

RADS

Building Plugins

<https://github.com/radservice/rad-community/fork>

Prerequisites

1. Basic web application development knowledge.
2. Java web application programming knowledge.
3. Understanding on RADS plugin architecture and plugin types.

Content

1. Introduction
2. Creating a Form Field Element Plugin
3. Creating a Datalist Formatter Plugin
4. Creating a Userview Menu Plugin
5. Generate & Build Plugin via Docker

A horizontal bar with a black left half and an orange right half.

Chapter I

Introduction

Introduction

- In this module, we will be learning on how to create:-
 - Process Tool / Post Form Submission Processing plugin.
 - Userview plugin.
 - Form Field Element plugin.

Each Plugin Is Different

- Before you embark on your journey to build a new plugin, be sure to:-
 - Each plugin may be implemented and configured (very) differently.
 - Check out existing implementations of such plugin type.
 - Extend the necessary classes for each implementation.

- Reference:

<https://docs.rads.purwana.net/Introduction+to+Plugin+Architecture>

Plugin Abstract Classes and Interface

- **Deadline Plugins**

extends `net.purwana.rads.workflow.model.DefaultDeadlinePlugin`

- **Process Participant Plugins**

extends `net.purwana.rads.workflow.model.DefaultParticipantPlugin`

- **Process Tool / Post Form Submission Processing Plugins**

extends `net.purwana.rads.plugin.base.DefaultApplicationPlugin`

- **Form Field Element Plugins**

extends `net.purwana.rads.apps.form.model.Element`

implements

`net.purwana.rads.apps.form.model FormBuilderPaletteElement`

Plugin Abstract Classes and Interface

- **Form Load Binder Plugins**

extends `net.purwana.rads.apps.form.model.FormBinder` implements
`net.purwana.rads.apps.form.model.FormLoadBinder`,
`net.purwana.rads.apps.form.model.FormLoadElementBinder`

- **Form Options Binder Plugins**

extends `net.purwana.rads.apps.form.model.FormBinder`
implements
`net.purwana.rads.apps.form.model.FormLoadOptionsBinder`

- **Form Store Binder Plugins**

extends `net.purwana.rads.apps.form.model.FormBinder` implements
`net.purwana.rads.apps.form.model.FormStoreBinder`,
`net.purwana.rads.apps.form.model.FormStoreElementBinder`

Plugin Abstract Classes and Interface

- **Form Validator Plugins**

extends `net.purwana.rads.apps.form.model.FormValidator`

- **Datalist Action Plugins**

extends `net.purwana.rads.apps.datalist.model.DataListActionDefault`

- **Datalist Binder Plugins**

extends `net.purwana.rads.apps.datalist.model.DataListBinderDefault`

- **Datalist Column Formatter Plugins**

extends

`net.purwana.rads.apps.datalist.model.DataListColumnFormatDefault`

- **Userview Menu Plugins**

extends `net.purwana.rads.apps.userview.model.UserviewMenu`

Plugin Abstract Classes and Interface

- **Userview Permission Plugins**

extends `net.purwana.rads.apps.userview.model.UserviewPermission`

- **Userview Theme Plugins**

extends `net.purwana.rads.apps.userview.model.UserviewTheme`

- **Audit Trail Plugins**

extends `net.purwana.rads.plugin.base.DefaultAuditTrailPlugin`

- **Hash Variable Plugins**

extends `net.purwana.rads.apps.app.model.DefaultHashVariablePlugin`

- **Directory Manager Plugins**

extends `net.purwana.rads.plugin.base.ExtDefaultPlugin` implements
`net.purwana.rads.directory.model.service.DirectoryManagerPlugin`,
`net.purwana.rads.plugin.property.model.PropertyEditable`

Introduction to Property Options

- Each plugin uses the Property Options template scheme to provide an interface for **app designers** to configure your plugin.
- Reference: <https://docs.rads.purwana.net/Plugin+Properties+Options>

Property Options - Email Tool

Plugin Configuration - Notify Approved (notifyApproved)

Configure Email Tool > SMTP Settings > Attachments

Configure Email Tool ?

To (Specific email address)

To (Participant ID)

CC

BCC

Subject

Message

HTML Content? ☐

Property Options - Email Tool

```
[
  {
    "title": "@@app.emailtool.config@@",
    "properties": [
      {
        "name": "toSpecific",
        "label": "@@app.emailtool.toEmail@@",
        "type": "textfield"
      },
      {
        "name": "toParticipantId",
        "label": "@@app.emailtool.toPid@@",
        "type": "textfield"
      },
      {
        "name": "cc",
        "label": "@@app.emailtool.cc@@",
        "type": "textfield"
      },
    ]
  }
]
```

Plugin Configuration - Notify Approved (notifyApproved)

Configure Email Tool > SMTP Settings

Configure Email Tool ?

To (Specific email address)	<input type="text"/>
To (Participant ID)	<input type="text"/>
CC	<input type="text"/>
BCC	<input type="text"/>
Subject	<input type="text"/>
Message	<input type="text"/>

<https://github.com/radservice/rad-community/blob/master/rad-core/src/main/resources/properties/app/emailTool.json>

Property Options

- JSON format

```
[
  {
    title : 'Page Title',
    properties : [
      {
        name : 'Property Name',
        label : 'Property Label',
        description : 'Property Description', //optional, default is
        NULL type : 'Property Type',
        value : 'Property Value', //optional, default is null
        required : 'Mandatory or Not', //optional, 'true' or 'false', default is
        'false'
        //... more attributes ...
      }, //... more fields ...
    ],
    validators : [ //optional
      //... properties custom validators ...
    ],
    buttons : [ //optional
      //... custom properties page buttons ...
    ]
  }, //... more properties page ...
]
```

TIP: Just search online for “JSON Beautifier” to properly indent and format your JSON definition.

Property Options Types

- From V4
 - Check Box– **CheckBox**
 - Element Select Box – **ElementSelect**
 - Grid – **Grid**
 - Hidden Field– **Hidden**
 - HTML Editor– **HtmlEditor**
 - Multi Select Box– **MultiSelect**
 - Password Field – **Password**
 - Radio Button – **Radio**
 - Readonly Text Field– **Readonly**
 - Select Box– **SelectBox**
 - Text Area – **TextArea**
 - Text Field – **TextField**

Property Options Types

- New in V5
 - Code Editor – **CodeEditor**
 - Combine Grid – **GridCombine**
 - Fixed Row Grid – **GridFixedRow**
 - Header – **Header**
 - Label – **Label**

Property Options Types

- New in V6
 - File – **File**
 - Image – **Image**
 - color - **Color Picker**
 - sortableSelect - **Sortable Select**
 - AutoComplete - **Auto Complete**
 - New Types to be used inside **Grid**
 - truefalse - **True/False**
 - autocomplete – **Autocomplete**

Property Options Types

- New in RADS
 - custom - **Custom Scripting**
 - elementmultiselect - **Multiselect in Grid interface**
 - number - **Number**
 - ImageRadio - **Image Radio**
 - Repeater

Please refer to <https://docs.rads.purwana.net/Plugin+Properties+Options>
latest documentation.

RADS - Property Options Types - custom

- Custom Scripting - For complex use cases such as the one used in Rules Decision Plugin.
- <https://github.com/radservice/rad-community/blob/master/rad-core/src/main/resources/properties/app/rulesDecisionPlugin.json>
- Calls line 7 “script_url” to fetch script to load.



The screenshot shows a code editor with a JSON configuration for a custom rules decision plugin. The editor has a status bar at the top indicating "10 lines (10 sloc)" and "355 Bytes". The JSON is as follows:

```
1  [{
2    "title" : "@@app.rulesdecision.config@",
3    "properties" : [{
4      "name" : "rules",
5      "label" : "@@app.rulesdecision.rules@",
6      "type" : "custom",
7      "script_url" : "[CONTEXT_PATH]/web/json/app[APP_PATH]/plugin/org.joget.apps.app.lib.RulesDecisionPlugin/s
8      "required" : "True"
9    }]
10 }
```

RADS - Property Options Types - custom

The screenshot displays the RADS Process Mapper interface. The main window is titled "PROCESS MAPPER - Master App v1" and shows a "PLUGIN CONFIGURATION - DECISION (ROUTE1)" dialog. The dialog is for configuring a "Simple Rules Decision".

Configure Simple Rules Decision

Rules *

IF

And

status Equal To Approved

THEN

Transition Approved

The interface also shows a sidebar with "Applicant" and "Approver" roles, and a bottom toolbar with various tools like "Forms & UI", "Processes", "Properties", "Users", "Monitor", "Settings", "Support Online", and "Quick Edit: On".

A red box highlights the "Response" tab in the bottom right corner, showing the following JavaScript code:

```
1 {  
2   getWorkflowVariables : ["status"],  
3   getTransitions : [{ "value": "transition7", "label": "Rejected" }, { "value": "transition6", "label": "Appr  
4   variablehtml : "",  
5   transitionshtml : "",  
6   addOnValidation: function(data, errors, checkEncryption) {  
7     var wrapper = $('#' + this.id + '_input');  
8  
9     var value = data[this.properties.name];  
10    var defaultValue = null;  
11  
12    if (this.defaultValue !== undefined && this.defaultValue !== null && this.defaultValue !== "")  
13      defaultValue = this.defaultValue;  
14  
15    var hasValue = true;  
16    var hasError = false;  
17  
18    if (value['ifrules'] === undefined && value['else'] !== undefined && value["else"].length === 0 {  
19      hasValue = false;  
20    }  
21  }
```

RADS - Property Options Types - elementmultiselect

- Grid-like selections with ability to support external call to dynamically populate more properties.
- <https://github.com/radservice/rad-community/blob/master/rad-core/src/main/resources/properties/app/multiTools.json#L8>

The image shows a GitHub file viewer for a JSON configuration file. The file is named 'multiTools.json' and is 1.36 KB in size. The JSON content is as follows:

```
1 [
2   {
3     "title" : "@@app.multitools.config@",
4     "properties" : [
5       {
6         "name" : "tools",
7         "label" : "@@app.multitools.tool@",
8         "type" : "elementmultiselect",
9       }
10    ]
11  }
12 ]
```

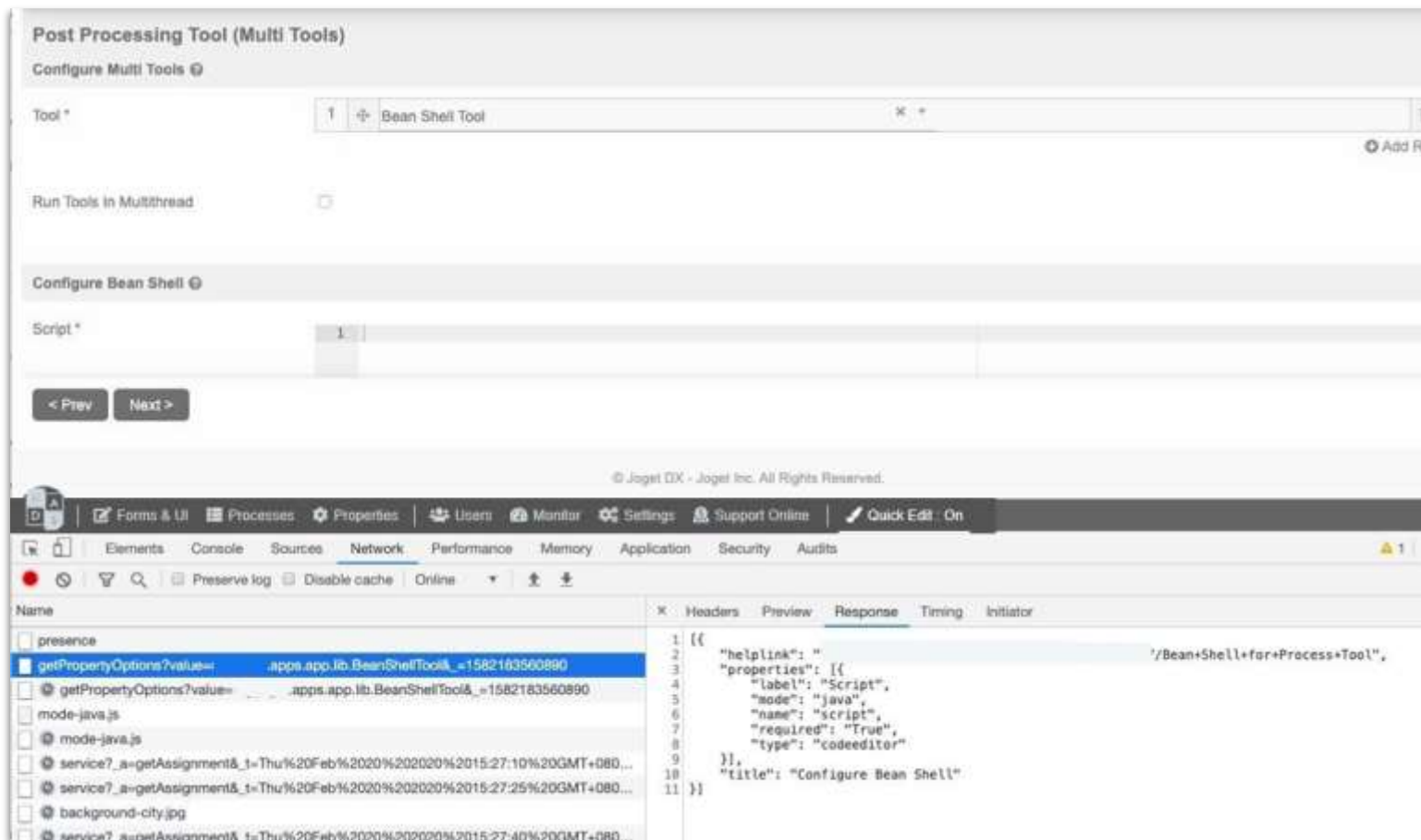
Below the JSON viewer, there is a UI form titled 'Post Processing Tool (Multi Tools)'. The form has a section 'Configure Multi Tools' with a table of tools. The table has two rows, each with a tool name and a delete button. The tools are 'Bean Shell Tool' and 'Email Tool'. The table is highlighted with a red border. Below the table, there is a checkbox labeled 'Run Tools In Multithread'.

Tool *	
1	Bean Shell Tool
2	Email Tool

Run Tools In Multithread ☐

RADS - Property Options Types - elementmultiselect

- <https://github.com/radservice/rad-community/blob/master/rad-core/src/main/resources/properties/app/multiTools.json#L8>



RADS - Property Options Types - Number

- <https://github.com/radservice/rad-community/blob/master/rad-consoleweb/src/main/webapp/js/dbuilder.core.js#L1565>

```
1559     {label: get_dbuilder_msg('dbuilder.responsiveView'),  
1560       name: 'responsiveView',  
1561       description : get_dbuilder_msg('dbuilder.responsiveView.desc'),  
1562       type: 'gridfixedrow',  
1563       columns : [  
1564         {key : 'view', label : get_dbuilder_msg('dbuilder.view')},  
1565         {key : 'breakpoint', label : get_dbuilder_msg('dbuilder.breakpoint'), type : 'number'},  
1566         {key : 'columns', label : get_dbuilder_msg('dbuilder.columns')}]  
1567     ],  
1568     rows: [  
1569       {label : get_dbui  
1570       {label : get_dbui  
1571     ]}
```

DATALIST BUILDER Asset Management System v1: List - Category (Published)

SOURCE DESIGN PROPERTIES PREVIEW SAVE Undo

Responsive Setting

The following setting only applicable for theme supporting responsive UI.

Disable responsive feature? ☐

Search display in popup? ☐

View Setting ⓘ

VIEW	MAX WIDTH(PX)	NO OF COLUMN/COLUMN NAME
Mobile	300	
Tablet		

Common Attributes for All Property Options Type except Hidden Field and Grid

```
{  
  name : 'Property Name',  
  label : 'Property Label',  
  description : 'Property Description', //optional, default is NULL  
  type : 'readonly',  
  value : 'Property Value', //optional , default is empty string  
  required : 'true', //optional, boolean value, default is false  
}
```


Extra Attributes for Text Field, Password Field, Text Area and HTML Editor

```
{
    size : '50', //optional , integer value, default is NULL, only for
text field and password field
    maxlength : '50', //optional, integer value, default is NULL, only
for text field and password field
    rows : '50', //optional, integer value, default is NULL, only for
text area and html editor
    cols : '50', //optional, integer value, default is NULL , only for
text area and html editor
    regex_validation : '^[a-zA-Z0-9_]+$' , //optional, default is NULL
validation_message : 'Error!!' //optional, default is NULL
}
```

Extra Attributes for Checkbox, Radio Button, Select Box and Multi Select Box

```
{
    size : '10', //optional, integer value, default is 4, only for multi
select box
    options : [ //is optional to use this attribute or options_ajax
        {value: 'value1', label : 'Value 1'},
        {value: 'value2', label : 'Value 2'},
        {value: 'value3', label : 'Value 3'}
    ],
    options_ajax_on_change : 'property1', //optional, value of this
property name will passed over to load options from ajax, only for select
box and multi select box
    options_ajax : 'URL to load options JSON' //optional, URL return JSON
Array of a set of Objects that have value & label attribute
}
```

Attributes for Hidden Field

```
{  
  name : 'Property Name',  
  type : 'hidden',  
  value : 'Property Value'  
}
```

Attributes for Grid

```
{
  name : 'Property Name',
  label : 'Property Label',
  description : 'Property Description', //optional, default is NULL
  type : 'grid',
  columns : [ // 2 type of column, with and without options attribute
    {key : 'col1', label : 'Col 1'},
    {key : 'col2', label : 'Col 2',
      options:[
        {value : 'option1', label : 'Option 1'},
        {value : 'option2', label : 'Option 2'}
      ]
    },
  ],
  value : [ //optional, default is NULL
    {col1 : 'abc', col2 : 'option1'},
    {col1 : 'def', col2 : 'option2'}
  ],
  required : 'true', //optional, boolean value, default is false
}
```

Extra Attributes for Element Select Field

```
{
    options_ajax_on_change : 'property1', //optional, value of this
property name will passover to load options from ajax
    options_ajax :
'[CONTEXT_PATH]/web/property/json/getElements?classname=
net.purwana.rads.apps.form.model.FormLoadElementBinder', //Load
plugin list based on class name given
    url : '[CONTEXT_PATH]/web/property/json/getPropertyOptions' //Load
plugin properties
}
```

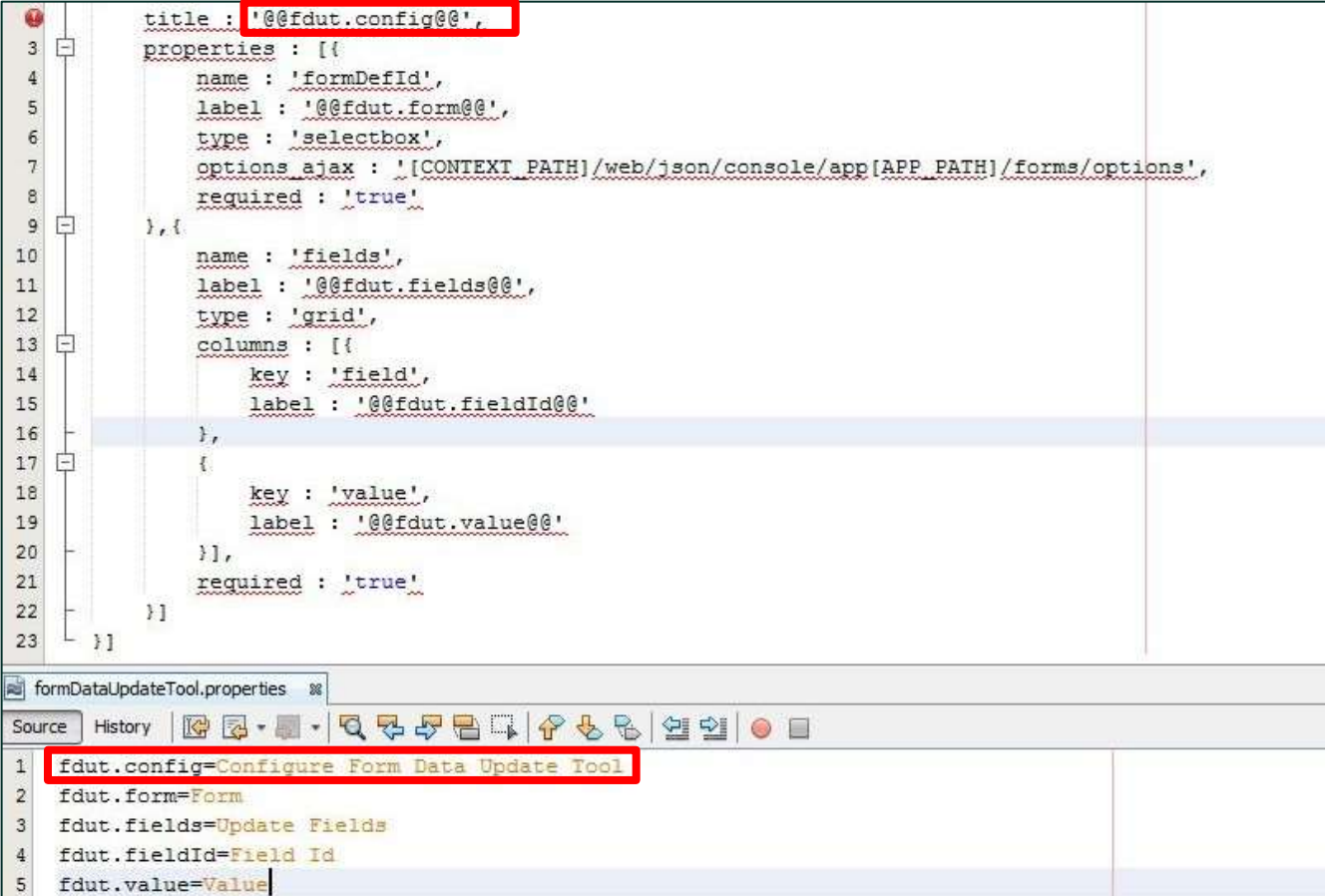
Property Validator Types

- Currently only one validator type supported - AJAX

```
{
  type : 'AJAX',
  url : 'URL to validate properties page value' ,
  // All properties in the same page will send to this url to validate,
  // URL return a JSON Object with status (success or fail) & message (JSONArray of String) attribute
  default_error_message : 'Error in this page!!' //optional, default is
  null
}
```

Internationalization Support

- You may localise your plugin.



```
1 title : '@@fdut.config@',
2
3 properties : [{
4   name : 'formDefId',
5   label : '@@fdut.form@',
6   type : 'selectbox',
7   options_ajax : '[CONTEXT_PATH]/web/json/console/app[APP_PATH]/forms/options',
8   required : 'true'
9 }, {
10  name : 'fields',
11  label : '@@fdut.fields@',
12  type : 'grid',
13  columns : [{
14    key : 'field',
15    label : '@@fdut.fieldId@'
16  },
17  {
18    key : 'value',
19    label : '@@fdut.value@'
20  }],
21  required : 'true'
22 }]
23 }
```

formDataUpdateTool.properties

```
1 fdut.config=Configure Form Data Update Tool
2 fdut.form=Form
3 fdut.fields=Update Fields
4 fdut.fieldId=Field Id
5 fdut.value=Value
```

Internationalization Support

1. In the **getPropertyOptions()** method of your plugin, make reference to the message key properties file

Example:

```
return AppUtil.readPluginResource(getClass().getName(),  
    "/properties/formDataUpdateTool.json", null, true,  
    "/messages/formDataUpdateTool");
```

2. Create the corresponding file (e.g. **formDataUpdateTool.properties**) in “src/main/resources/messages” folder.

Common Plugin Utility Methods

- Get a bean from application context.

```
DirectoryManager dm = (DirectoryManager)  
AppUtil.getApplicationContext().getBean("directoryManager");
```

Bean Name

- Read a resource file as String from resources folder.

```
String resource = AppUtil.readPluginResource(getClass().getName(),  
"/properties/plugin.json", new String[]{"value 1", "value 2"}, true,  
"message/pluginResouseBundle");
```

Path to message bundle
in resources folder,
without .properties file
extension

Path to resource file in
resources folder

Argument used for
String.format()

Plugin Class Name

Remove new line char

Common Plugin Utility Methods

- Processing Hash Variable to a String.

```
content = AppUtil.processHashVariable (content, workflowAssignment,  
StringUtil.TYPE_REGEX, replaceMap);
```

String escape type,
TYPE_REGEX,
TYPE_JSON or null

A map contains Strings to be replace

Content to be process

Workflow Assignment Object

- Get a i18n message from message bundle.

```
String message = AppPluginUtil.getMessage ("Label", getClass().getName(),  
"message/pluginResouseBundle")
```

Path to message bundle in resources
folder, without .properties file extension

Message Key

Plugin Class Name

Common Plugin Utility Methods

- Get parameter name of Form Element.

```
String param = FormUtil.getElementParameterName(this);
```

- Get value of Form Element.

```
String value = FormUtil.getElementPropertyValue(this, formData);
```

Common Plugin Utility Methods

- More at

<https://docs.rads.purwana.net/Utility+and+Service+Methods>

Plugin Web Support

- Provides an interface that enables you to implement your Web Service in a plugin.
- How to invoke/call?
 - URL Pattern
 - **{Context Path}/web/json/plugin/{Plugin Class Name}/service**
 - Example:
`http://localhost:8080/rad/web/json/plugin/net.purwana.rads.sample.lib.SimpleFormElement/service?say_something=Hello World`
 - URL Pattern
 - **{Context Path}/web/json/app/{App Id}/{App Version}/plugin/{Plugin Class Name}/service**
 - Example:
`http://localhost:8080/rad/web/json/app/crm/1/plugin/net.purwana.rads.sample.lib.SimpleFormElement/service?say_something=Hello World`

Plugin Web Support

- Implements `net.purwana.rads.plugin.base.PluginWebSupport`.
- Implement **webService** method.
- Example:

```
public void webService(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException {
    //get request parameter
    String param = request.getParameter("param");

    //print json response
    JSONArray jsonArray = new JSONArray();
    Map<String, String> option1 = new HashMap<String, String>();
    option1.put("value", "value1"); option1.put("label", "Value 1");
    jsonArray.put(option1);

    Map<String, String> option2 = new HashMap<String, String>();
    option2.put("value", "value2"); option2.put("label", "Value 2");
    jsonArray.put(option2);

    jsonArray.write(response.getWriter());
}
```

Plugin Web Support

- Add the following dependency into your **pom.xml** file.

```
<dependency>  
    <groupId>javax.servlet</groupId>  
    <artifactId>jsp-api</artifactId>  
    <version>2.0</version>  
</dependency>
```

- Read more at <https://docs.rads.purwana.net/Web+Service+Plugin>



Chapter 2

Creating a Form Field Element Plugin

What Are We Going To Build?

- We are going to build a Form Field Element that works very similarly like a Text Field but...
 - By incorporating the use of a jQuery plugin that allows users to pick a color from a palette.
 - Reference: <https://github.com/philzet/ColorPick.js>

Creating a Form Field Element Plugin

- Study the existing implementation of other existing form field elements.
 - Open “TextField.java”, locate relevant files that made up of the plugin.

```
@Override
    public String renderTemplate(FormData formData, Map dataModel) {
        String template = "textField.ftl";
```

```
@Override
    public String getFormBuilderIcon() {
        return
            "/plugin/net.purwana.rads.apps.form.lib.TextField/images/textField_icon.gif"
        ;
    }
```

```
@Override
    public String getPropertyOptions() {
        ...
        return AppUtil.readPluginResource(getClass().getName(),
            "/properties/form/textField.json", new Object[]{encryption}, true,
            "message/form/TextField");
    }
```

Creating a Maven Project for Your Plugin

- Using RADS subproject “rad-plugin-archetype” to create a Maven project for your plugin.
- **For Windows:**
 1. Create a directory to contain your plugins. (E.g. “C:\RADS-projects”).
 2. In Command Prompt, navigate to the newly created directory.
 3. Run “...**rad-plugin-archetype\create-plugin.bat**
net.purwana.rads.tutorial color_picker-pack 7.0-SNAPSHOT”.
 4. Key in “7.0-SNAPSHOT” for version and “y” to confirm all the information.
- **For Linux:**
 1. Create a directory at home directory to contain your plugins. (E.g. “~\RADS-projects”).
 2. In Command Terminal, go to the created directory.
 3. Run “...**rad-plugin-archetype\create-plugin.bat**
net.purwana.rads.tutorial color_picker-pack 7.0-SNAPSHOT”.
 4. Key in “7.0-SNAPSHOT” for version and “y” to confirm all the information.

Creating a Maven Project for Your Plugin

- Windows

```
C:\RADS-projects>C:\rad-community\trunk\rad-plugin-archetype\create-plugin.bat net.purwana.rads.tutorial
color_picker-pack 7.0-SNAPSHOT
[INFO] Scanning for projects...
[INFO]
[INFO] Using the builder org.apache.maven.lifecycle.internal.builder.singlethreaded.SingleThreadedBuilder with a thread
count of 1
[INFO]
[INFO] _____
[INFO] Building Maven Stub Project (No POM) 1
[INFO] _____
[INFO]
[INFO] >>> maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[WARNING] Archetype not found in any catalog. Falling back to central repository (http://repo1.maven.org/maven2).
[WARNING] Use -DarchetypeRepository=<your repository> if archetype's repository is elsewhere.
Downloading: http://repo1.maven.org/maven2/net/purwana/rads/rad-plugin-archetype/7.0-SNAPSHOT/maven-
metadata.xml Downloading: http://repo1.maven.org/net/purwana/rads/rad-plugin-archetype/7.0-SNAPSHOT/maven-
metadata.xml
```

Creating a Maven Project for Your Plugin

- Windows

[INFO] Using property: groupId = net.purwana.rads.tutorial

[INFO] Using property: artifactId = color_picker-pack

Define value for property 'version': 1.0-SNAPSHOT: **7.0-SNAPSHOT**

[INFO] Using property: package =

net.purwana.rads.tutorial Confirm properties

configuration:

groupId:

net.purwana.rads.tutorial

artifactId: color_picker-pack

version: 7.0-SNAPSHOT

package:

net.purwana.rads.tutorial Y: : **Y**

[INFO] _____

[INFO] Using following parameters for creating project from Old (1.x) Archetype: rad-plugin-archetype:7.0-SNAPSHOT [INFO] __

[INFO] Parameter: groupId, Value: net.purwana.rads.tutorial

[INFO] Parameter: packageName, Value:

net.purwana.rads.tutorial [INFO] Parameter: package, Value:

net.purwana.rads.tutorial [INFO] Parameter: artifactId, Value:

color_picker-pack [INFO] Parameter: version, Value: 7.0-

SNAPSHOT

[INFO] project created from Old (1.x) Archetype in dir: **C:\RADS-projects\color_picker-pack**

[INFO] _____

[INFO] BUILD SUCCESS

What is Inside The Maven Project

- Open the newly created project in your IDE (i.e. Netbeans).

What is Inside The Maven Project

- pom.xml
 - POM stands for "Project Object Model", an XML representation of a Maven project.
 - Used to manage your plugin dependencies jar.
- Activator.java
 - Bundle Activator for OSGi framework.
 - The activator class is the bundle's hook to the lifecycle layer for management.
 - Used to register your plugin class in **start** method.

Creating a Plugin Class

1. In your Maven project, create a plugin class call “ColorPicker”.
2. Extends **Element** implements **FormBuilderPaletteElement**.
3. Import required class file.
4. Implement all abstract methods.

Register Your Plugin Class

1. Open Activator.java.
2. Add the code below to **start** method.

```
//Register plugin here  
registrationList.add(context.registerService(ColorPicker.class.getName()  
, new ColorPicker(), null));
```

Implementing the Methods

- You may copy the existing implementations of **TextField**.
- Replace where applicable.

Property Options

Edit Color Picker

Edit Color Picker > Advanced Options

ID *	field1
Label *	Color Picker

Advanced Options

Edit Color Picker > Advanced Options

Data

Value

Max Length

Validator

UI

Read Only

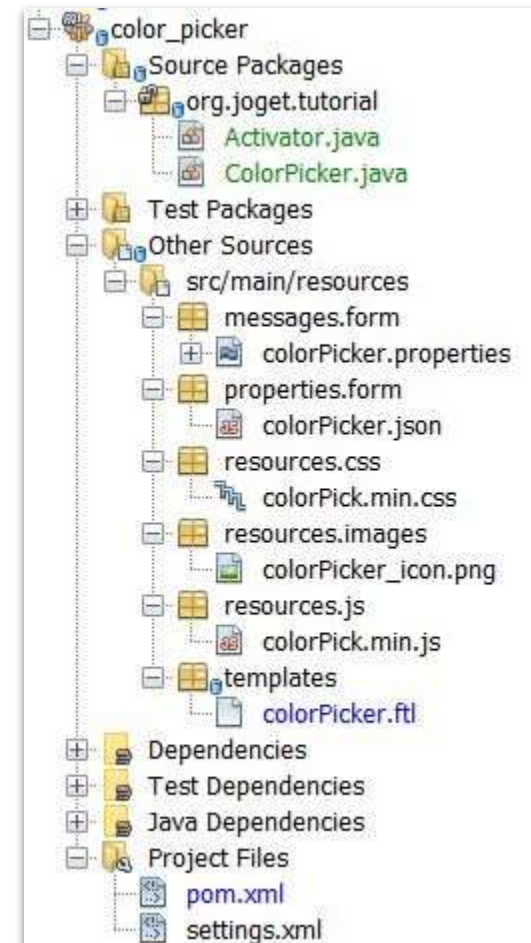
☐

Read Only Label

☐

Creating the Supporting Files

- `resources/messages/form/colorPicker.properties`
- `resources/properties/form/colorPicker.json`
- `resources/resources/images/colorPicker_icon.gif`
- `resources/resources/js/colorPick.min.js`
- `resources/templates/css/colorPick.min`
- `resources/templates/colorPicker.ftl`



Build and Upload

- When you are ready, build the project by running the following command in your project path.

```
mvn clean install
```

- Obtain the .jar file generated and upload into RAD.

The screenshot shows the 'Manage Plugins' section of the RAD Service interface. On the left is a sidebar with navigation links: 'System Settings', 'General Settings', 'Datasource & Profile Settings', 'Directory Manager Settings', 'Manage Plugins' (highlighted), and 'Manage Messages'. The main area has two buttons at the top: 'Reload Plugins' and 'Upload Plugin'. Below these are tabs for 'Installed Plugins' (active) and 'All Plugins'. A 'Filter by Type' dropdown menu is present, followed by a 'Search' input field. A table displays the installed plugins with columns for selection, name, description, version, and type.

<input type="checkbox"/>	PLUGIN NAME	PLUGIN DESCRIPTION	PLUGIN VERSION	TYPE
<input type="checkbox"/>	Color Picker	Color Picker Field Element	7.0.0	Form Element

Build and Upload

- Test out the form element field in actual Form.
- Repeat as many times as needed too until you achieve what you want.

Materials

- You may obtain project source code of the sample new theme showcased in this chapter from the file **17-2-color_picker-pack.zip**

Chapter Review

- Be able to create a Form Field Element plugin.



Chapter 3

Creating a Datalist Formatter Plugin

What Are We Going To Build?

- Previous chapter we developed a color picker.
- We are going to build a **Datalist Formatter** that displays the background color based on the value in color picker.

Creating a Datalist Formatter Plugin

- Study the existing implementation of other existing Datalist Formatter elements.
 - Open “DefaultFormatter.java”, locate relevant files that made up of the plugin.

```
@Override
    public String getPropertyOptions() {
        AppDefinition appDef = AppUtil.getCurrentAppDefinition();

        String appId = appDef.getId();
        String appVersion = appDef.getVersion().toString();

        Object[] arguments = new Object[]{appId, appVersion};

        String json = AppUtil.readPluginResource(getClass().getName(),
            "/properties/datalist/defaultFormatter.json", arguments, true,
            "message/datalist/defaultFormatter");

        return json;
    }
```

Creating a Maven Project for Your Plugin

- Using RADS subproject “rad-plugin-archetype” to create a Maven project for your plugin.
- **For Windows:**
 1. Create a directory to contain your plugins. (E.g. “C:\RADS-projects”)
 2. In Command Prompt, navigate to the newly created directory.
 3. Run “...**rad-plugin-archetype\create-plugin.bat**
net.purwana.rads.tutorial color_datalist_formatter-pack 7.0-SNAPSHOT”
 4. Key in “7.0-SNAPSHOT” for version and “y” to confirm all the information
- **For Linux:**
 1. Create a directory at home directory to contain your plugins. (E.g. “~\RADS-projects”)
 2. In Command Terminal, go to the created directory.
 3. Run “...**rad-plugin-archetype\create-plugin.bat**
net.purwana.rads.tutorial color_datalist_formatter-pack 7.0-SNAPSHOT”
 4. Key in “7.0-SNAPSHOT” for version and “y” to confirm all the information

Creating a Maven Project for Your Plugin

- Windows

```
C:\RADS-projects>C:\jw-community\trunk\rad-plugin-archetype\create-plugin.bat
net.purwana.rads.tutorial color_datalist_formatter-pack 7.0-SNAPSHOT
[INFO] Scanning for projects...
[INFO]
[INFO] Using the builder org.apache.maven.lifecycle.internal.builder.singlethreaded.SingleThreadedBuilder with a thread
count of 1
[INFO]
[INFO] _____
[INFO] Building Maven Stub Project (No POM) 1
[INFO] _____
[INFO]
[INFO] >>> maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[WARNING] Archetype not found in any catalog. Falling back to central repository (http://repo1.maven.org/maven2).
[WARNING] Use -DarchetypeRepository=<your repository> if archetype's repository is elsewhere.
Downloading: http://repo1.maven.org/maven2/net/purwana/rads/rad-plugin-archetype/7.0-SNAPSHOT/maven-
metadata.xml Downloading: http://repo1.maven.org/net/purwana/rads/rad-plugin-archetype/7.0-SNAPSHOT/maven-
metadata.xml
```

Creating a Maven Project for Your Plugin

- Windows

```
[INFO] Using property: groupId = net.purwana.rads.tutorial
[INFO] Using property: artifactId = color_datalist_formatter-pack
Define value for property 'version': 1.0-SNAPSHOT: 7.0-SNAPSHOT
[INFO] Using property: package = net.purwana.rads.tutorial
Confirm properties configuration:
groupId: net.purwana.rads.tutorial
artifactId: color_datalist_formatter-pack
version: 7.0-SNAPSHOT
package:
net.purwana.rads.tutorial
Y: : Y
[INFO] _____
[INFO] Using following parameters for creating project from Old (1.x) Archetype: rad-plugin-archetype:7.0-SNAPSHOT
[INFO] _____
[INFO] Parameter: groupId, Value:
net.purwana.rads.tutorial [INFO] Parameter:
packageName, Value: net.purwana.rads.tutorial [INFO]
Parameter: package, Value: net.purwana.rads.tutorial
[INFO] Parameter: artifactId, Value: color_datalist_formatter-pack
[INFO] Parameter: version, Value: 7.0-SNAPSHOT
[INFO] project created from Old (1.x) Archetype in dir: C:\RADS-projects\color_datalist_formatter-pack
[INFO] _____
[INFO] BUILD SUCCESS
```

What Is Inside the Maven Project

- Open the newly created project in your IDE (i.e. Netbeans).

What Is Inside the Maven Project

- pom.xml
 - POM stands for "Project Object Model", an XML representation of a Maven project.
 - Used to manage your plugin dependencies jar.
- Activator.java
 - Bundle Activator for OSGi framework.
 - The activator class is the bundle's hook to the lifecycle layer for management.
 - Used to register your plugin class in **start** method.

Creating a Plugin Class

1. In your Maven project, create a plugin class call “ColorDatalistFormatter”.
2. Extends **DataListColumnFormatDefault**.
3. Import required class file.
4. Implement all abstract methods.

Register Your Plugin Class

1. Open Activator.java.
2. Add the code below to **start** method.

```
//Register plugin here  
registrationList.add(context.registerService(ColorDatalistFormatter.cla  
ss.getName(), new ColorDatalistFormatter(), null));
```

Implementing the Methods

- You may copy the existing implementations of **Default Formatter**.
- Replace where applicable.

Property Options

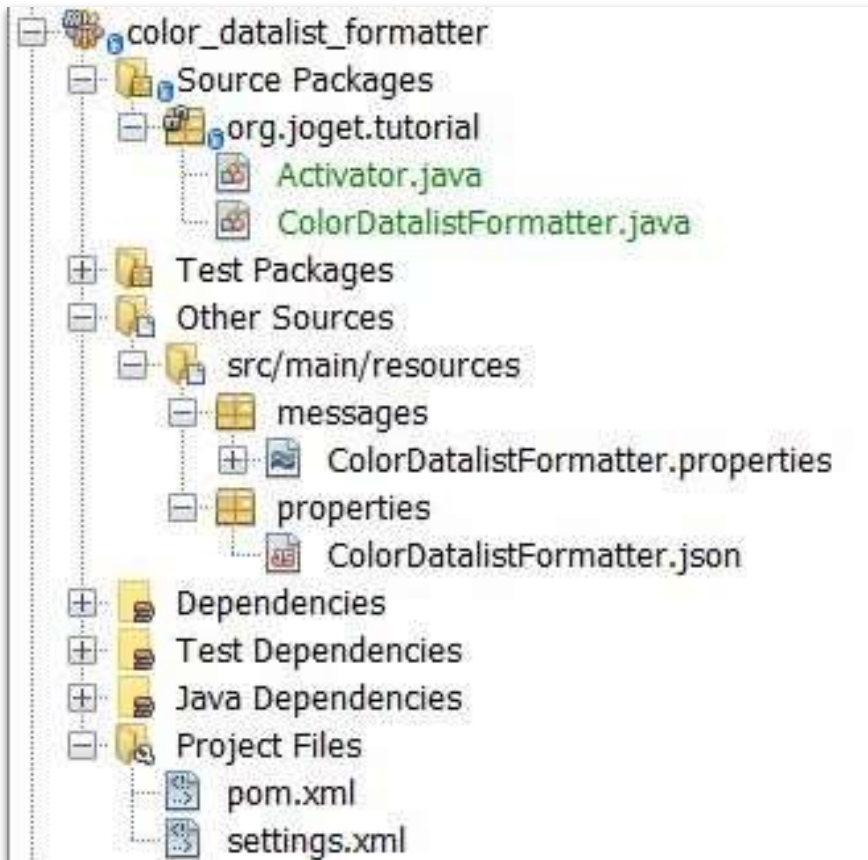
Configure Color Datalist Formatter

General > Action Mapping > Formatter > **Configure Color Datalist Formatter**

Show Label	<input checked="" type="checkbox"/>
Font Color	<input type="text" value="#FFFFFF"/>

Creating the Supporting Files

- resources/messages/form/**ColorDatalistFormatter.properties**
- resources/properties/form/**ColorDatalistFormatter.json**

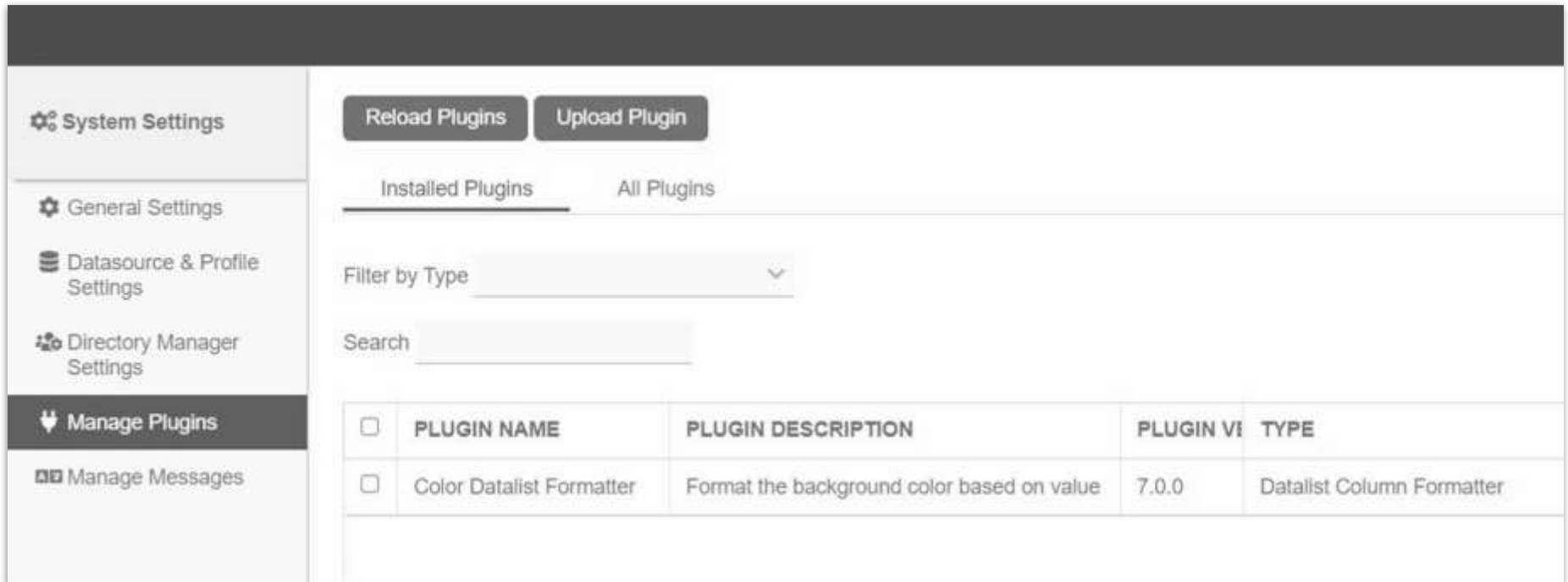


Build and Upload

- When you are ready, build the project by running the following command in your project path.

```
mvn clean install
```

- Obtain the .jar file generated and upload into RADS.



The screenshot shows the 'Manage Plugins' section of the RADS interface. On the left is a sidebar with navigation links: 'System Settings', 'General Settings', 'Datasource & Profile Settings', 'Directory Manager Settings', 'Manage Plugins' (highlighted), and 'Manage Messages'. The main area has two buttons at the top: 'Reload Plugins' and 'Upload Plugin'. Below these are tabs for 'Installed Plugins' (active) and 'All Plugins'. There is a 'Filter by Type' dropdown menu and a 'Search' input field. A table lists installed plugins with columns for selection, plugin name, description, version, and type.

<input type="checkbox"/>	PLUGIN NAME	PLUGIN DESCRIPTION	PLUGIN VI	TYPE
<input type="checkbox"/>	Color Datalist Formatter	Format the background color based on value	7.0.0	Datalist Column Formatter

Build and Upload

- Test out the datalist formatter in actual datalist.
- Repeat as many times as needed too until you achieve what you want.

Materials

- You may obtain project source code of the sample new theme showcased in this chapter from the file:
17-3-color_datalist_formatter-pack.zip

Chapter Review

- Be able to create a Datalist Formatter plugin.



Chapter 4

Creating a Custom HTML Userview Menu Plugin

What Are We Going To Build?

- We are going to build a Userview Menu that allows users to input HTML scripts similar to Custom HTML in Form Builder.

Creating a Userview Menu Plugin

- Study the existing implementation of other existing form field elements.
 - Open “UserProfileMenu.java”, locate relevant files that made up of the plugin.

```
@Override
public String getRenderPage() {
    ..
    String content = pluginManager.getPluginFreeMarkerTemplate(model,
getClass().getName(), "/templates/userProfile.ftl", null);
    return content;
}
```

```
@Override
public String getIcon() {
    return "/plugin/net.purwana.rads.plugin.enterprise.UserProfileMenu/images/grid_icon.gif"
;
}
```

```
public String getPropertyOptions() {
    return AppUtil.readPluginResource(getClass().getName(),
"/properties/userview/userProfileMenu.json" , null, true, "message/userview/userProfileMenu");
}
```

Creating a Maven Project for Your Plugin

- Using RADS subproject “rad-plugin-archetype” to create a Maven project for your plugin.
- **For Windows:**
 1. Create a directory to contain your plugins. (E.g. “C:\RADS-projects”)
 2. In Command Prompt, navigate to the newly created directory.
 3. Run “...**rad-plugin-archetype\create-plugin.bat**”
net.purwana.rads.tutorial classic_html_menu”
 4. Key in “7.0-SNAPSHOT” for version and “y” to confirm all the information
- **For Linux:**
 1. Create a directory at home directory to contain your plugins. (E.g. “~\RADS-projects”)
 2. In Command Terminal, go to the created directory.
 3. Run “...**rad-plugin-archetype\create-plugin.bat**”
net.purwana.rads.tutorial classic_html_menu”
 4. Key in “7.0-SNAPSHOT” for version and “y” to confirm all the information

Creating a Maven Project for Your Plugin

- Windows

```
C:\RADS-projects>C:\jw-community\trunk\rad-plugin-archetype\create-plugin.bat
net.purwana.rads.tutorial classic_html_menu
[INFO] Scanning for projects...
[INFO]
[INFO] Using the builder org.apache.maven.lifecycle.internal.builder.singlethreaded.SingleThreadedBuilder with a thread
count of 1
[INFO]
[INFO] _____
[INFO] Building Maven Stub Project (No POM) 1
[INFO] _____
[INFO]
[INFO] >>> maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom >>>
[INFO]
[INFO] <<< maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom <<<
[INFO]
[INFO] --- maven-archetype-plugin:2.2:generate (default-cli) @ standalone-pom ---
[INFO] Generating project in Interactive mode
[WARNING] Archetype not found in any catalog. Falling back to central repository (http://repo1.maven.org/maven2).
[WARNING] Use -DarchetypeRepository=<your repository> if archetype's repository is elsewhere.
Downloading: http://repo1.maven.org/maven2/net/purwana/rads/rad-plugin-archetype/7.0-SNAPSHOT/maven-
metadata.xml Downloading: http://repo1.maven.org/net/purwana/rads/rad-plugin-archetype/7.0-SNAPSHOT/maven-
metadata.xml
```

Creating a Maven Project for Your Plugin

- Windows

```
[INFO] Using property: groupId = net.purwana.rads.tutorial
```

```
[INFO] Using property: artifactId = classic_html_menu
```

```
Define value for property 'version': 1.0-SNAPSHOT: 7.0-SNAPSHOT
```

```
[INFO] Using property: package =
```

```
net.purwana.rads.tutorial Confirm properties
```

```
configuration:
```

```
groupId:
```

```
net.purwana.rads.tutorial
```

```
artifactId: classic_html_menu
```

```
version: 7.0-SNAPSHOT
```

```
package:
```

```
net.purwana.rads.tutorial
```

```
Y: : Y
```

```
[INFO] _____
```

```
[INFO] Using following parameters for creating project from Old (1.x) Archetype: rad-plugin-archetype:7.0-SNAPSHOT [INFO]
```

```
_____
```

```
[INFO] Parameter: groupId, Value: net.purwana.rads.tutorial
```

```
[INFO] Parameter: packageName, Value:
```

```
net.purwana.rads.tutorial [INFO] Parameter: package, Value:
```

```
net.purwana.rads.tutorial [INFO] Parameter: artifactId, Value:
```

```
classic_html_menu [INFO] Parameter: version, Value: 7.0-
```

```
SNAPSHOT
```

```
[INFO] project created from Old (1.x) Archetype in dir: C:\RADS-projects\classic_html_menu
```

```
[INFO] _____
```

```
[INFO] BUILD SUCCESS
```

What Is Inside the Maven Project

- Open the newly created project in your IDE (i.e. Netbeans).

What Is Inside the Maven Project

- pom.xml
 - POM stands for "Project Object Model", an XML representation of a Maven project
 - Used to manage your plugin dependencies jar
- Activator.java
 - Bundle Activator for OSGi framework
 - The activator class is the bundle's hook to the lifecycle layer for management.
 - Used to register your plugin class in **start** method

Creating a Plugin Class

1. In your Maven project, create a plugin class called as “ClassicHTMLMenu”
2. Extends **UserviewMenu**
3. Import required class file

Register Your Plugin Class

1. Open Activator.java
2. Add the code below to **start** method

```
//Register plugin here  
registrationList.add(context.registerService(ClassicHTMLMenu.class.getName(), new ClassicHTMLMenu(), null));
```

Implementing the Methods

- You may copy the existing implementations of **Usserview Menu**.
- Replace where applicable.

Property Options

The image shows a 'Configure Classic HTML Menu' dialog box with the 'Performance & Offline' tab selected. The dialog is divided into two main sections: 'Cache Settings' and 'PWA Offline Settings'.

Configure Classic HTML Menu

Configure Classic HTML Menu > Performance & Offline

Id: 8275F7F19FB445CF9C58C1333880093E

Custom ID: [Empty field]

Label *: Classic HTML Menu

Code: 1

< Prev Next >

Performance & Offline

Configure Classic HTML Menu > Performance & Offline

Cache Settings

Scope ? None

Duration (s) ? 20

PWA Offline Settings

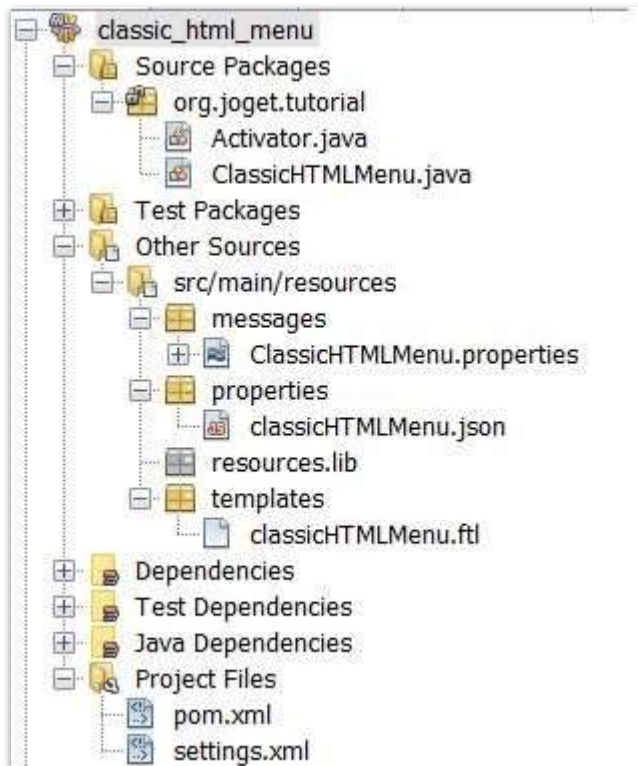
PWA Offline support is dependent on the theme used.

Enable cache for offline support ☐

< Prev Next > OK Cancel

Creating the Supporting Files

- resources/messages/**ClassicHTMLMenu.properties**
- resources/properties/**classicHTMLMenu.json**
- resources/templates/**classicHTMLMenu.ftl**

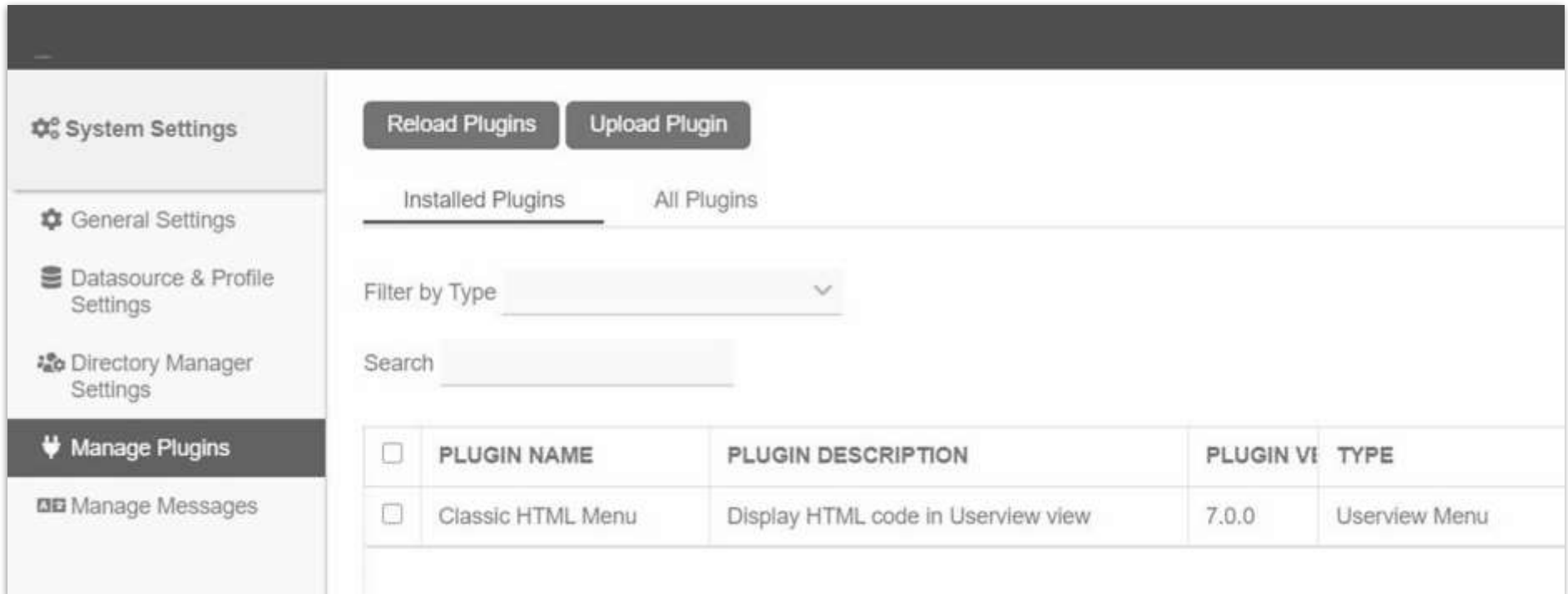


Build And Upload

- When you are ready, build the project by running the following command in your project path.

```
mvn clean install
```

- Obtain the .jar file generated and upload into RADS.



The screenshot shows the 'Manage Plugins' section of the RADS interface. On the left is a sidebar with navigation links: 'System Settings', 'General Settings', 'Datasource & Profile Settings', 'Directory Manager Settings', 'Manage Plugins' (highlighted), and 'Manage Messages'. The main area has two buttons at the top: 'Reload Plugins' and 'Upload Plugin'. Below these are tabs for 'Installed Plugins' (selected) and 'All Plugins'. There is a 'Filter by Type' dropdown menu and a 'Search' input field. A table lists the installed plugins with columns for a checkbox, plugin name, description, version, and type.

<input type="checkbox"/>	PLUGIN NAME	PLUGIN DESCRIPTION	PLUGIN VERSION	TYPE
<input type="checkbox"/>	Classic HTML Menu	Display HTML code in Userview view	7.0.0	Userview Menu

Build And Upload

- Test out the userview menu.
- Repeat as many times as needed too until you achieve what you want.

Materials

- You may obtain project source code of the sample new theme showcased in this chapter from the file **17-4-classic_html_menu.zip**

Chapter Review

- Be able to create a Custom HTML Userview Menu plugin.



Chapter 5

Generate & Build Plugin via Docker

Building Plugin Using Docker

- Without needing to prepare development environment as described in Module 16 (Java, Maven, Install External Libraries), you can generate and build plugin by using a special docker image prepared.

Links

- Please refer to

<https://docs.rads.purwana.net/Build+Plugin+Source+Code+using+Docker>
to continue.

- Reference:

<https://hub.docker.com/r/rads1945/docker-maven-rads>

Note: For long term development, still recommended to setup a proper environment as per the KB

Module Review

1. Introduction
2. Creating a Form Field Element Plugin
3. Creating a Datalist Formatter Plugin
4. Creating a Custom html Userview Menu plugin
5. Generate & Build Plugin via Docker

Recommended Further Learning

- Study on how other plugin types are implemented.
 - Check out the RADS Marketplace at <https://marketplace.rads.purwana.net/>
 - Check out the RADS Knowledge Base – Developer Guide <https://docs.rads.purwana.net/Developing+Plugins>

Stay Connected With RADS

- rads.purwana.net
- <https://github.com/radservice/rad-community>