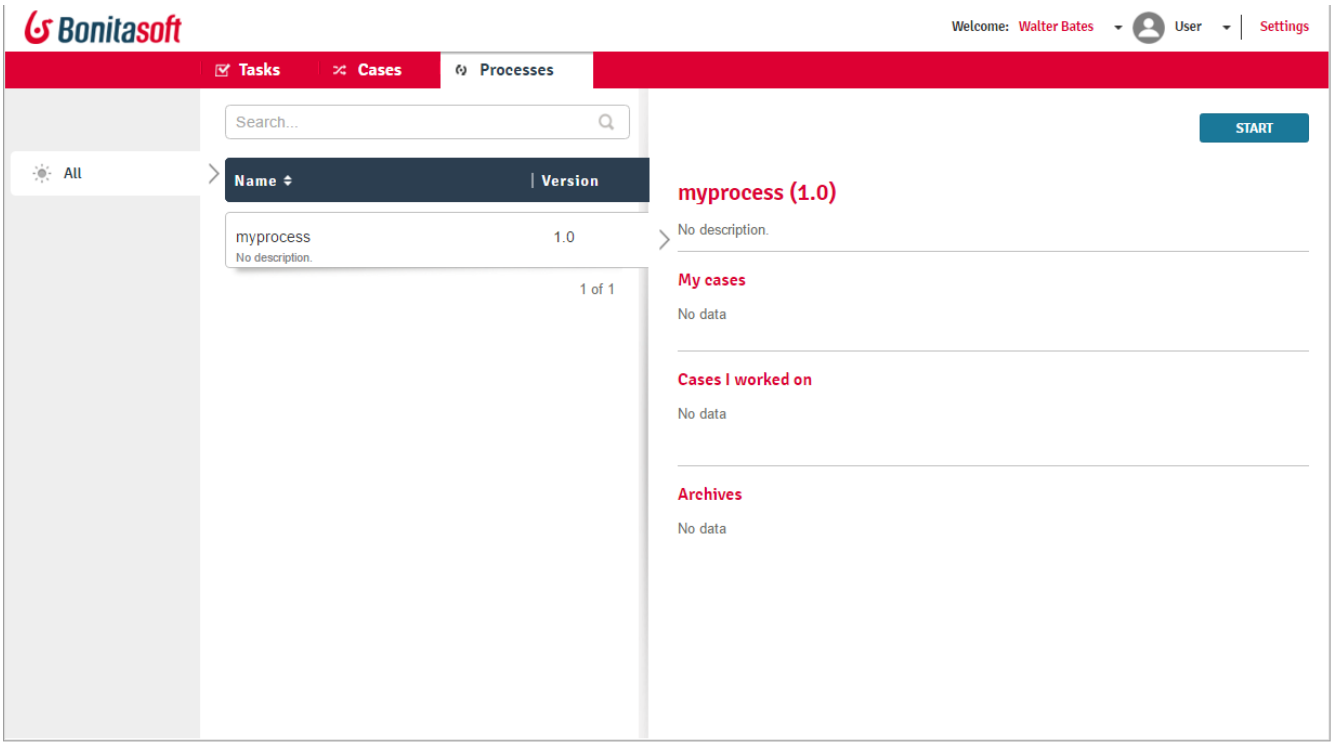


Figure 14. Start a process

1.4.6. Update configuration / license

The Platform setup tool handles the creation of the database schema and the configuration of Bonita BPM Platform.

In Tomcat bundle you can find the tool in the setup folder

It is composed of the following items:

- platform_conf/
- initial/: contains the default configuration of the Bonita BPM Platform, that can be customized and will be pushed when the database is created.
- current/: will contain configuration files after a pull from the database is made.
- licenses/: (Subscriptions only) ⇒ must contain the license file to allow Bonita BPM Platform to start without error.
- sql/: SQL scripts that are used to create the Bonita BPM database tables
- setup.sh: Unix / Mac script to run.
- setup.bat: Windows script to run.
- database.properties: contains properties to connect to the database on which the configuration is managed.

To modify the configuration of an already initialized Bonita BPM Platform, you must use the Platform setup tool as follows:

- Stop Bonita BPM Platform.
- Make sure the database.properties of the Platform setup tool points to the database used by Bonita BPM Platform.
- Run setup.sh pull or setup.bat pull. It will get the current configuration and put it in the platform_conf/current folder.
- Modify the configuration files inside the platform_conf/current folder according to your needs.
- If you are updating your license file, put it inside platform_conf/licenses, along with the existing ones. If some retrieved license files are not valid anymore, you can remove them, to delete them from the database when pushed.
- Run setup.sh push or setup.bat push.
- Start Bonita BPM Platform.

1.4.7. Tips.

- Change the port Run the server and the studio at the same time You can run the server and the studio at the same time if you change the all port in server.xml and in the configuration database. See the Bonitasoft documentation to change that.
- Passwords of technical user As part of the configuration managed by the Platform setup tool; the technical user, install, password install, can be changed. See *http://documentation.bonitasoft.com/bonitabpm/?page=first-steps-after-setup* for more information
- H2 Database access You can consult the data in the BDM by the overview of the case. By default, the server use a H2 database, exactly like the studio. In the folder "TOMCAT_HOME\lib\bonita", you can execute the h2 driver.

Under windows if the JAVA_HOME is correct, just double click on the driver (ex : h2-1.3.170.jar).

Else execute

```
java -jar h2-1.3.170.jar".
```

A page is visible in a browser:

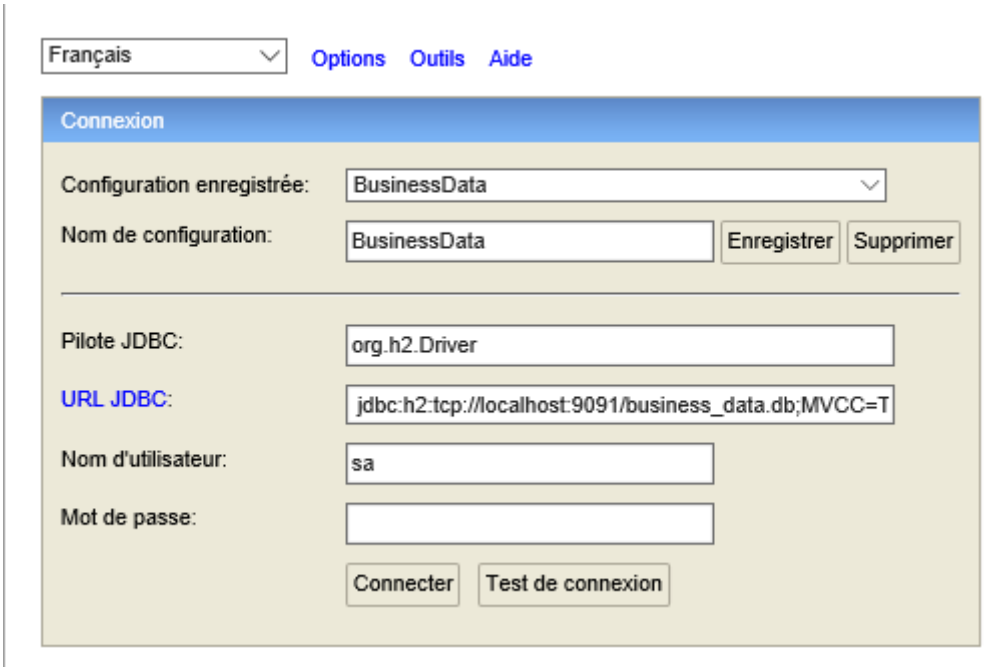


Figure 15. H2 connection

You need to change the URL JDBC by "jdbc:h2:tcp://localhost:9091/business_data.db"

Now you can see directly your data for development.

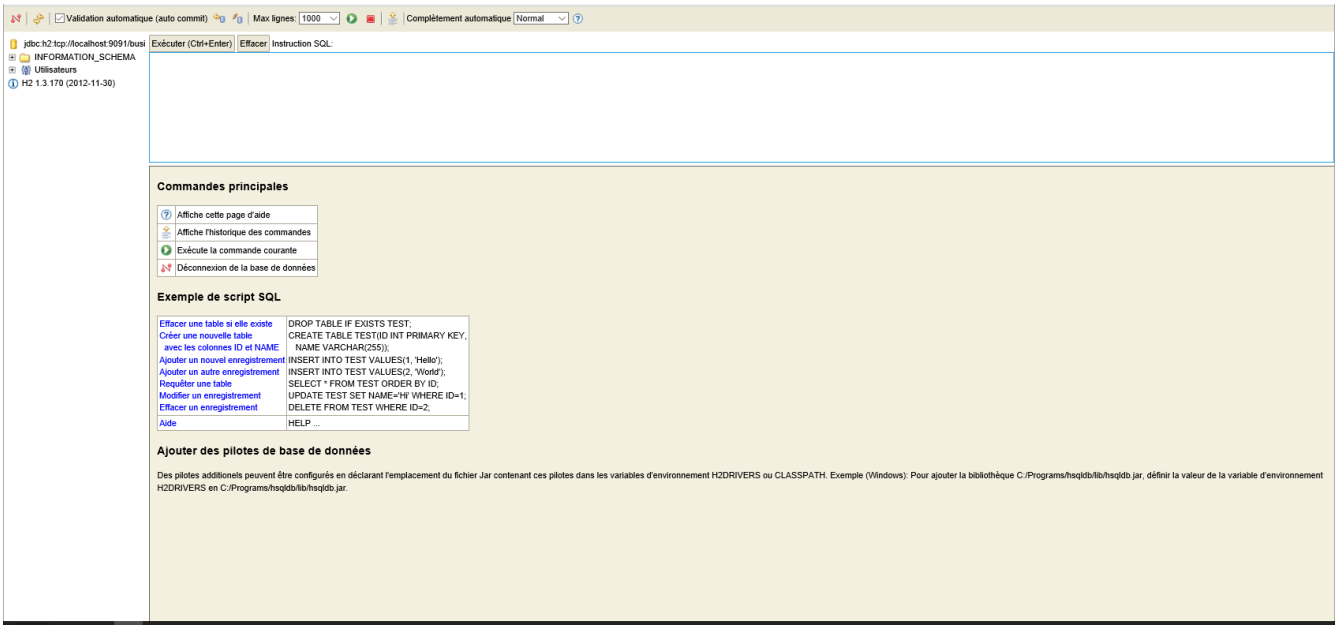


Figure 16. Display the page

Chapter 2. Connect to bonita bpm engine with java

2.1. Objective

The goal of this exercise is to create a java client and use Bonita BPM API to connect with the Bonita BPM Engine on a separate server and get the list of active users.

2.2. Instructions

- Create a java project.
- Import the Bonita BPM java dependencies.
- Create a java class with a main method where you will:
- Connect to the Bonita BPM Engine.
- Retrieve the list of active users.

2.3. Correction

2.3.1. Create a maven project on eclipse

the correction is based on Eclipse IDE, feel free to use the IDE that you prefer.

1. In Eclipse click on "**New→Project→Other**" and choose "**Maven Project**".

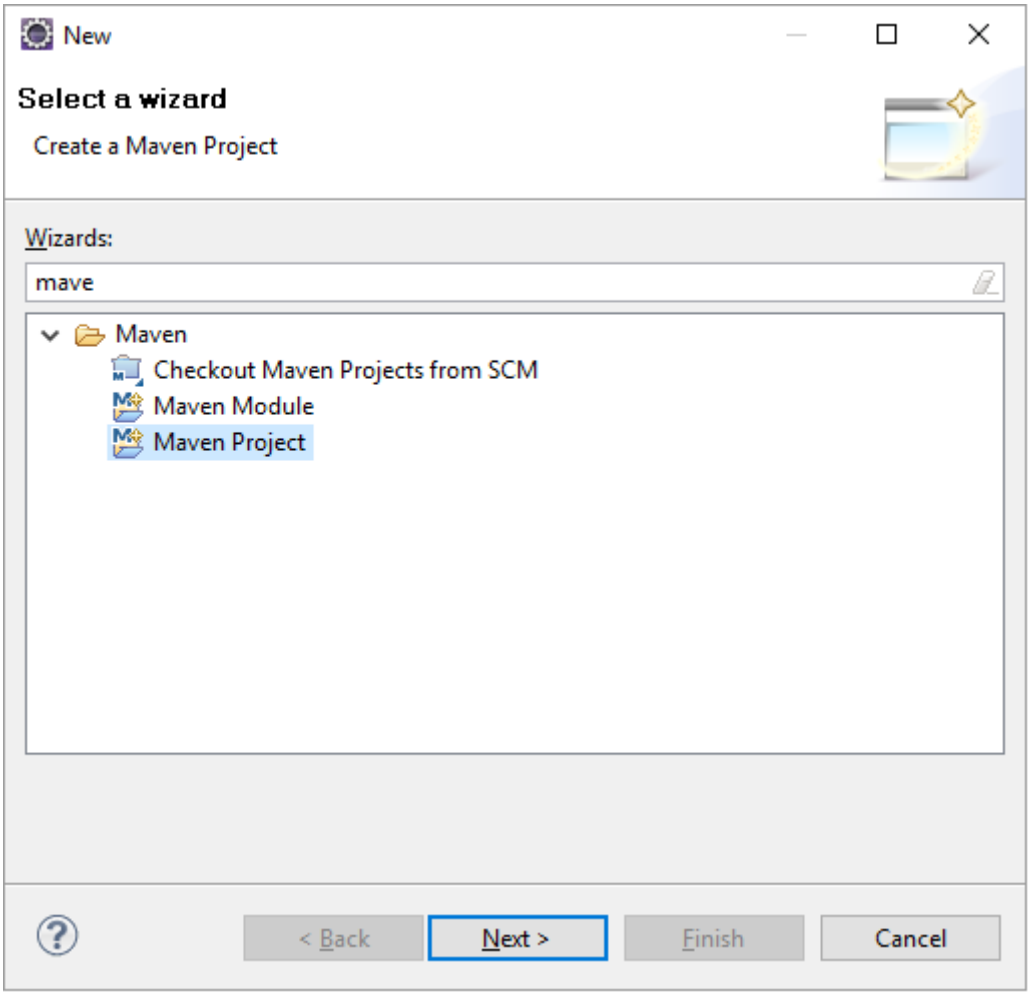


Figure 17. Create the project

1. Select the "**Create a simple project (skip archetype selection)**"

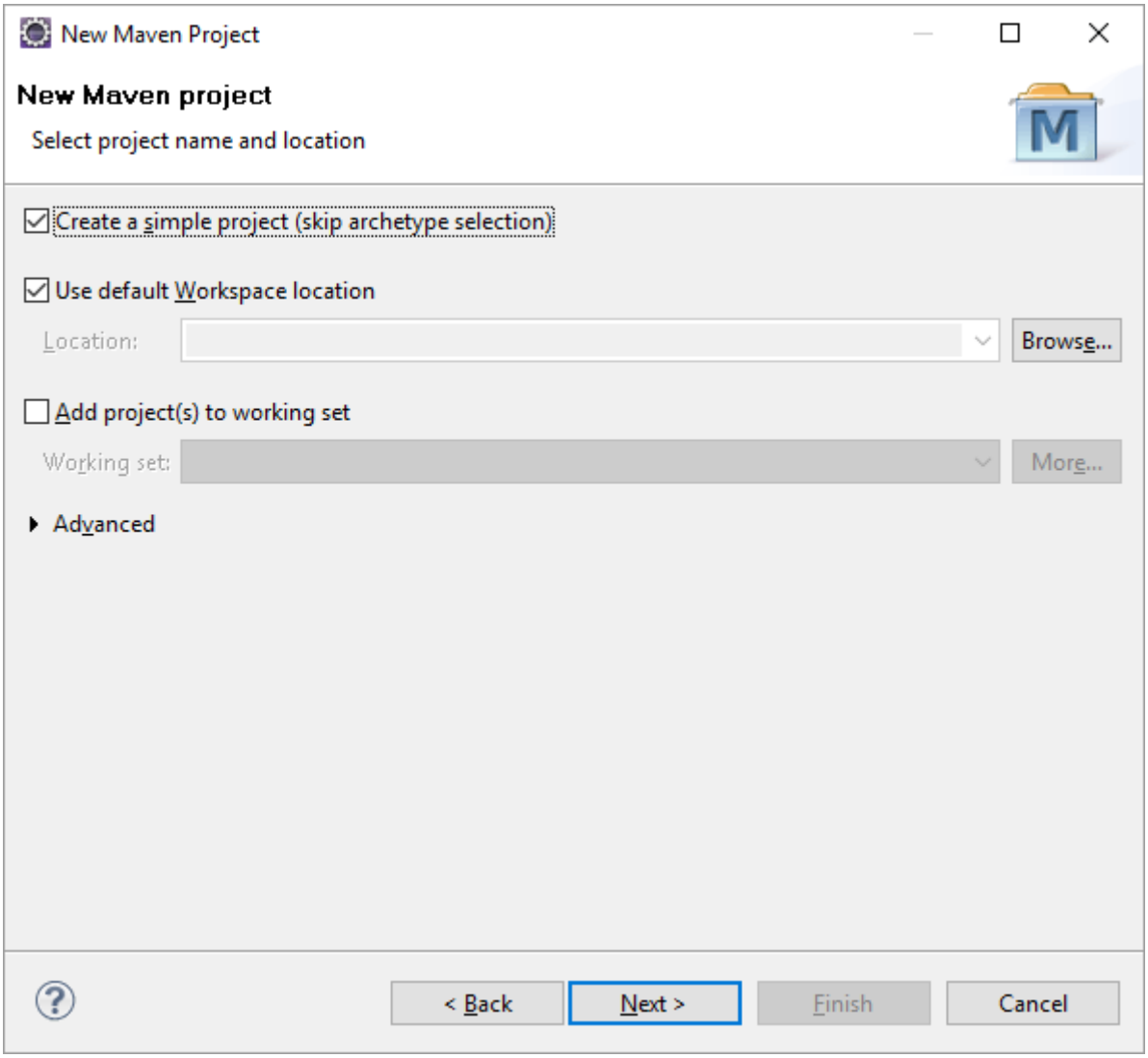


Figure 18. Default Archetype selection

1. Give "**org.bonitasoft.training**" as groupId, and "**bonitaTestApi**" as artifactId, click on finish.

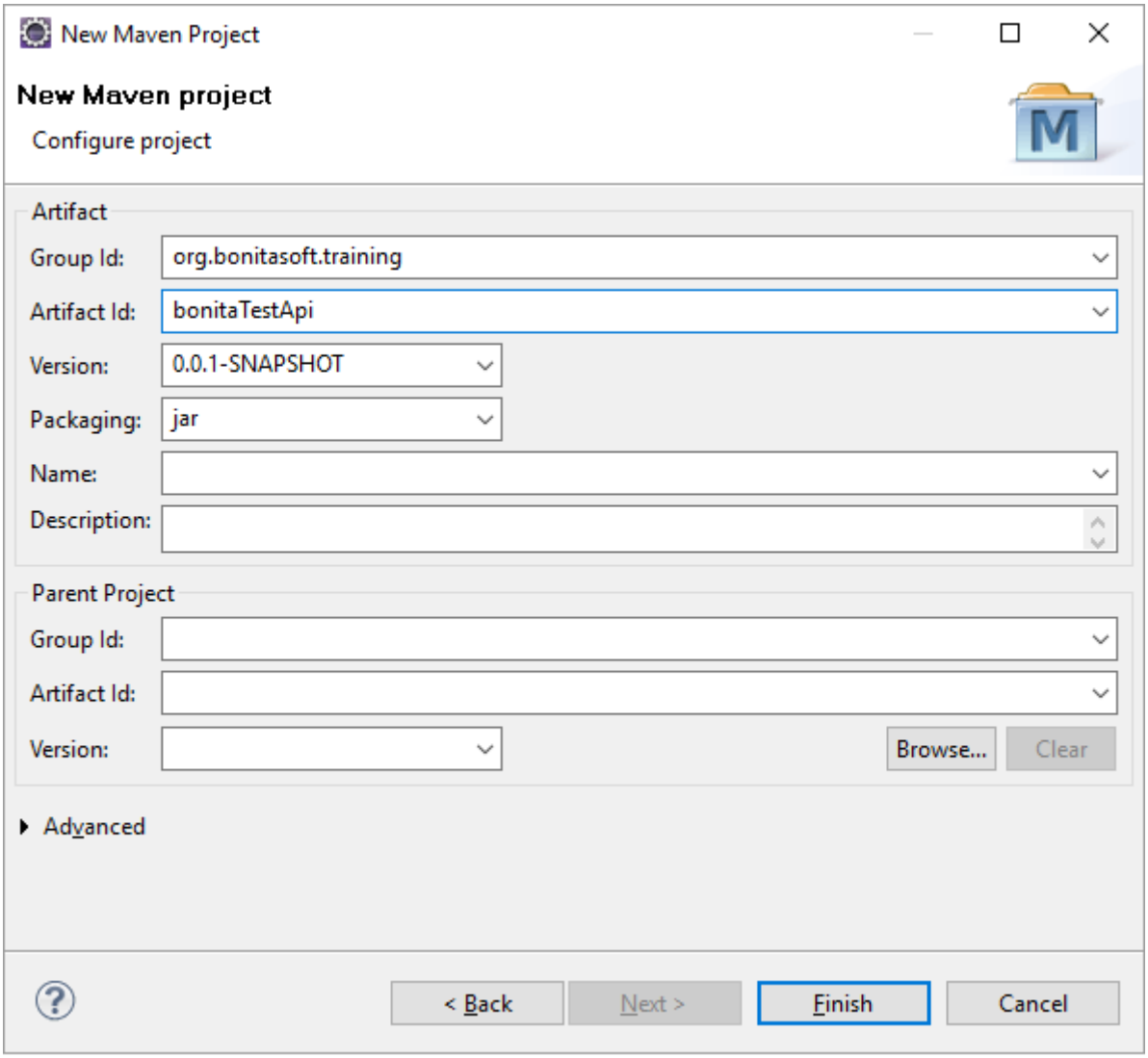


Figure 19. All parameters

- Update the pom.xml, insert the dependencies:

```
<dependencies>
    <dependency>
        <groupId>org.bonitasoft.engine</groupId>
        <artifactId>bonita-client</artifactId>
        <version>Z.X.Y</version>
    </dependency>
</dependencies>
```

Remember to replace the Z.X.Y with your Bonita BPM version

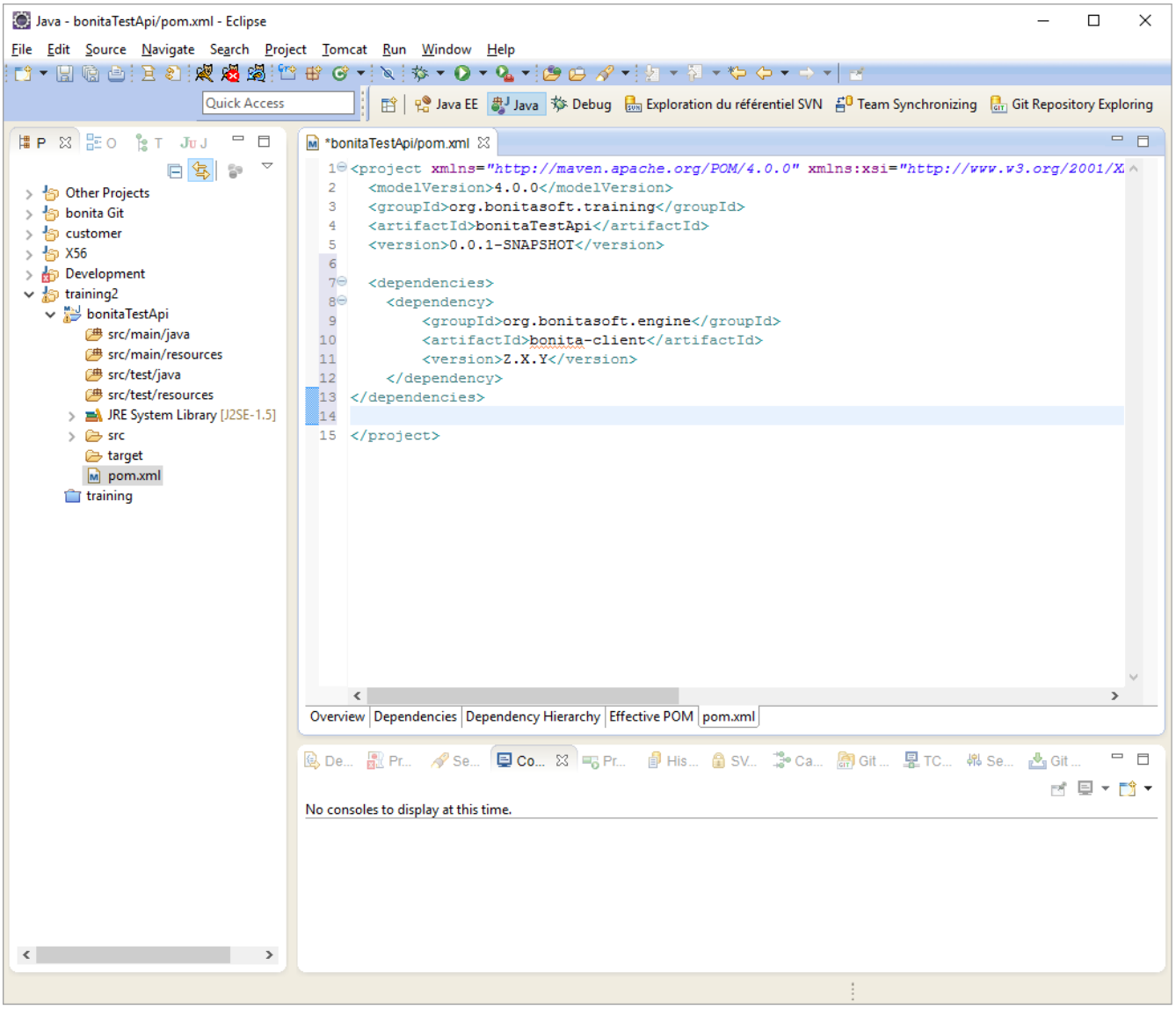


Figure 20. Update the pom.xml

1. Update the Maven project : right click on the project, then select Maven → Update project

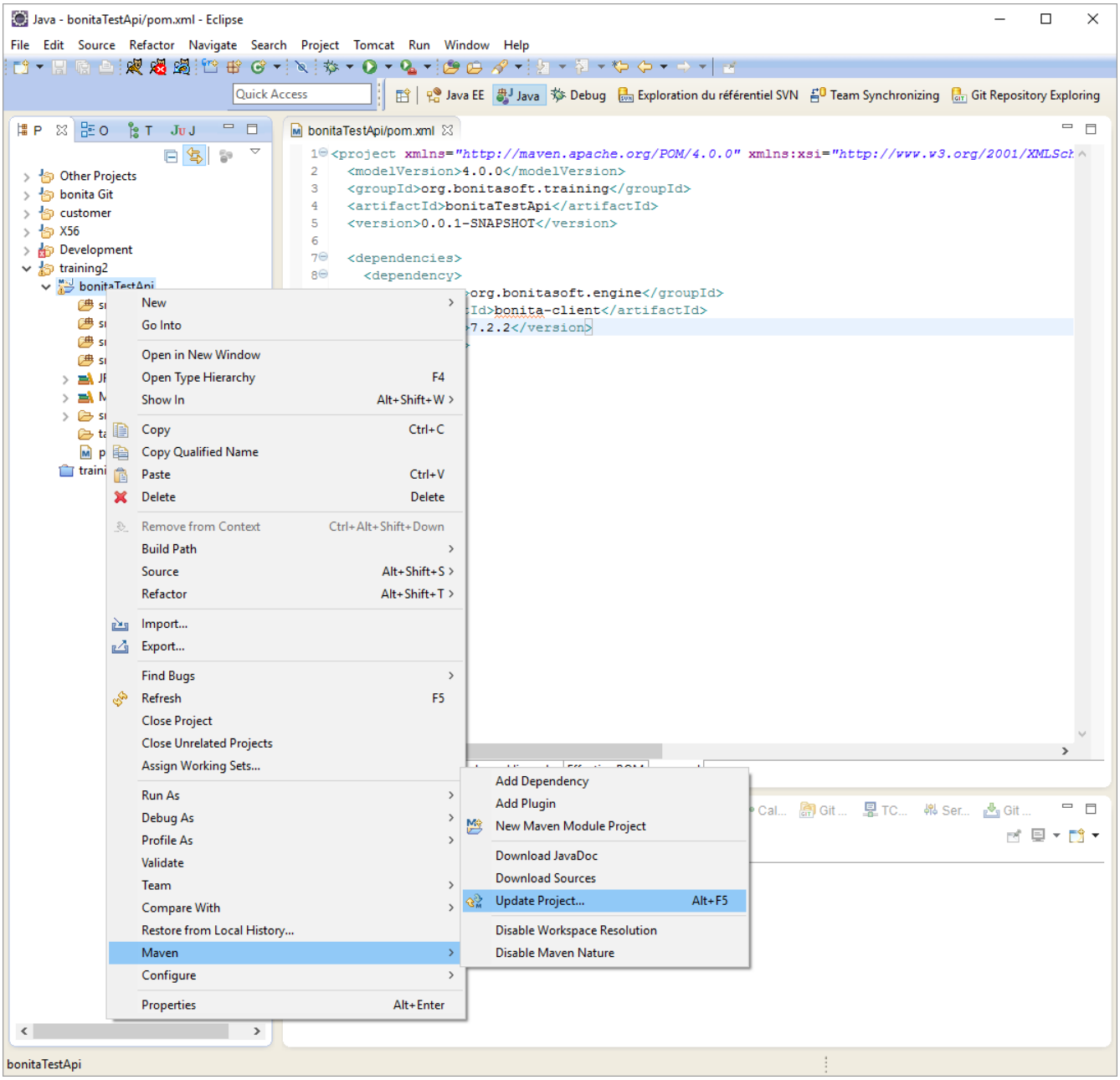


Figure 21. Update the maven project.xml

All the

2.3.2. Create the java class

Create a java class with a static void main method, there write the code to connect to Bonita BPM Engine and retrieve the user list. Create a class TestUserList in the package com.bonitasoft.training

Try not to copy the whole block of code at once, but block by block in order to better understand the single steps

```
package org.bonitasoft.training;

import java.util.HashMap;
import java.util.List;
import java.util.Map;
```

```
import java.util.logging.Level;
import java.util.logging.Logger;

import org.bonitasoft.engine.api.ApiAccessType;
import org.bonitasoft.engine.api.IdentityAPI;
import org.bonitasoft.engine.api.LoginAPI;
import org.bonitasoft.engine.api.TenantAPIAccessor;
import org.bonitasoft.engine.identity.User;
import org.bonitasoft.engine.identity.UserCriterion;
import org.bonitasoft.engine.session.APISession;
import org.bonitasoft.engine.util.APITypeManager;

public class TestUserList {
    public static void main(String args[]){
        Logger logger = Logger.getLogger("TestUserList");
        try{

            /*Block 1: set API type */
            Map<String, String> map = new HashMap<String, String>();
            map.put("server.url", "http://localhost:8080");
            map.put("application.name", "bonita");
            APITypeManager.setAPITypeAndParams(ApiAccessType.HTTP, map);

            /*Block 2: Authentication */
            // Set the username and password
            final String username = "william.jobs";
            final String password = "bpm";
            // get the LoginAPI using the TenantAPIAccessor
            final LoginAPI loginAPI = TenantAPIAccessor.getLoginAPI();
            // log in to the tenant to create a session
            final APISession session = loginAPI.login(username, password);

            /*Block 3: Identity api and list of users */
            // get the identityAPI bound to the session created previously.
            final IdentityAPI identity = TenantAPIAccessor.getIdentityAPI(session);

            // get the list of users
            final List<User> user =
identity.getUsers(0,30,UserCriterion.FIRST_NAME_ASC);

            // display the list of userNames

            /*Block 4: Print the list of users */
            for(int i=0; i< user.size(); i++) {
                System.out.println(user.get(i).getUserName());
            }

            /*Block 5: Logout */
            loginAPI.logout(session);
        }
        catch(Exception e){
```

```
            logger.log(Level.SEVERE, "ERROR RETRIEVING USERS", e);
        }
    }
}
```

2.3.3. Execute the project

Before the run, be sure you have a bonita bpm server instance running (standalone server or Bonita BPM Studio).

On the console you should get the user list of Bonita BPM organization.

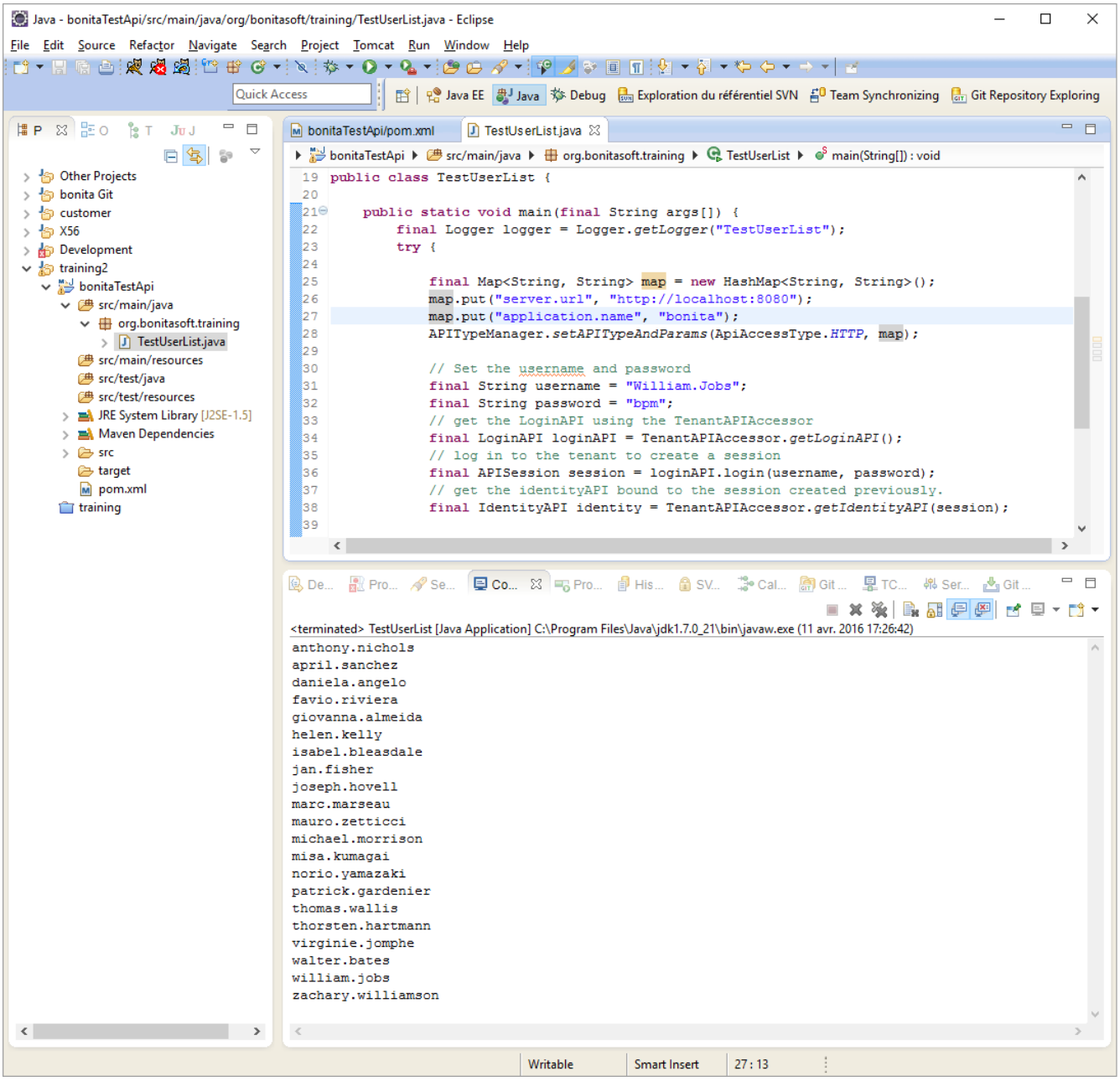


Figure 22. All users are returned.xml

Chapter 3. Using Bonita REST API

3.1. Prerequisites

You must have Bonita BPM Studio SP installed and started.

3.2. Objectives

The goal of this exercise is to become familiar with using REST to communicate and interact with the Bonita Engine.

3.3. Instructions

- Choose a Rest Client
- Connect to Bonita BPM engine
- Create a new user
- Get a list of users
- Get the List of Installed Processes
- Create a case
- Get the List of Pending Tasks
- Set Case Variable Value
- Logout

3.4. Correction

3.4.1. Download the REST client

Use a rest client plugin in your browser. For this exercise we will use the firefox RestClient plugin, but you are free to use any browser based or standalone REST client. (We recommend you do not use REST Easy for Firefox as it had some functional issues when tried with this exercise)

If REST Client is not already installed in your browser, you can install it via the menu (top right) and the Add-ons button.

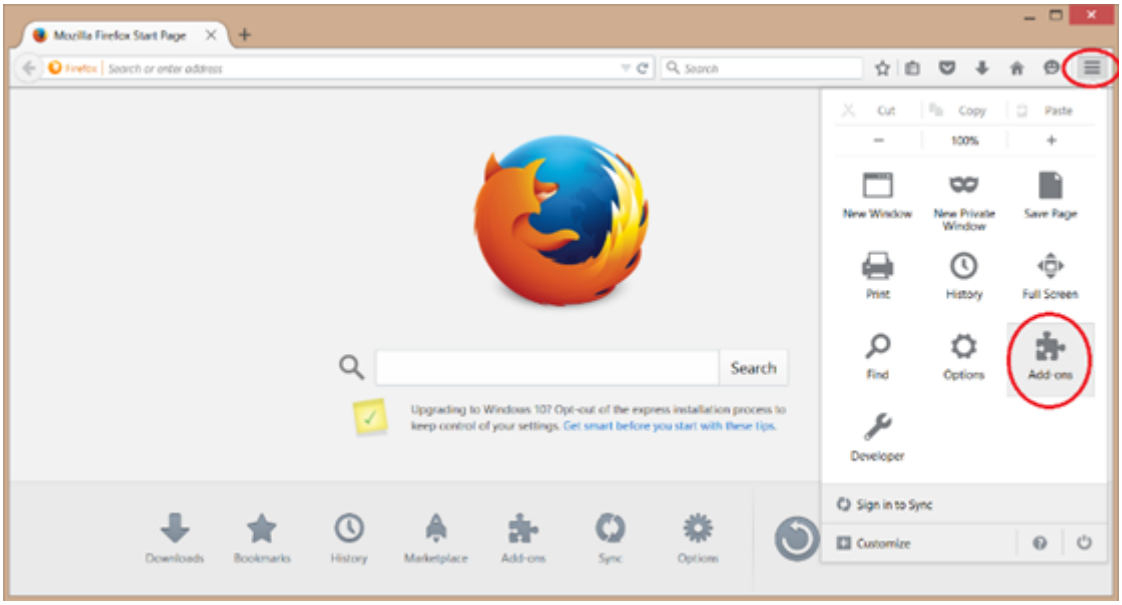


Figure 23. REST Client

Search for and Install REST Client:

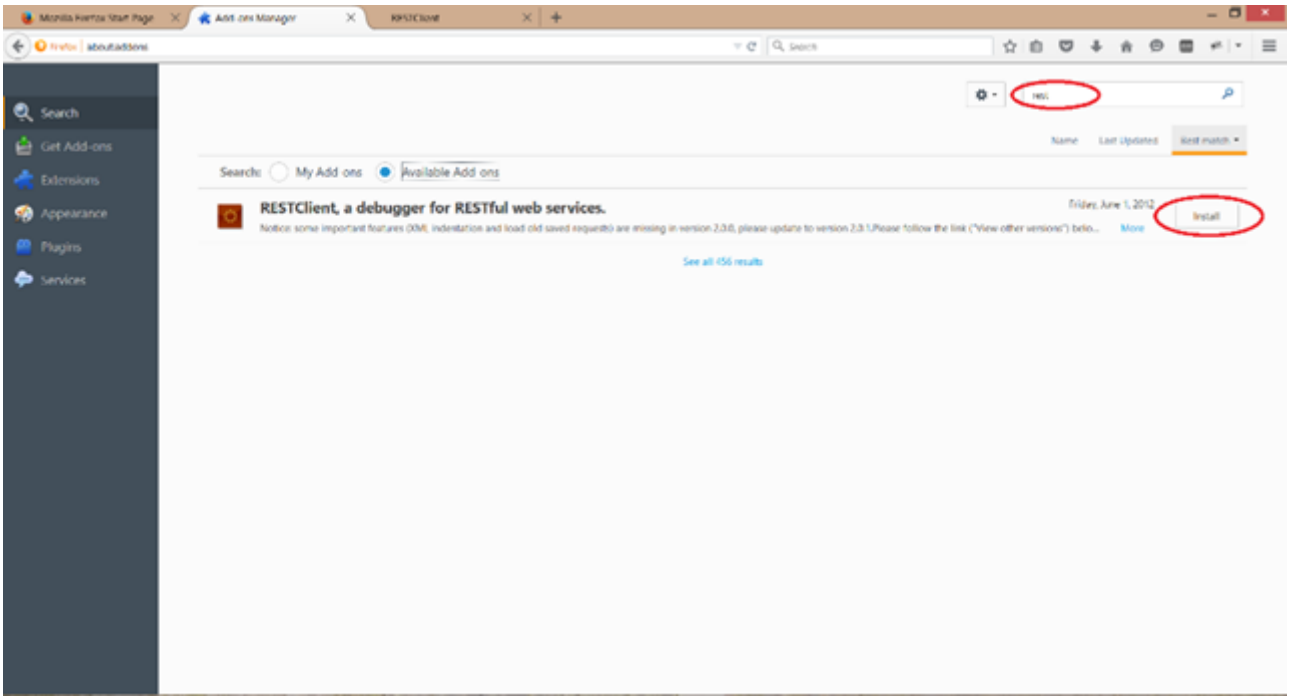


Figure 24. REST Client icon

After you restart Firefox Button to activate REST Client will appear beside the Menu button on your browser :

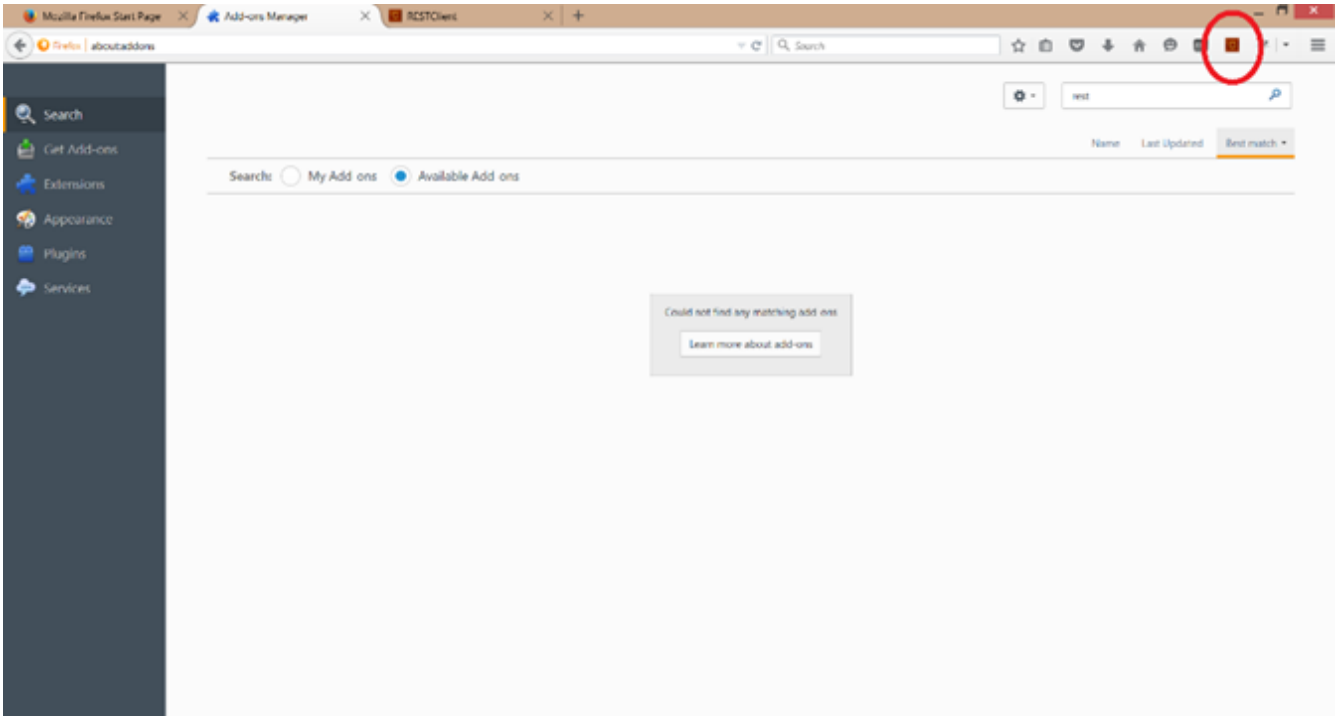


Figure 25. REST Client icon

3.4.2. Connect To The Engine

Click on the REST Client button to open the REST client page. The first operation is to connect to the Bonita Engine. A SessionID is created, and that SessionID will be sent back to the server on each subsequent call. See the documentation WEB REST API on the Bonita Documentation Website for more details. Configure the REST call as follows:

Item	**Value**
URL	http://localhost:8080/bonita/loginservice?
Method	POST
Content type	application/x-www-form-urlencoded

Note : setting the content type will require you to add a header to the request. Add the header via the Headers menu at the top of the REST Client page.

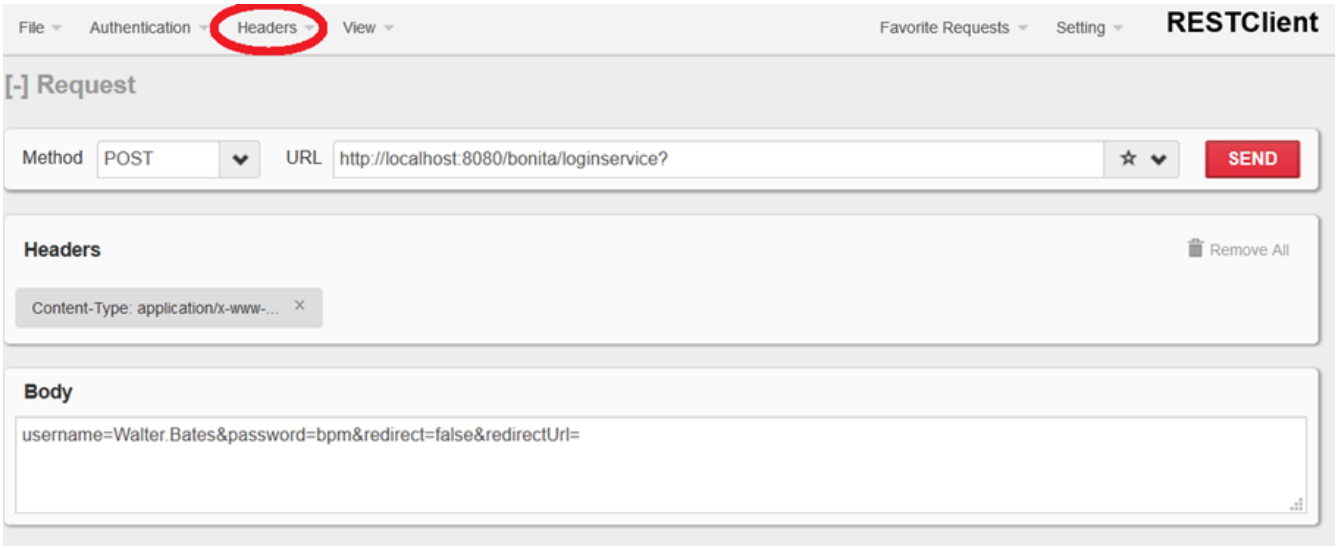


Figure 26. Access the header

And click on the button

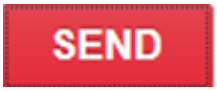


Figure 27. Send

Result : You should receive a successful answer: HTTP/1. 1 200 OK

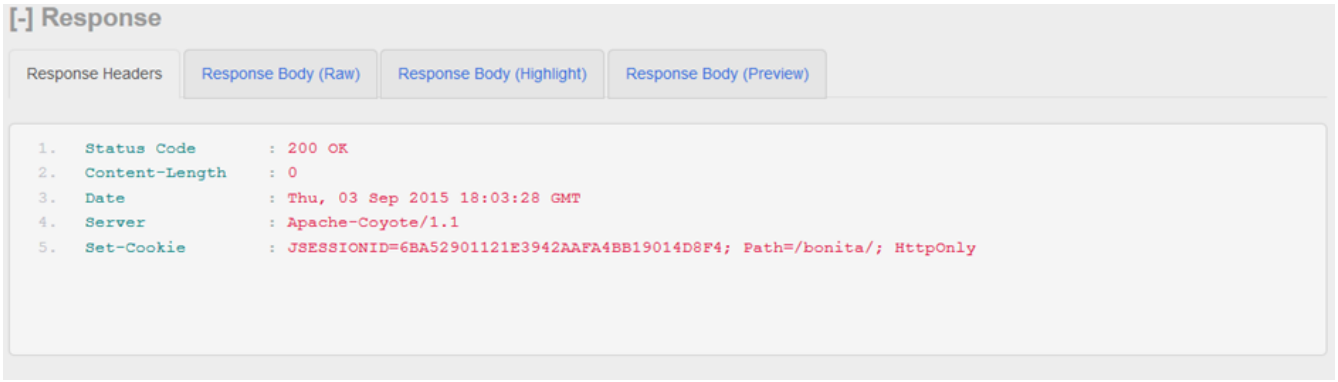


Figure 28. Status 200

Extract the API SessionId from the Set-Cookie line in the response header. As long as the Session ID is set as a cookie in the header, the client can access the REST API.

OR

Using a second tab in the browser, just access the Bonita Portal, and connect using Walter.Bates. Then, the cookie is created and call from the REST CLIENT is worling (the browser share the cookie between tab).

3.4.3. Create a New User

Using the Identity API, create a user. Use these values with the content type and the cookie set in the header.

Item	Value

URL	http://localhost:8080/bonita/API/identity/user
Method	POST
Content type	application/json;charset=UTF-8
Body	{"userName":"john.doe","password":"bpm", "password_confirm":"bpm","firstname":"John","lastname":"Doe"}

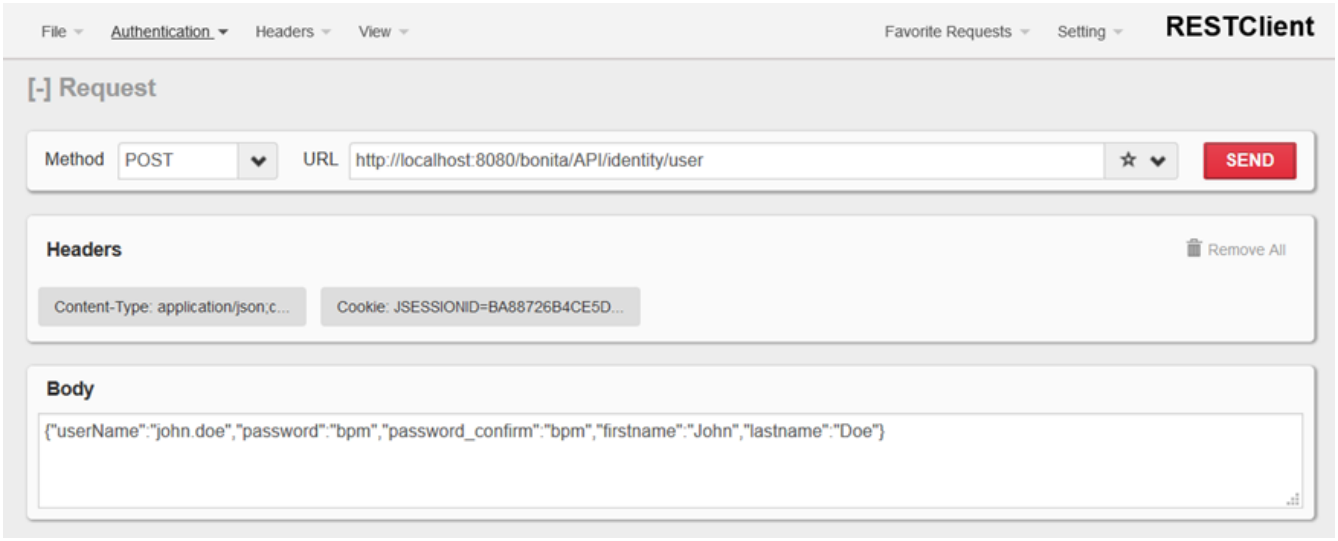


Figure 29. Create a user

The result must be HTTP/1.1 200 OK in the response header :

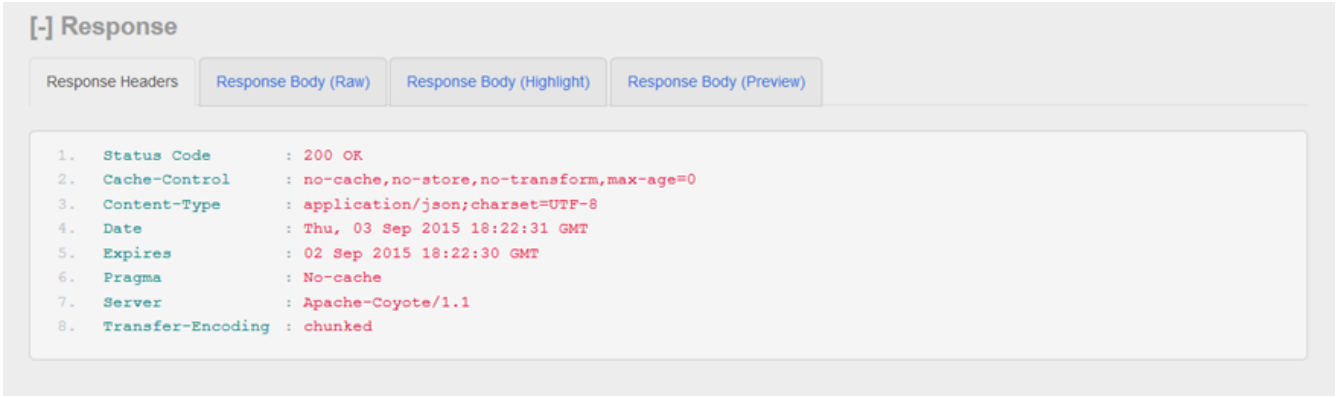


Figure 30. Result 200

But you may also navigate the response body for more details.

Confirm that the user was created by logging into the portal as an administrator and browsing to the (Inactive) Users in the Organization:

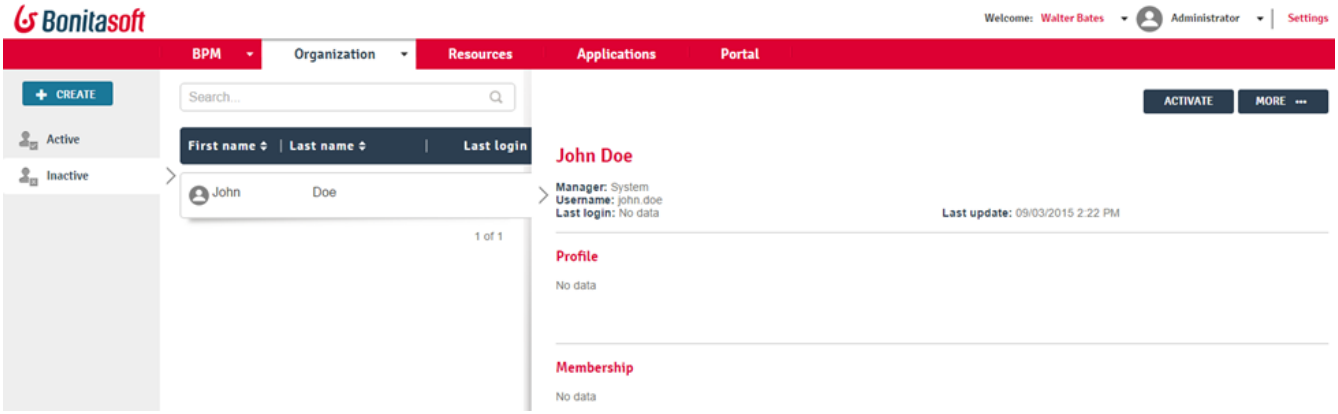


Figure 31. User John Doe

3.4.4. Get a List of Users

Send the following API call as a GET message (keep the headers, but the request body is not used for a "Get" call.

Be careful with copy/paste, there are spaces in the URL that you should get rid of

Item	Value
URL	http://localhost:8080/bonita/API/identity/user?p=0&c=10&o=userName%20ASC&f=enabled%3dtrue
Method	GET
Content type	
Body	

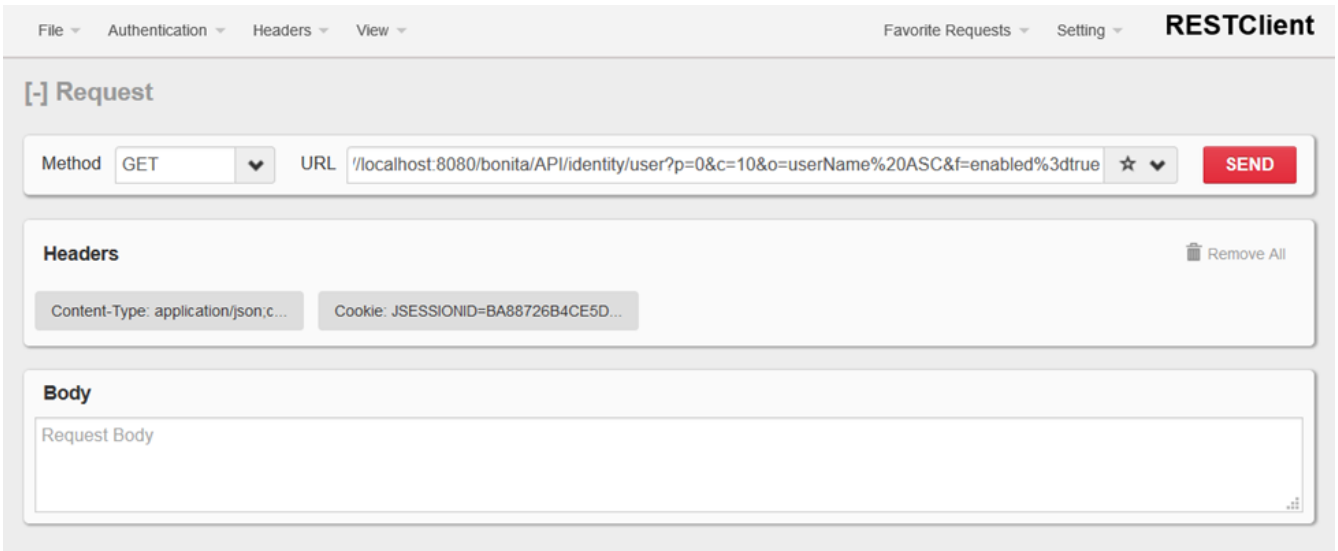


Figure 32. Get list of users

View the user details in the response body.

Note : the function return a list, so parameter "p" is mandatory. This parameter is the Page number, counting from 0. "c" is the number of item per page, and "o" is used to give a sort key.

3.4.5. Get the List of Installed Processes

Use the GET method on the URL

Item	Value
URL	http://localhost:8080/bonita/API/bpm/process?p=0
Method	GET
Content type	
Body	

And then run your request: you get the list of all processes in JSON format

Result is:

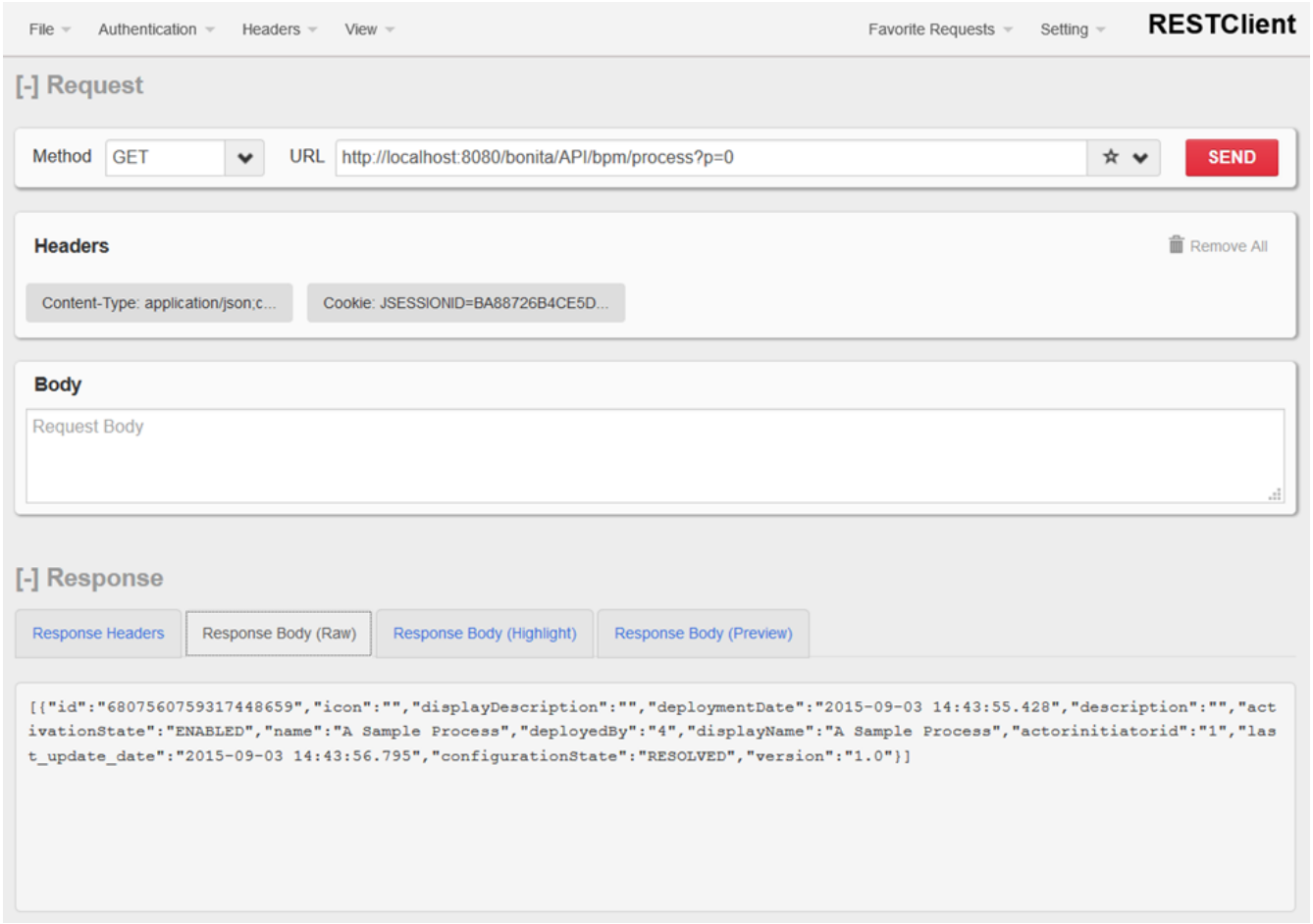


Figure 33. List of processes

3.4.6. Create a Case

To start a new case you must specify the URL, you must use the POST method. As content type, you must use: application/json;charset=UTF-8. In the body you must add the process definition identifier as parameter, you can take it from the process definition ID in response in Step 5

Item	Value

URL	http://localhost:8080/bonita/API/bpm/case
Method	POST
Content type	application/json;charset=UTF-8
Body	{"processDefinitionId":7708373484763319816}

Result is

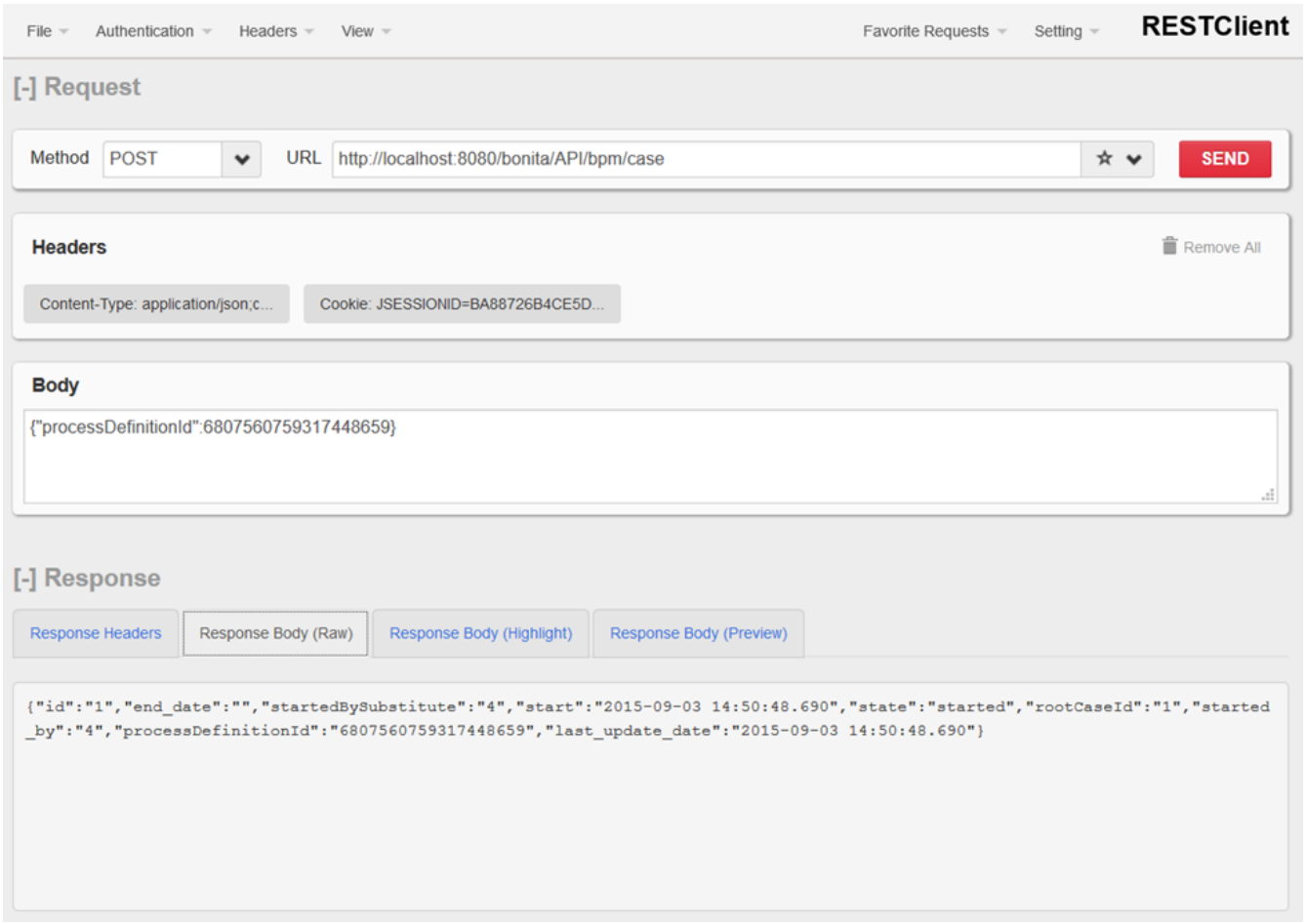


Figure 34. Create a case

The result must be HTTP/1.1 200 OK

3.4.7. Get the List of Pending Tasks

To know the ID of a user, access the portal as an administrator, and click on a user. The URL contains the user's ID.

Example : when clicking on Walter Bates

http://localhost:8080/bonita/console/homepage#?*id=_4*&_p=userlistingadmin&_pf=2&_f=allusersfilter

We note that the Id is 4. The URL specifies the user_id.

Item	**Value**

URL	http://localhost:8080/bonita/API/bpm/humanTask?p=0&c=10&f=state%3dready&f=user_id%3d4
Method	GET
Content type	
Body	

Result is

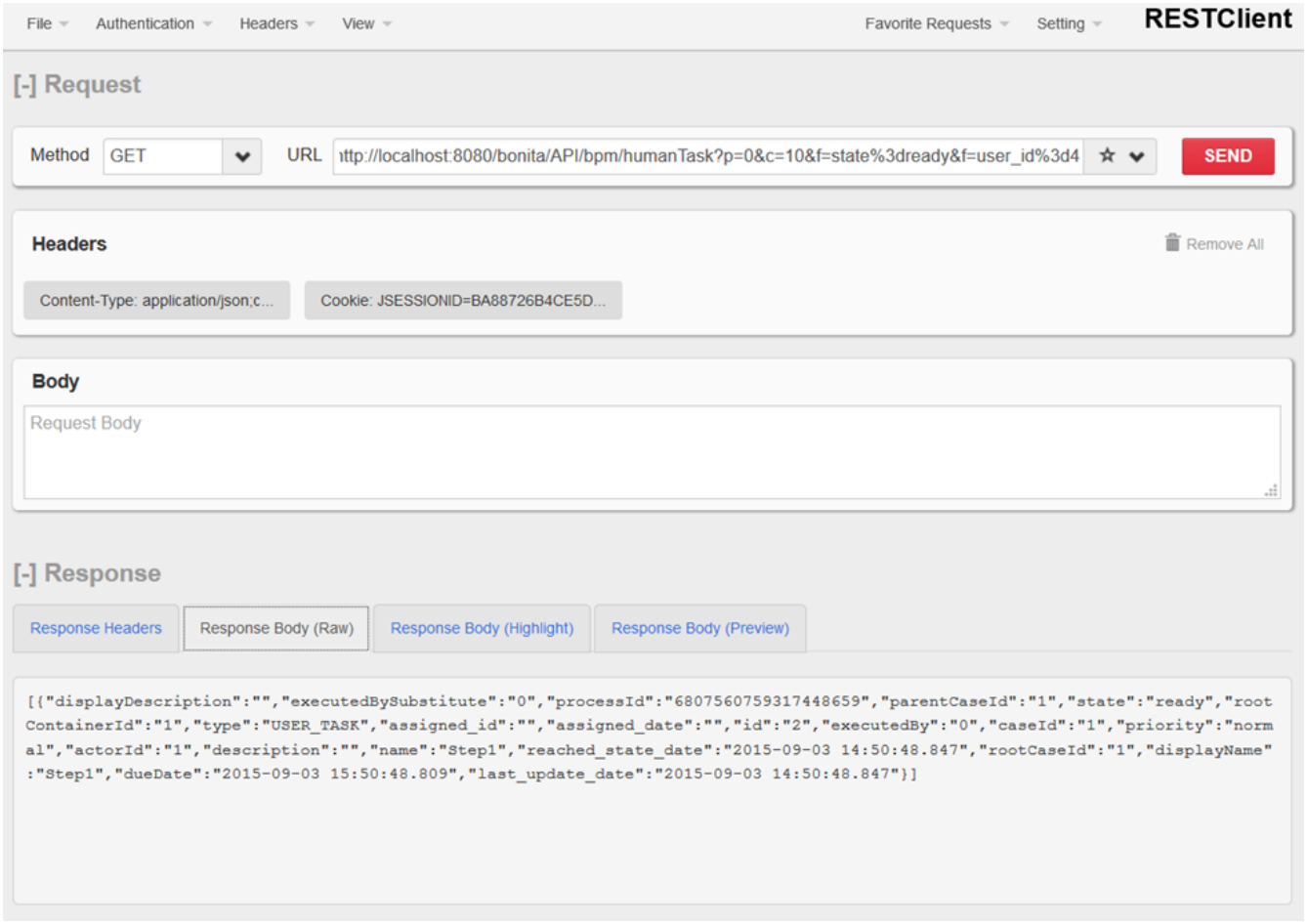


Figure 35. List of pending tasks

3.4.8. Set Case Variable Value

The URL contains the activity identifier. In this example, you will set the value of aSampleVariable variable to a new "updatedValue". The used method is PUT. In this example, the case Id = 4 and the variable name in is "aSampleVariable"

Item	**Value**
URL	http://localhost:8080/bonita/API/bpm/caseVariable/4/aSampleVariable
Method	POST
Content type	application/json;charset=UTF-8

Body	{"type": "java.lang.String", "value": "updatedValue"}

Access the Bonitasoft portal and verify if the value is updated

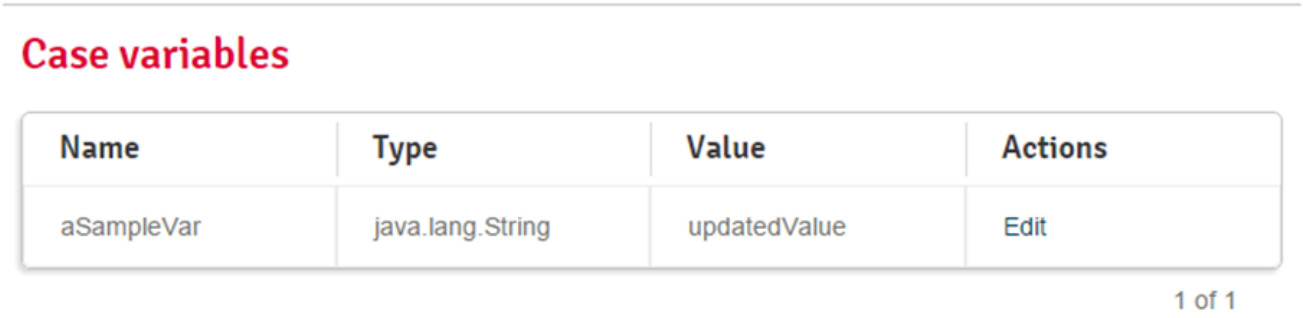


Figure 36. Case variable value

3.4.9. Logout

Item	Value
URL	http://localhost:8080/bonita/logoutservice
Method	GET
Content type	
Body	

After this call, any request will fail with the following response

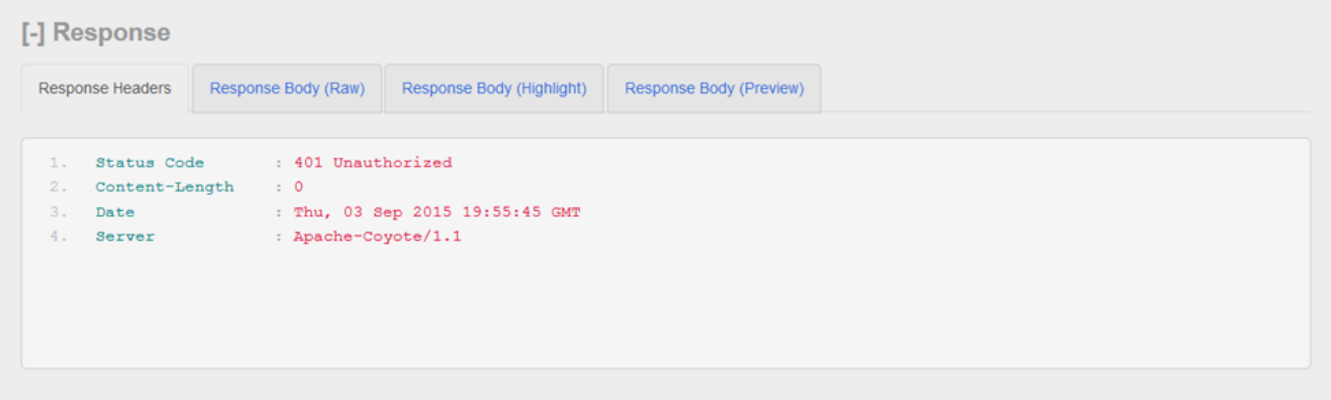


Figure 37. Logout

Chapter 4. Vacation Request Use case

For next exercises we will use an example application for managing payed vacation.

Helen Kelly, HR manager of the ACME corporation, wants an application that employees can use to track their paid vacation allowance and request days off.

4.1. Use case description

This is how the application works:

- When an employee log in to the application, he wants to view the number of days available for him.
- Then he can fill a form to request vacation
- The request is sent to the employee manager who reviews it and approves or refuse it.
- At any time the employee can cancel or update an existing request.
- Every manager will have an overall status of his employees vacations, and of course, he will be able to validate/refuse requests.

4.2. Use case implementation

As we know, the application logic is managed by processes. In the described use case we can imagine to have several processes, one for each vacation operation: Create a new Request, Delete it and update it.

These processes are provided, you can check them to see how they work, but you don't need to modify them, unless you want to apply customizations to understand them better.

In the following exercises you will work on creating the front end application that drives the processes. In fact the processes are not intended to be started from Bonita Studio or Bonita Portal, but from this external application that we are going to create.

4.3. Preliminary work

For this exercise we will use Bonita BPM Studio.

4.3.1. Create a new repository

In order to not mess up with previous works you can create a new separate local repository:

in the Bonita BPM Studio use the menu **Repository → Local → Create new repository**.

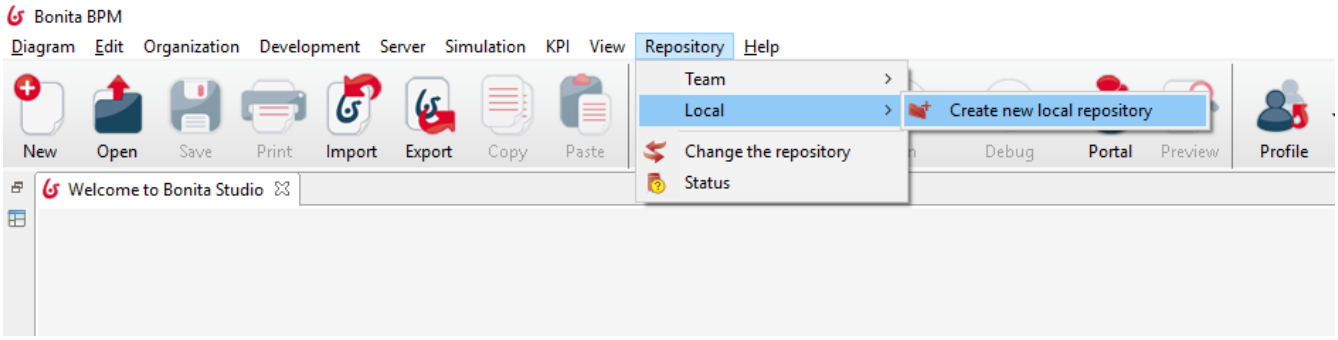


Figure 38. Create a new repository

4.3.2. Deploy existing processes

Download and import vacation Request processes: **VacationRequest-1.0.bos** . You can notice that one bdm is imported too, and it contains two Business Objects: **VacationAvailable** and **VacationRequest**

- From the Studio, click on Import button from the Cool bar and choose the provided **VacationRequest-1.0.bos**

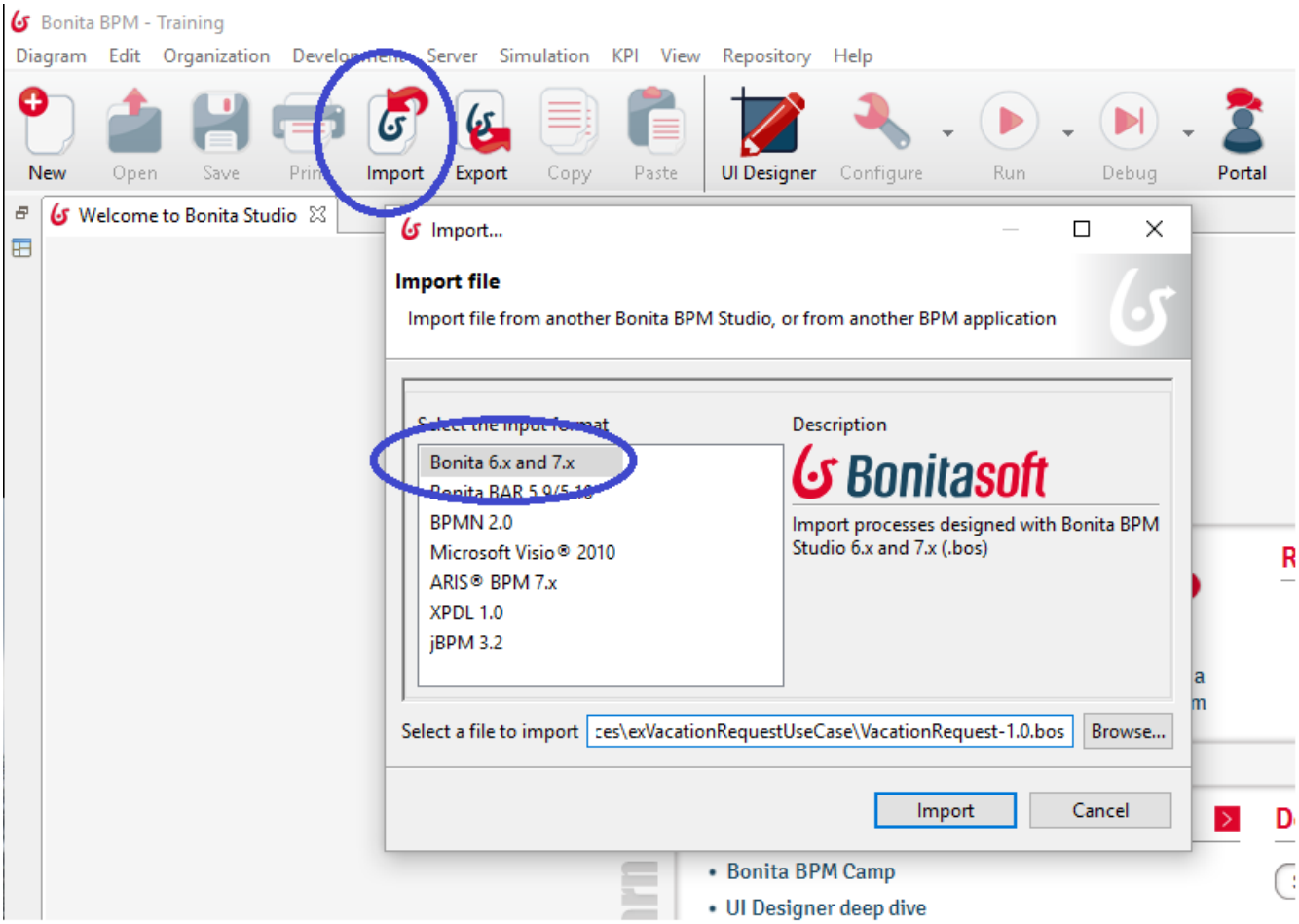


Figure 39. Import diagrams

Then, we need to deploy the processes using the **Run** button.

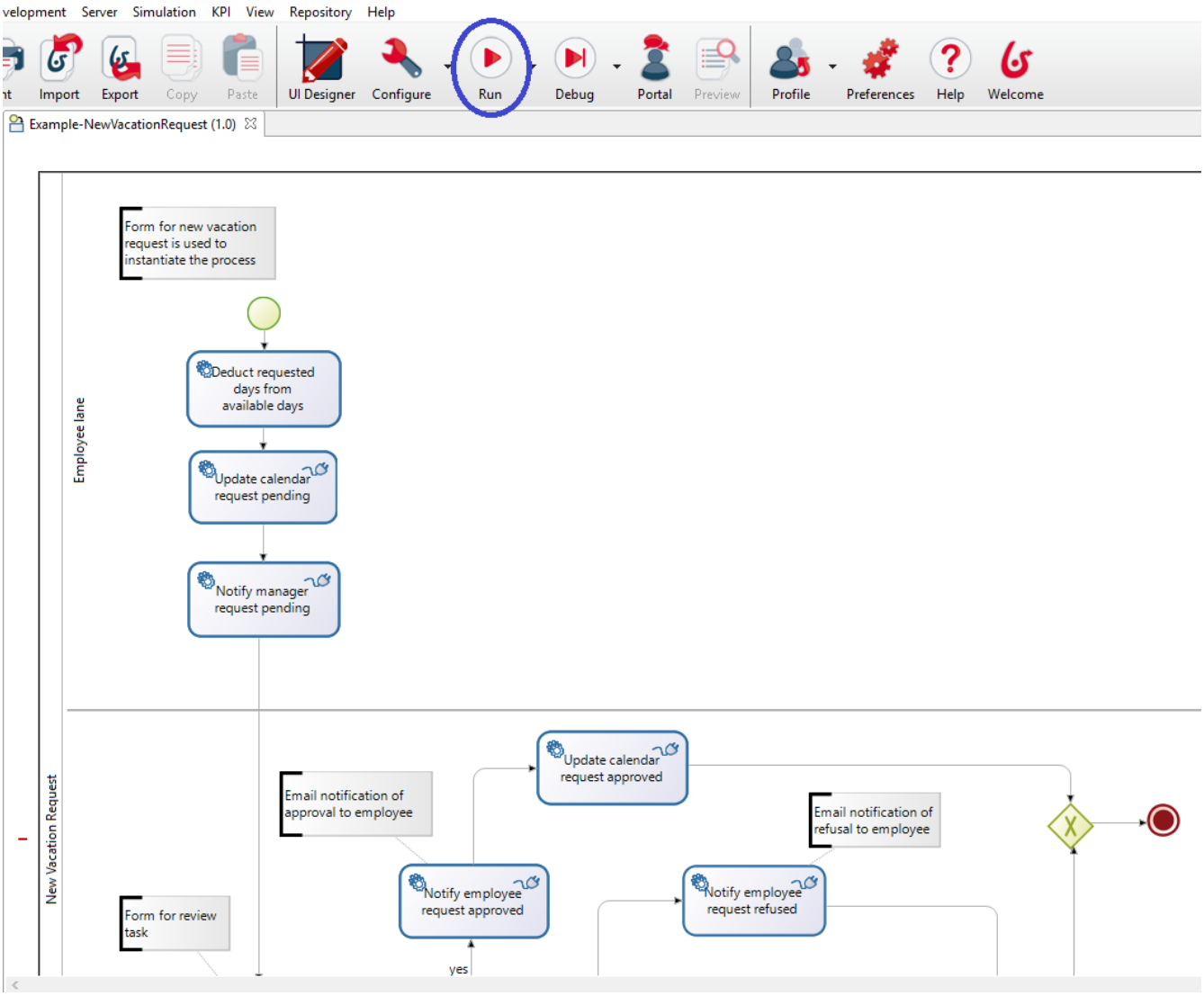


Figure 40. Run button

The button "Run" makes two actions: deploy and execute, but for our needs we just use it to deploy.

- Run **Example-InitiateVacationAvailable** process - this will add some initial data into the BDM. A browser page is opened, click on "Initialize vacation available" button and close the page.

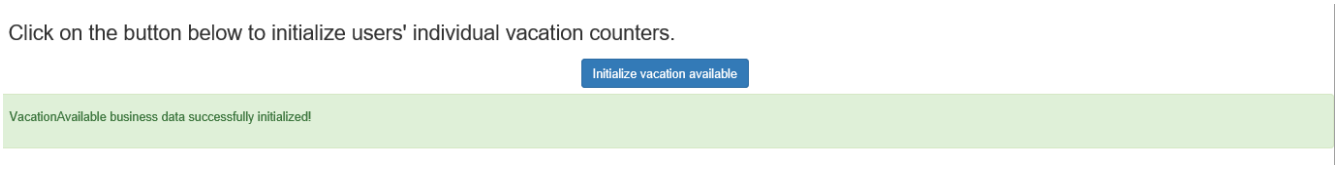


Figure 41. Click to run the process

Now we have 10 vacation days available for each user in our Organization.

- Run **Example-CancelVacationRequest**, **Example-NewVacationRequest** **Example-ModifyPendingVacationRequest** processes and close the pages (just ckick RUN to deploy the processes)

4.3.3. Check your BDM data

Once you do it go and check the database to better understand your model.

Do you remember how to connect to the h2 database embedded in your studio?

Go to **BONITA_STUDIO\workspace\tomcat\lib\bonita**

and double click on the jar file that starts with h2.

Alternatively open a command prompt on that directory and execute the command:

```
java -jar h2-1.3.170.jar
```

A browser with the h2 console will be opened.

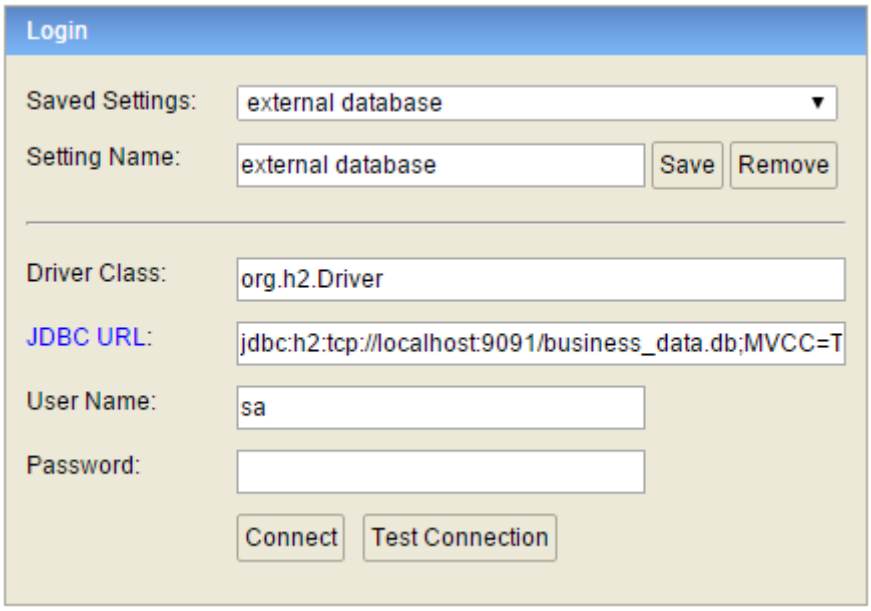


Figure 42. H2 Connection

In the jdbc URL put:

```
jdbc:h2:tcp://localhost:9091/business_data.db
```

leave the other fields unchanged and click on Connect. This will lead to the main dashboard from where you can execute query like:

*SELECT * FROM VACATIONAVAILABLE*

to show vacations available for each user.

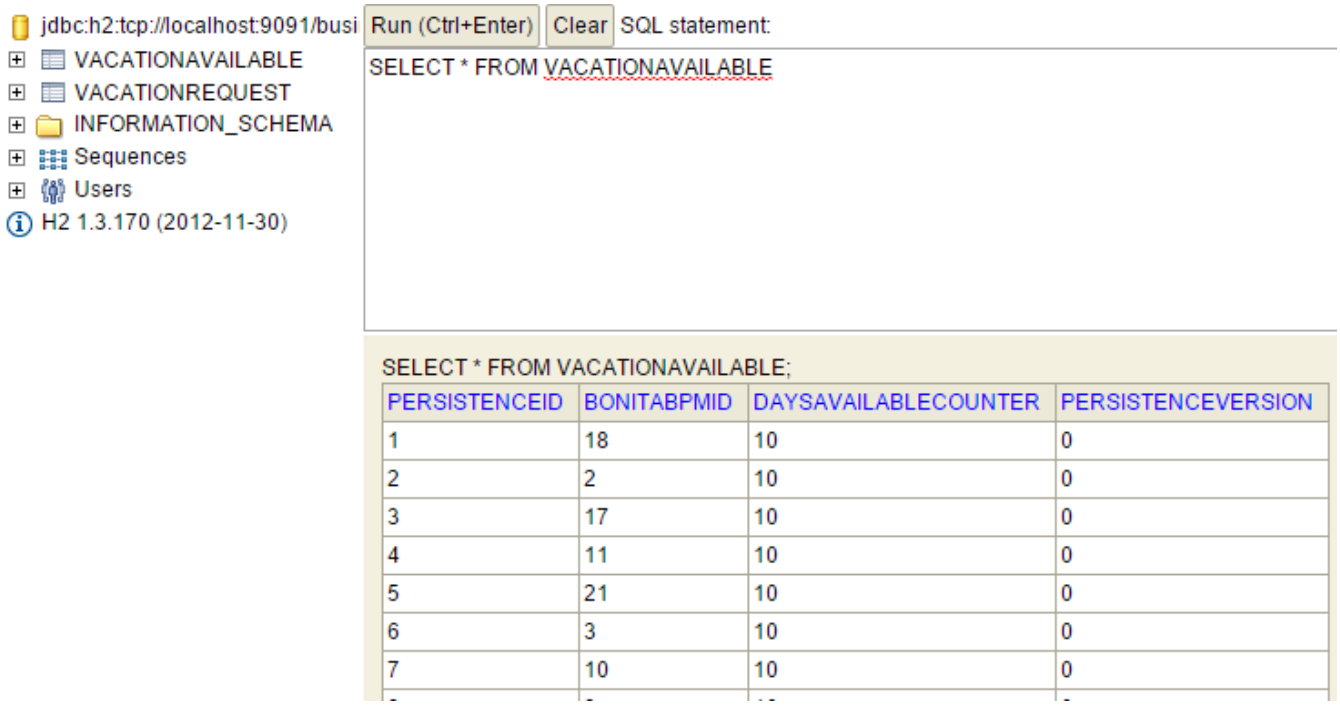


Figure 43. H2 Browser information

bonitaBpmId is the user Id

Now we have processes and data we are ready to create the application and its pages, that's the goal of next exercises.

Chapter 5. Create a page for the Employees

5.1. Objectives

In the previous exercise we created the basic environment in order to start creating our Leaving Request application. The goal of this exercice is to create a page for the employees to be used in this application. This "custom" page will be created using the UI designer as seen for the form in previous chapters. It will:

- show the **logged user** name
- show the number of **available days**
- show a **list** of his vacation requests
- give the possibility to **create a new one** through a button link.

Optional

- Create buttons to modify/cancel the vacation requests
- Display a different background-color due to the state's request
- Display a text only if there are no requests
- Add your Company logo

5.1.1. Overview

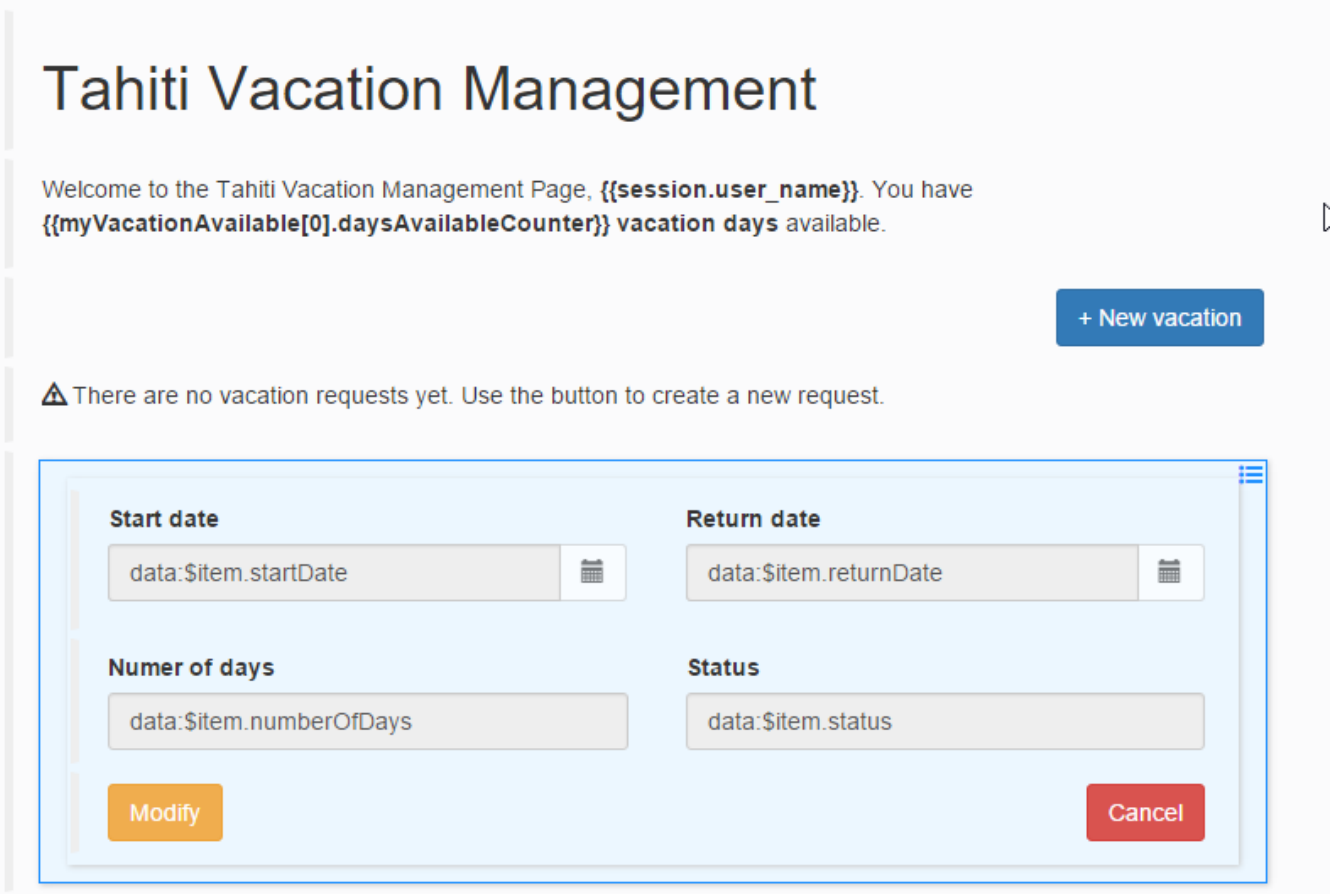


Figure 44. Overview

5.2. Instructions

- Create a new page
- Create all the data needed for your page (API variables to load the BDM,...)
- Drag and Drop the widgets used on your page, you will need Text, Title, Containers, Datepickers, Inputs and Link widgets
- Bind all your data to your widgets
- Test your page
- Create an application that contains your page
- Test your application page.

5.3. Correction

This section provides details about steps to follow to create a page using best practices

5.3.1. Create a new empty page

- Run the UI Designer either by clicking on UI Designer icon on the Studio image::exPageEmployee/exPageEmployee_02.png[title=UI Designer]
- On the UI Designer home page, click on "+ Create" button and be sure that the Type **"Application page"** is checked. Name your page **myVacationRequest** and click on Create

button.

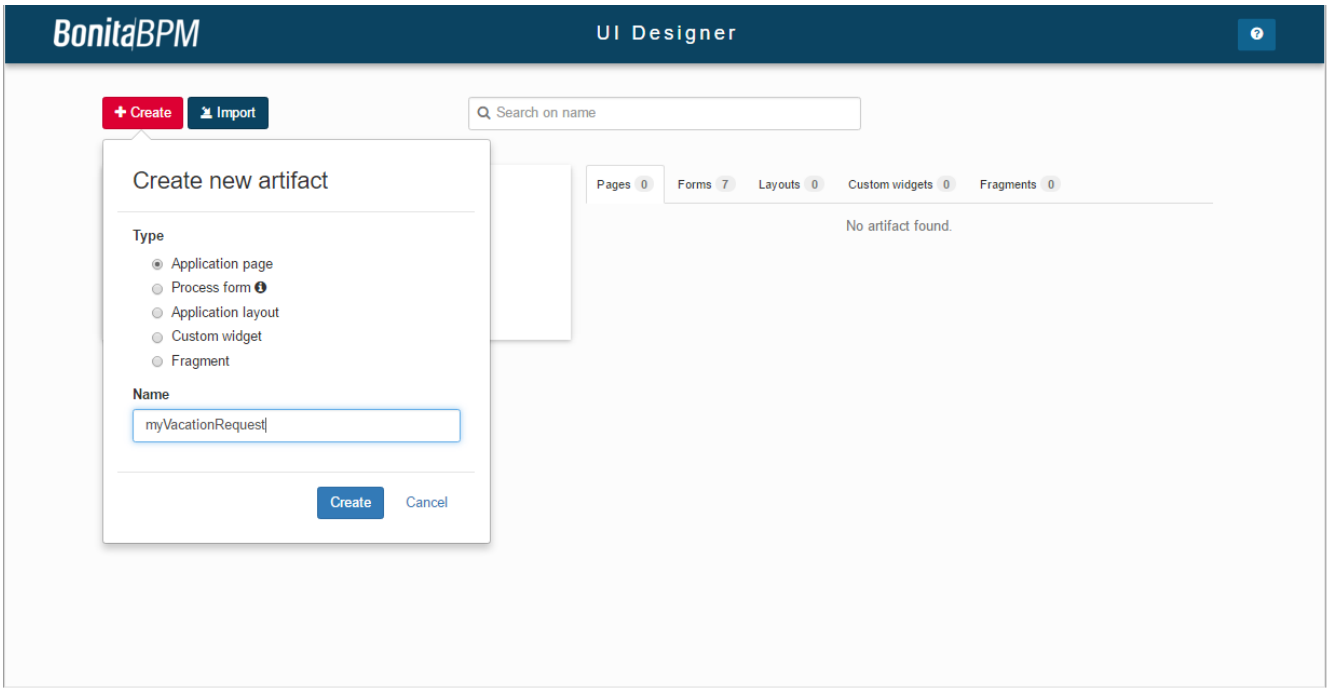


Figure 45. Create your page

- Your page is created

5.3.2. Create the data

For your page communication and logic you will need some data. Below the list of data you need to create with the detailed use of each one.

Data creation

In the page, search the button "Create a new variable" and for each line, create a variable.

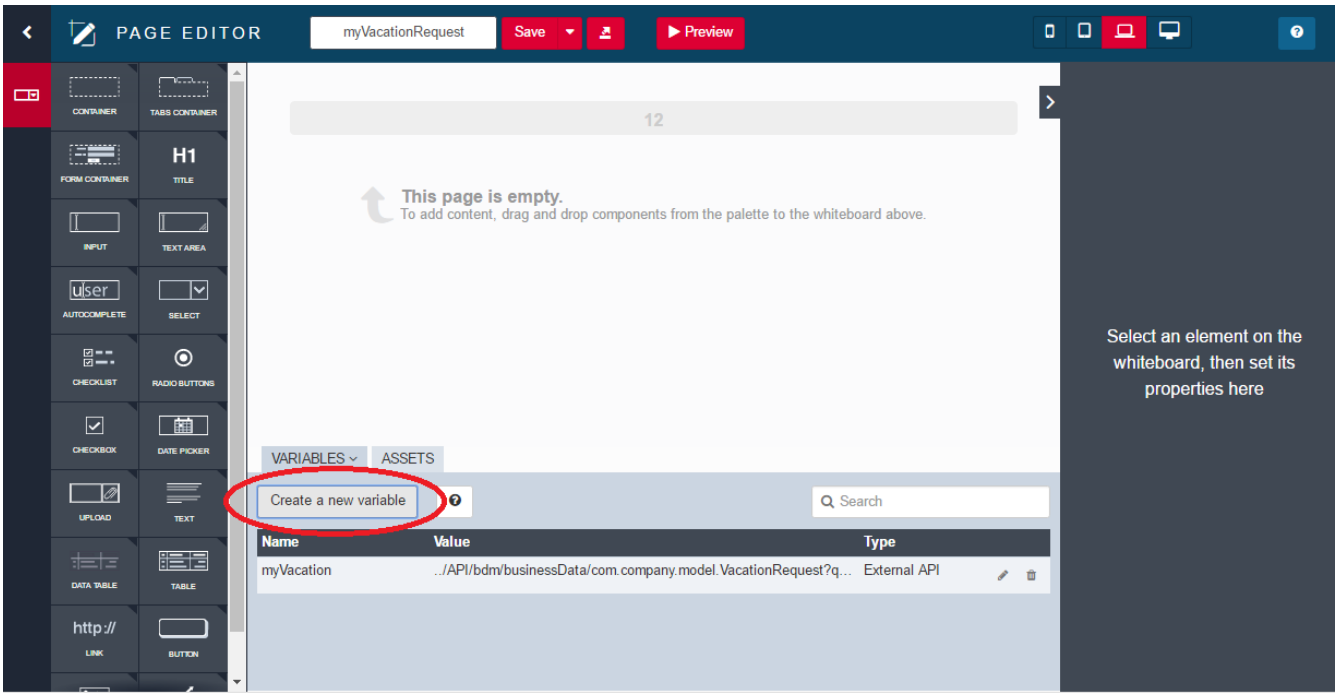


Figure 46. Create variables

Name	Type	Content
myVacation	External API	../API/bdm/businessData/com.company.model.VacationRequest?q=findByRequesterBonitaBPMId&p=0&c=100&f=requesterBonitaBPMId={{session.user_id}}
myVacationAvailable	External API	../API/bdm/businessData/com.company.model.VacationAvailable?q=findByBonitaBPMId&p=0&c=1&f=bonitaBPMId={{session.user_id}}
processCreate	External API	../API/bpm/process?s=New%20Vacation%20Request&p=0&c=10&o=version&f=activationState=ENABLED
session	External API	../API/system/session/unusedid
urlStartCreateProcess	Javascript expression	if ($data.processCreate && $data.processCreate.length > 0) { return "/bonita/portal/resource/process/"+ $data.processCreate[$data.processCreate.length-1].name+ "/" + $data.processCreate[$data.processCreate.length-1].version+ "/content/?id="+ $data.processCreate[$data.processCreate.length-1].id; } else { return null; }

More about created data

myVacation

This API call is used to load the Vacation Request business data using the requester id (f parameter) and the user_id provided by the session.

myVacationAvailable

This API call is used to load the Vacation Available business data using the current logged user.

processCreate

This API call is used to gather information of the "New Vacation Request" process.

session

This API call returns the current logged user info.

urlStartCreateProcess

This JS expression return the URL to start "New Vacation Request" process using the processCreate data.

Note 1: to access the another variable: use $data.<name>.

Note 2 : the javascript test first if the $data.processCreate exist, because the UI Designer will call the JavaScript first at begining, and when any REST API result arrive on the browser.

5.3.3. Build your page

Now we can start to design **"graphically"** our page. We are going to add widgts, configure them and bind them to related data. This will be the last step of your page creation.

5.3.4. Page mock-up

Before getting started, you should design your page mock-up. As you have all the variables inside and outside your page already created, you can know which widgets you will use. You can also take he opportunity to think about the widgets placement and the global look'n'feel of your page.

5.3.5. Choosing and placing your widgets

We are going to need:

- a **Title widget** to display the name of our page
- a **Text widget** to display the current user name and his available vacation days
- a **Container widget** to iterate the vacation requests with
  - a **Datepicker widget** to show the Start date
  - a **Datepicker widget** to show the Return date
  - an **Input widget** to show the Number of days
  - an **Input widget** to show the Status of the request
- a **Link widget** as a button to call the create a new instance of the NewVacationRequest process

Title of our Custom Page

Add a Title widget to the whiteboard and fill in their properties.

Property name	Property value
Text	Tahiti Vacation Management
Title level	Level 1
Alignment	left

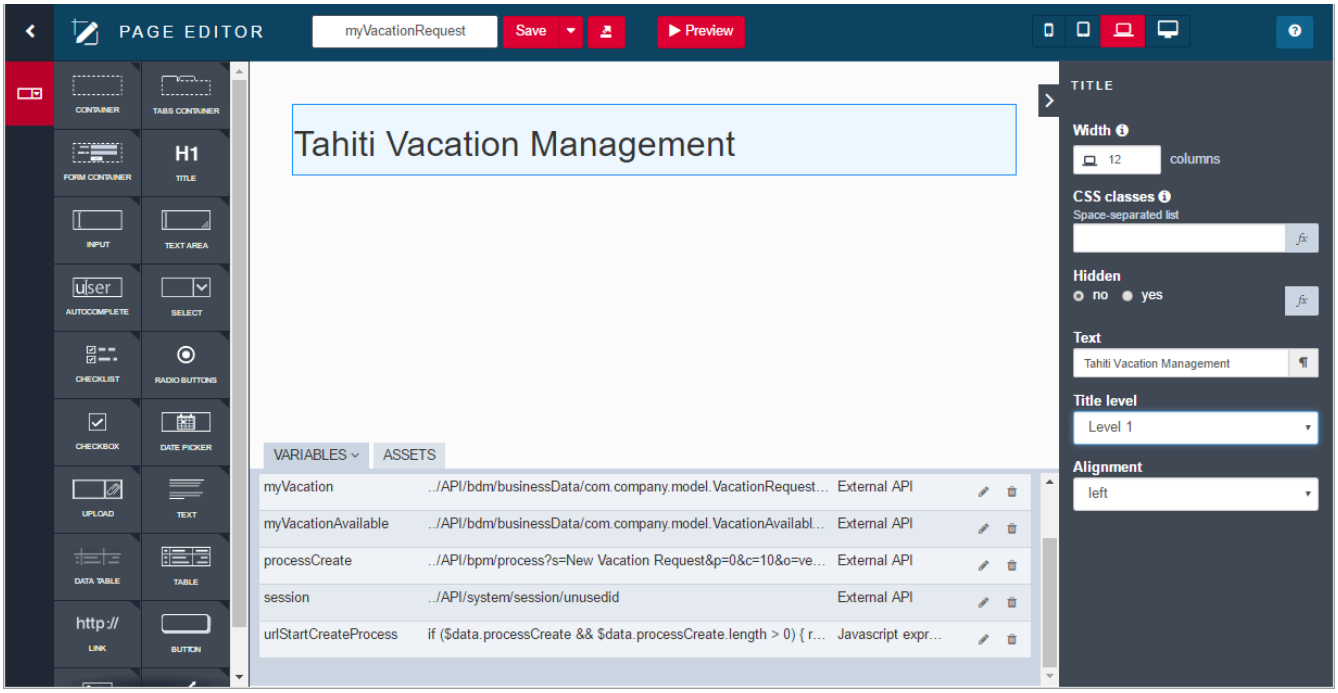


Figure 47. Title widget

Text widget

Add a Text widget below the Title widget and fill in their properties.

Property name	Property value
Text	Welcome to the Tahiti Vacation Management Page, {{**session.user_name**}}. You have {{**myVacationAvailable[0].daysAvailableCounter**}} vacation days available.
Width	6
Alignment	left

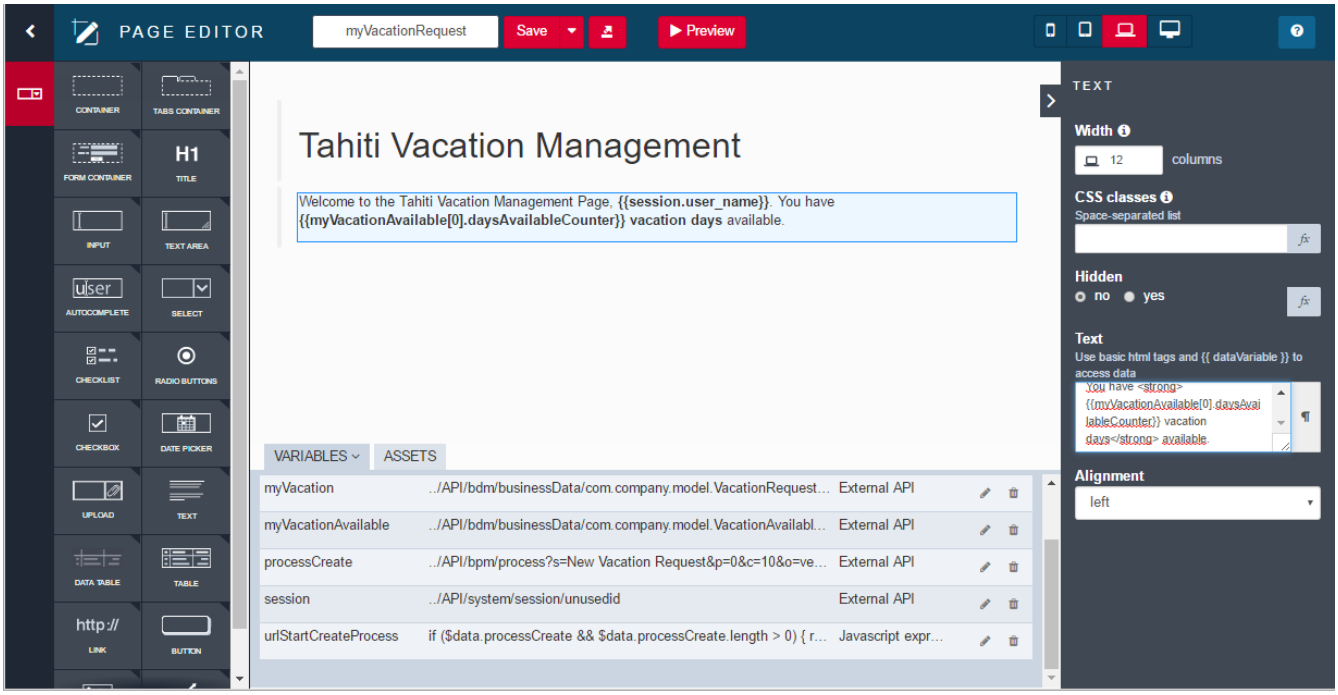


Figure 48. Create variables

Text property is using an Interpolation Type of data (thanks to AngularJS), so we can use basic html tags and **{{ dataVariable }}** to access data.

We are using **session** variable, that returns a JSON like this:

```
session: { "user_name": "helen.kelly", "session_id": "8247337820069982753", "is_technical_user": "false", "user_id": "3", "conf": "[\"976A80D4E3EC6F1D2D1 ... 2ACA9B5EA2B562E\"]", "copyright": "Bonitasoft © 2016", "version": "7.2.0" }
```

We want to display the **user_name** attribute so we use: {{session.user_name}}

Instead, **myVacationAvailable** variable returns a JSON list like this:

```
myVacationAvailable: [ { "persistenceId": 60, "persistenceId_string": "60", "persistenceVersion": 0, "persistenceVersion_string": "0", "bonitaBPMId": 3, "bonitaBPMId_string": "3", "daysAvailableCounter": 10 } ]
```

We need to select the first (and unique) element of the list, and display the **daysAvailableCounter** attribute, so we use: {{myVacationAvailable[0].daysAvailableCounter}}

5.3.6. Container widget

Drag and drop a Container widget below the Text widget and use these properties:

Property name	Property value
Collection	myVacation

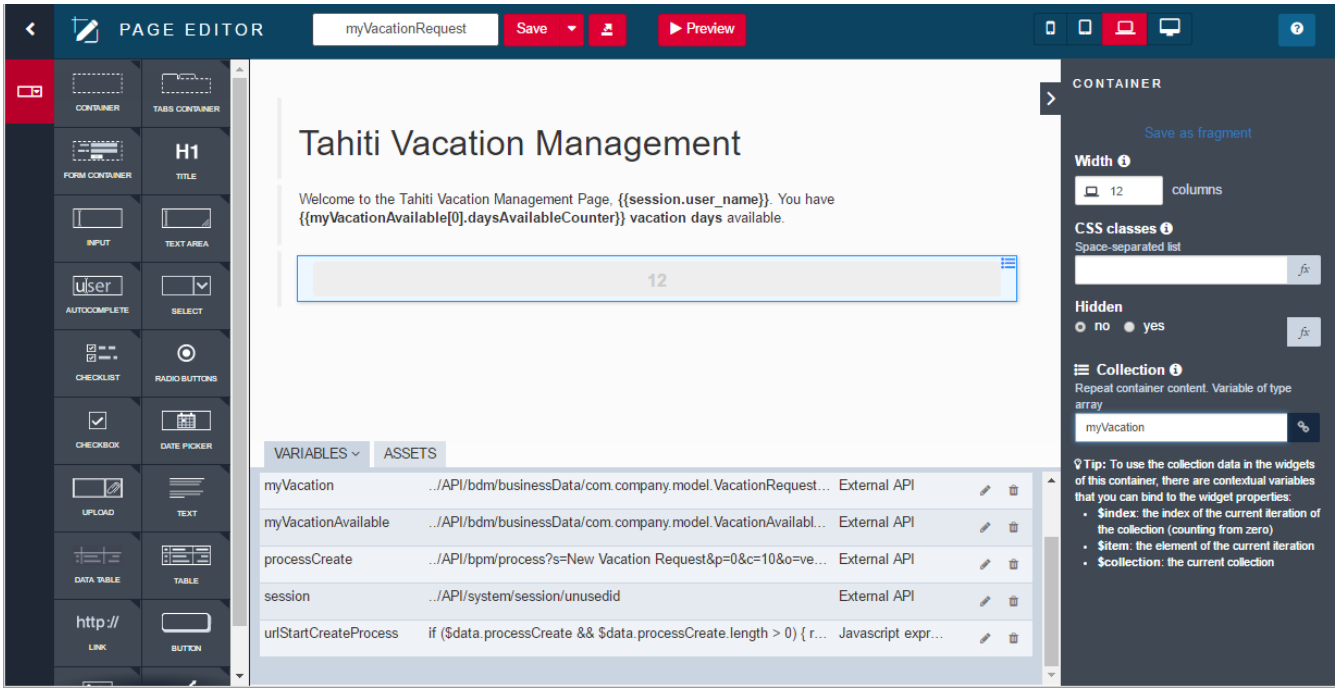


Figure 49. Collection

This Collection parameter is expecting an Array, so we are using **myVacation** variable, which is returning a JSON list, to iterate the content of the list using **$item** inside for each iteration.

Drag and drop 2 Datepicker widgets and 2 Input widgets inside the Container widget, and configure their properties this way:

Start date - Datepicker

Property name	**Property value**
	Width
6 Read-only *(bound to an expression or variable)*	$item.status != "pending"
Label	Start date
Value	$item.startDate

Number of days - Input

Property name	**Property value**
Width	6
Read-only *(bound to an expression or variable)*	$item.status != "pending"
Label	Number of days
Value	$item.numberOfDays

Return date - Datepicker

Property name	Property value
Width	6
Read-only *(bound to an expression or variable)*	$item.status != "pending"
Label	Return date
Value	$item.returnDate

Status - Input

Property name	Property value
Width	6
Read-only	yes
Label	Status
Value	$item.status

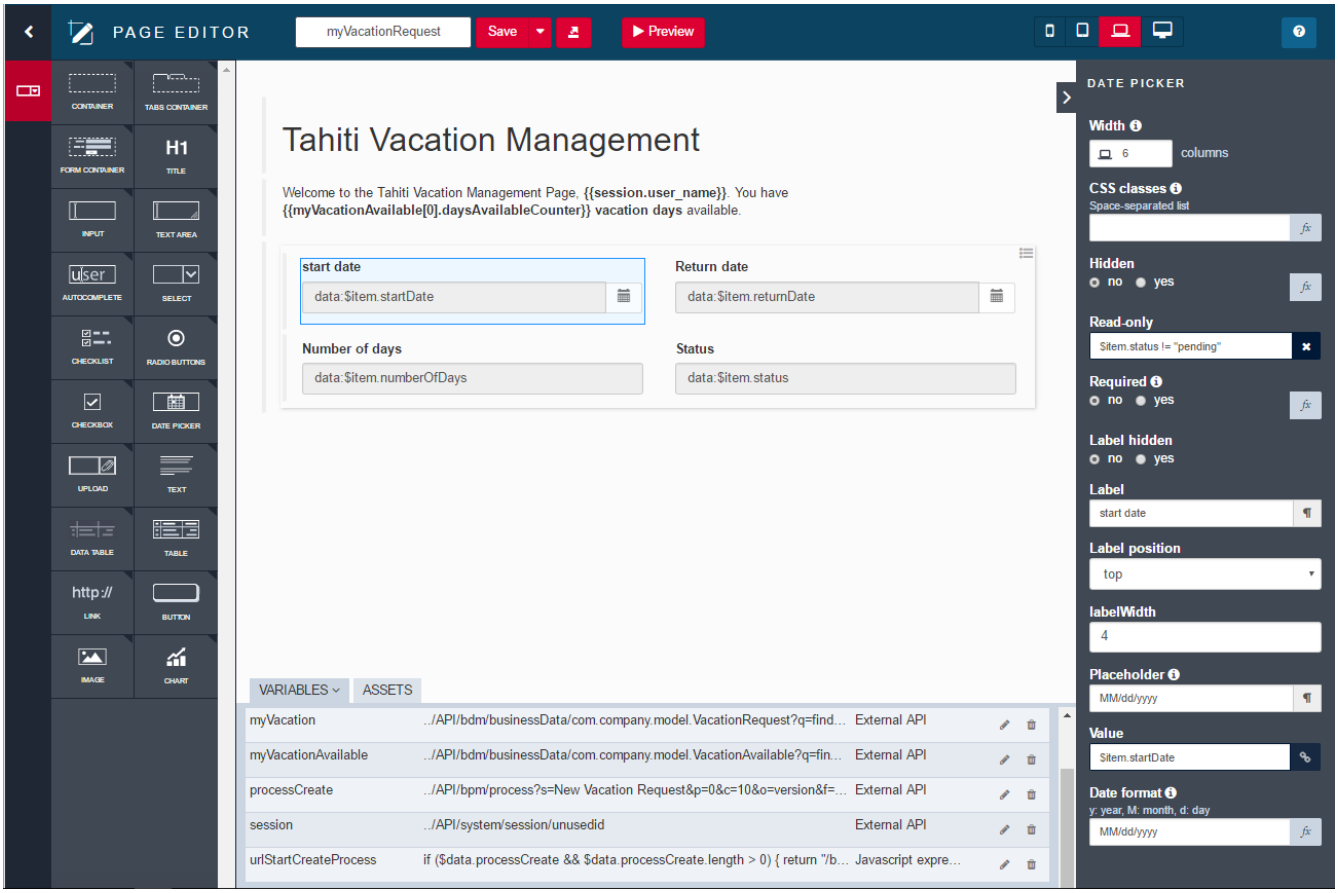


Figure 50. All sub widgets

We want to activate the Read-only property only when vacation request status is not "pending". Using **$item** inside the container allows us access the current list element into the list iteration.

5.3.7. Link widget as a button

Drag and drop a Link widget between the Text widget and the Container widget and configure its properties:

Property name	Property value
Text	+ New vacation
URL *(bound to an expression or variable)*	urlStartCreateProcess
Alignment	right
Style	primary

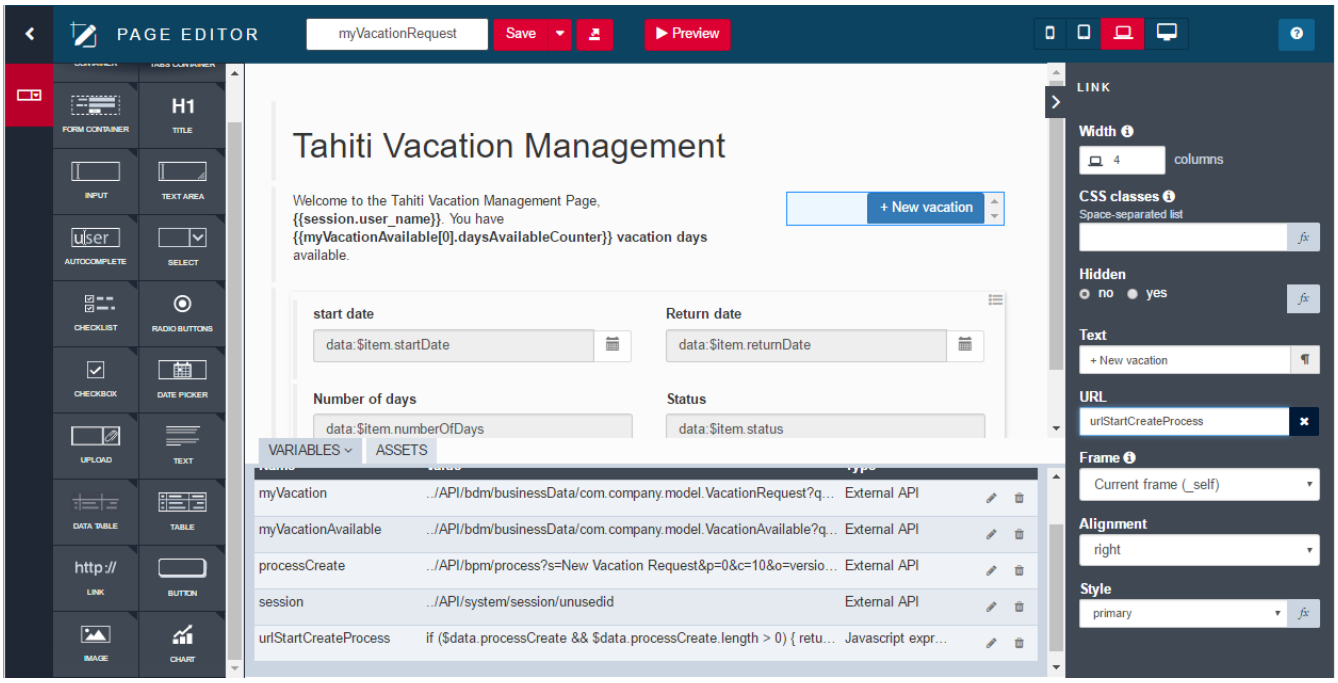


Figure 51. Link widget

Link URL property is **Dynamic Value** type. You can use a dynamic value field to specify a constant (by default) or an expression. Click on the expression icon **'fx'** to switch from constant to expression and start typing the name of your variable (in this case **urlStartCreateProcess**) and select it from the autocompleter selector.

5.3.8. Preview on different devices

Save your changes and use the **PREVIEW** button to check how your page is going to look like.

In order to access the information, your browser must be logged. So, in a first tab on your browser, connect as Walter.Bates. Then, access the UI Designer and click on Preview. image::exPageEmployee/exPageEmployee_10.png[title=Connect to the portal]

On preview, you can see the the information about Walter.Bates are displayed:

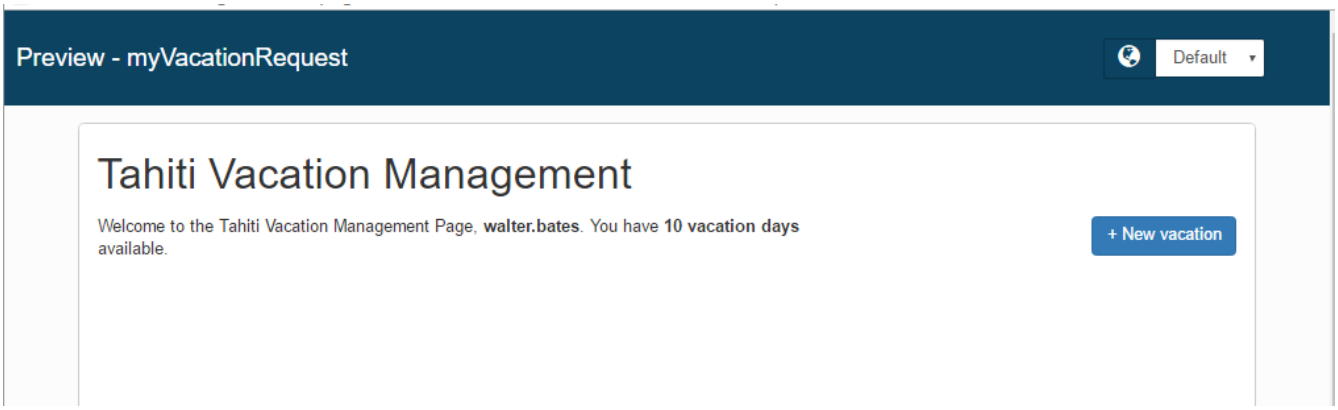


Figure 52. Preview as Walter Bates

Click on +New vacation, and add a vacation (no worry about the error 404 you get when you create it : you are in the preview). So, information are updated:

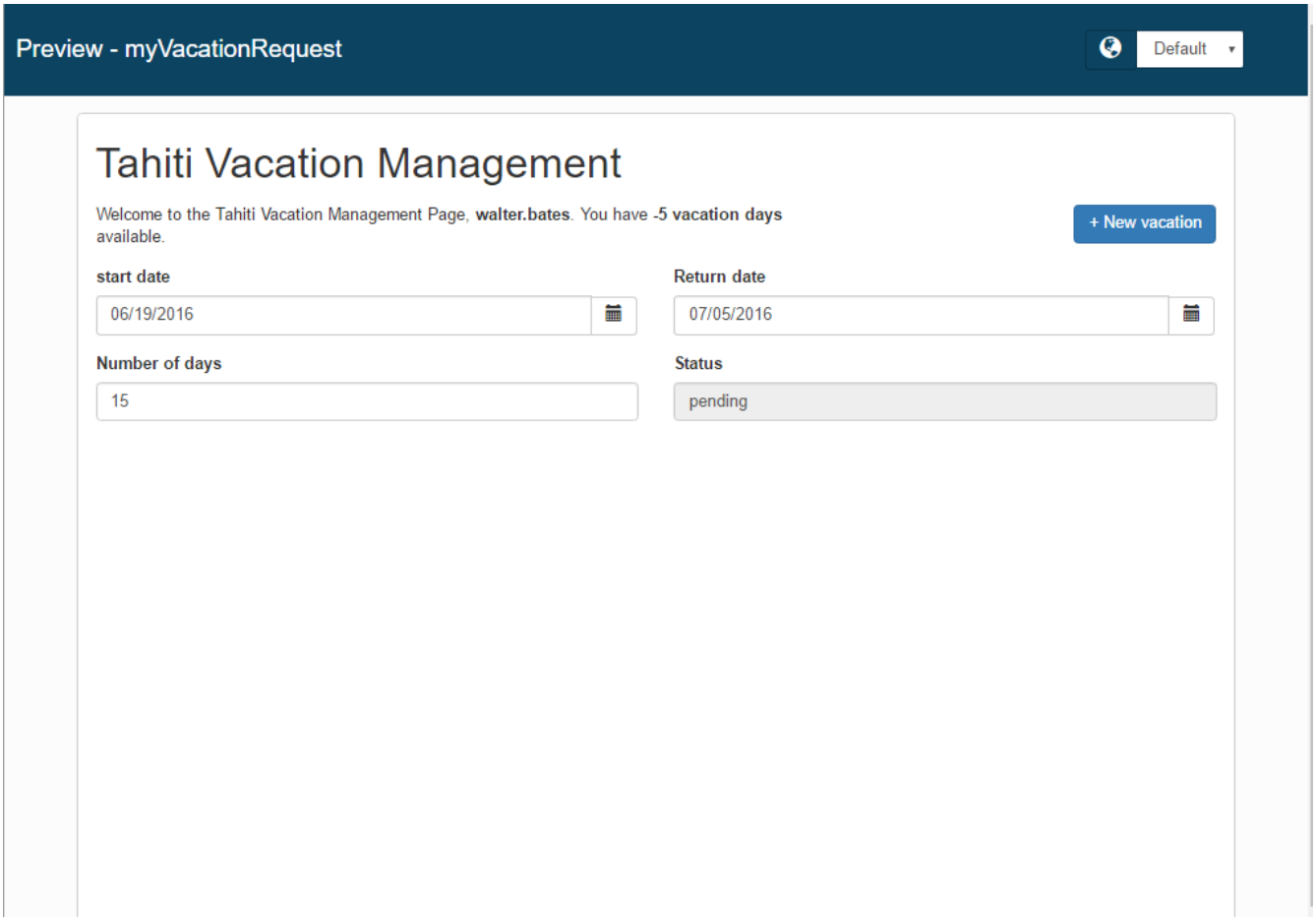


Figure 53. Preview

Use the different devices view button to test how widgets will be shown.

Tips

> Each device view is directly related with each widget Width property. The value of this property can be from 1 to 12. This is based on Bootstrap, where a total of 12 cols divide the screen for each different device (extra-small, small, medium, large).

As an example, a Datepicker widget inside the container could have this width properties:

Device	Width property value
Large (width >= 1200px)	3
Medium (width >= 992px)	3
Small (width >= 768px)	12
Extra small (width < 768px)	12

Play with the different widget Width values that fits your page design for the different devices using the PREVIEW button.

5.3.9. Export your page

Once everything is ready on your page, click on the Export button. It will create a .zip file that we can use to import it as a resource into the Bonita Portal.

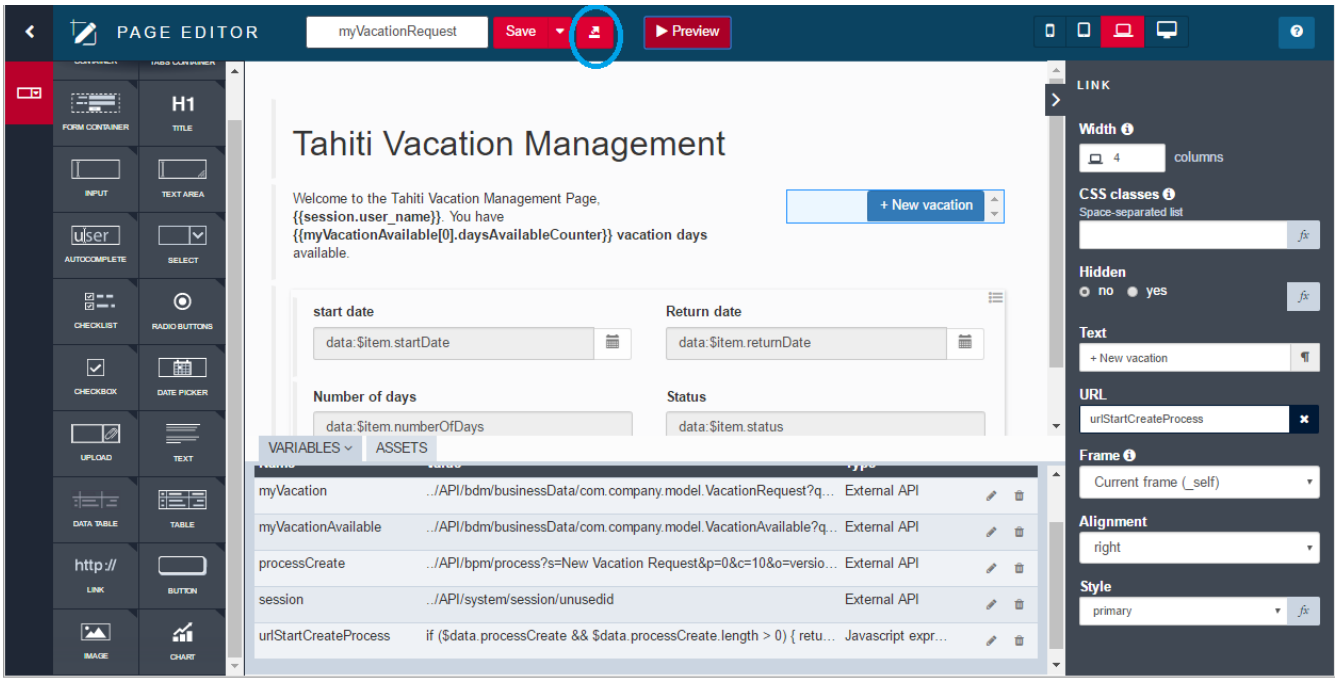


Figure 54. Export button

5.3.10. Create a new application and test your page

New application

- Go to the Bonita Portal using the **Administrator** profile, **Resources** section.

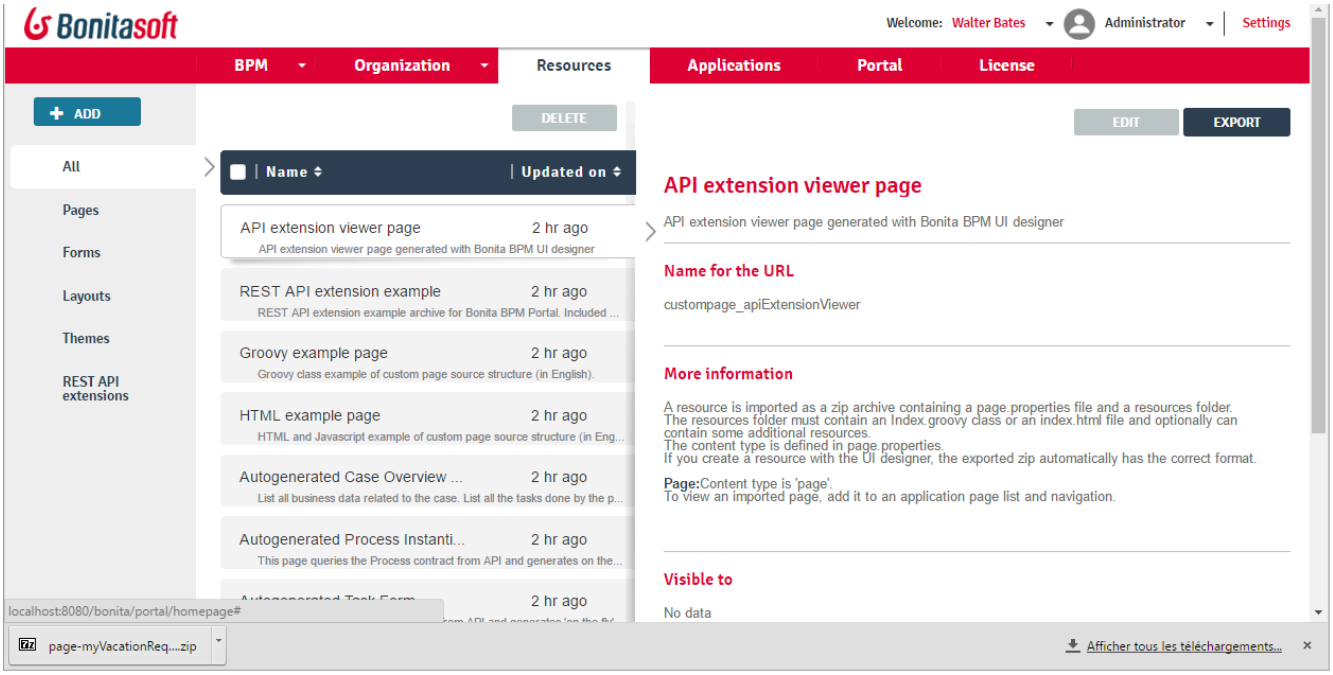


Figure 55. Import the page in the portal

- **Import your page-myVacationRequest.zip** file clicking on "+ ADD" button on the top left side.
- Go to **Applications** section and click on New button.

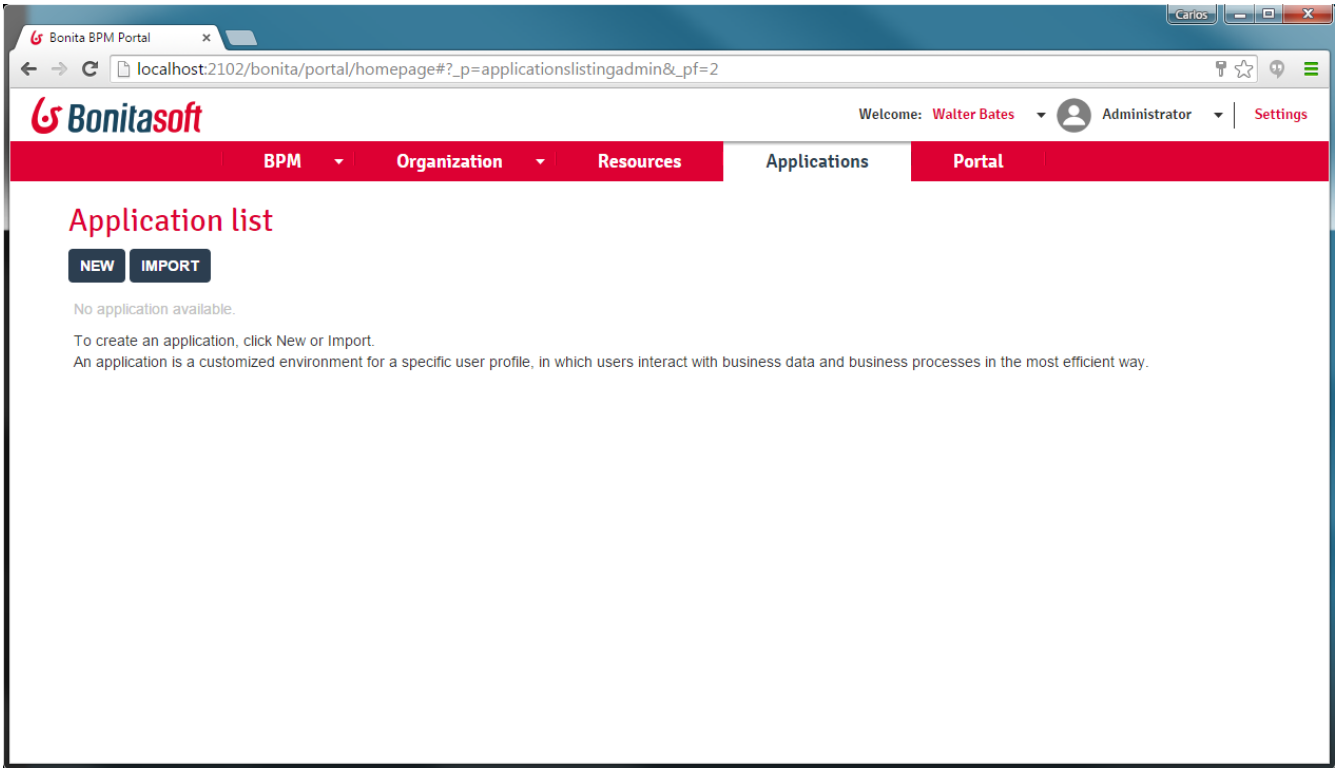


Figure 56. Application list

- Use this values:

Input name	Input value
Display name	Vacation Management
URL	tahiti

Input name	Input value
Version	1.0
Profile	User
Description	Vacation management for employees and managers

- Click on Create button.

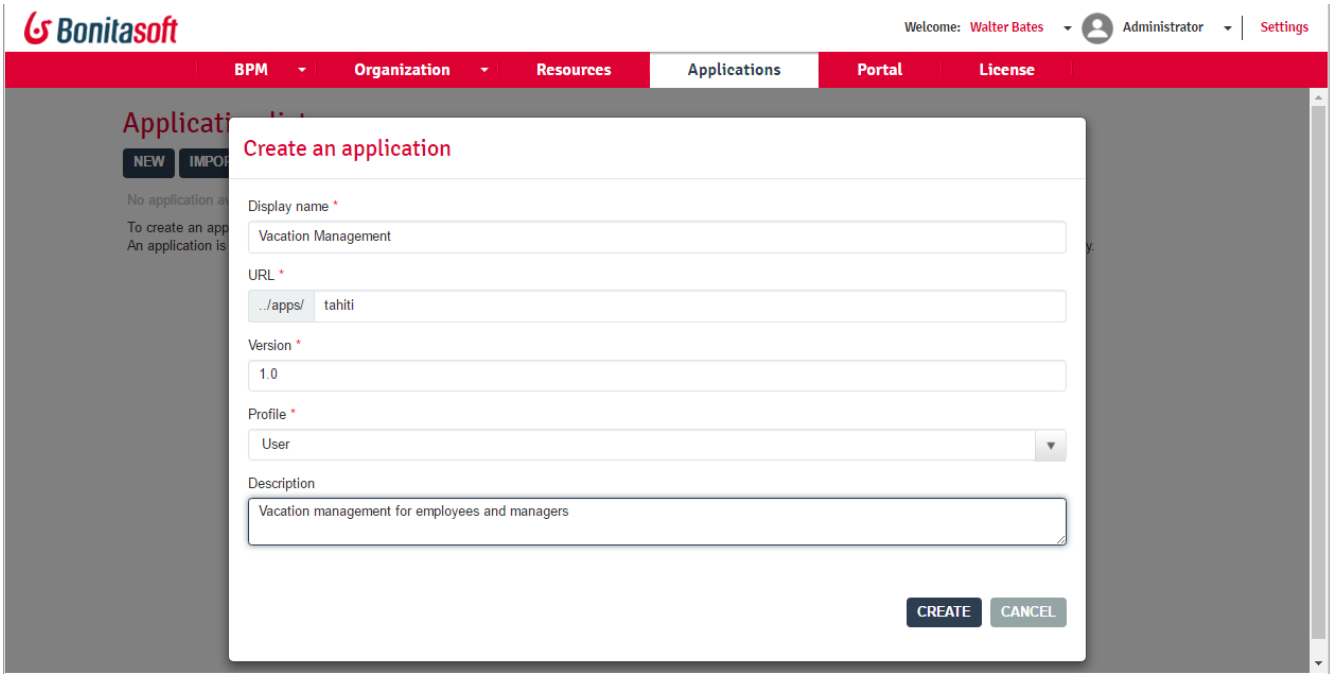


Figure 57. Create the application

Your Vacation Management application is created. You can click on the URL link to access your application. There are no pages or menu elements included yet, just by default page/menu so, **let's add your page into your application!**

Configure application

- Click on the "three dots" action button to configure your application.

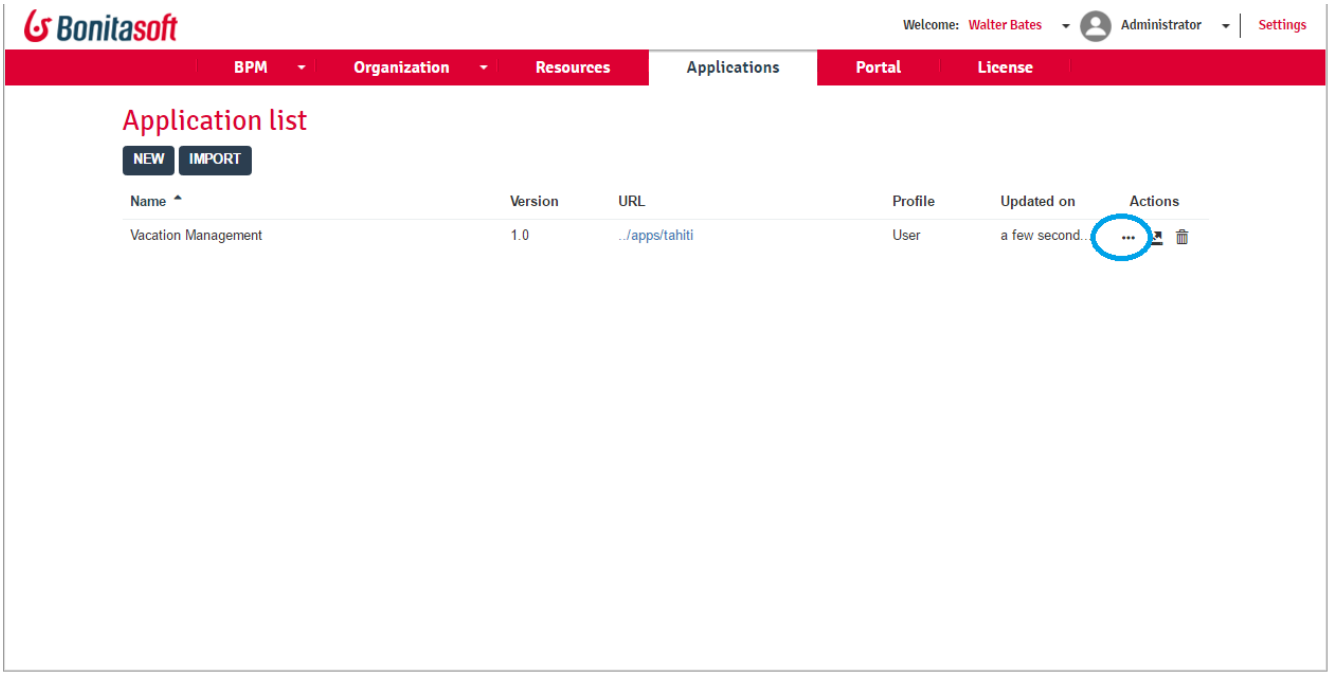


Figure 58. Access the application

We can change the Look & Feel selecting a different Layout or Theme and we can add more adding them into Resources section. Let's keep it simple for the moment but feel free to change the Look & Feel later.

Add a page

Let's add your Page and a new Navigation Menu for your application.

- Click on Pages "ADD" button and select **custompage_myVacationRequest - myVacationRequest page**. Also set "**index**" into the URL, finish with click on "ADD".

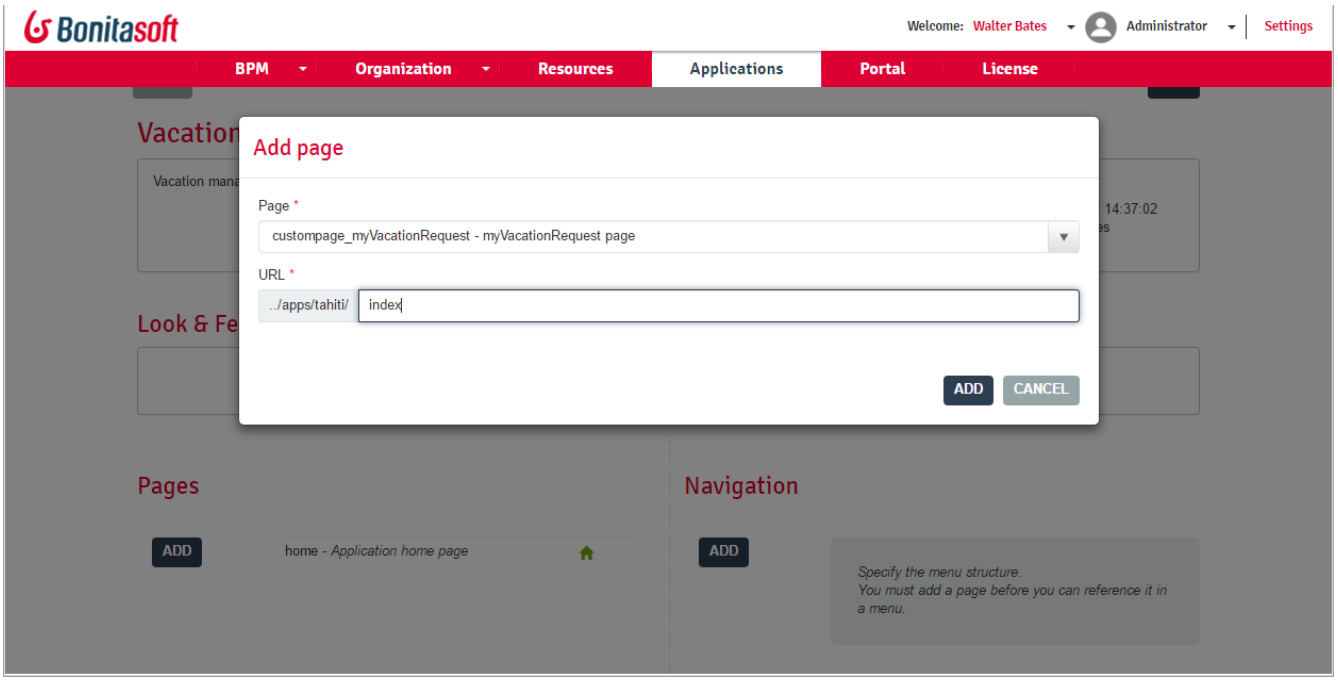


Figure 59. Add the Vacation request page

The green house icon of the default added page shows that every time you access to your

application URL, that page will be shown first, as the Home page. Let's change it.

- Set your page as your application Home page making active the green house icon.

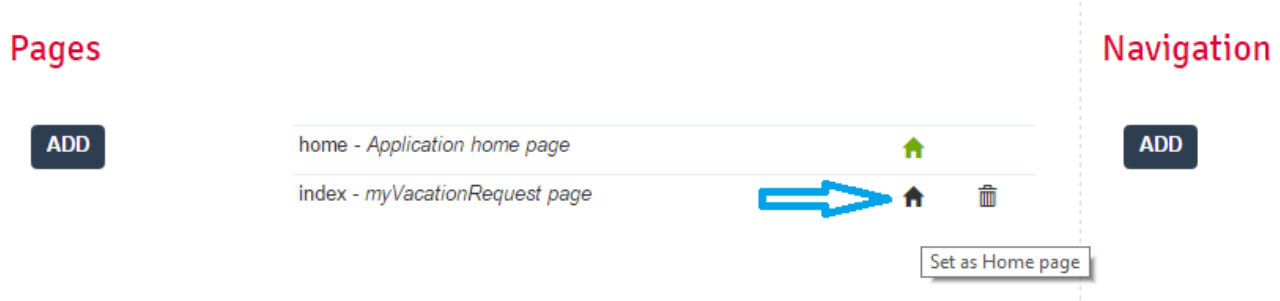


Figure 60. Set the home page

- Delete the default page using the trash icon

Every time end-users access to our application, myVacationRequest page will be shown as Home page.

Add a Menu element

We can add a Navigation element because in the future we will add another page into this application.

- Click on Navigation "ADD" button, use the Name "Index" and select your page. Click on "ADD" button.

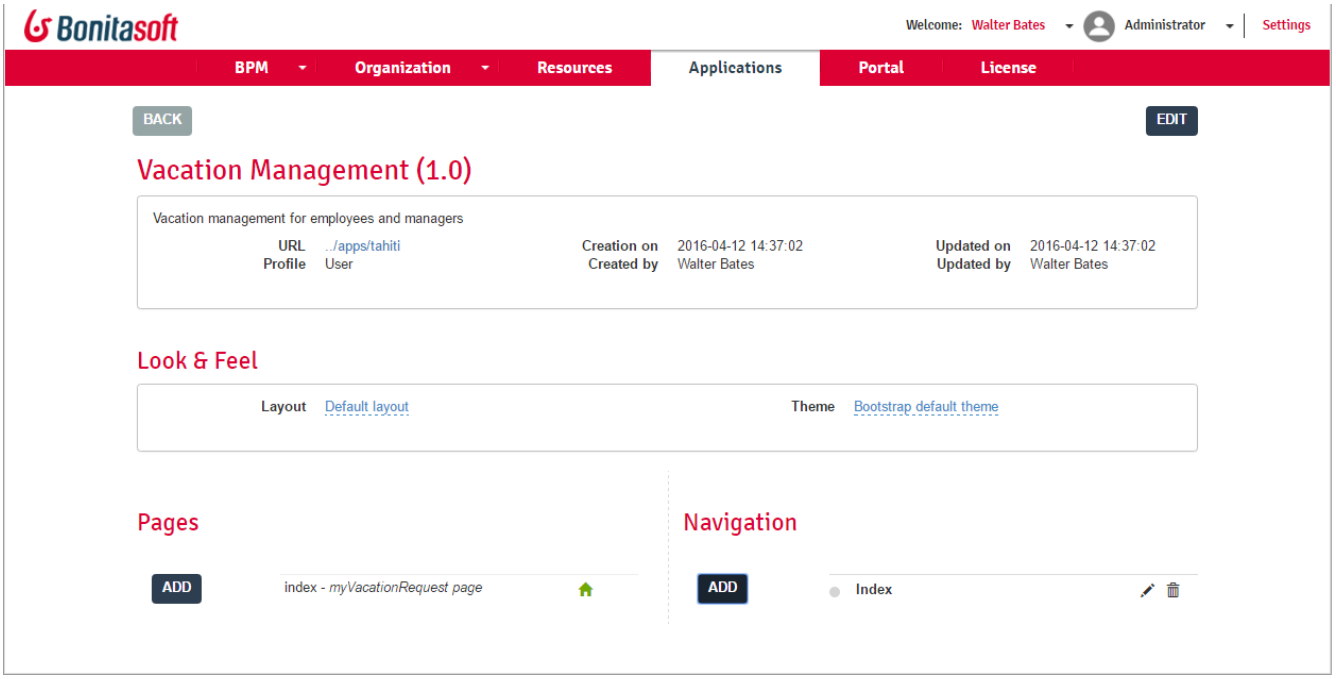


Figure 61. Final result

Test application

Now we can access our application clicking on the URL link or accessing to http://localhost:8080/bonita/apps/tahiti/index/

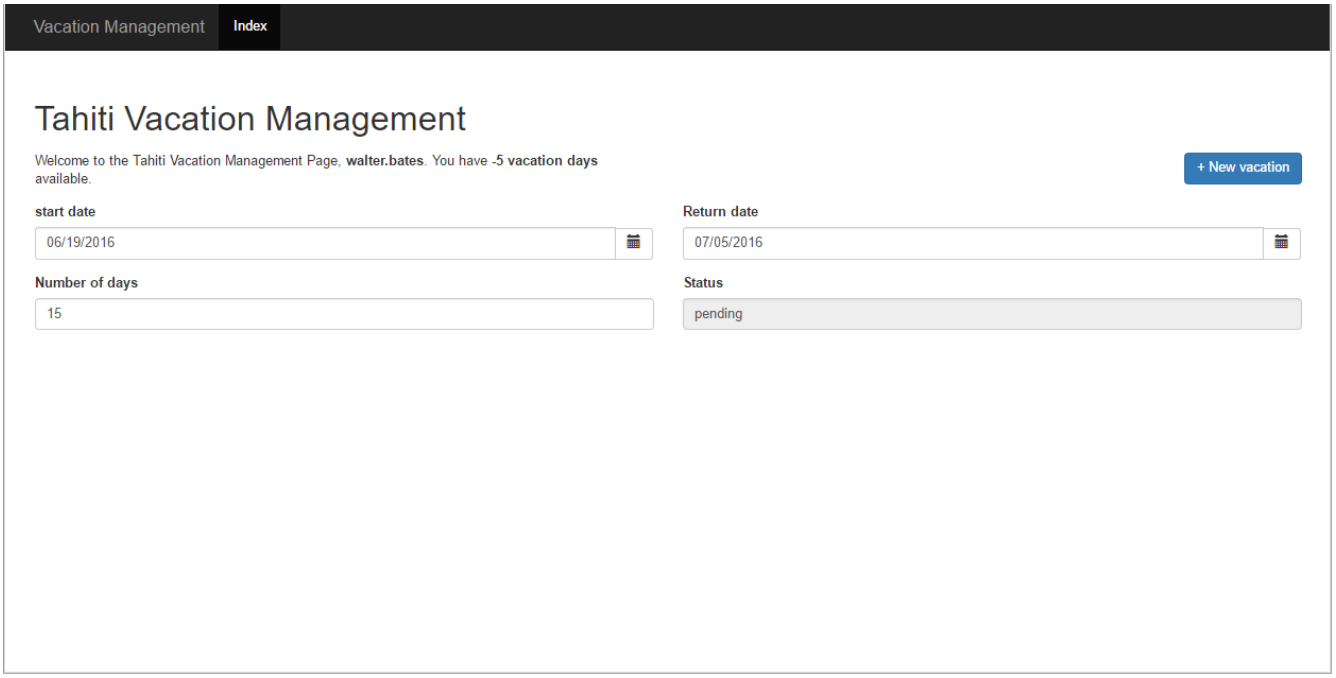


Figure 62. Application

Test the "+ New vacation" button and create a new vacation request.

5.4. Optional exercises

We can improve our Page adding some valuable features due to enhance the end-users experience.

Remember

- **Rename** your page using the Save as button.
- **Export** your new page.
- **Import** your new page directly in Bonita Portal.
- **Resources** section, selecting the old page and clicking on **Edit** button. It will overwrite the old page with the new improved one and you could test it on your application directly.

5.4.1. Display modify and cancel buttons

Create buttons to modify/cancel the vacation requests.

Data creation

We are going to need some new variables to call the **Modify Pending Vacation Request** and **Cancel Vacation Rquest** processes:

Name	Type	Content
processModify	External API	../API/bpm/process?s=Modify Pending Vacation Request &p=0&c=10&o=version&f=activationState=ENABLED

Name	Type	Content
urlStartModifyProcess	Javascript expression	if ($data.processModify && $data.processModify.length > 0) { return "../API/bpm/process/"+ $data.processModify[$data.processModify.length-1].id+ "/instantiation"; } else { return null; }
processCancel	External API	../API/bpm/process?s=Cancel Vacation Request&p=0&c=10&o=version&f=activationState=ENABLED
urlStartCancelProcess	Javascript expression	if ($data.processCancel && $data.processCancel.length > 0) { return "../API/bpm/process/"+ $data.processCancel[$data.processCancel.length-1].id+ "/instantiation"; } else { return null; }

processModify and processCancel

These External APIs gather all the information related to the enable processes using a by name search parameter.

urlStartModifyProcess and urlStartCancelProcess

These JS expressions return the builded URL to call into the buttons in order to instanciate their processes.

Modify - Button widget

Drag and drop a Button widget into the **Container widget**, close to Status Input widget, and use this properties:

Property name	Property value
Width	6
Hidden *(bound to an expression or variable)*	$item.status!=="pending"
Label	Modify
Alignment	left
Style	warning
Action	POST
URL to call	{{urlStartModifyProcess}}

Property name	Property value
Data sent on click *(bound to an expression or variable)*	{"vacationRequestIdContract": $item.persistenceId_string, "startDateContract": $item.startDate, "returnDateContract": $item.returnDate, "numberOfDaysContract": $item.numberOfDays}
Target URL on success	/bonita/apps/tahiti/index/

Cancel - Button widget

Drag and drop a Button widget into the Container widget, close to Modify button widget, and use this properties:

Property name	Property value
Width	6
Hidden *(bound to an expression or variable)*	$item.status!="pending"
Label	Cancel
Alignment	right
Style	danger
Action	POST
URL to call	{{urlStartCancelProcess}}
Data sent on click *(bound to an expression or variable)*	{"vacationRequestIdContract": $item.persistenceId_string}
Target URL on success	/bonita/apps/tahiti/index/

The page is now: image::exPageEmployee/exPageEmployee_20.png[title=With modify and Cancel]

5.4.2. Display background-color

Display a different background-color due to the state's request

We are going to use nested-containers to achieve this exercise. We will add classes into the Vacation Requests container widget evaluating some expressions.

Main Container widget

- Add an extra **Container widget** above the current Container widget.
- Drag and drop the old Container widget (with all the widgets inside) into the new one.
- Configure the Main Container widget properties:

Property name	Property value
Collection	myVacation

Old Container widget

We need to remove *myVacation* variable from Collection widget property and add some expressions to evaluate whenever the status change within each iteration.

- Configure the sub **Container widget** properties this way:

Property name	Property value
CSS classes *(bound to an expression or variable)*	($item.status == "refused") ? "alert alert-danger" : ($item.status == "approved") ? "alert alert-success" : ($item.status == "pending") ? "alert alert-warning" : ($item.status == "cancelled") ? "alert alert-danger" : "alert"
Collection	

The two container embeded image::exPageEmployee/exPageEmployee_21.png[title=Two containers]

and the result in preview (if you add a new Vacation request, and then cancel it) :

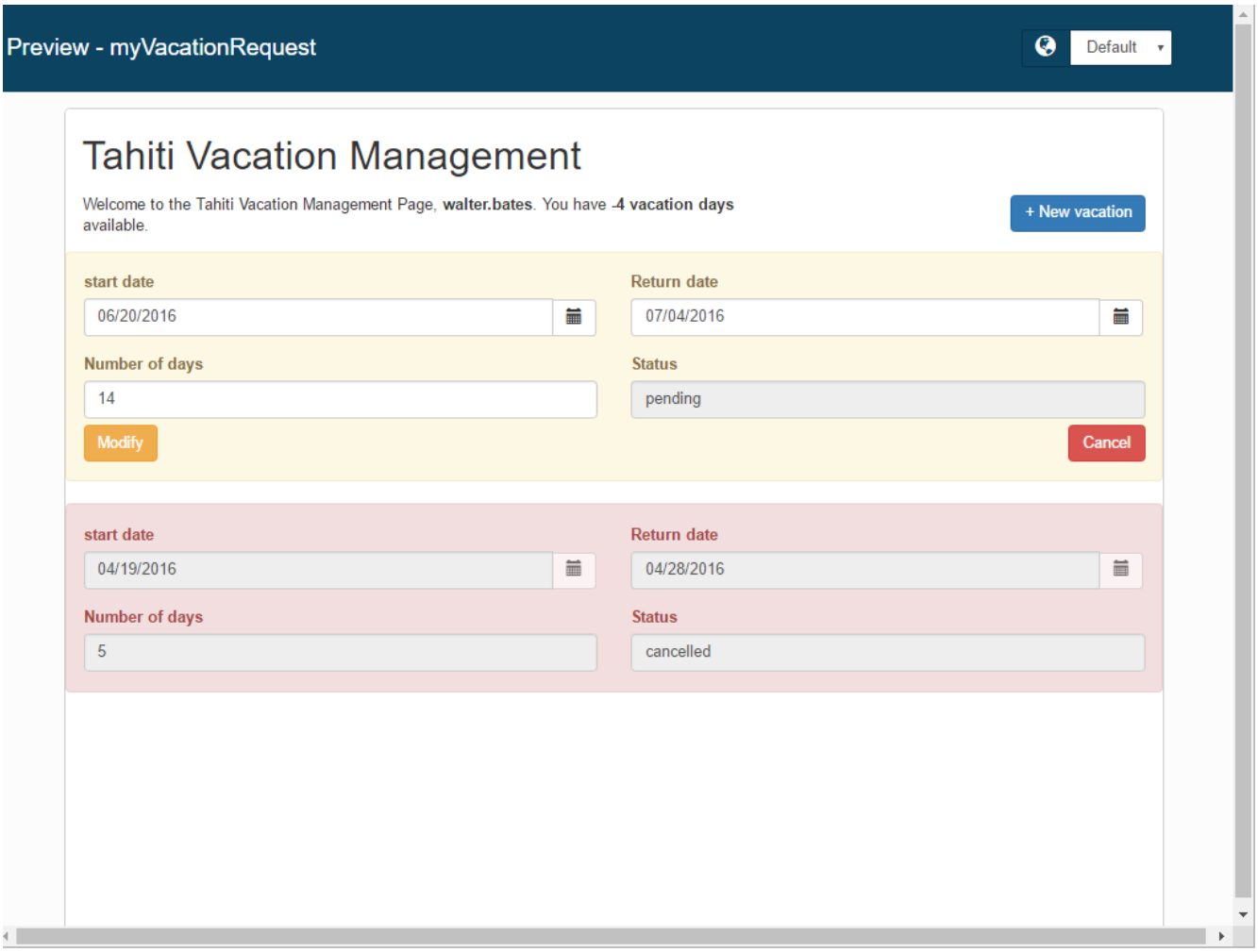


Figure 63. Color change

The first container do the iteration, when the second control the color.

5.4.3. Display a warning text

Display a text only if there are no vacation requests.

Text widget

- Add a **Text widget** above the Link widget + **New vacation** and configure its properties:

Property name	Property value
CSS classes	alert alert-danger
Hidden *(bound to an expression or variable)*	myVacation!=0
Text	There are no vacation requests yet. Use the button to create a new request.
Alignment	left

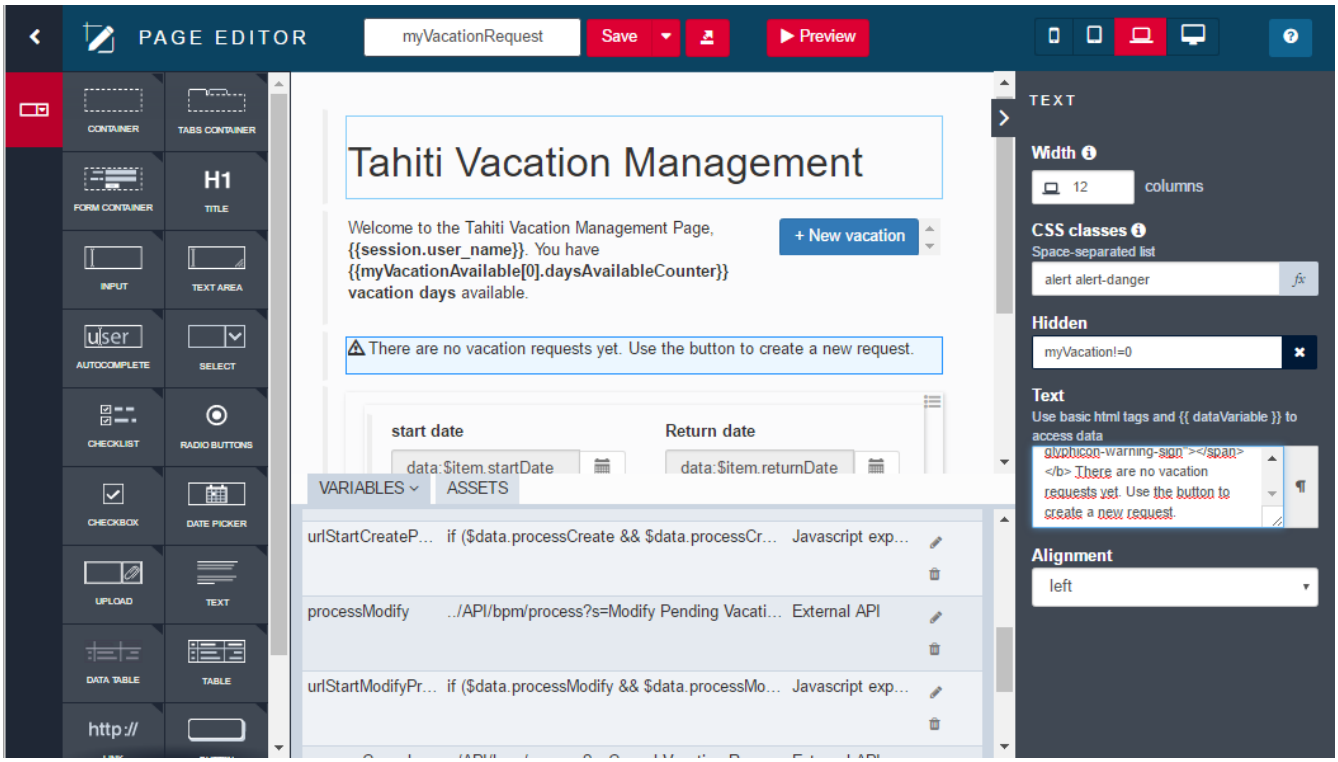


Figure 64. Text warning

Main Container widget

- Configure the **Main Container widget** properties this way:

Property name	Property value
Hidden *(bound to an expression or variable)*	!myVacation
Collection	myVacation

- Now, when there are no employee vacation requests we warn the end-users they new to use the

Link widget to create a new vacation request.

Chapter 6. Create a new REST API Extention

6.1. Prerequisites

You must have Bonita BPM Studio SP installed and started. An Internet connection is mandatory.

6.2. Objectives

The goal of this exercise is to become familiar with developing REST API Extensions with Bonita BPM Studio. It will permit a manager to get the list of her team subordinates colleagues vacations.

6.3. Instructions

In this exercise we will create an extension that will consolidate the information for future util view manager.

- Create a new REST API extension
- Implement the business logic
- Implement test
- Deploy
- Execute
- Create a page to use the extension
- Add the page to the application

Optional

- Advanced tests

6.4. Correction

6.4.1. Create new REST API extension

You can create a new REST API extension from the studio menu **Development** / **REST API Extension** / **New** ... as name put Tahiti REST API extension

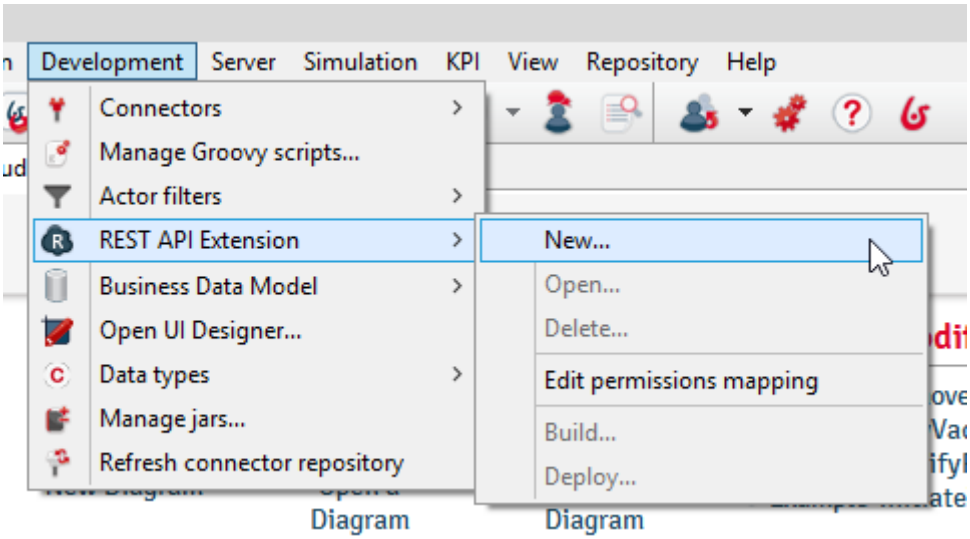


Figure 65. REST API Extension menu

For the first creation, you must have an Internet connection. The studio use Maven to install all additional component

6.4.2. Configure the new project

Your new REST API Extention needs to be configured.

Please indicate the following parameters.

Field	Value
Name	Tahiti REST API extension
Description	REST API extension that provide API to list users that are managed by a manager
Package	com.tahiti.rest.api
Project name	tahitiUsersOfManagerExtension
Version	1.0.0-SNAPSHOT

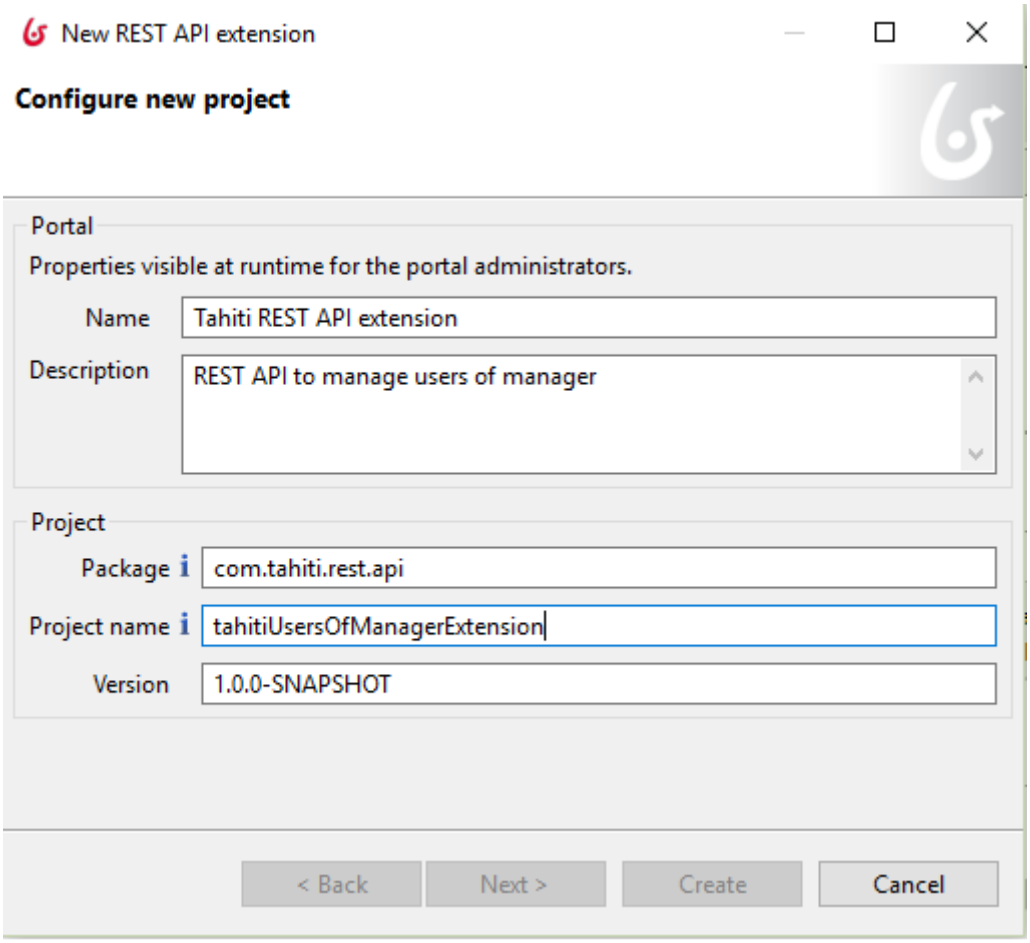


Figure 66. Description

Click on **Next** when you finish.

6.4.3. Configuration advanced

Indicate the following parameters.

Field	Value
Path template	tahitiUsersOfManager
Add BDM dependencies	false
Permissions	task_visualization

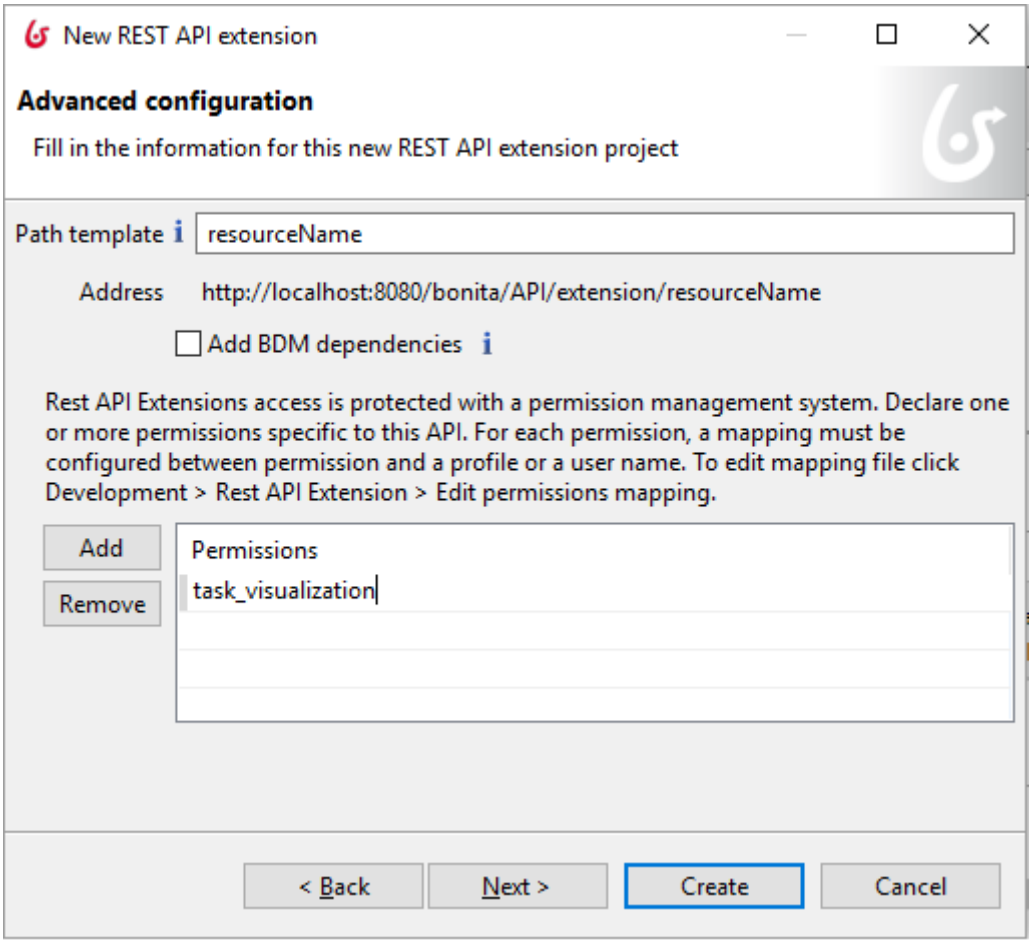


Figure 67. Permission

Click on **Next** when you finish.

6.4.4. Configuration parameters

For the purpose of the exercise we just keep the parameters p and c

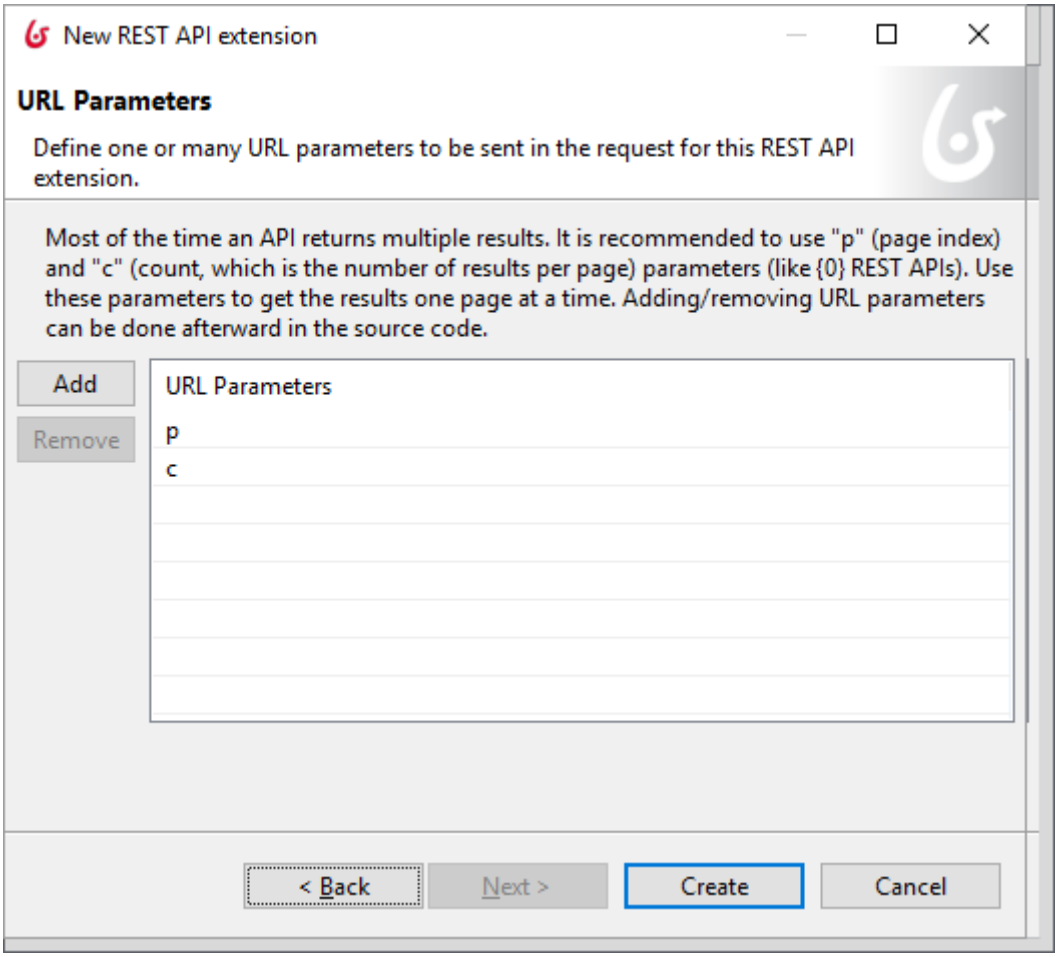


Figure 68. Rest parameters

Click on **Create** when you finish.

6.4.5. Screen start

When the configuration is finished, the studio will open the "Rest API development perspective" on your project REST API extension.

On the left panel you find the tree of your project, it's been auto-generated by the studio.

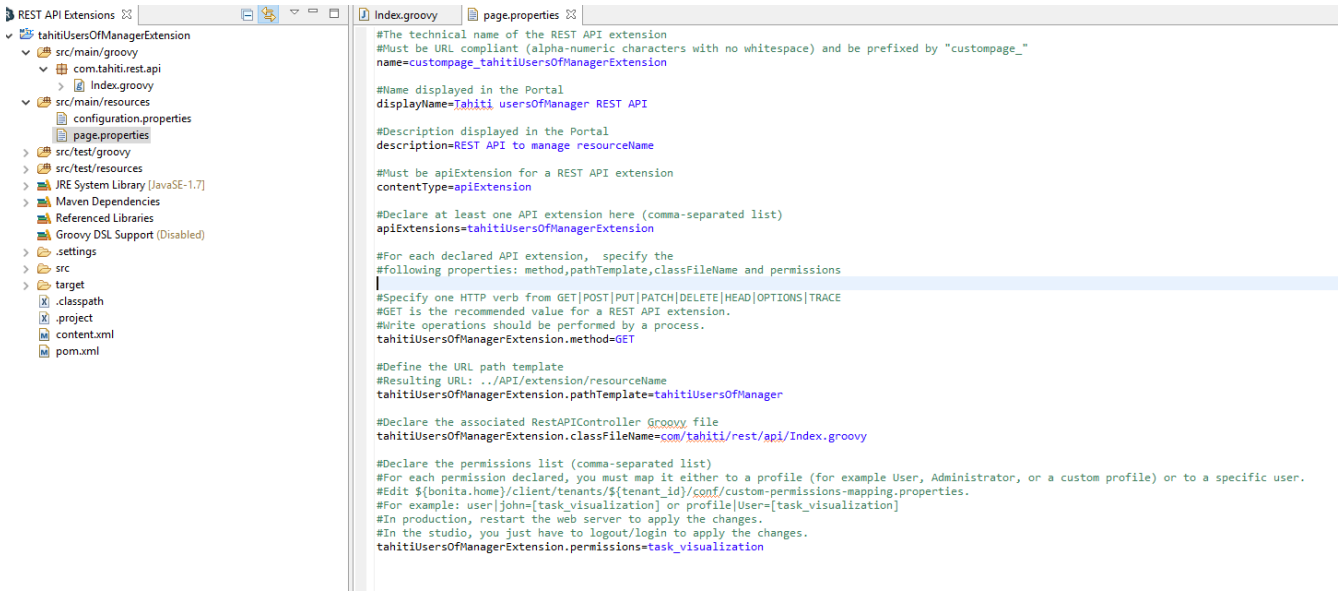


Figure 69. Configuration file

We don't need to modify the file "page.properties" you can close it.

6.4.6. Implement the business logic

An important part of the work is of course to implement the logic of our REST API ext, it's on the file "Index.groovy".

Here you are the default page created by the Studio that we are going to modify.

```
class Index implements RestApiController {

    private static final Logger LOGGER = LoggerFactory.getLogger(Index.class)

    @Override
    RestApiResponse doHandle(HttpServletRequest request, RestApiResponseBuilder responseBuilder, RestAPIContext context) {
        // To retrieve query parameters use the request.getParameter(..) method.
        // Be careful, parameter values are always returned as String values

        // Retrieve p parameter
        def p = request.getParameter "p"
        if (p == null) {
            return buildResponse(responseBuilder, HttpServletResponse.SC_BAD_REQUEST,"""{"error" : "the parameter p is missing"}""")
        }

        // Retrieve c parameter
        def c = request.getParameter "c"
        if (c == null) {
            return buildResponse(responseBuilder, HttpServletResponse.SC_BAD_REQUEST,"""{"error" : "the parameter c is missing"}""")
        }

        // Here is an example of how you can retrieve configuration parameters from a properties file
        // It is safe to remove this if no configuration is required
        Properties props = loadProperties("configuration.properties", context.resourceProvider)
        String paramValue = props["myParameterKey"]

        /*
         * Execute business logic here
         *
         *
         * Your code goes here
         *
         *
         */

        // Prepare the result
        def result = [ "p" : p ,"c" : c , "myParameterKey" : paramValue ]

        // Send the result as a JSON representation
        // You may use buildPagedResponse if your result is multiple
        return buildResponse(responseBuilder, HttpServletResponse.SC_OK, new JsonBuilder(result).toPrettyString())
    }
```

Figure 70. Index.groovy

The idea is to return the list of subordinates of a specific user. The extension will return a json with the users (list of subordinates).

You can remove the content of the doHandle method.

In order to better understand, we will gradually introduce code blocks step by step.

Retrieve input parameters

We have three input parameters:

pagination parameters p (page number) and c (number of elements to return) and the id of the manager

We retrieve these parameters in this way:

```
int p = 0;
int c = 10;

try{
    p = Integer.parseInt(request.getParameter("p"));
    c = Integer.parseInt(request.getParameter("c"));
}
catch(Exception e){
    LOGGER.info("Request parameters p and c should be numbers");
}
```

As you see in the code if p and c are not numbers we just log it and we use default values.

The id of the manager, managerUserId is retrieved from the session:

```
def apiSession = context.getApiSession();
def managerUserId = apiSession.getUserId();
```

Retrieve user subordinates

This is the core of the Rest extension. First of all we retrieve the IdentityApi then we use the search Bonita api classes and methods to retrieve our users. They are stored in the variable users

While coding, in order to get the import done, use autocompletion clicking CTRL + SPACE to have the list of suggestions.

```
def contextApiClient = context.getApiClient();
// Get a reference to IdentityAPI to search for users managed by current user
def identityAPI = contextApiClient.getIdentityAPI();

def searchBuilder = new SearchOptionsBuilder(p*c, c);

//We filter the user for MANAGER_USER_ID
searchBuilder.filter(UserSearchDescriptor.MANAGER_USER_ID, managerUserId)

def users = identityAPI.searchUsers(searchBuilder.done()).getResult()

LOGGER.info "Users managed by: " + managerUserId + " are: " + users
// If current user manage at least one user he/she is a manager

def userListNumber = 0;
if(!users.empty)
    userListNumber = users.size();
```

Result creation and pagination

Now we can build the paged response in this way:

```
 return buildPagedResponse(responseBuilder, new JsonBuilder(users).toPrettyString(),p,
c, new Long(userListNumber))
```

Check the imports

The index.groovy class is terminated, check that the class import are correctly done. You should have the following import list :

```
import groovy.json.JsonBuilder

import javax.servlet.http.HttpServletRequest
import javax.servlet.http.HttpServletResponse

import org.apache.http.HttpHeaders
import org.bonitasoft.web.extension.ResourceProvider
import org.bonitasoft.web.extension.rest.RestApiResponse
import org.bonitasoft.web.extension.rest.RestApiResponseBuilder
import org.slf4j.Logger
import org.slf4j.LoggerFactory

import com.bonitasoft.web.extension.rest.RestAPIContext
import com.bonitasoft.web.extension.rest.RestApiController

import org.bonitasoft.engine.session.APISession
import org.bonitasoft.engine.search.SearchOptionsBuilder
import org.bonitasoft.engine.api.TenantAPIAccessor
import org.bonitasoft.engine.identity.UserSearchDescriptor
```

6.4.7. Implement the test

This environment includes test features, so by default a test has been delivered. We provide here an example of test that should be included in the IndexTest.groovy file. If you are familiar with tests, this should sound logic to you.

When business logic changes, present test should change too.

```
package com.tahiti.rest.api;

import groovy.json.JsonSlurper
import groovy.mock.interceptor.MockFor;

import javax.servlet.http.HttpServletRequest

import org.bonitasoft.engine.identity.User
```

```
import org.bonitasoft.engine.identity.UserSearchDescriptor;
import org.bonitasoft.engine.search.SearchOptionsBuilder
import org.bonitasoft.engine.search.impl.SearchResultImpl;
import org.bonitasoft.engine.session.APISession;
import org.bonitasoft.web.extension.ResourceProvider
import org.bonitasoft.web.extension.rest.RestApiResponseBuilder

import spock.lang.Specification

import com.bonitasoft.engine.api.APIClient;
import com.bonitasoft.engine.api.IdentityAPI;
import com.bonitasoft.web.extension.rest.RestAPIContext

/**
 * @see http://spockframework.github.io/spock/docs/1.0/index.html
 */
class IndexTest extends Specification {

    // Declare mocks here
    // Mocks are used to simulate external dependencies behavior
    def HttpServletRequest httpRequest = Mock()
    def ResourceProvider resourceProvider = Mock()
    def RestAPIContext context = Mock()
    def APIClient apiClient = Mock();
    def APISession apiSession = Mock();
    def IdentityAPI identityAPI = Mock();

    /**
     * You can configure mocks before each tests in the setup method
     */
    def setup(){
        // Simulate access to configuration.properties resource
        context.resourceProvider >> resourceProvider
        resourceProvider.getResourceAsStream("configuration.properties") >>
IndexTest.class.classLoader.getResourceAsStream("testConfiguration.properties")
        context.apiClient >> apiClient
        context.apiSession >> apiSession
        apiSession.userId >> 1L
        apiClient.identityAPI >> identityAPI

    }

    public void should_return_an_empty_userlist_when_logged_user_is_not_manager() {
        given: "a RestAPIController"
        def index = new Index()
        httpRequest.getParameter("p") >> 0
        httpRequest.getParameter("c") >> 100
        identityAPI.searchUsers(new SearchOptionsBuilder(0, 100)
            .filter(UserSearchDescriptor.MANAGER_USER_ID, apiSession.userId).done())
>> new SearchResultImpl<User>(0,[])
```

```
        when: "Invoking the REST API"
        def apiResponse = index.doHandle(httpRequest, new RestApiResponseBuilder(),
context)

        then: "A JSON representation is returned in response body"
        def jsonResponse = new JsonSlurper().parseText(apiResponse.response)
        // Validate returned response
        apiResponse.httpStatus == 200
        jsonResponse == []
    }

    public void should_return_a_userlist_when_logged_user_is_a_manager() {
        given: "a RestAPIController"
        def index = new Index()
        httpRequest.getParameter("p") >> 0
        httpRequest.getParameter("c") >> 100
        identityAPI.searchUsers(new SearchOptionsBuilder(0, 100)
            .filter(UserSearchDescriptor.MANAGER_USER_ID, apiSession.userId).done())
>> new SearchResultImpl<User>(2,[Mock(User),Mock(User)])

        when: "Invoking the REST API"
        def apiResponse = index.doHandle(httpRequest, new RestApiResponseBuilder(),
context)

        then: "A JSON representation is returned in response body"
        def jsonResponse = new JsonSlurper().parseText(apiResponse.response)
        // Validate returned response
        apiResponse.httpStatus == 200
        jsonResponse.size() == 2
    }
}
```

6.4.8. Deploy

To test the interface with the embedded platform, we have the possibility to deploy directly from the Bonita BPM Studio.

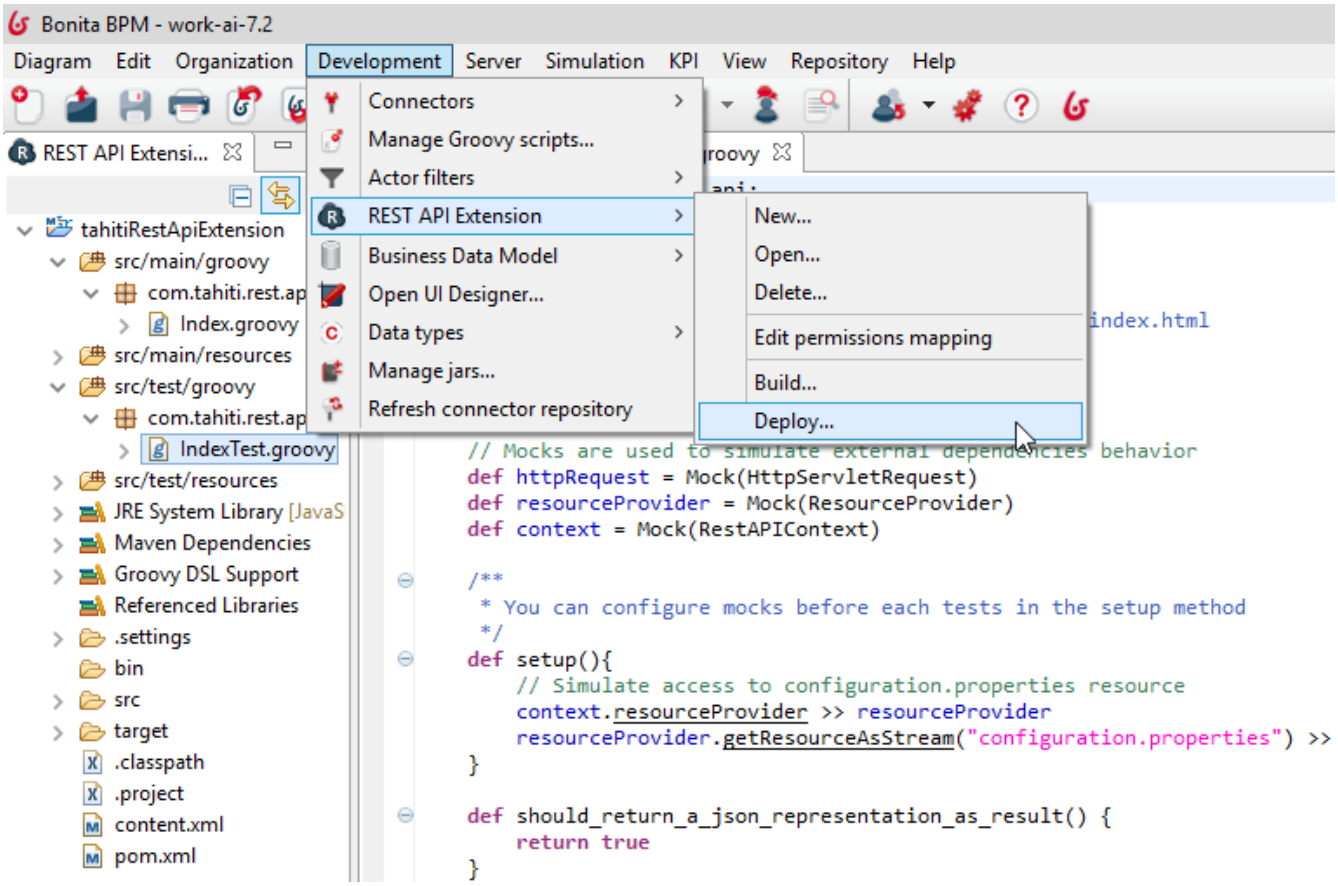


Figure 71. Deploy

If by any chance you have a failure at this stage, we must start from the beginning.

6.4.9. Execute

As a reminder the purpose of the REST API EXT is to get users of the manager. We must login in the portal with a manager.

Helen Kelly Login: helen.kelly Password: bpm

We can take the opportunity to change the profile to "Administrator" and see the resources in our REST API is present Ext.

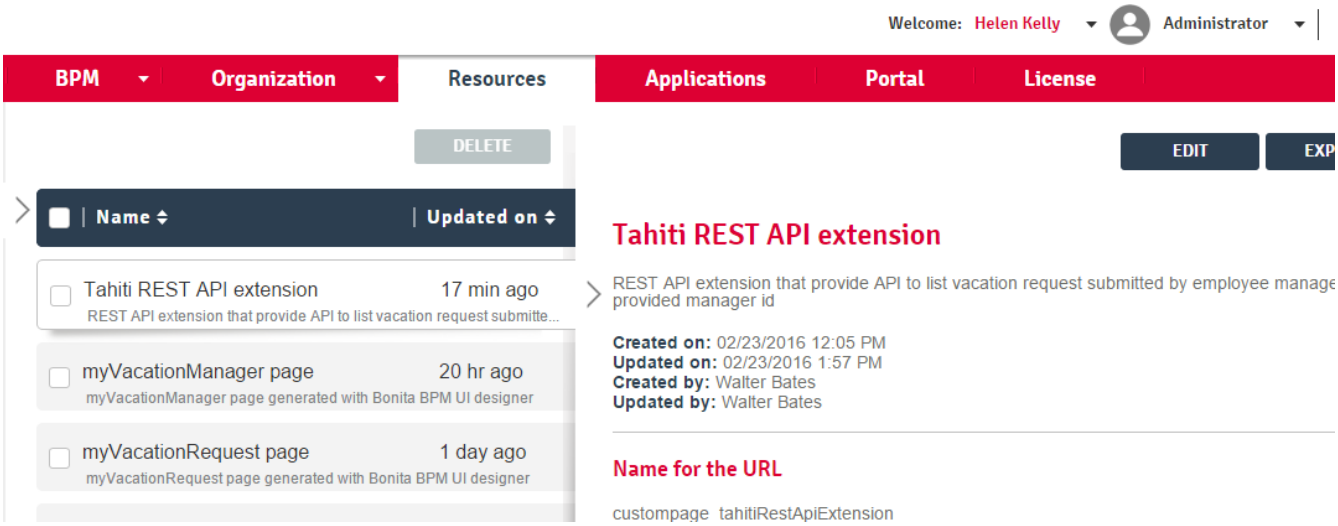


Figure 72. Resource is deployed

As a reminder we said our REST API Ext has the following path: **tahitiUsersOfManager**, so the url to provide is: http://localhost:8080/bonita/API/extension/tahitiUsersOfManager?p=0&c=10

First, log in the browser as Helen.Kelly

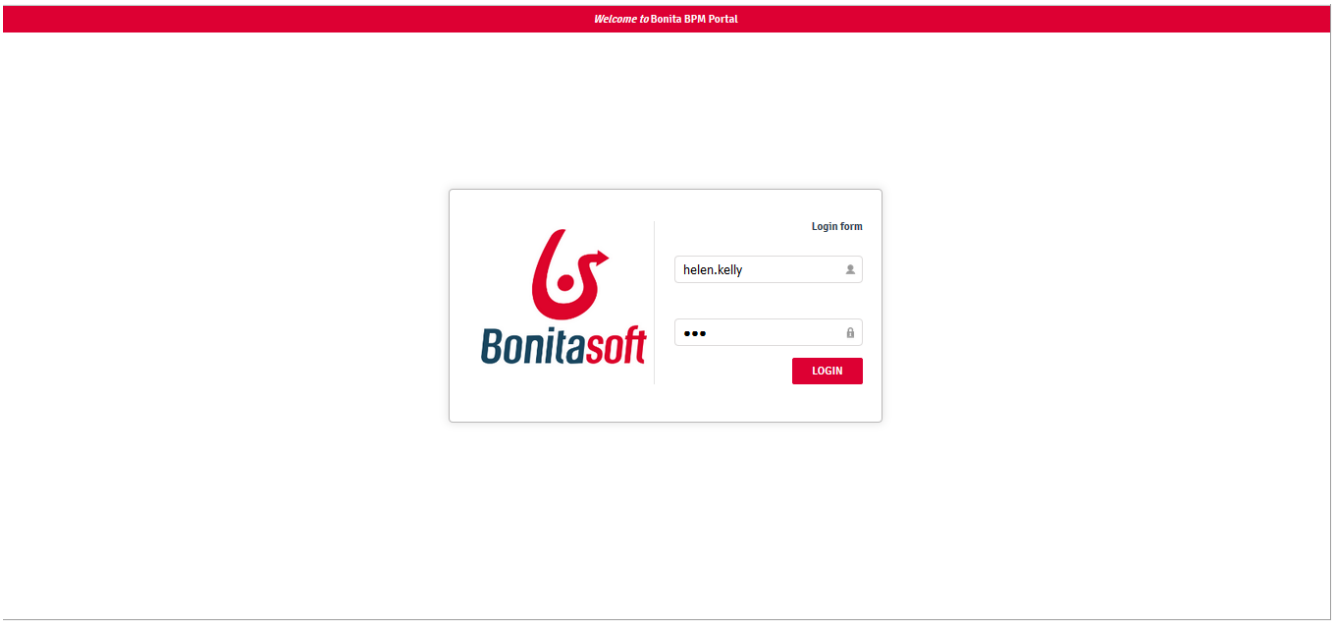


Figure 73. Log as Helen.Kelly

Then, using the REST CLIENT, check the call

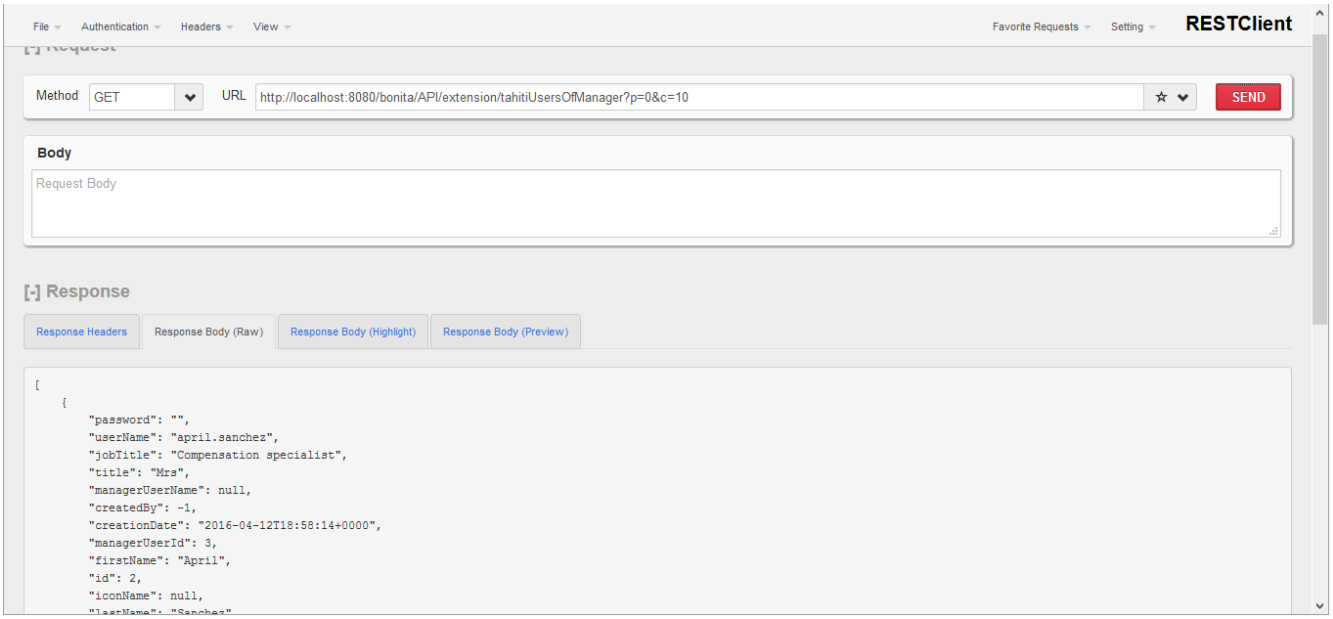


Figure 74. Run the REST CLIENT

Just copy and paste this url on a new tab of your browser.

```
[
    {
      "password": "",
      "userName": "april.sanchez",
      "jobTitle": "Compensation specialist",
      "title": "Mrs",
      "managerUserName": null,
      "createdBy": -1,
      "creationDate": "2016-03-22T15:51:54+0000",
      "managerUserId": 147,
      "firstName": "April",
      "id": 146,
      "iconName": null,
      "lastName": "Sanchez",
      "enabled": true,
      "iconPath": null,
      "lastUpdate": "2016-03-22T15:51:54+0000",
      "lastConnection": null
    },
    {
      "password": "",
      "userName": "walter.bates",
      "jobTitle": "Human resources benefits",
      "title": "Mr",
      "managerUserName": null,
      "createdBy": -1,
      "creationDate": "2016-03-22T15:51:54+0000",
      "managerUserId": 147,
      "firstName": "Walter",
      "id": 148,
      "iconName": null,
      "lastName": "Bates",
      "enabled": true,
      "iconPath": null,
      "lastUpdate": "2016-03-22T15:51:54+0000",
      "lastConnection": "2016-03-25T08:53:35+0000"
    }
]
```


Result is

Figure 75. Execute the REST

6.4.10. View results on a Page

In order to see the results of our extension we need to create a simple **application page**. It will have just two widgets:

- a **Title widget** to display the name of our page: Team members
- a **Data table** to list all the manager team members

Title of our Page

Create a page and name it **Tahiti Page**.

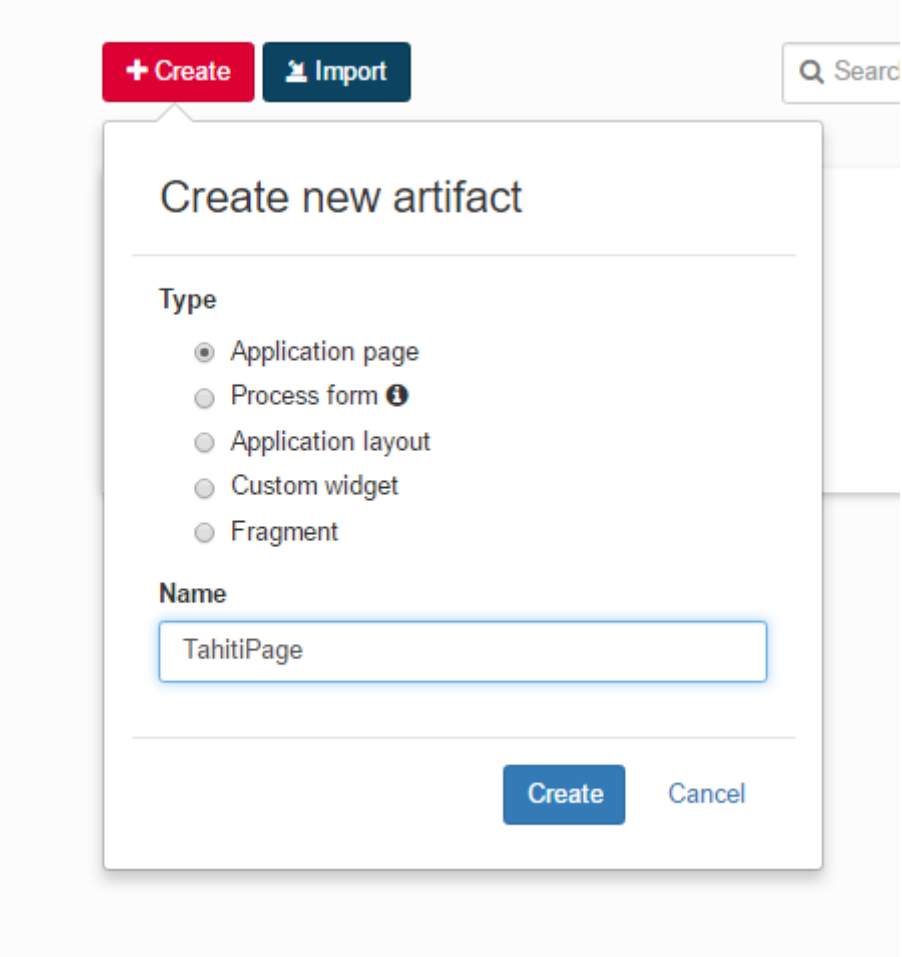


Figure 76. Create the page

Add a Title widget to the whiteboard and fill in their properties.

Property name	**Property value**
Text	Team members
Title level	Level 1
Alignment	left

Add a Data table widget

Property name	**Property value**
Headers	firstName, lastName, jobTitle
Data source	Bonita API
URL	../API/extension/tahitiUsersOfManager
Columns key	firstName, lastName, jobTitle

Page are

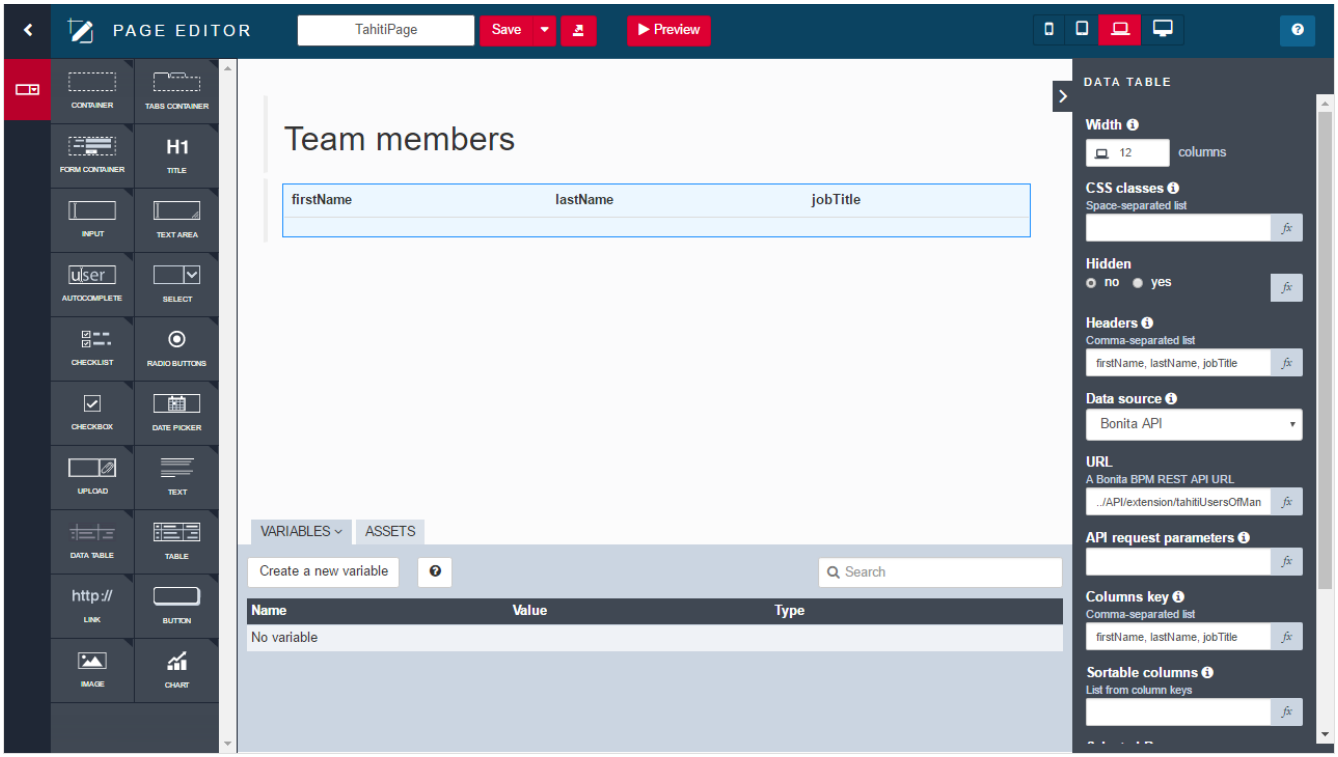


Figure 77. Content of the Tahiti page

You can preview your page with the button "Preview" and check that everything works fine. Attention : first log as Helen.Kelly in the browser;

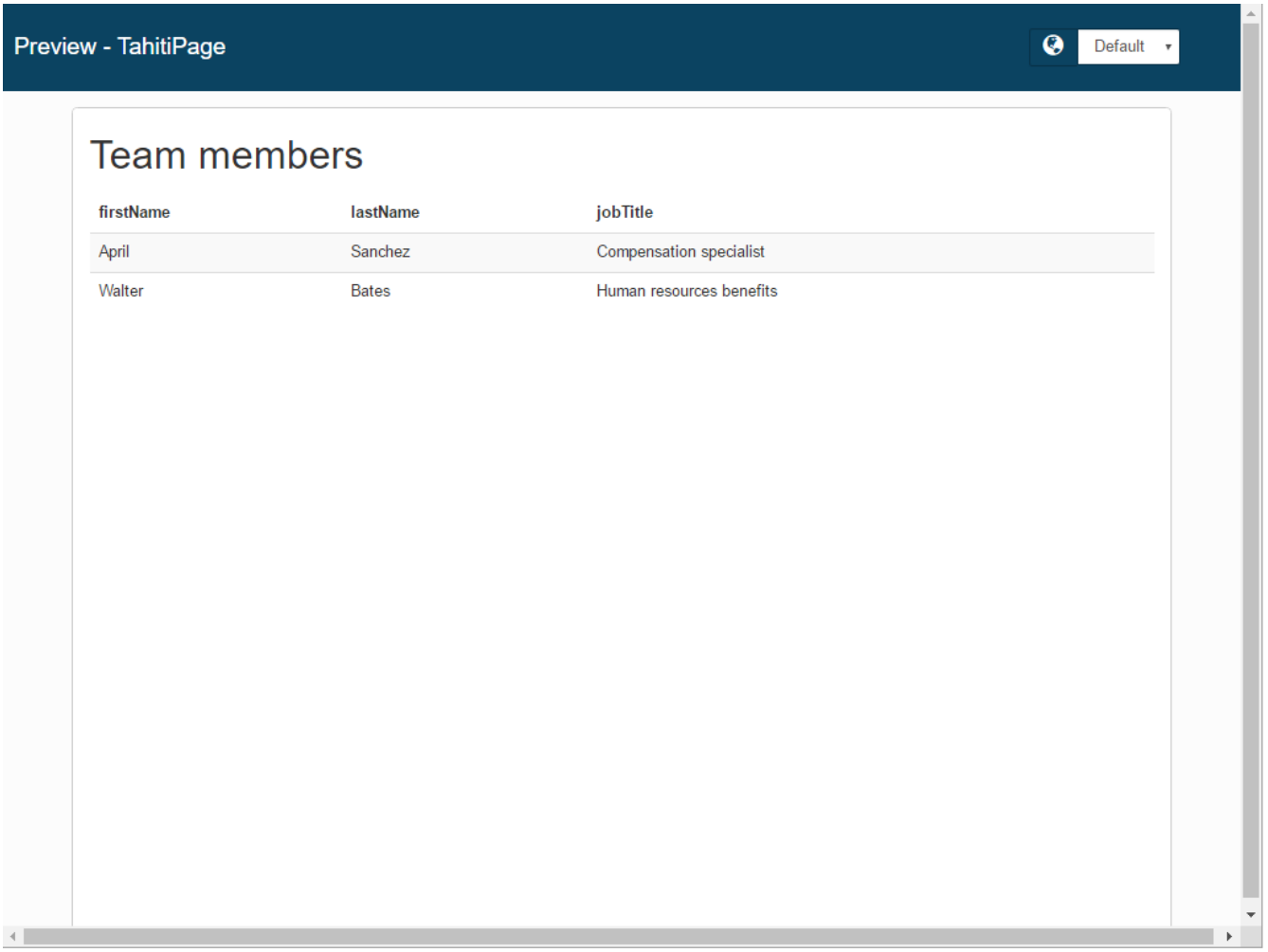


Figure 78. List of persons of the team

Every time a manager login he will see his team members, if you login with a user that is not a manager you will not see any users.

Once the page is created you can add it to the application. Do you remember how to do it?

If not, just check the previous exercise.

Chapter 7. Create a custom page for the Managers

7.1. Prerequisites

Having done the previous exercises

7.2. Objectives

The goal of this exercice is to create a custom page for the Managers to be used in the Vacation Management application. The custom page will be created using the UI Designer as seen in the previous exercise. This custom page will:

- show the **vacation available** from all manager employees
- show the **vacation requests** from all manager employees
- display a **review link** to access selected vacation request validation form

Optional

- Display a bar chart with manager employees and their available vacation days
- Display a warning text only when logged user is not a manager

7.2.1. Overview

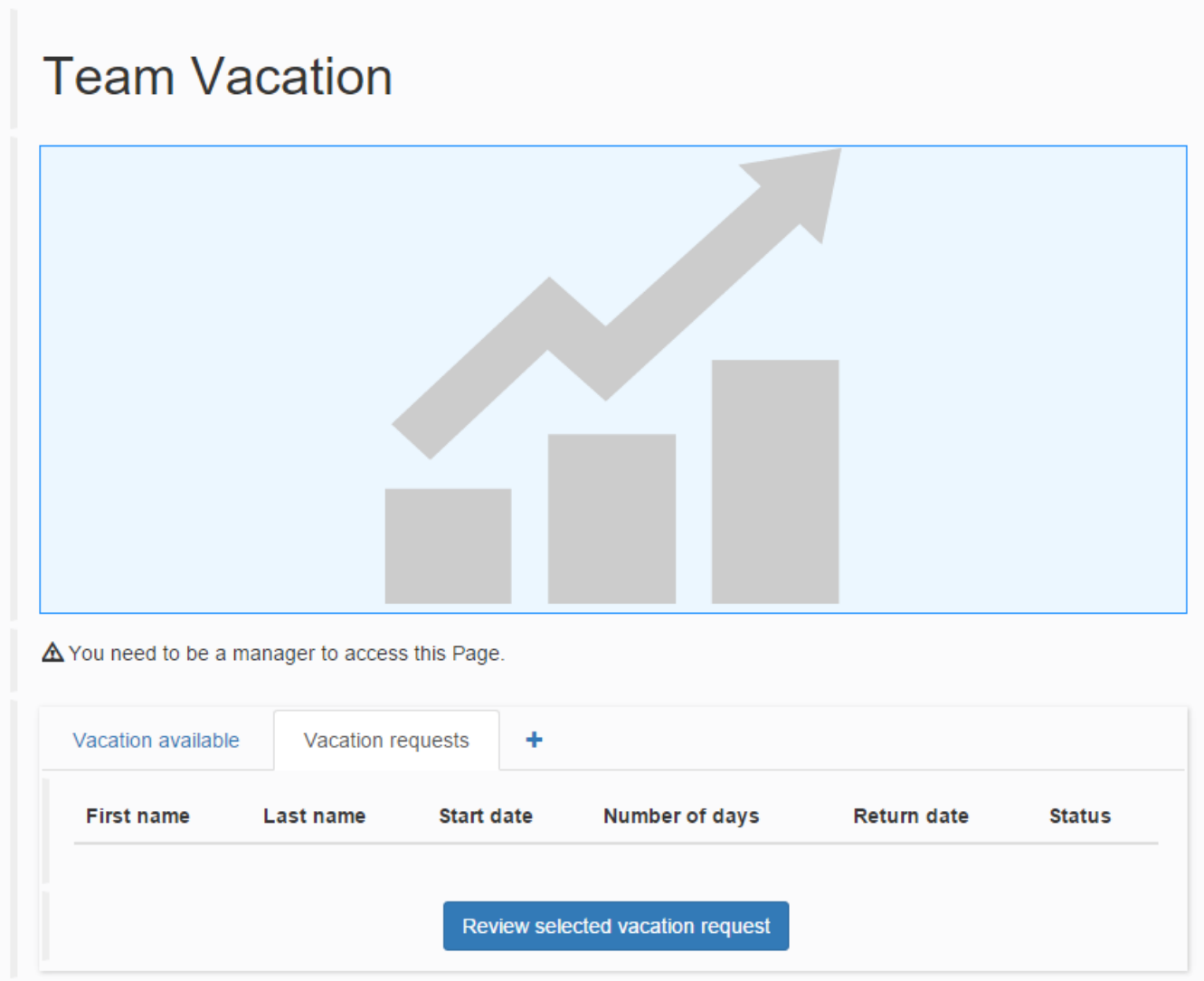


Figure 79. Overview

7.3. Instructions

- Create a new page
- Create all the data needed for your page (API variables to load the BDM,...)
- Drag and Drop the widgets used on your page, you will need Title, Tabs Container, Table and Button widgets
- Bind all your data to your widgets
- Test your page
- Add your page into the Vacation Management application
- Test your application page.

7.4. Correction

This section provides details about steps to follow to create a page using best practices.

7.4.1. Create a new empty page

- Run the UI Designer either by clicking on UI Designer icon on the Studio
- On the UI Designer home page, click on "+ Create" button and be sure that the Type **"Application page"** is checked. Name your page **myVacationManager** and click on Create button.

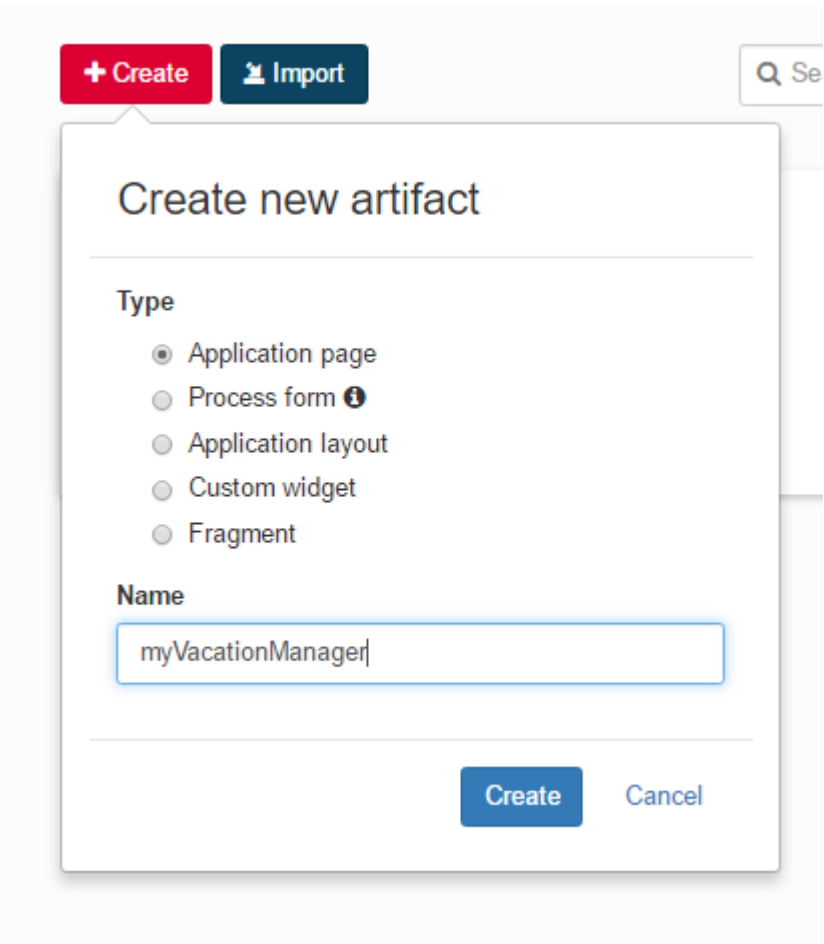


Figure 80. Create the page

- Your page is created

7.4.2. Rest API Extension

We need to retrieve the information of the vacation days available for each team member. We will use a provided Rest API Extension for that, called tahitiRestApiExtension.

Download it from provided files and import the .bos file as it were a new process.

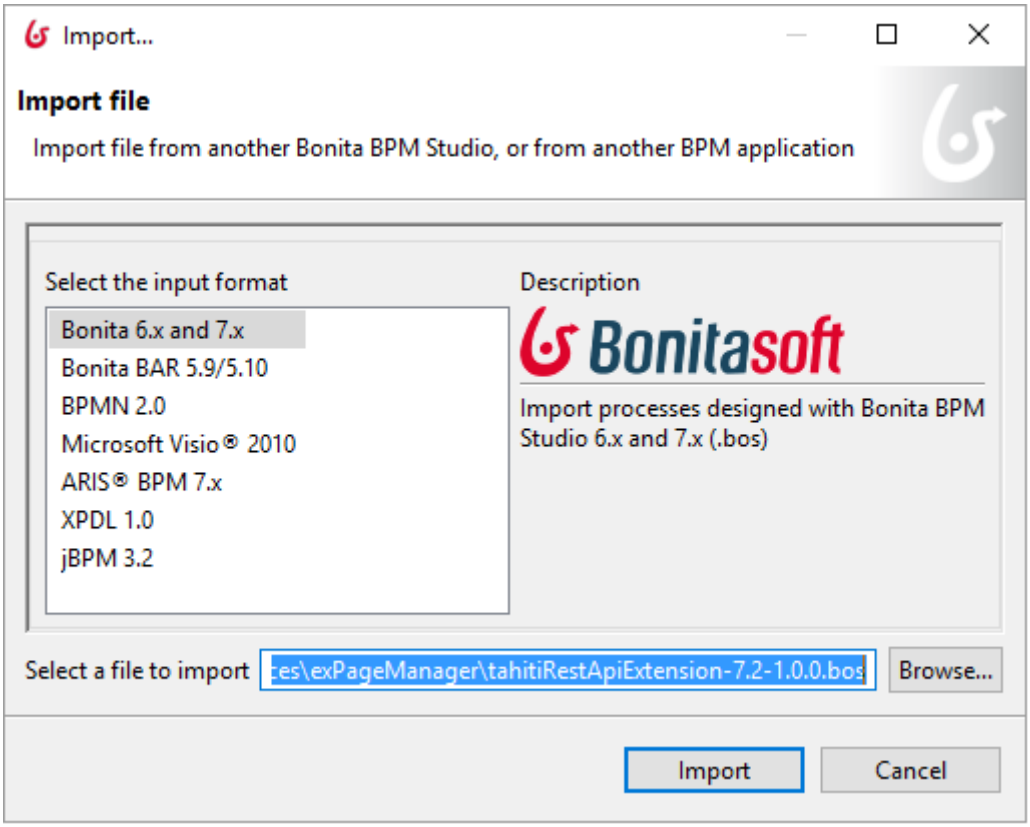


Figure 81. Import the REST API

You can then deploy it on the portal:

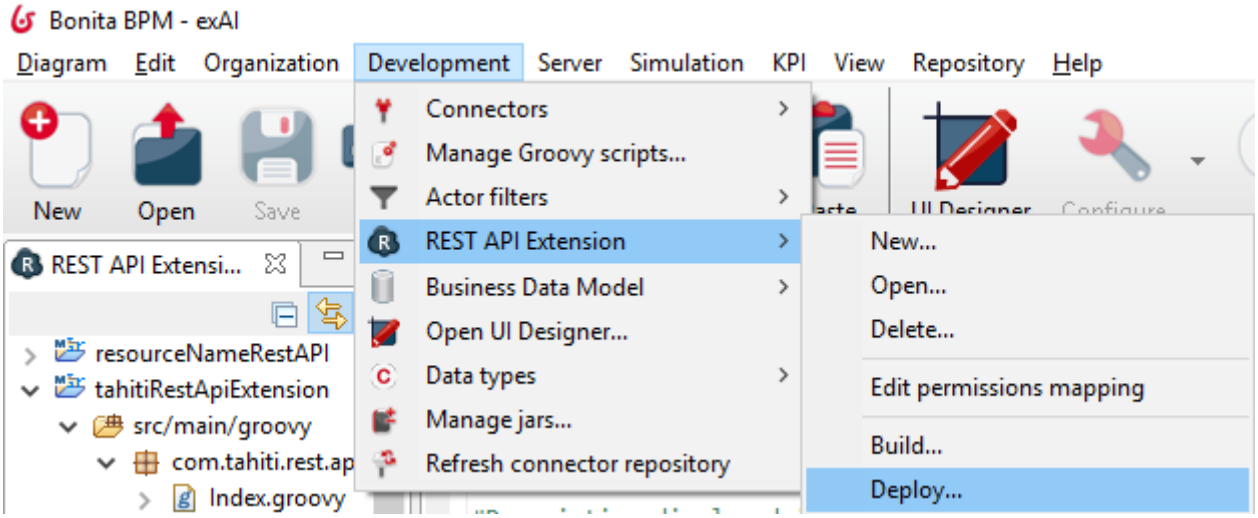


Figure 82. Deploy the RESTAPI

7.4.3. Create the data

For your page communication and logic you will need some data. Below the list of data you need to create.

Name	Type	Content
managerTeamInfo	External API	../API/extension/vacationRequest
teamSelectedRow	JSON	{}

Result is

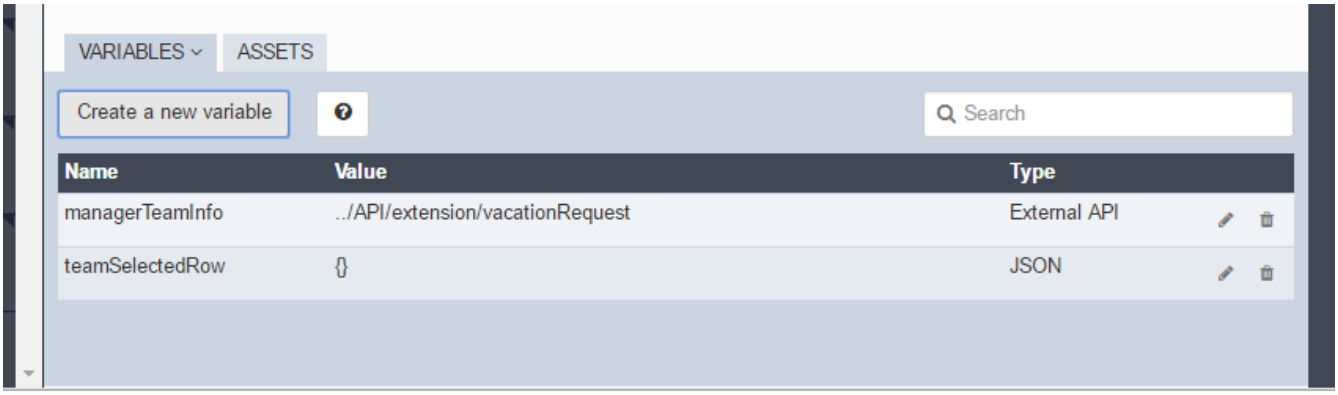


Figure 83. Variables created

More about created data

managerTeamInfo

This API call is used to load all the Vacation Request business data

teamSelectedRow

This empty JSON will be useful to take data from the selected row in the Table widget

7.4.4. Build your page

Now we can start to design **"graphically"** our page. We are going to add widgts, configure them and bind them to related data. This will be the last step of your page creation.

Before getting started, you should design your page mock-up. As you have all the variables inside and outside your page already created, you can know which widgets you will use. You can also take he opportunity to think about the widgets placement and the global look'n'feel of your page.

We are going to need:

- a **Title widget** to display the name of our page
- a **Tabs container widget** to show Vacation available tab and Vacation requests tab
  - a **Table widget** to show the Vacation available of the manager employees
  - a **Table widget** to show the Vacation requests of the manager employees
  - a **Link widget** as a button to call the task "Review request" from the NewVacationRequest process, once selected a request in the previous Table.

Widget Title

Add a Title widget to the whiteboard and fill in their properties.

Property name	Property value
Text	Team Vacation

Property name	Property value
Title level	Level 1
Alignment	left

Tabs container widget

Add a Tabs container widget below the Title widget. Click on "+" on the top right corner of the Tabs container widget to add a new tab. Fill in their properties.

Property name	Property value
Title (on the first tab)	Vacation available
Title (on the second tab)	Vacation requests

Once you select a tab, you can drag and drop widgets inside.

Drag and drop 2 Table widgets, one for each tab, a Link widget into the second tab and configure their properties this way:

Vacation available tab - Table widget

Drag and drop a Table widget inside the "Vacation available" tab and use these properties:

Property name	Property value
Headers	First name, Last name, Days available
Content *(bound to an expression or variable)*	managerTeamInfo.employeesVacationAvailable
Column keys	firstName, lastName, daysAvailableCounter

Headers property display the name of the Table widget headers.

Column keys property belong to the Content attributes.

Content property is a **Dynamic Value** type. You can use a dynamic value field to specify a constant (by default) or an expression. Click on the expression icon **'fx'** to switch from constant to expression and start typing the name of your variable (in this case **managerTeamInfo**) and select it from the autocompleter selector. We want to display the **employeesVacationAvailable** attribute that is a JSON list If you run the REST API, the result is this one:

```
managerTeamInfo: {
    "isManager": true,
    "employeesVacationRequests": [
        { "firstName": "Walter", "lastName": "Bates", "startDate": "2016-02-
12T00:00:00+0000", "returnDate": "2016-02-13T00:00:00+0000", "numberOfDays": 1,
"status": "processing cancellation", "taskId": null },{ "firstName": "Walter",
"lastName": "Bates", "startDate": "2016-02-12T00:00:00+0000", "returnDate": "2016-02-
14T00:00:00+0000", "numberOfDays": 2, "status": "approved", "taskId": null },{
"firstName": "Walter", "lastName": "Bates", "startDate": "2016-02-15T00:00:00+0000",
"returnDate": "2016-02-17T00:00:00+0000", "numberOfDays": 2, "status": "cancelled",
"taskId": null }
    ],
    "employeesVacationAvailable": [
        { "firstName": "April", "lastName": "Sanchez", "daysAvailableCounter": 10 },
        { "firstName": "Walter", "lastName": "Bates", "daysAvailableCounter": 7 }
    ]
}
```


So we use **managerTeamInfo.employeesVacationAvailable** JSON list for iteration.

Result of the tab is

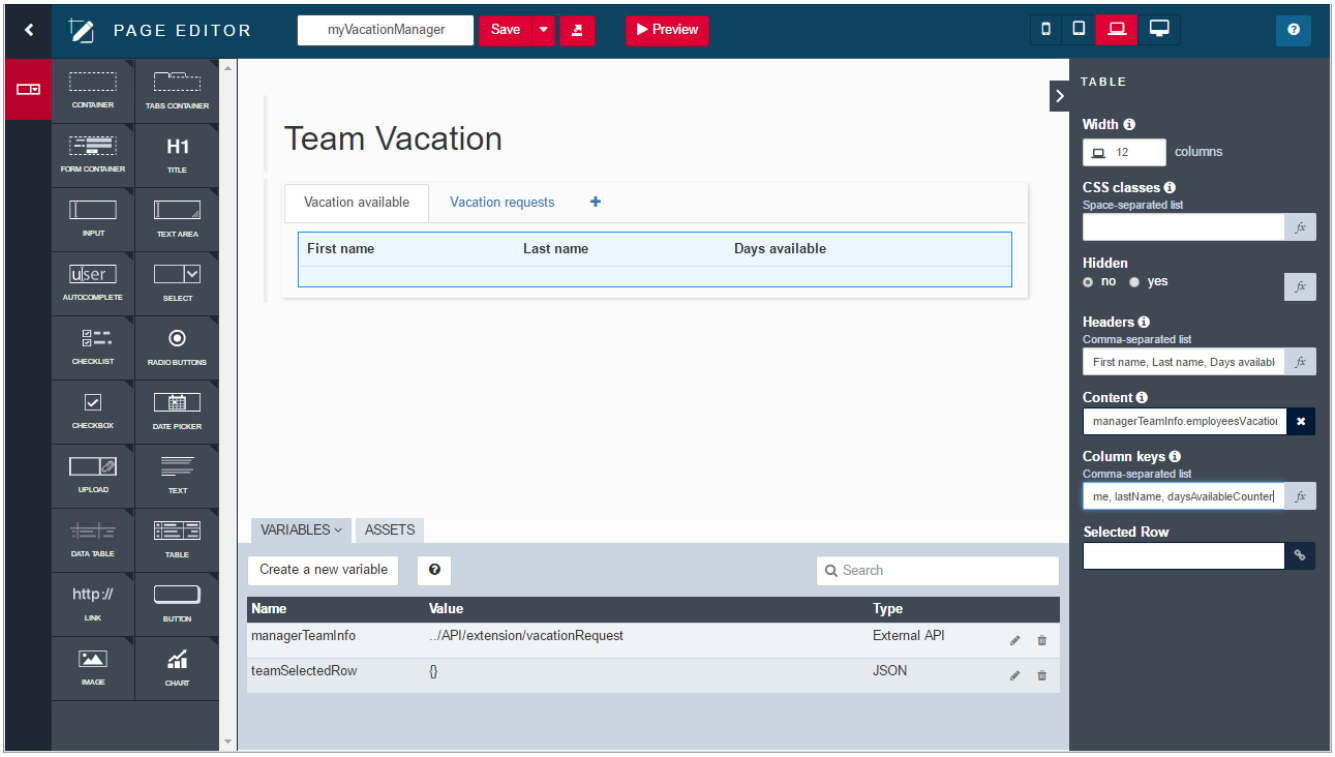


Figure 84. Vacation available tab

Vacation request tab - Table widget

Drag and drop a Table widget inside the "Vacation request" tab and use these properties:

Property name	Property value
Headers	First name, Last name, Start date, Number of days, Return date, Status
Content *(bound to an expression or variable)*	managerTeamInfo.employeesVacationRequests
Column keys	firstName, lastName, startDate | date, numberOfDays, returnDate | date, status
Selected Row	teamSelectedRow

Column keys property is using a list of attributes that match the Content list property. Attributes startDate and returnDate are using an AngularJS filter to show formated dates like this: **startDate | date**.

SelectedRow property is using a variable to store the value of the selected row in the Table widget.

Content property is a **Dynamic Value** type. You can use a dynamic value field to specify a constant (by default) or an expression. Click on the expression icon **'fx'** to switch from constant to expression and start typing the name of your variable (in this case **managerTeamInfo**) and select it from the autocompleter selector. We want to display the **employeesVacationRequests** attribute that is a JSON list:

```
managerTeamInfo: {
    "isManager": true,
    "employeesVacationRequests": [
         { "firstName": "Walter", "lastName": "Bates", "startDate": "2016-02-
12T00:00:00+0000", "returnDate": "2016-02-13T00:00:00+0000", "numberOfDays": 1,
"status": "processing cancellation", "taskId": null },
         { "firstName": "Walter", "lastName": "Bates", "startDate": "2016-02-
12T00:00:00+0000", "returnDate": "2016-02-14T00:00:00+0000", "numberOfDays": 2,
"status": "approved", "taskId": null },
         { "firstName": "Walter", "lastName": "Bates", "startDate": "2016-02-
15T00:00:00+0000", "returnDate": "2016-02-17T00:00:00+0000", "numberOfDays": 2,
"status": "cancelled", "taskId": null }
    ],
    "employeesVacationAvailable": [
        { "firstName": "April", "lastName": "Sanchez", "daysAvailableCounter": 10 }, {
"firstName": "Walter", "lastName": "Bates", "daysAvailableCounter": 7 }
    ]
}
```

So we use **managerTeamInfo.employeesVacationRequests** JSON list for iteration.

Vacation request tab - Link widget

Drag and drop a Link widgets inside the "Vacation request" tab, below the Table widget, and configure their properties this way:

Property name	Property value
Hidden *(bound to an expression or variable)*	teamSelectedRow.status!=="pending"
Text	Review selected vacation request
URL *(bound to an expression or variable)*	"/bonita/portal/form/taskInstance/"+ teamSelectedRow.taskId
Frame	Current frame (_self)
Alignment	center
Style	primary

Hidden property is a **Dynamic Value** type and we want to evaluate an expression so, it needs to be bound to an expression or variable. We want to hide the Link whenever the status of the selected Table row is not "pending".

URL property is a **Dynamic Value** type. You can use a dynamic value field to specify a constant (by default) or an expression. Click on the expression icon **'fx'** to switch from constant to expression. In this case we want to display the URL String path + the selected row taskId. We can take the **taskId** from the selected row bound to **teamSelectedRow** data:

teamSelectedRow: { "firstName": "Helen", "lastName": "Kelly", "startDate": "2016-02-17T00:00:00+0000", "returnDate": "2016-02-18T00:00:00+0000", "numberOfDays": 1, "status": "pending", "taskId": 80005 }

So we use the path as a String "/bonita/portal/form/taskInstance/" and we add the teamSelectedRow.taskId

Result is

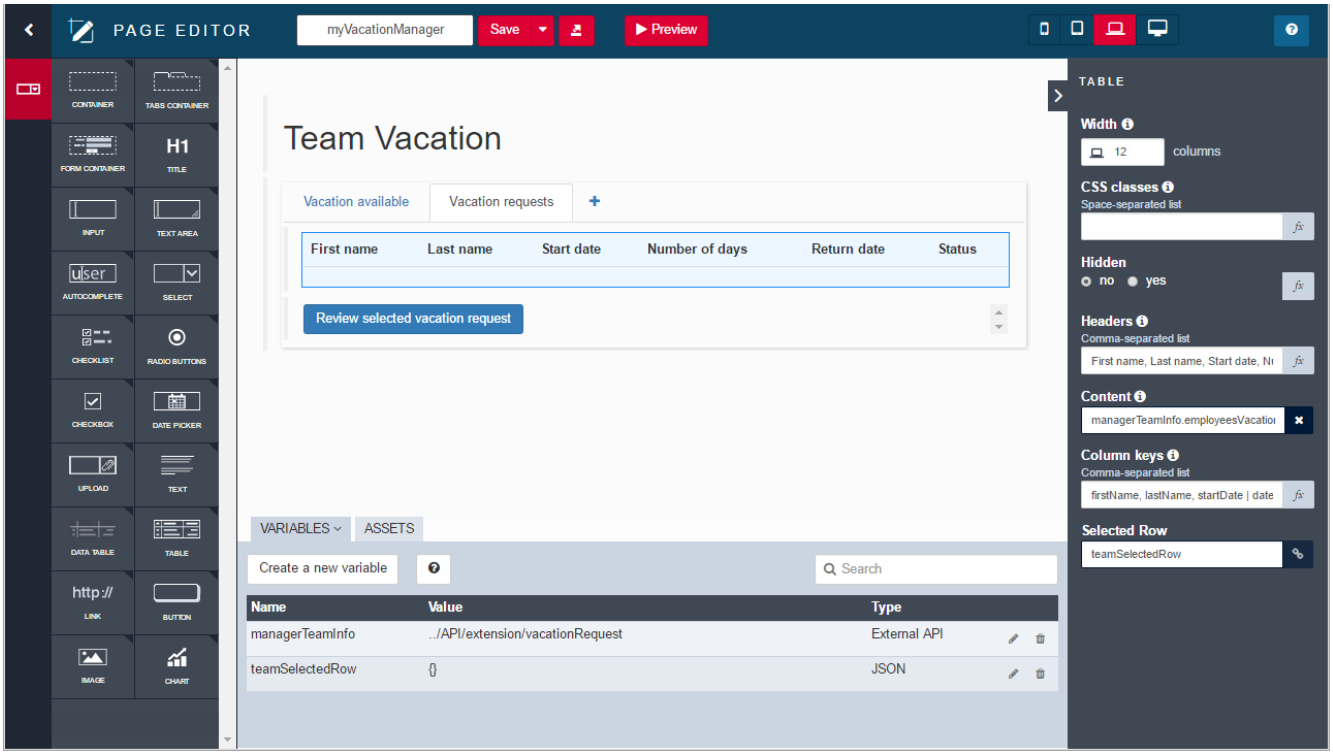


Figure 85. Tab Vacation request

7.4.5. Preview on different devices

Save your changes and use the Preview button to check how your page is going to look like. Use the different devices view button to test how widgets will be shown.

Tips

> Each device view is directly related with each widget Width property. The value of this property can be from 1 to 12. This is based on Bootstrap, where a total of 12 cols divide the screen for each different device (extra-small, small, medium, large).

Play with the different widget Width values that fits your page design for the different devices using the Preview button.

7.4.6. Export your page

Once everything is ready on your page, click on the Export button. It will create a .zip file that we can use to import it as a resource into the Bonita Portal.

7.4.7. Add your page to the Vacation Management application

- Go to the Bonita Portal using the Administrator profile, **Resources** section.
- **Import your page-myVacationManager.zip** file clicking on "+ ADD" button on the top left side.

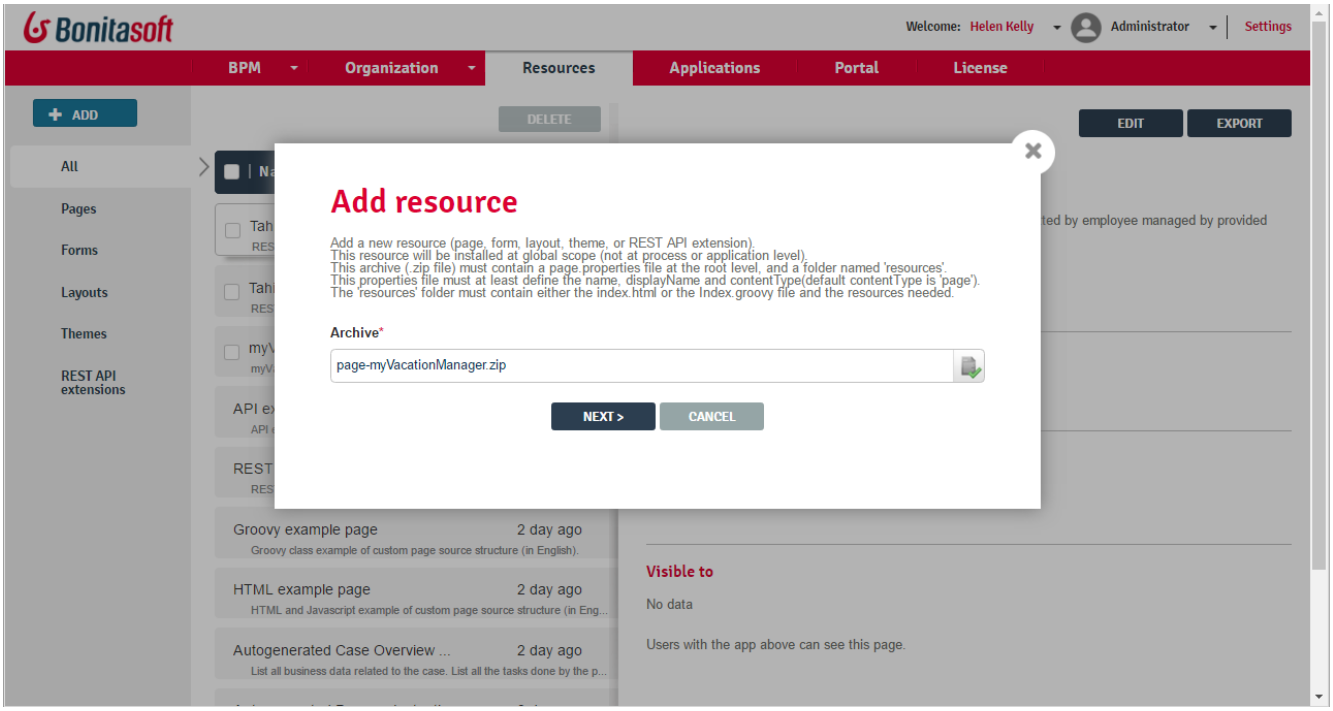


Figure 86. Add the page

- Also, you will need to import the REST API extension provided.
- Go to **Applications** section and click on the three dots icon action button of the Vacation Management application.

Let's add your Page and a new Navigation Menu for your application.

- Click on Pages "ADD" button and select **custompage_myVacationManager - myVacationManager page**. Also type ***management*** into the URL field.

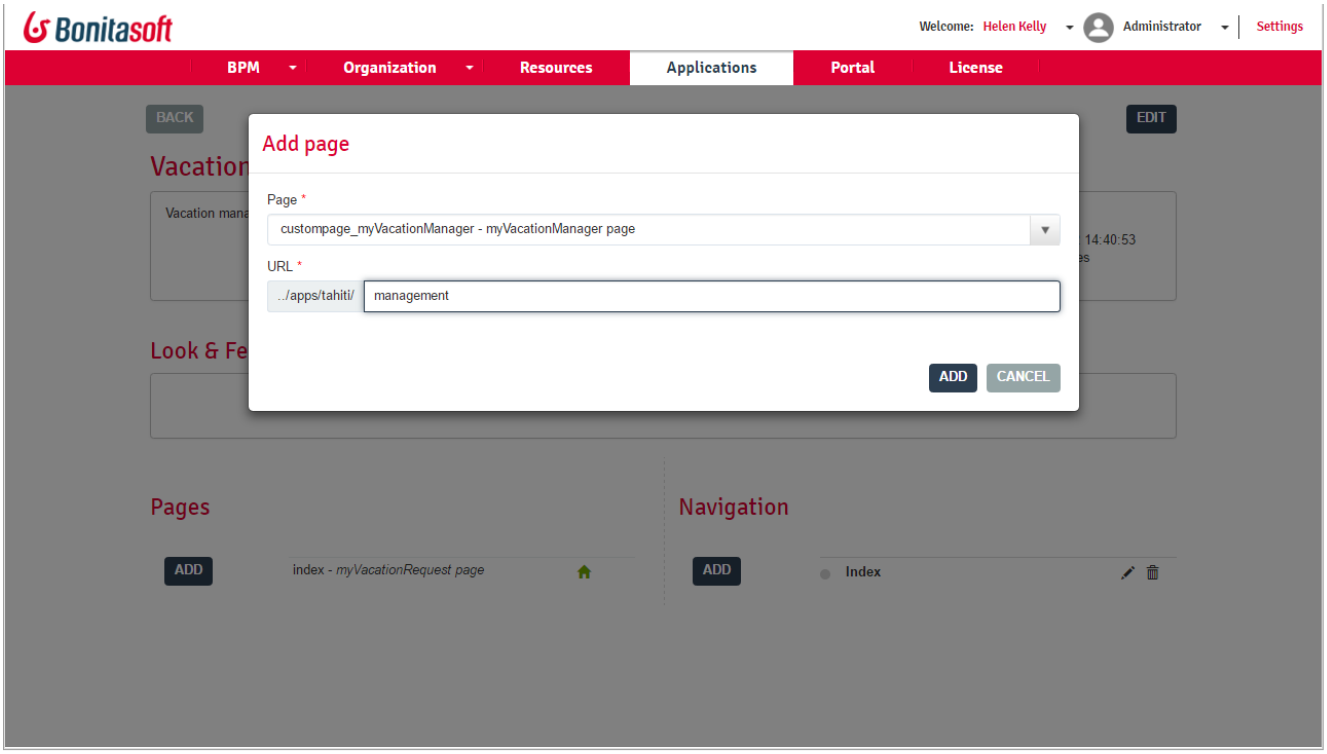


Figure 87. Add the page

- Click on Navigation "ADD" button, use the Name ***Management*** and select your page. Click on "ADD" button.

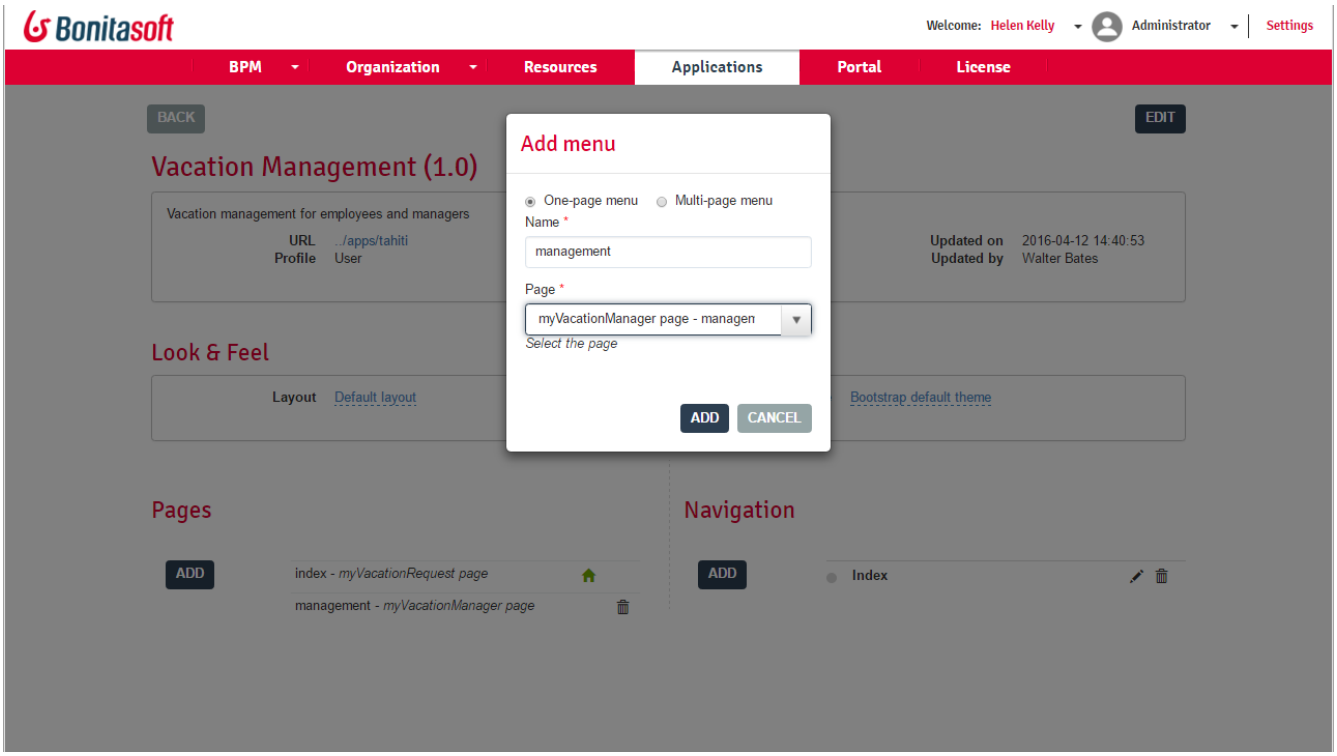


Figure 88. Add the menu

Now we can access our application clicking on the URL link or directly access to http://localhost:8080/bonita/apps/tahiti/index/

Be sure that you are logged in as a manager, for example as helen.kelly, manager of the HR group in ACME organization.

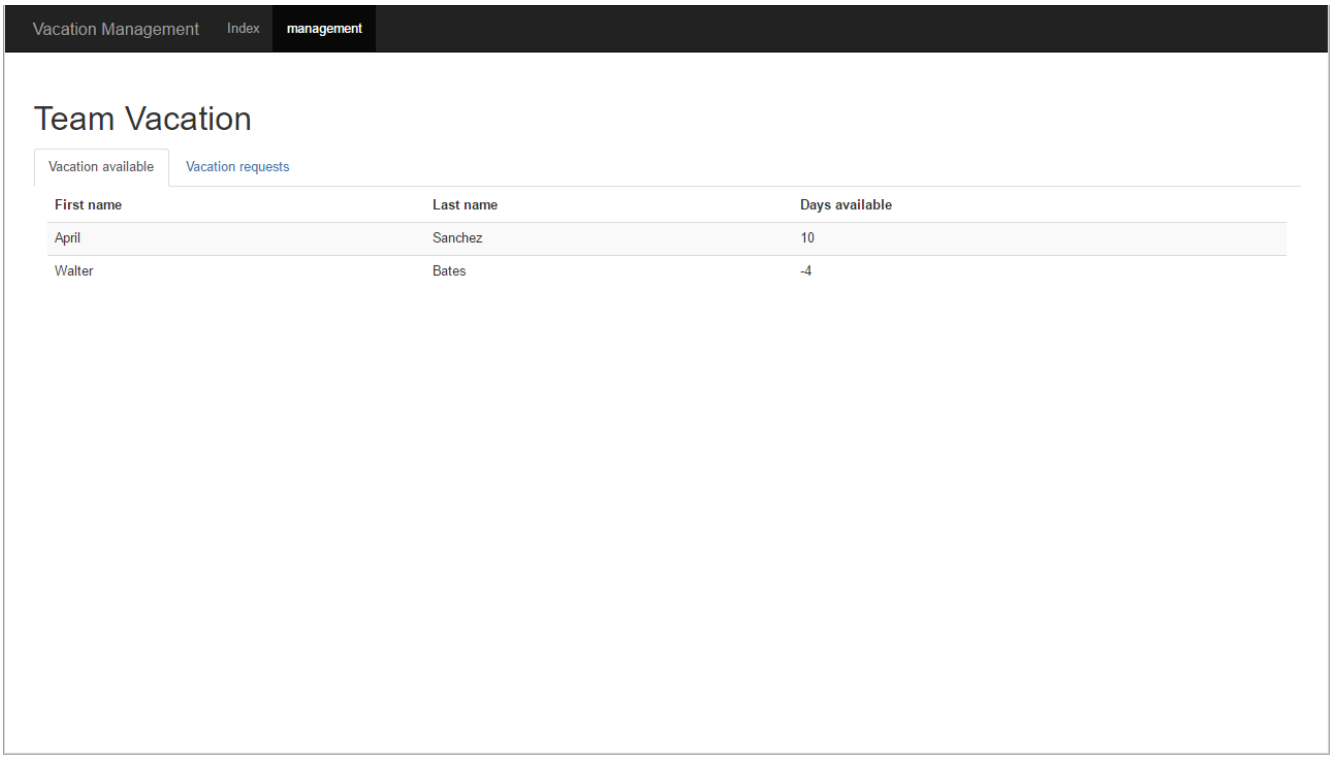


Figure 89. Vacation application

- Test the page Management.

7.5. Optional exercises

We can improve our Page adding some valuable features due to enhance the end-users experience.

Remember

- **Rename** your page using the Save as button
- **Export** your new page.
- **Import** your new page directly in Bonita Portal - **Resources** section, selecting the old page and clicking on **Edit** button. It will overwrite the old page with the new improved one and you could test it on your application directly.

7.5.1. Display a bar chart

Display a bar chart with manager employees and their available vacation days.

Data creation

Add these new variables:

Name	Type	Content
datas	Javascript expression	if($data.managerTeamInfo){ return $data.managerTeamInfo.employeesVacationAvailable.map(function(selector){ return selector.daysAvailableCounter; }); }
labels	Javascript expression	if($data.managerTeamInfo){ return $data.managerTeamInfo.employeesVacationAvailable.map(function(selector){ return selector.firstName + " " + selector.lastName; }); }

datas

this JS expression iterates managerTeamInfo.employeesVacationAvailable and returns a list of daysAvailableCounter.

labels

this JS expression iterates managerTeamInfo.employeesVacationAvailable and returns a list of firstName and lastname.

Chart widget

Drag and drop a Chart widget above title and use this properties:

Property name	Property value
Hidden *(bound to an expression or variable)*	!datas && !labels
Type	Bar
Data *(bound to an expression or variable)*	datas
Labels *(bound to an expression or variable)*	labels
Set labels	Vacation days left
Legend hidden	no

7.5.2. Display a warning text

Display a warning text only when logged user is not a manager.

One managerTeamInfo attribute is ***isManager*** of boolean type, so we can check it using an expression into a Hidden widget property. Remember that we need to switch to ***bind an expressions or variables*** clicking on the *fx* button close to yes/no radio buttons.

- Add a **Text widget** above the Title widget and configure its properties:

Property name	Property value
CSS classes	alert alert-danger
Hidden *(bound to an expression or variable)*	managerTeamInfo.isManager
Text	You need to be a manager to access this Page.
Alignment	left

Container widget

- Add a Container widget below the Text widget and drag and drop the Title, Chart and Tab container widgets inside.
- Configure the **Container widget** properties this way:

Property name	Property value
Hidden *(bound to an expression or variable)*	!managerTeamInfo.isManager

- Now, when an employee user access the page Management will see the warning text and only a manager could access to see the content.

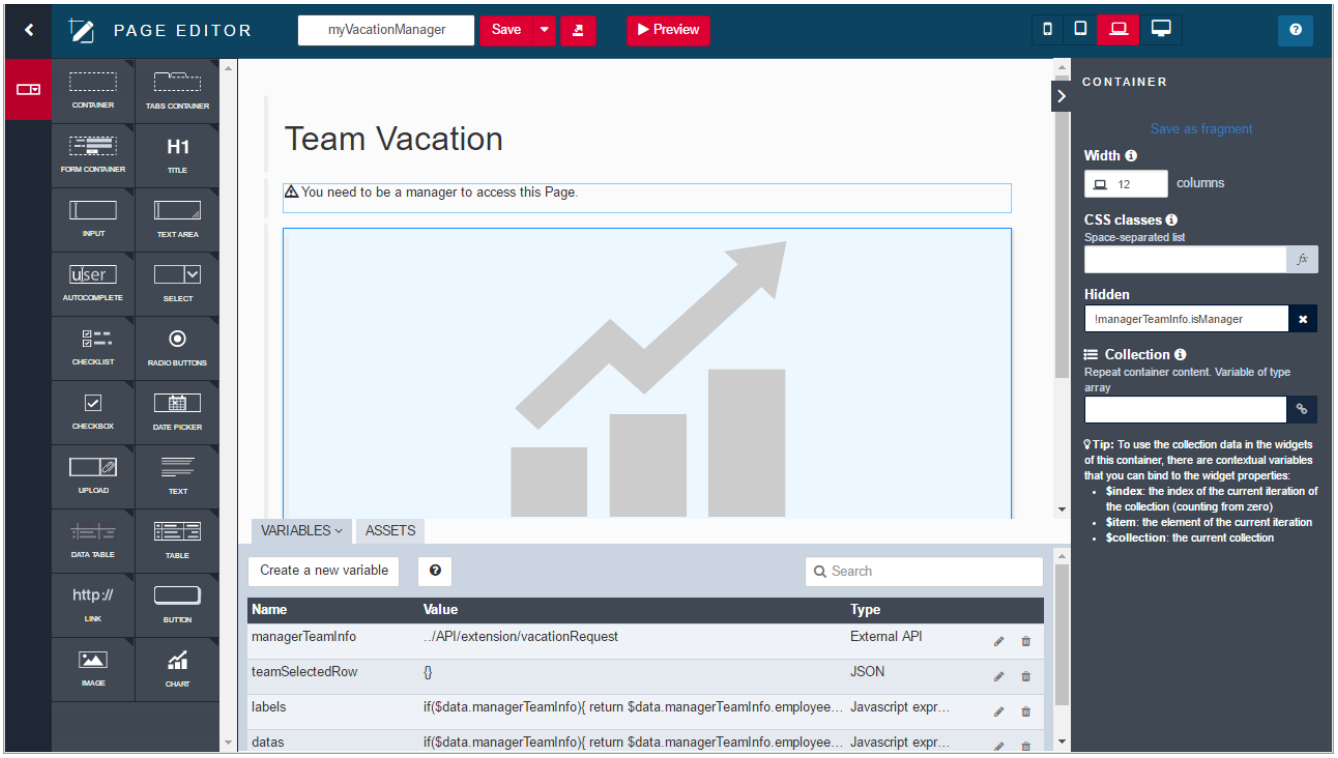


Figure 90. Optional design

Run the preview:

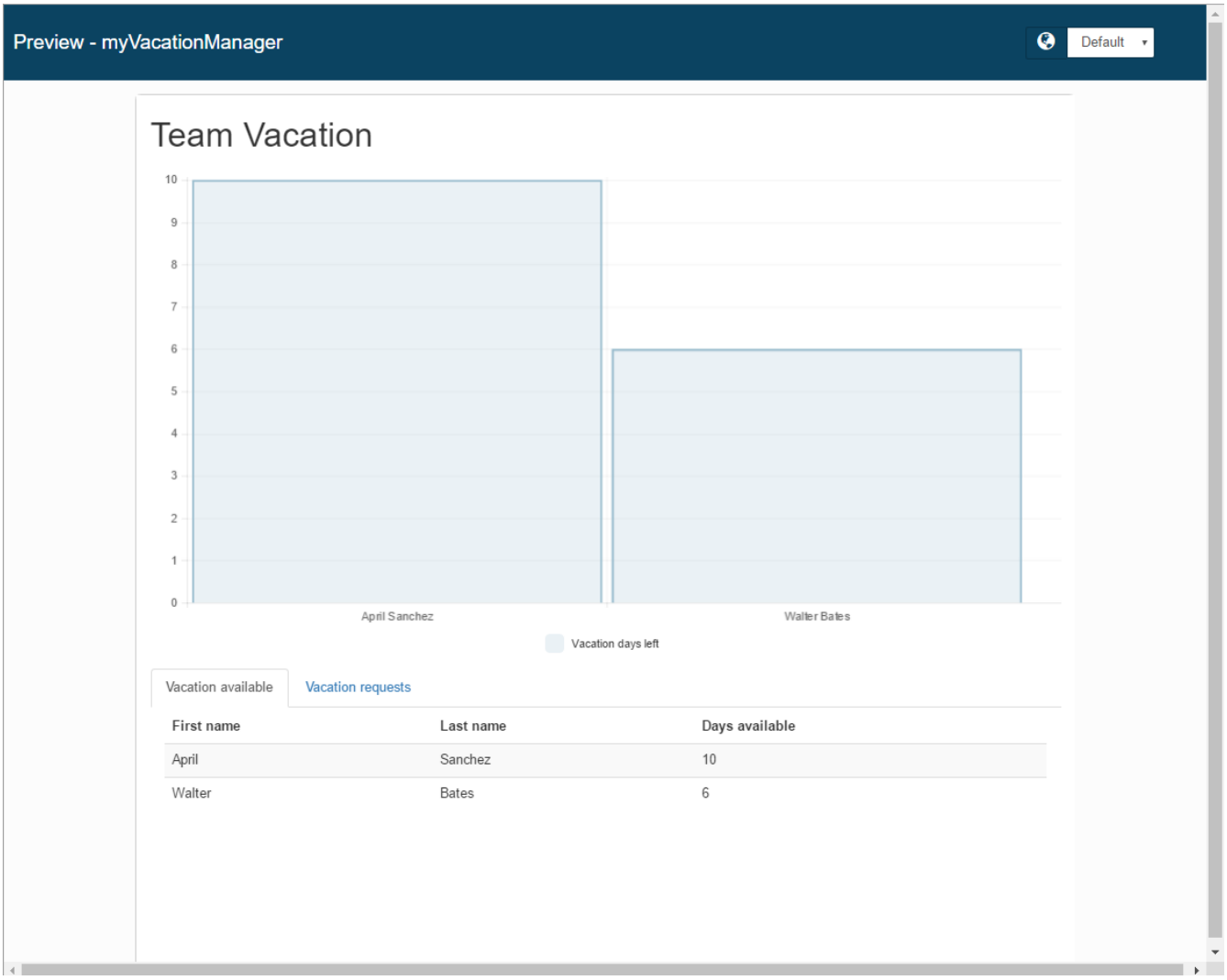


Figure 91. Preview the application

Chapter 8. Create a new connector

8.1. Objective

The goal of this exercise is to build a new connector using the Connector Development Toolkit.

8.2. Prerequisites

To develop and test a Bonita BPM connector with the toolkit, you need the following software installed:

- Java 7 or later
- Maven 3.2.x or later

8.3. Instructions

- Download and install the development connector toolkit.
- Create connector definition and implementation.
- Use and test the new connector in a process.

8.4. Correction

8.4.1. Download the Development Connector Toolkit from customer portal.

Access the Customer portal, Downloads and the choose the Connector-Development-Toolkit

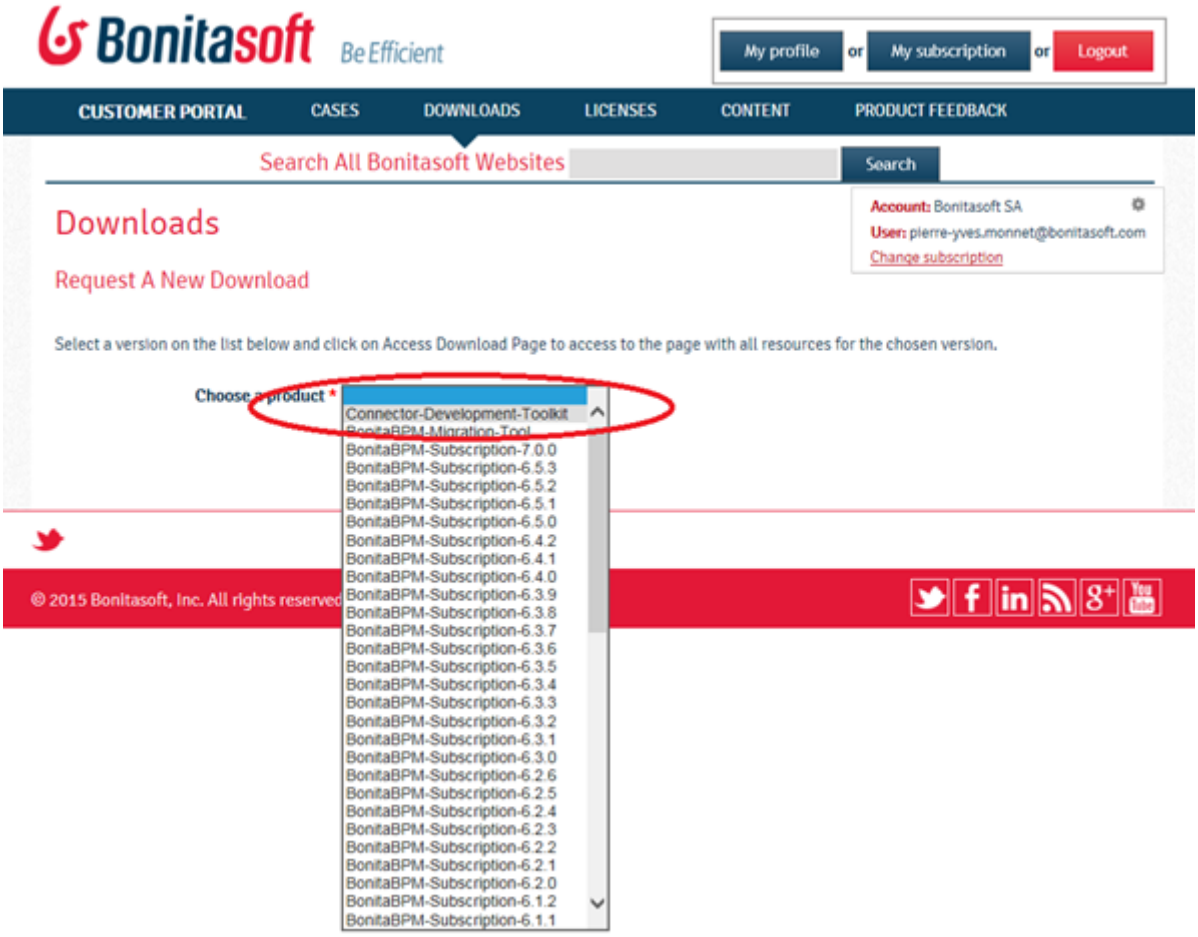


Figure 92. Download the toolkit

Unzip the toolkit file into a temporary installation folder, for example **c:\atelier supports**. Using a Command, do

```
cd C:\atelier supports\bonita-connector-development-toolkit-1.0
install.bat
```

Figure 93. Download the toolkit

8.4.2. Create the definition

Open a command window and navigate to the folder that will hold your connector definition. For exemple, we create a folder UserCreation under c:\atelier supports

```
cd "C:\atelier supports"
```

and then Run the following command:

```
mvn archetype:generate -DinteractiveMode=false
-DarchetypeGroupId=com.bonitasoft.connector.definition -DarchetypeArtifactId=bonita
-connector-definition-archetype -DarchetypeVersion=1.0
-DgroupId=com.bonitasoft.connectors -DartifactId=userCreation -Dversion=1.0.0
```

If the result is success, a new directory named UserCreation should be created.

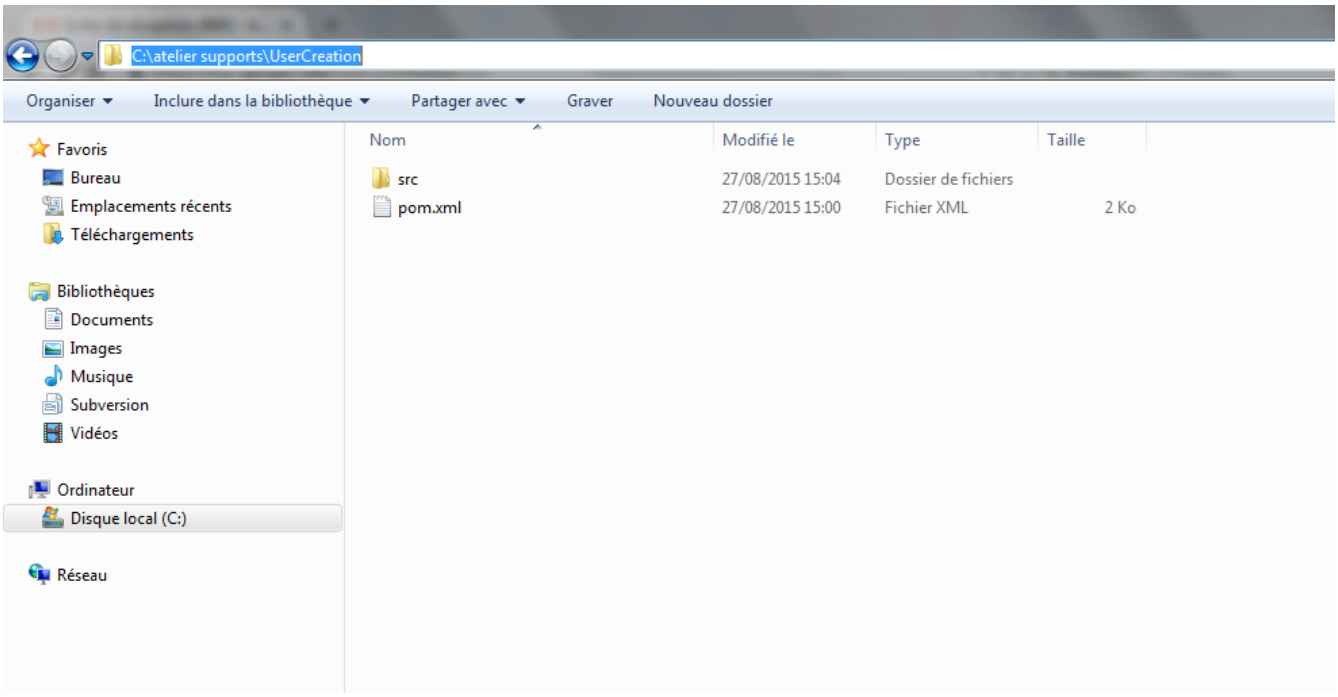


Figure 94. Create the definition

Edit the file pom.xml under **c:\atelier support\userCreation** and change the Bonita.version

```
    <properties>
        <bonita.version>7.2.0</bonita.version>
        <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    </properties>
```

Edit the file userCreation/src/main/resources/connector_definition.xml. Change the content of this file as the following:

WARNING

change the BonitaVersion to the version you use at this moment (7.0.2 in the example)

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ConnectorDefinition xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <_package>com.bonitasoft.connectors</_package>
    <id>UserCreation</id>
    <version>1.0.0</version>
    <label>user creation connector</label>
    <description>UserCreation 1.0.0</description>
    <icon>connector-icon.png</icon>
```

```
    <category>
        <id>MyCategory</id>
        <icon>category-icon.png</icon>
    </category>

    <!-- Configure the version of your Bonita Engine -->
    <bonitaVersion>7.0.2</bonitaVersion>

    <!-- connector Wizard pages configuration -->
    <pages>
        <page>
            <id>userData</id>
            <title>User Data</title>
            <description>User Data description</description>
            <!-- an ordered set of one or more widget tags contained inside a page -->
            <widgets>
                <widget>
                    <id>Username</id>
                    <label>Username</label>
                    <!-- widget types: [Text, Password, TextArea, Checkbox,
RadioGroup,
Select, Array, ScriptEditor, List, Group] -->
                    <widgetType>Text</widgetType>
                    <javaType>java.lang.String</javaType>
                    <mandatory>true</mandatory>
                    <defaultValue/>
                    <description>The username</description>
                </widget>
                <widget>
                    <id>Password</id>
                    <label>Password</label>
                    <!-- widget types: [Text, Password, TextArea, Checkbox,
RadioGroup,
Select, Array, ScriptEditor, List, Group] -->
                    <widgetType>Password</widgetType>
                    <javaType>java.lang.String</javaType>
                    <mandatory>true</mandatory>
                    <defaultValue/>
                    <description>The password</description>
                </widget>
                <widget>
                    <id>FirstName</id>
                    <label>First Name</label>
                    <widgetType>Text</widgetType>
                    <javaType>java.lang.String</javaType>
                    <mandatory>true</mandatory>
                    <defaultValue/>
                    <description>The FirstName</description>
                </widget>
                <widget>
                    <id>LastName</id>
```

```
                    <label>Last Name</label>
                    <widgetType>Text</widgetType>
                    <javaType>java.lang.String</javaType>
                    <mandatory>true</mandatory>
                    <defaultValue/>
                    <description>The LastName</description>
                </widget>
                <widget>
                    <id>ProfileId</id>
                    <label>ProfileId</label>
                    <widgetType>Text</widgetType>
                    <javaType>java.lang.String</javaType>
                    <mandatory>true</mandatory>
                    <defaultValue/>
                    <description>The Profile ID</description>
                </widget>
            </widgets>
        </page>
    </pages>
    <!-- the 'outputs' configuration tag is optional and responsible for defining -->
    <!-- connector outputs -->
    <outputs>
        <output>
            <id>result</id>
            <javaType>java.lang.String</javaType>
        </output>
    </outputs>

</ConnectorDefinition>
```

8.4.3. Create the implementation

Open a command windows, navigate to UserCreation folder and run the following command:

```
cd "c:\atelier supports\userCreation"

mvn archetype:generate -DinteractiveMode=false
-DarchetypeGroupId=com.bonitasoft.connector.implementation
-DarchetypeArtifactId=bonita-connector-implementation-archetype -DarchetypeVersion=1.0
-DgroupId=com.bonitasoft.connectors -DartifactId=userCreationImpl -Dversion=1.0.0
-DdefinitionId=userCreation -DdefinitionVersion=1.0.0
```

If the result of build is success, a directory named "UserCreationImpl" containing the connector implementation project will be created.

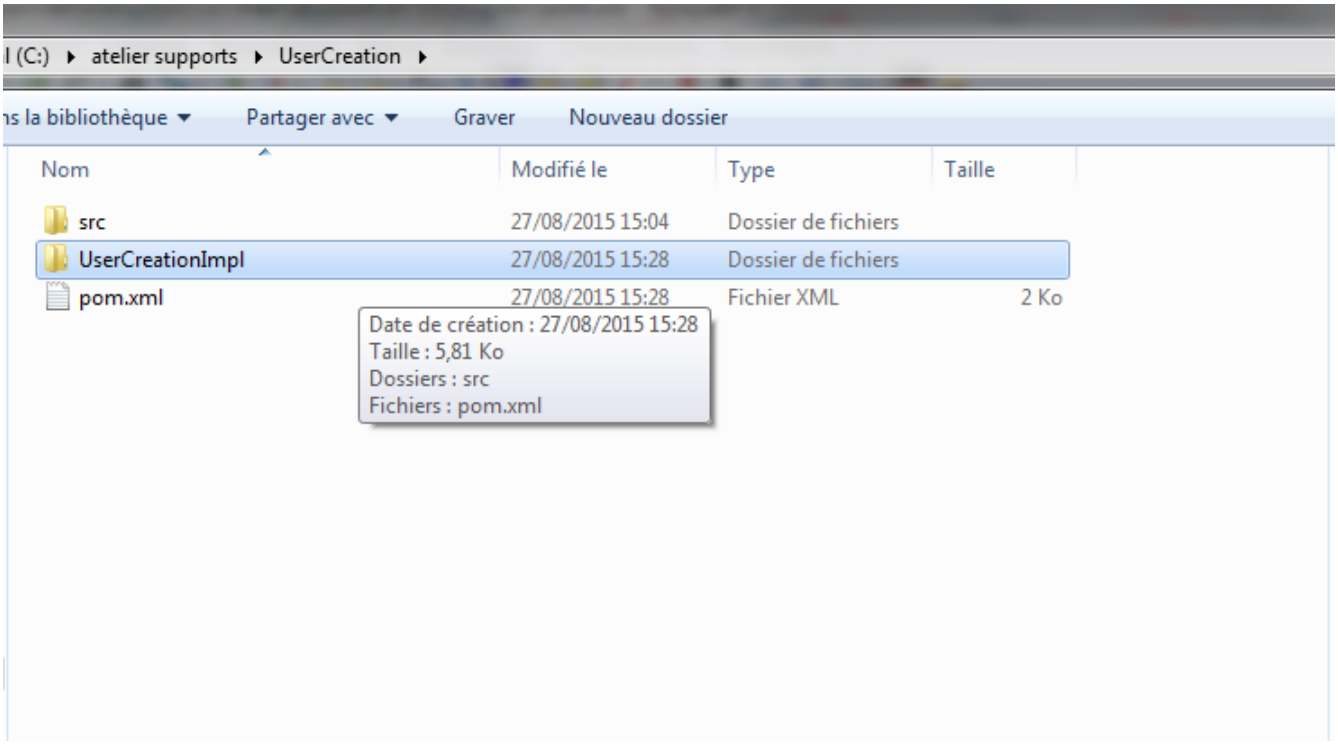


Figure 95. Check the creation

8.4.4. Generate the java project

run the following command:

```
cd "c:\atelier supports\userCreation\userCreationImpl"
mvn bonita-connector-definition:generate
mvn bonita-connector-implementation:generate
```

After these commands, an abstract class named "AbstractUserCreation.java" and a stub of the connector implementation named "UserCreationImpl.java" will be created.

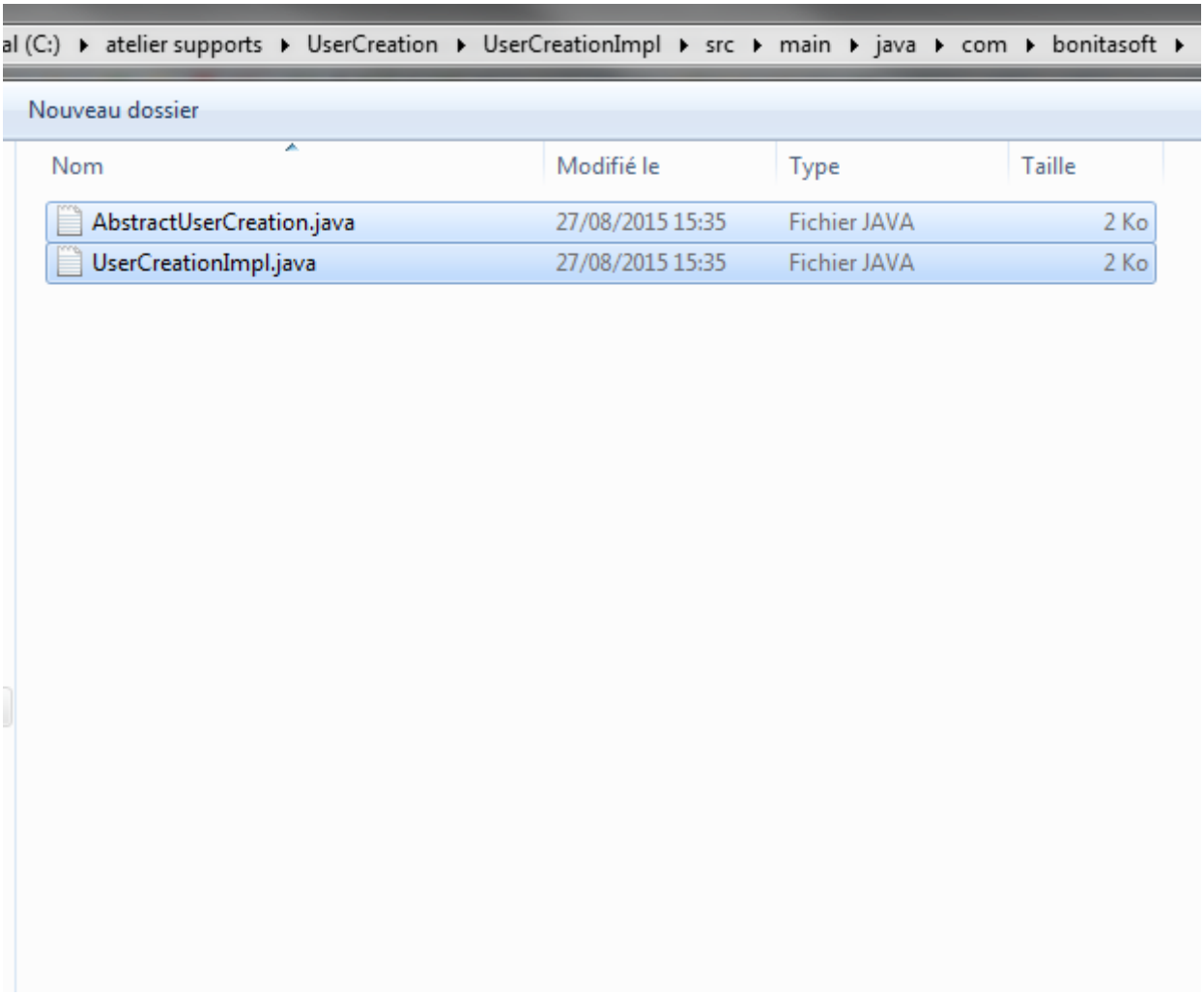


Figure 96. Java files should be generated

8.4.5. Launch Eclipse and import the maven project

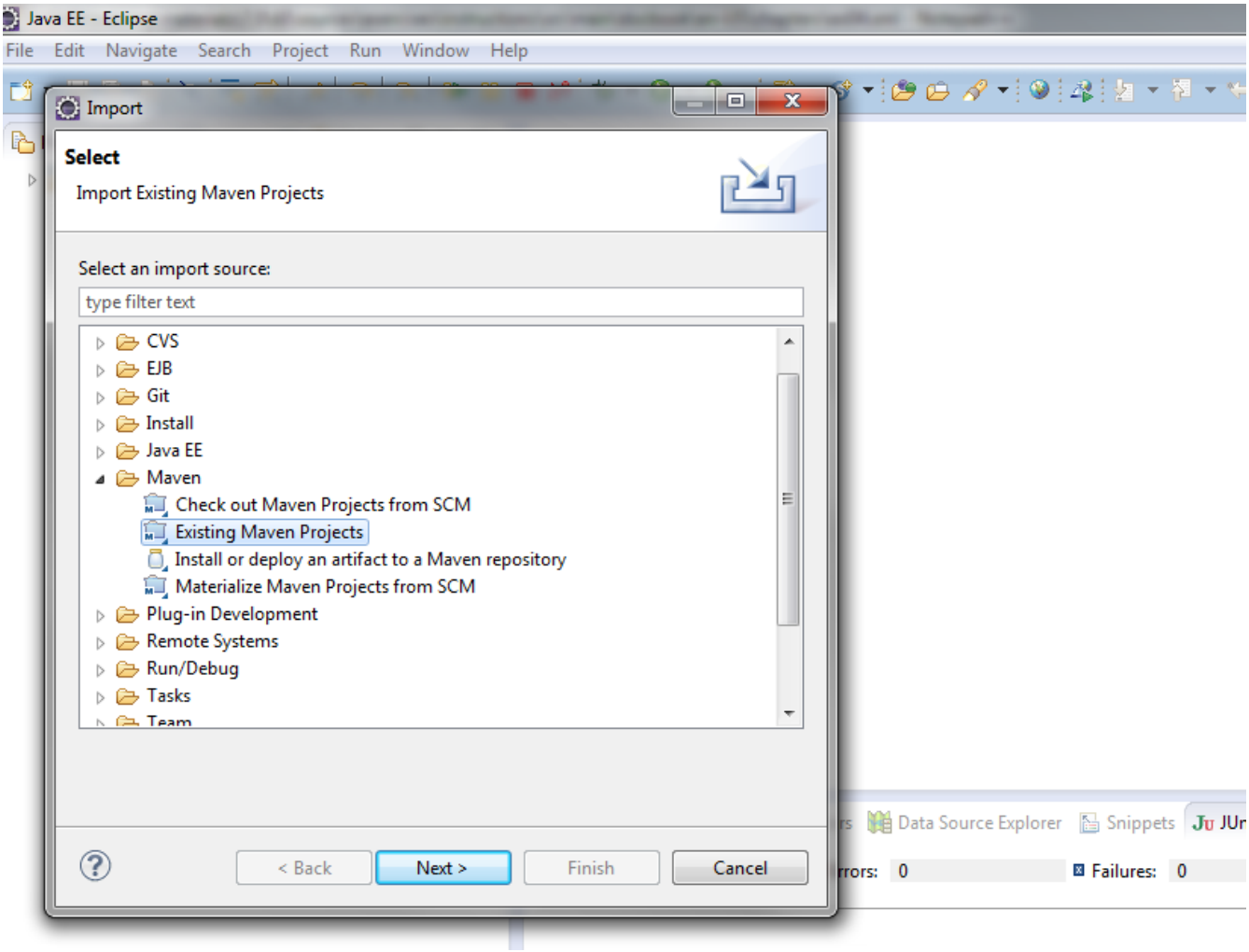


Figure 97. Import the Maven project

Select "pom.xml" file located under UserCreationImpl directory

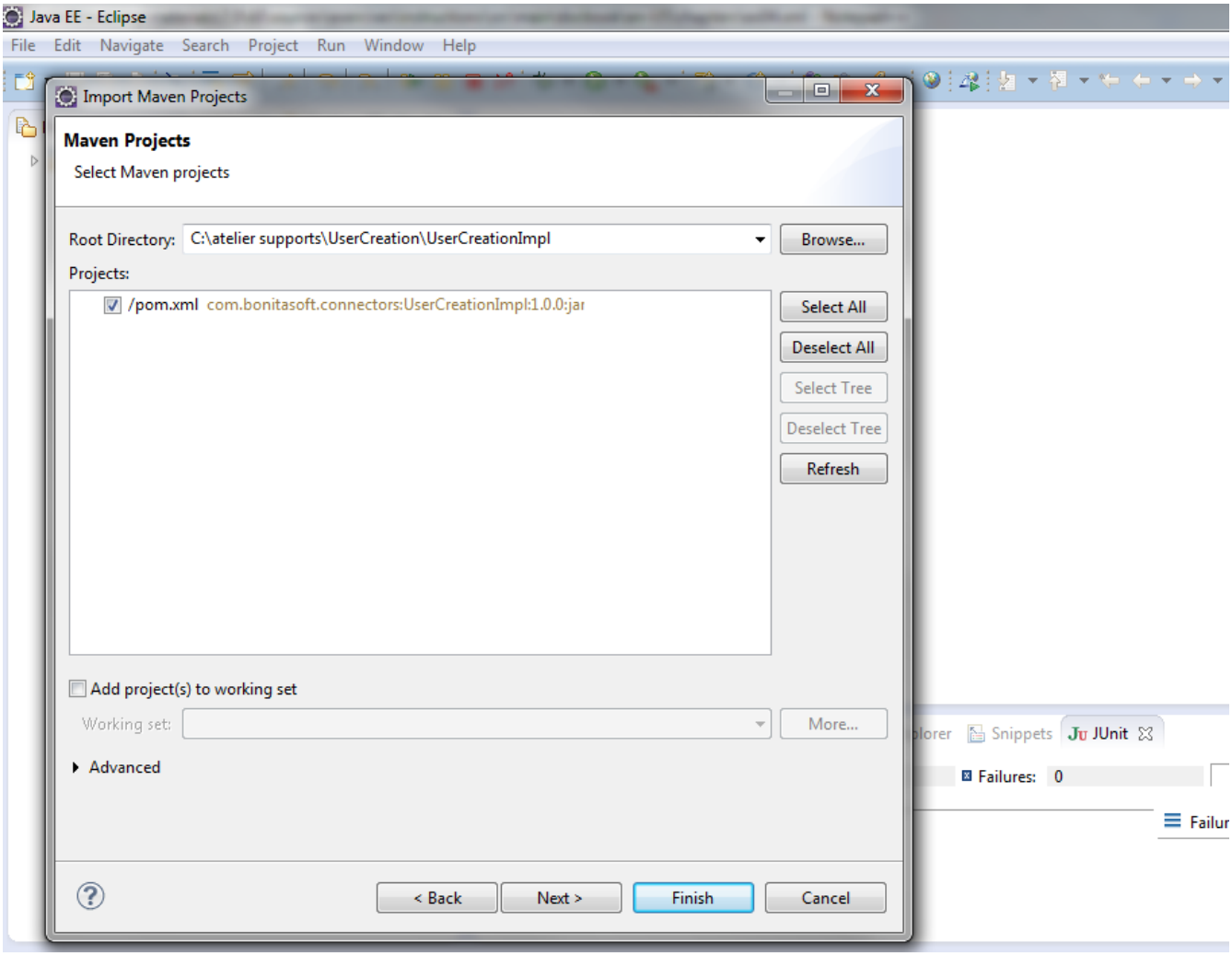


Figure 98. Access the pom.xml

Click on Finish. This operation adds one project in Eclipse.

8.4.6. Complete your connector implementation.

Open "UserCreationImpl" class and modify the method "executeBusinessLogic" with the following code:

```
        IdentityAPI identityAPI = getAPIAccessor().getIdentityAPI();
        String result;
        try {
            // Execute the delegate object business logic. Provide identityAPI
reference.
            User newUser = identityAPI.createUser(getUsername(), getPassword());
            result = String.valueOf(newUser.getId() );
        } catch (Exception e) {
            throw new ConnectorException(e);
        }
       setResult(result);
```

8.4.7. Generate the connector

In the command prompt, go to "UserCreationImpl" directory and execute the following command:

```
cd "c:\atelier supports\userCreation\userCreationImpl"
mvn package
```

The connector is now generated and packaged in zip file under "UserCreation/UserCreationImpl/target" directory

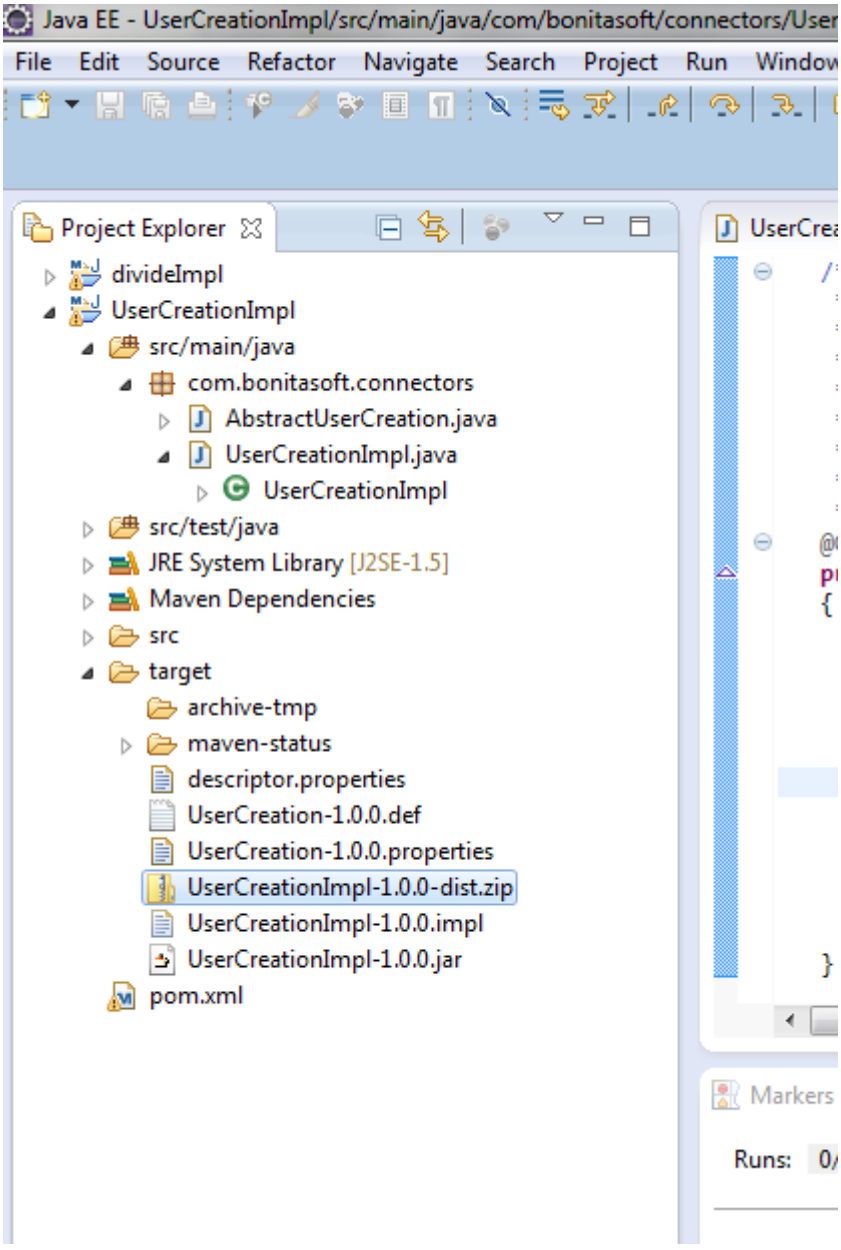


Figure 99. Check the Zip file

8.4.8. Import the zip file generated in the previous step in Bonita studio

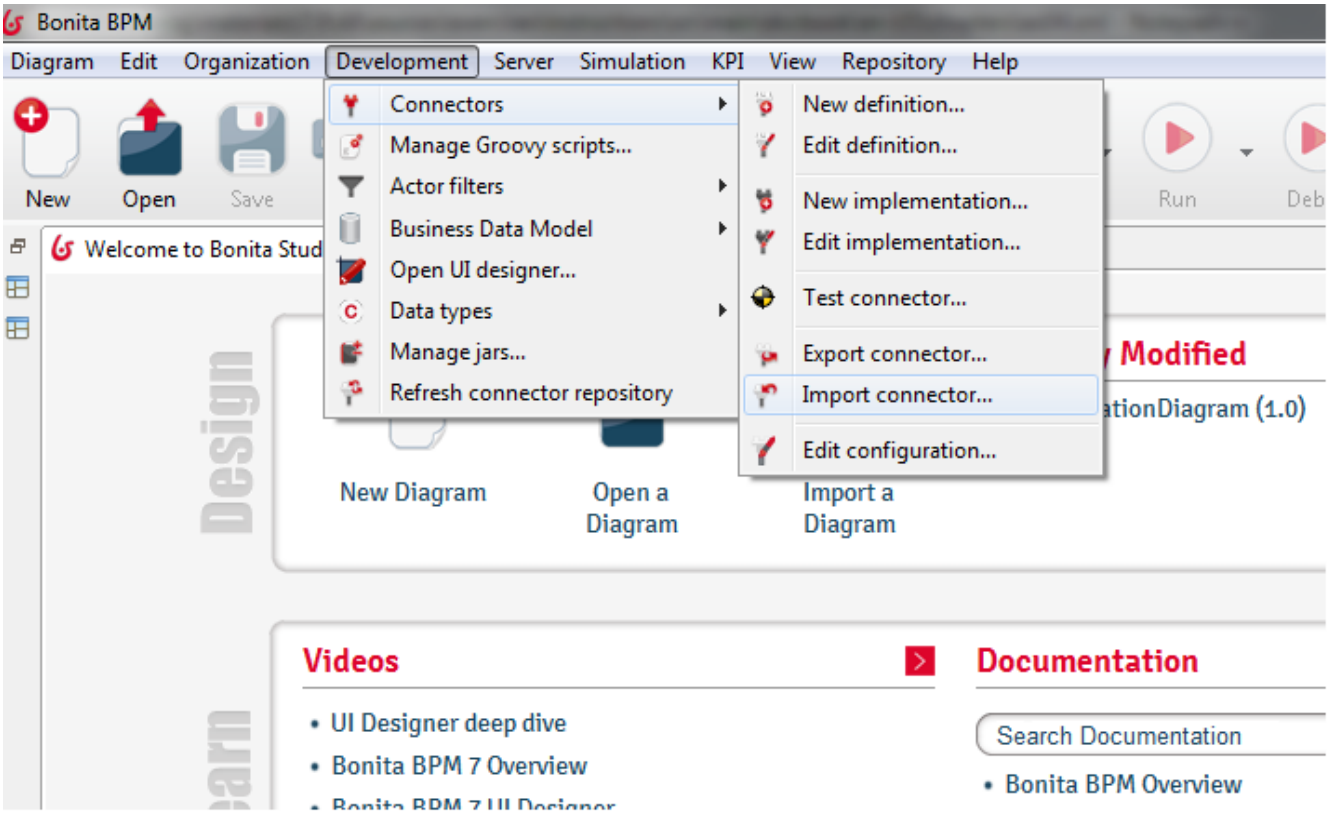


Figure 100. Import the connector

8.4.9. Import "UserCreationDiagram.bos" from provided_files folder

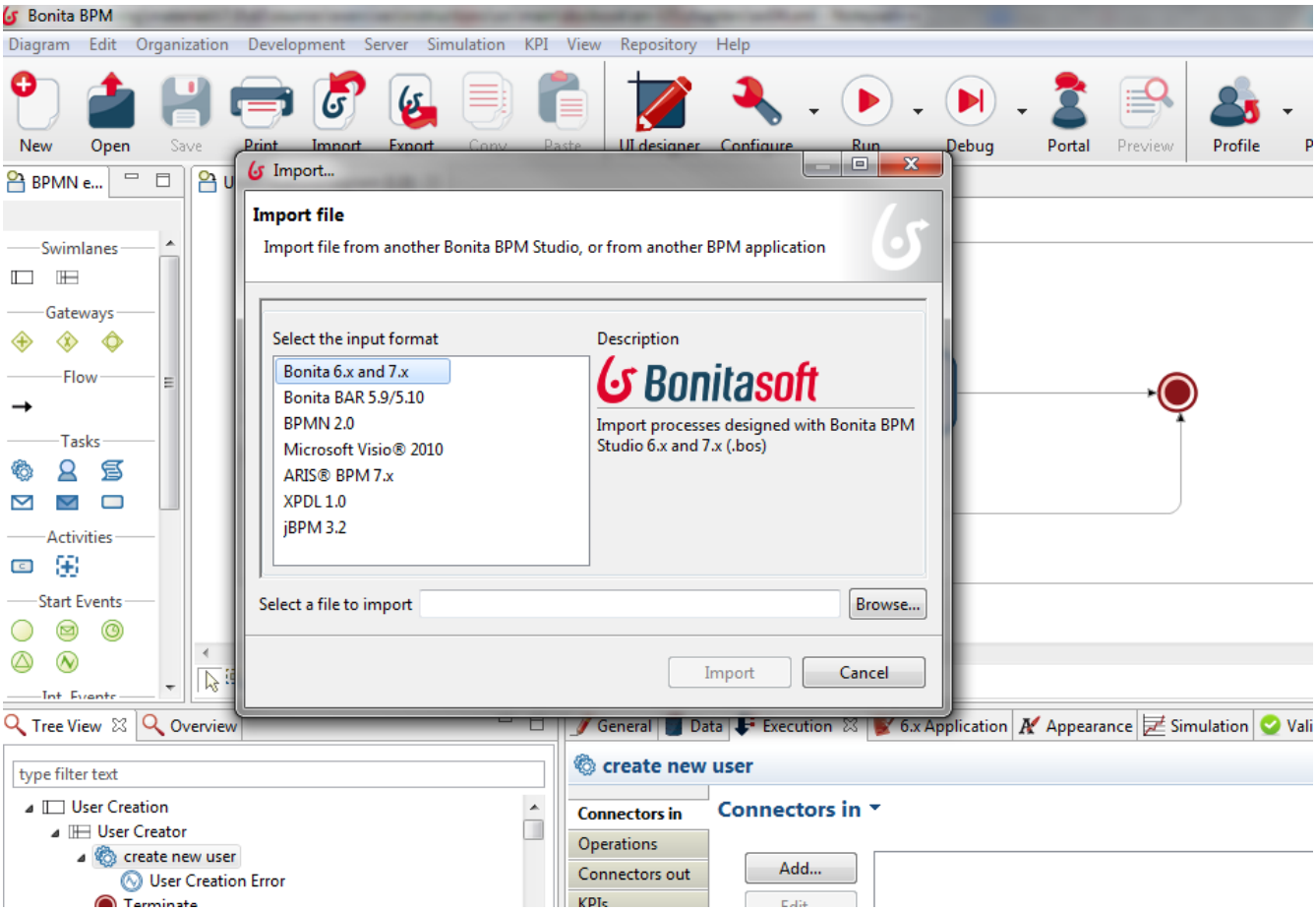
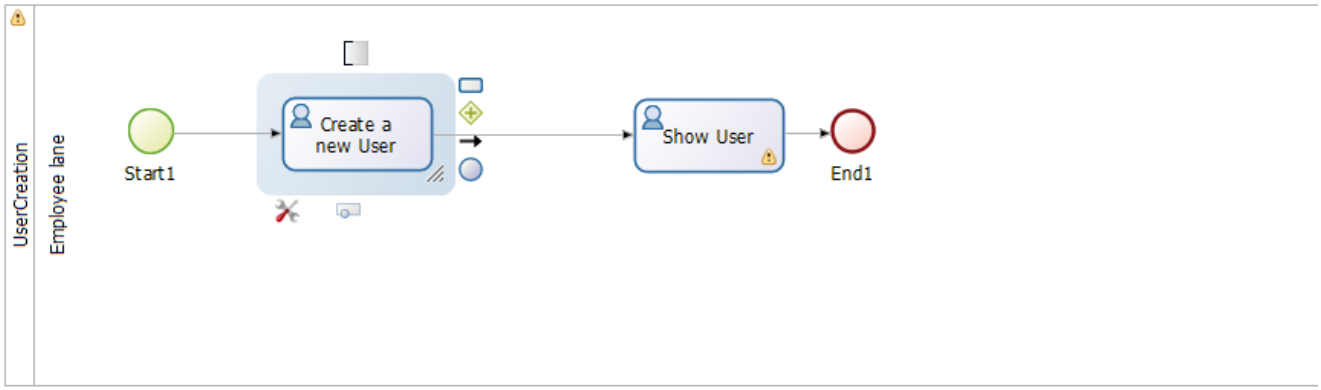


Figure 101. Import the process

- Create a connector OUT in the "Create new user" activity.



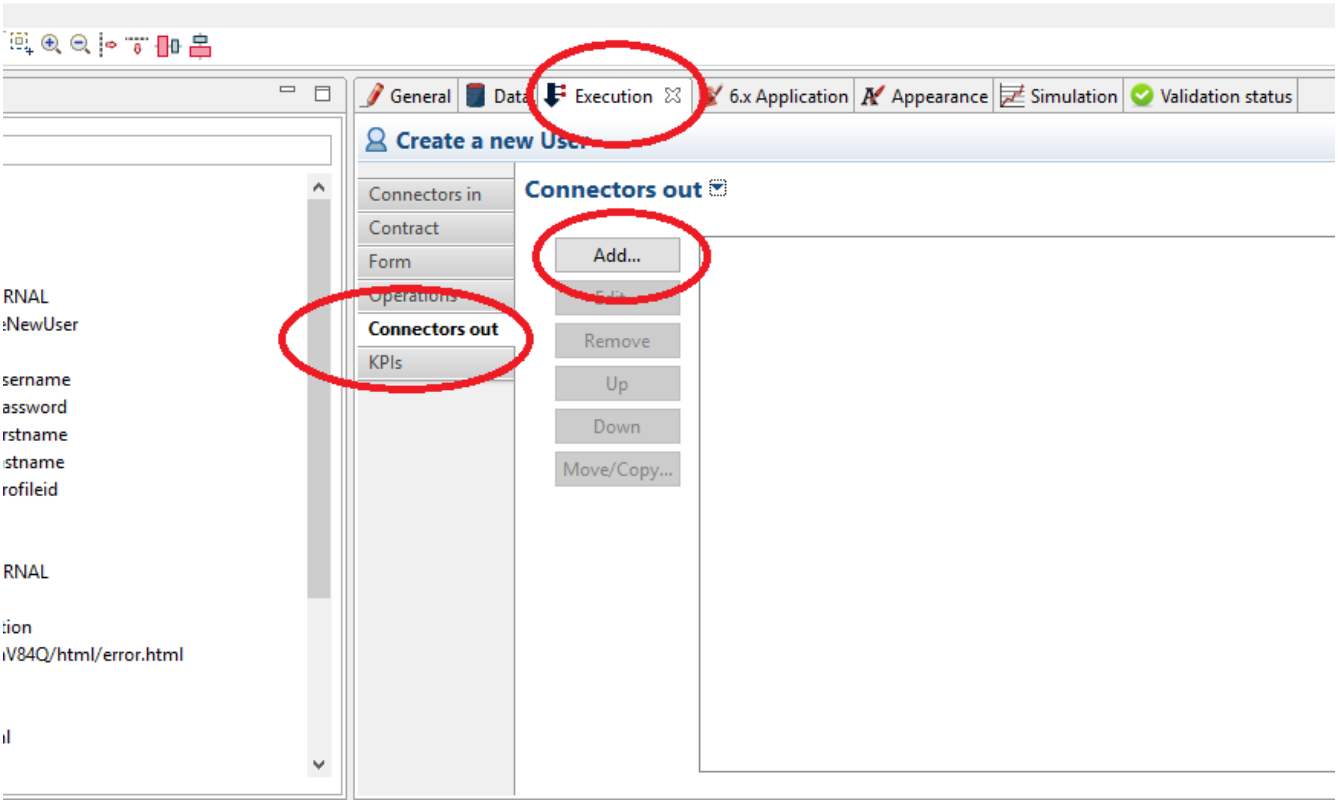


Figure 102. Create the connector Out

- The username, password, firstName, lastName, profileId connector inputs are mapped to the relative **contract data**.
- The resultMessage process data will hold a message coming from the connector showing the result.

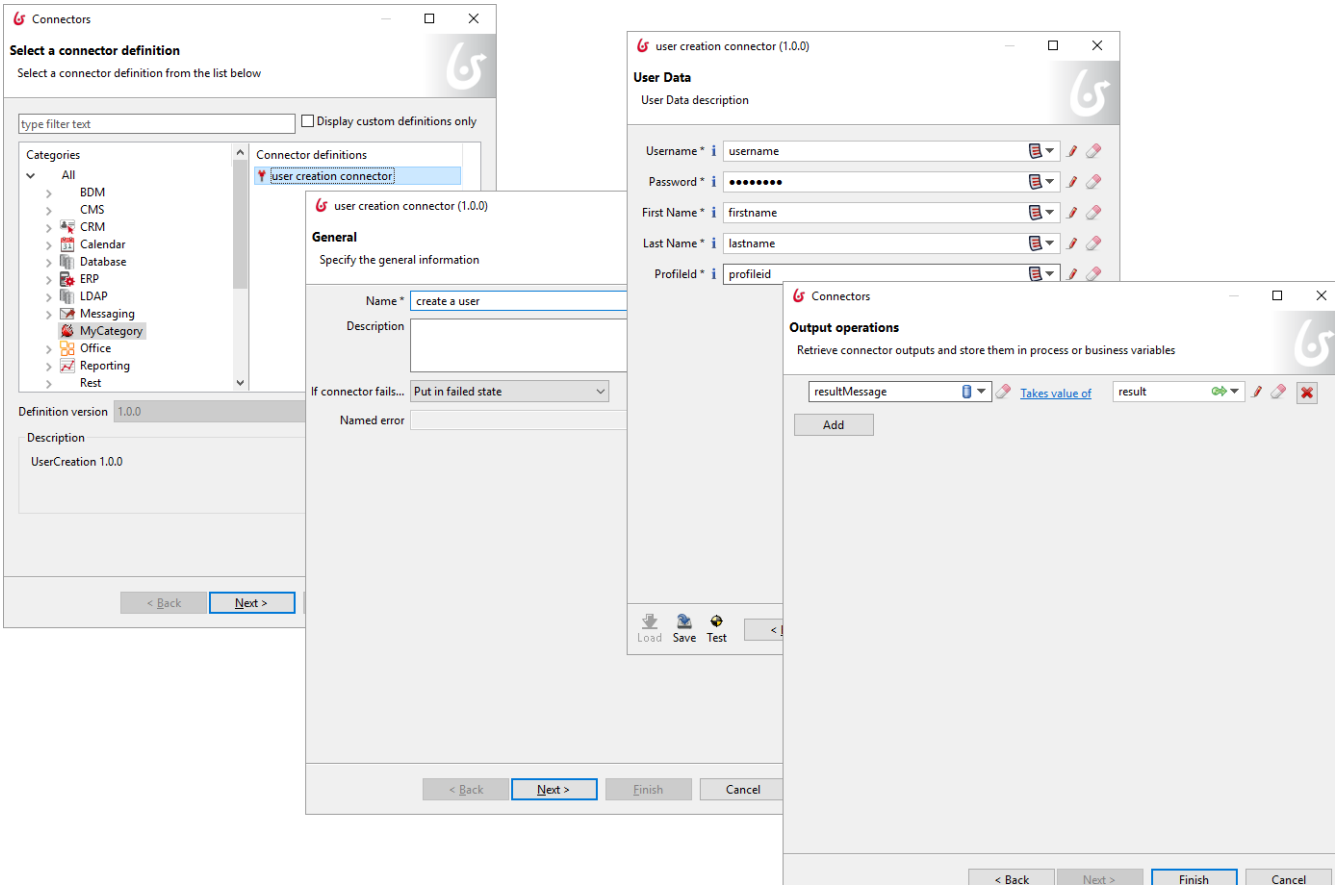


Figure 103. Reference the connector

- This resultMessage is mapped to the display name of "Show User" task

8.4.10. Test the process

- Run the process from the studio
- In the empty instantiation form click on the Start button to start the process
- Open the task "Create a new User" from the task list
- Fill the text widgets, choose the "User" profile, and click on "Submit"
- In the task list you should get a task that has for display name the connector output message
- From the portal change the profile to Administrator,switch to Organization, and double check that the user has been added in the organization with the User profile

Chapter 9. Create a new Custom Widget

9.1. Prerequisites

You must have Bonita BPM Studio SP installed and started.

9.2. Objectives

The goal of this exercise is to create a new Custom Widget. This widget is a Select list where the user can select multiple values, not only one.

9.3. Instructions

In this exercise we will create a custom widget.

- Create a new Custom widget
- Define the properties of the widget : list of available values (and key, label), list of items selected (you should call it value to be consistent with other widgets).
- Define the HTML and the Angular JS part. The HTML is the look and feel, and it will contain the reference to the AngularJS scope. Then, the HTML present a select box with values retrieved from the scope. When the user clicks on an item, the controller is called, and maintains the list of items selected.
- To test the custom widget, reference the widget in a page, and call the Preview function. When you do a change, just save again the page, and in the UI Designer refresh the Preview windows.

9.3.1. Correction

9.3.2. Create the custom widget

Lanuch the UI Designer from the Studio, and then go to Create. Select Custom Widget and give MultipleDropDown as name

[exCustomWidget 01] | *exCustomWidget_01.png*

Figure 104. Create a new custom widget

9.3.3. Access the page

You have different area :

[exCustomWidget 02] | *exCustomWidget_02.png*

Figure 105. Custom Widget

- Template is the HTML Part
- Controller is the AngularJS part
- Asset is used if you want to add some JAVASCRIPT library or any resource file

- Angular Module is used to reference some external angular module
- Properties represents the properties of your widget

9.3.4. Properties

Please indicate the following properties:

Properties name	Label	Treat value as	Type	Default
label	Label	Interpolation		Select
availableValues	Available Values	Dynamic value	Collection	
displayedKey	Displayed Key	Dynamic value	Text	
returnedKey	Returned Key	Dynamic value	Text	
value	Value	Dynamic value	Collection	

Properties are:

[exCustomWidget 03] | *exCustomWidget_03.png*

Figure 106. Properties

9.3.5. HTML

The HTML part will display the result of the select box. It will use the AngularJS syntax to present the list of values.

If we display the list, we loop on it and display the glyphicon image if the element is selected.

On each element we can click to update the list.

```
<label class="control-label col-xs-12">{{ properties.label | uiTranslate }}</label>
<button type="button" ng-
click="ctrl.toggleDropdown()">{{ctrl.getButtonLabel()}}</button>
<div class="panel panel-warning" ng-show="ctrl.isOpen">
  <div class="panel-heading">
      <table>
        <tr ng-repeat="oneline in ctrl.getValues() track by $index">
            <td>
                <span class="glyphicon glyphicon-ok" ng-
show="ctrl.isAlreadySelected(oneline)"></span>
            </td>
            <td>
                <a ng-click="ctrl.clickOnLine(oneline)">{{ctrl.getLabel(oneline)}}</a>
            </td>
        </tr>
      </table>
  </div>
</div>
```

9.3.6. Controller

The control is the following code.

The controller put in the scope 2 properties: open, list of value.

The next methods are for the behavior.

```
function ($scope) {
    var ctrl = this;

    var isOpen = true;

    var listValues = $scope.properties.value;

    this.toggleDropdown = function(){
        this.isOpen = !this.isOpen;
    }

    this.getValues = function () {
        return $scope.properties.availableValues;
    }

    this.getButtonLabel = function(){
        if (listValues.length === 0){
            return "No selection";
        }else if (listValues.length === 1){
            return "1 item selected";
        }else{
            return listValues.length+ " items selected";
        }
    }

    this.getLabel = function (oneLine){
        return oneLine[$scope.properties.displayedKey];
    }

    this.clickOnLine = function (oneLine){
        var id = oneLine[ $scope.properties.returnedKey ];
        // is this id is in the list of value ? If yes, remove it, else add id
        listValues = $scope.properties.value;
        iId = listValues.indexOf( id );
        if (iId !== -1 ) {
            listValues.splice( iId, 1 );
        }else {
            listValues.push( id );
        }
    }

    this.isAlreadySelected = function( oneLine ){
        id = oneLine[$scope.properties.returnedKey];
```

```
        listValues = $scope.properties.value;
        if (!angular.isDefined( listValues)){
            alert("Undefined");
            return false;
        }
        if (listValues.indexOf( id ) !== -1) {
            return true;
        }
        return false;
    }
}
```

9.3.7. How to test

Use two different tabs in your browser. in one tab, display the custom widget.

In a second tab, access the UI Designer (click again on the UI Designer in the studio) and create a page (TestMultiDropDown).

[exCustomWidgetCreatePage 04] | *exCustomWidgetCreatePage_04.png*

Figure 107. Create a page to test the widget

In this page, access the custom widget panel, and select the new custom widget

[exCustomWidgetAddWidget 05] | *exCustomWidgetAddWidget_05.png*

Figure 108. Select the custom widget in the panel

Drag and drop the widget in the page. Create two JSON variables :

Variable	Value	Type
availableValue	[{"car":"Dodge","carid":"DO"},{"car":"Nissan Guest","carid":"NQU"}, {"car":"Renault Espace", "carid":"RESP"},{"car":"Suburban","carid":"SUB" }]	JSON
selectedCars	["NQU"]	JSON

And then match the properties in the widget:

propertie	Value
Label	Choose a car
Available value	availableValue (change the selector to a variable)
Displayed key	car
Returned key	carid

Value	selectedCars

Add a text widget, and set as the text

```
<span class="label label-success">Value:{{selectedCars}}</span>
```

The result should be

[exCustomWidgetResultpage 05] | *exCustomWidgetResultpage_05.png*

Figure 109. Definition of the test page

So, now, it's time to test it : click on Preview. The result is

[exCustomWidgetPreview 06] | *exCustomWidgetPreview_06.png*

Figure 110. Preview page

Tips: To change and to test the new custom Widget, in the tab related to the custom widget, save the modification. Then, in the application page, just click on save (even if you don't change anything) : then preview then reload the page, and take into account change in the custom widget.