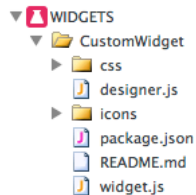


Widgets v2 Creating a Widget

In addition to Wakanda's built-in widgets, you also have the possibility to create your own custom widgets or add widgets created from other frameworks. Wakanda offers you the following features available for your custom widgets:

- Install a custom widget easily into your solution,
- Edit the code for your custom widget directly in Wakanda Studio,
- Define properties (displayed in the **Properties** tab of the GUI Designer) that can be datasources or static values for your custom widget,
- Customize events for your custom widget as well as those that can be intercepted by the user from the GUI Designer's **Events** tab,
- Define which CSS style sections are available in the **Styles** tab of the GUI Designer, and
- Drag and drop the custom widget onto the Page.

A custom widget has the following file structure:



Each custom widget's folder contains the following items:

- **css/widget.css**: The "widget.css" file, which is created by default for your widget, allows you to set your custom widget's default styles at runtime and design mode. The user can override them widget's CSS in the **Styles** tab if you give him/her access to these style settings.
- **designer.js**: JavaScript file allows you to customize your custom widget as it is displayed in the GUI Designer (style settings to make available, default size of the widget, and customize properties defined in the widget.js file).
- **icons**: This folder contains the custom widget's .png file, by default named "widget.png", that is used in the GUI Designer. The custom widget's icon must be 16x16 pixels.
- **package.json**: A JSON file in which you define the files necessary for your custom widget including any dependencies on other widgets. In this file, you also define the widget's display name, its icon, and its category as well as its meta data (like author, date, and version).
- **README.md**: A text file using Markdown syntax that you can use to describe your widget when distributing it.
- **widget.js**: Your custom widget's JavaScript file in which you code your custom widget and define its properties.

Creating a custom widget in GUI Designer

You can create a custom widget from within Wakanda Studio by selecting **New Custom Widget** from the **File** menu or the Widgets folder's contextual menu.

When naming your custom widget, the first letter must be uppercase because each widget is a JavaScript class.

Note: Your custom widget's CSS class will be converted into all lowercase letters regardless of the name you give your custom widget. For example, if you name your widget "MyCustomWidget", the CSS class for it will be "mycustomwidget".

Location of custom widgets

You can install custom widgets either in the selected project's "Widgets" folder or the Widgets favorites folder. Refer to **Defining custom widgets as favorites**, for more information.

Your Favorites folder is in the following location:

- On Macintosh: /Users/username/Documents/Wakanda/Widgets/
- On Windows: diskName:\Users\username\Documents\Wakanda\Widgets\

In Wakanda 8, this folder contained the custom widgets that you could use in all of your projects. Now, you can access only the custom widgets installed in your project's "Widgets" folder.

As of Wakanda 9, any custom widget in the favorites folder will be copied automatically into a new project.

Tag not saved in the HTML file

If in your code, you have an HTML tag that you want to display, but do not want to save with your HTML page, you can use the **waf-studio-donotsave** class.

For example, you could write the following in your custom widget's code using the **doAfter()** function:

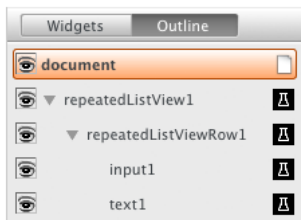
```
CustomWidget.doAfter("init", function() {
    this.node.innerHTML += '<div class="waf-studio-donotsave">This information will not be saved in the HTML</div>';
});
```

Widget IDs

The ID for a custom widget added to the Page will be the widget's name plus a sequential number. If your widget's name is "CustomWidget", the ID of the first widget you add to your Page will be "customWidget1". The number added at the end will be sequential, starting at 1.

In the case of multiple widgets created for a custom widget, the ID for each widget will be the widget's name plus a sequential number.

For example, if you have a widget named RepeatedListView widget that creates three widgets (RepeatedListViewRow, Input, and Text), the IDs for each widget will be "repeatedListView1", "repeatedListViewRow1", "input1", and "text1".



Instantiating a widget at runtime

Below is how you instantiate a custom widget in JavaScript:

```
var MyNewWidget = WAF.require('CustomWidget');  
var instance = new MyNewWidget();
```

The new custom widget's ID will be similar to the one given in Wakanda Studio, i.e., its name starting with a lowercase letter and a number: "customWidget1".

Defining a dependent widget to be installed

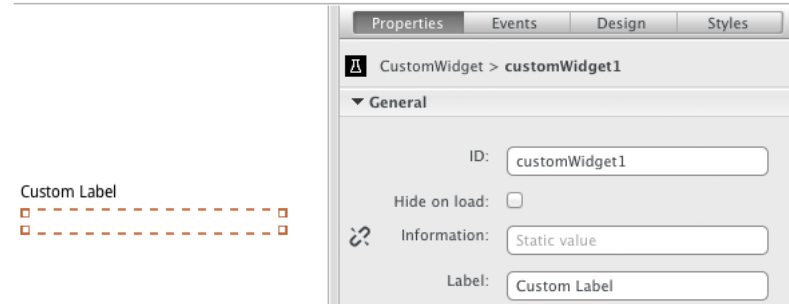
If your custom widget requires another widget for it to function properly, you must indicate it in the *externalWidgets* property in the custom widget's **package.json** file. You can also hide it from the GUI Designer, by setting the category to "Hidden".

Any dependent widgets will be installed automatically for you. If they existed before, the old ones will be placed in a separate folder.

Defining a widget's properties

In this chapter, we explain how to add properties to your custom widget. For more information about properties for a widget are displayed, refer to [Widget Properties](#).

In our example below, we add one property (which creates two fields in the GUI Designer) and a label property:



To add a property to your widget:

- Use the `addProperty()` function to define the property in your "widget.js" file.
- Use the `customizeProperty()` function in the "designer.js" file to customize how it appears in the Properties tab in the GUI Designer.

However, if you want to add a label property to your widget, which is managed automatically by Wakanda Studio, refer to the [Adding a Label property](#) section below.

Adding a property

To define a property, you can either:

1. Use the `widget.create()` function:

```
var CustomWidget = widget.create('CustomWidget', {
  info: widget.property()
});
```

Or

2. Use the `addProperty()` function in the "widget.js" file

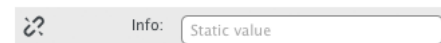
```
CustomWidget.addProperty('info');
```

Both functions have the same **options property**.

Regardless of the method you use to add a property (named *propertyName*) to your widget, two properties in the DOM node (and the Properties panel) will be created:

- `data-propertyName`: default (static) value for this property
- `data-binding-propertyName`: name of the attribute bound to this property

In the GUI Designer, the two fields for this property appear as shown below:

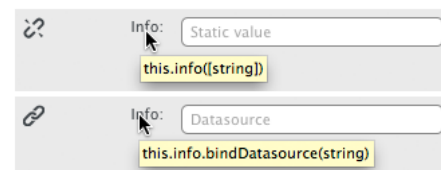


Note: Click the  icon to toggle between the static value and the datasource.

In our example above, we have the "data-info" and the "data-binding-info" properties in the custom widget's DOM node:

```
<div id="customWidget1" data-type="CustomWidget" data-package="CustomWidget" data-lib="WAF"
data-info="static value" data-binding-info="company.url"
data-label-position="left" data-label="Custom Widget Label"
class="waf-widget waf-customwidget" data-constraint-top="true"
data-constraint-left="true"></div>
```

By default, a tooltip appears when you hover the property's title and is different depending on if you have the static field or the datasource field displayed:



To add your own tooltip message before the syntax, refer to the `customizeProperty()` function.

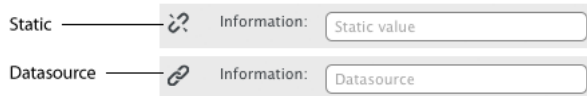
Customizing a property

If you want to customize it in the GUI Designer, you can do so by using the `customizeProperty()` function in the "designer.js" file:

```
CustomWidget.customizeProperty('info', {
  sourceTitle: 'Information Source',
  title: 'Information',
  display: true,
  sourceDisplay: true
});
```

```
});
```

The "info" property appears as shown below in the **Properties** tab. Click the  icon to toggle between the static value and the datasource:



For more information, refer to the [addProperty\(\)](#) and [customizeProperty\(\)](#) functions.

Adding a Label property

To add a label property for your widget, which Wakanda manages automatically for you, use the [addLabel\(\)](#) function. For more information about the Label widget, refer to the [Label Property](#) section.

Ordering the properties

The order in which the properties are defined in the "widget.js" file is the same order in which they are displayed in the **Properties** tab. For our CustomWidget example above, the **Label** property is displayed at the bottom of the list.

Property of type boolean

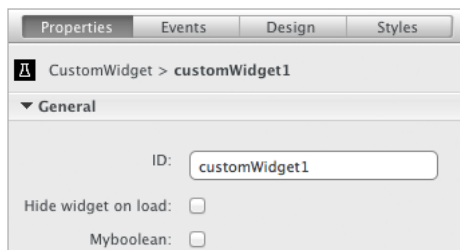
You can define a property of type "boolean" in the "widget.js" file:

```
CustomWidget.addProperty('myboolean', {
  type: 'boolean',
  defaultValue: false,
  bindable: false
});
```

The values for this property type are *true* and *false*.

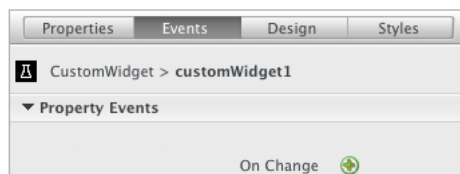
Properties tab

In the **Properties** tab, this property appears as a checkbox in the GUI Designer:



Events tab

For this property, you can intercept the **On Change** event in the GUI Designer's **Events** tab:



This event is fired when the value for the property has been modified.

event object for onChange event

In the event object are the following properties:

Name	Description
data.oldValue	Previous value for the property
data.value	Actual value for the property
kind	Event type
parentEvent	Event that triggered this event
target	Property name

Property of type datasource

For a property of type "datasource", you define the values in the "widget.js" file:

```
CustomWidget.addProperty('mysource', {
  type: 'datasource',
  attributes: ['att1', 'att2']
});
```

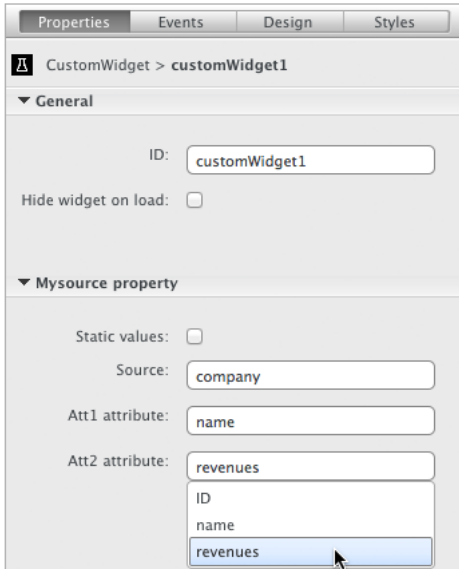
You can also define the attributes as shown below:

```
CustomWidget.addProperty('mysource', {
  type: 'datasource',
  attributes: [{
    name: 'att1'
  }, {
    name: 'att2'
  }]
});
```

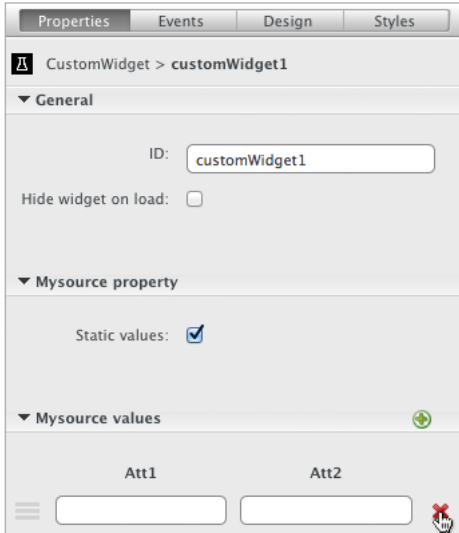
Properties tab

In the **Properties** tab, you define the values for each attribute.


In the property's "property" section, you can bind datasources to the attributes by selecting the datastore class (or array) in the **Source** field and the individual attributes in the attributes that you defined for your property:



To define static values, check the **Static values** checkbox. The property's "values" section appears:

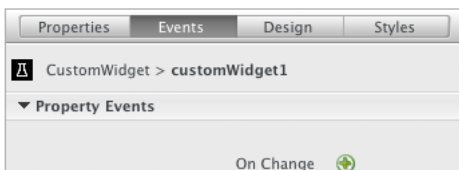


To add an element, click on the  icon at the top of this section.

To delete an element, click on the  icon.

Events tab

For this property, you can intercept the **On Change** event in the GUI Designer's **Events** tab:



This event is fired when the value for the property has been modified.

event object for onChange event

In the event object are the following properties:

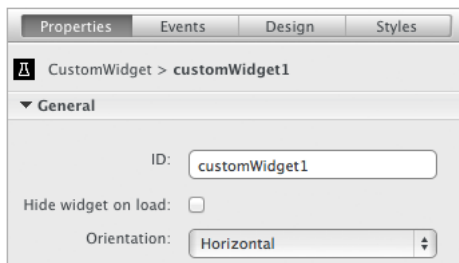
Name	Description
data.oldValue	Previous value for the property
data.value	Actual value for the property
kind	Event type
parentEvent	Event that triggered this event
target	Property name

Property of type enum

For a property of type "enum", you define the values in the "widget.js" file:

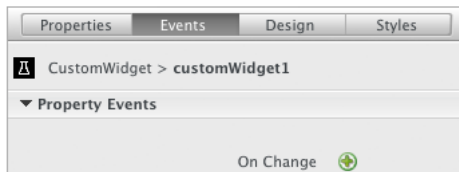
```
CustomWidget.addProperty('orientation', {  
  type: "enum",  
  "values": {  
    horizontal: "Horizontal",  
    vertical: "Vertical"  
  },  
  bindable: false  
});
```

In the GUI Designer, it appears as shown below:



Events tab

For this property, you can intercept the **On Change** event in the GUI Designer's Events tab:



This event is fired when the value for the property has been modified.

event object for onChange event

In the event object are the following properties:

Name	Description
data.oldValue	Previous value for the property
data.value	Actual value for the property
kind	Event type
parentEvent	Event that triggered this event
target	Property name

Property of type integer

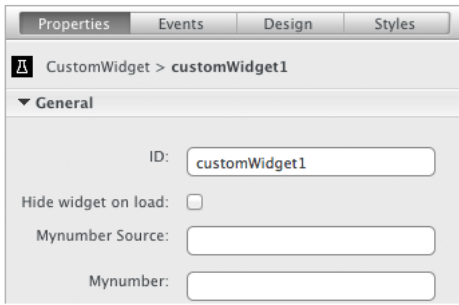
For a property of type "integer", you define the values in the "widget.js" file:

```
CustomWidget.addProperty('mynumber', {  
  type: 'integer',  
  defaultValue: 0  
});
```

The value returned by this property is always a number.

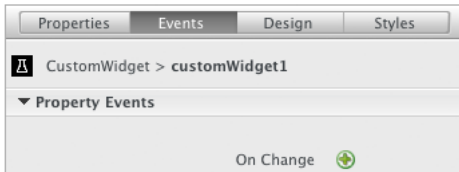
Properties tab

In the **Properties** tab, you either bind a datasource to this property or define a static value for it.



Events tab

For this property, you can intercept the **On Change** event in the GUI Designer's Events tab:



This event is fired when the value for the property has been modified.

event object for onChange event

In the event object are the following properties:

Name	Description
data.oldValue	Previous value for the property
data.value	Actual value for the property
kind	Event type
parentEvent	Event that triggered this event
target	Property name

Property of type list

For a property of type "list", you define the attributes in the "widget.js" file.

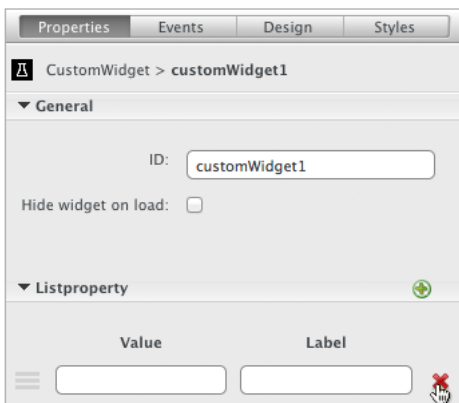
```
CustomWidget.addProperty('listproperty', {
  type: "list",
  attributes: [{
    name: 'value'
  }, {
    name: 'label'
  }]
});
```

To create an element, you can:

- Define it in the custom widget's **Properties** tab (in the GUI Designer),
- Pass an object containing the values for each attribute to the `{propertyName}.insert()` function, or
- Pass the element number (where to insert or which one to modify) plus an object containing the values for each attribute to the `{propertyName}()` function.

Properties

In the **Properties** tab, you define an element in the list property's section by specifying a value for each attribute:



To add an element, click on the  icon at the top of the list property's section.

To delete an element, click on the  icon.

Events

In the Events tab, the property of type "list" activates multiple events besides the On Change event, which appears by default if your widget has at least one property.



Here are the events proposed by the list property:

- **On Change:** When the list property changes.
- **On Insert:** When a new element is added to the list property.
- **On Remove:** When an element is removed from the list property.
- **On Modify:** When one or more values of an existing element are modified.
- **On Move:** When an element is moved.

For more information about the events that are fired, refer to .

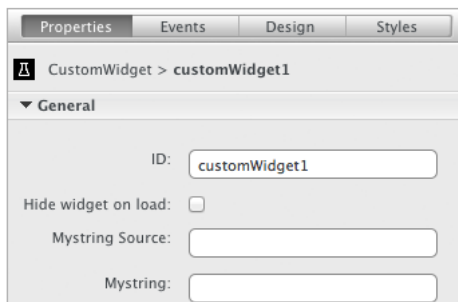
Property of type string

For a property of type "string", which is the type by default, you define the values in the "widget.js" file:

```
CustomWidget.addProperty('mystring', {  
  type: 'string'  
});
```

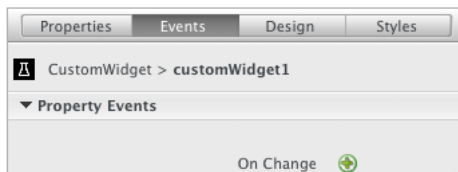
Properties tab

In the **Properties** tab, this property appears as two fields (which can contain either a static value or a datasource) in the GUI Designer:



Events tab

For this property, you can intercept the **On Change** event in the GUI Designer's **Events** tab:



This event is fired when the value for the property has been modified.

event object for onChange event

In the event object are the following properties:

Name	Description
data.oldValue	Previous value for the property
data.value	Actual value for the property
kind	Event type
parentEvent	Event that triggered this event
target	Property name

Property of type template

For a property of type template, you define HTML templates in which you define attributes within {{ and }} characters. When the widget is published, the template

is rendered with the data from the datasource.

For this type of property, you can either manage the datasource's collection or just one entity.

- To handle only an entity, you just define the templates in the template property.
- To handle the entire collection, you must specify the *datasourceProperty* property as well as create a property of type *datasource* for your widget that works in conjunction with it. For more information about *datasourceProperty*, refer to **datasourceProperty property**.

Here is an example of how to create a template property that will handle the selection.

```
collection: widget.property({
  type: 'datasource'
}),
template: widget.property({
  type: 'template',
  templates: [{
    name: 'Template 1',
    template: '<h1>{{name}}</h1>'
  }, {
    name: 'Template 2',
    template: '<h1>{{name}}</h1><p><b>{{revenues}}</b></p>'
  }, {
    name: 'Template 3',
    template: '<h1>{{name}}</h1><p><strong>{{revenues}}</strong><br />From: <a href="mailto:{{email}}">{{email}}</a>'
  }],
  datasourceProperty: 'collection'
})
```

templates object

In this array of objects, you define two properties in the object for each template:

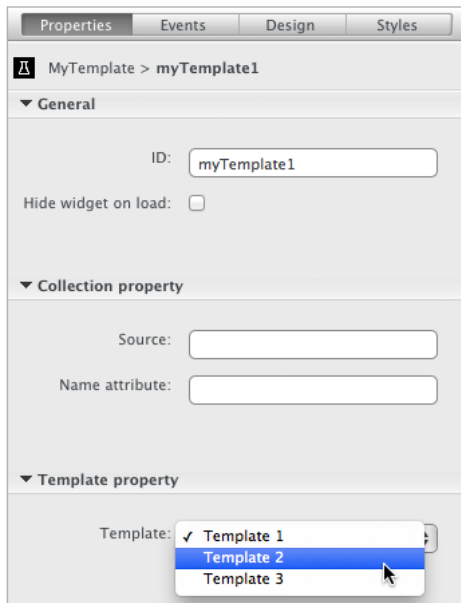
Property	Description
name	Display name for your template
template	String that defines the template with each attribute defined within {{ and }} characters. No spaces are allowed in the attribute name.

If you have defined a *datasource* property for your widget and specified it in the template property's *datasourceProperty* property, each attribute will be displayed in the section for the *datasourceProperty* property.

Properties

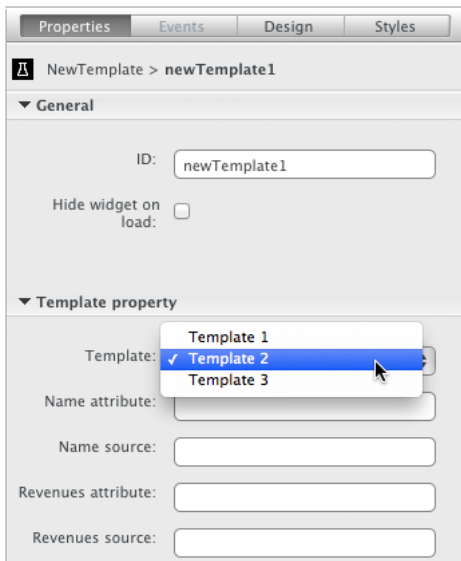
In the **Properties** tab, the templates you defined in the appear as shown below.

For each attribute defined in your template, the *datasourceProperty* section displays a field for each attribute. For example, the "Name attribute" property comes from the *name* attribute defined in the *template* object.



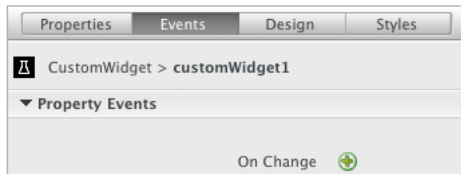
If you did not define a *datasource* for your template property, two fields appear for each attribute that you defined in your template. One field for the *datasource* and one field for the static value.

In our example below, we have two fields for each of the two attributes: *name* and *revenues*:



Events tab

For this property, you can intercept the **On Change** event in the GUI Designer's Events tab:



This event is fired when the value for the property has been modified.

event object for onChange event

In the event object are the following properties:

Name	Description
data.oldValue	Previous value for the property
data.value	Actual value for the property
kind	Event type
parentEvent	Event that triggered this event
target	Property name

Defining events

You can define two types of event for your custom widget that can be intercepted by the user of your custom widget:

- DOM event
- Custom event

For both types of events, you must use first declare it for your custom widget by using the `mapDomEvents()` function in your custom widget's "widget.js" file. To customize how the event will be displayed in the **Events** tab for your custom widget, use the `addEvent()` or `addEvents()` functions in your custom widget's "designer.js" file.

You can change the order of the events in the **Events** tab by using the `orderEvents()` function. Use the `removeEvent()` function to remove an event from the **Events** tab.

*Note: By adding a property to your custom widget, the **On Change** event is added automatically in the **Events** tab (in the GUI Designer). See the paragraph below to find out more about the **onChange** event.*

If, however, you declare an event using jQuery, it will not be in the GUI Designer's **Events** tab. See the example below.

Refer to [Widget events](#) for more information about interacting with the GUI Designer's **Events** tab.

DOM events

For more information about DOM events, refer to .

For more information about DOM event properties and methods, refer to .

onChange event object

In the **On Change** event, an *event* object is returned. Here are a few of the important properties:

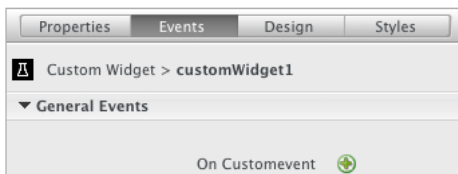
Property	Description
<code>data.oldValue</code>	Widget's previous value
<code>data.value</code>	Widget's current value
<code>kind</code>	Event type. In this case, "change".
<code>parentEvent</code>	Event that is the parent of this event
<code>target</code>	Property that was changed

Example

The following code placed in the "widget.js" file binds the "customevent" to the standard DOM click event so that "customevent" will be fired when you click on the custom widget:

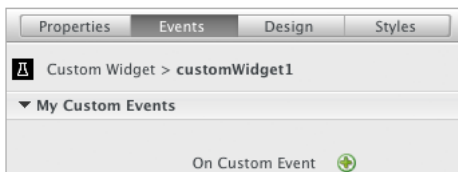
```
CustomWidget.mapDomEvents( { 'click': 'customevent' } );
```

Your "customevent" appears as shown below in the GUI Designer:



If you want to customize the display of the event, you can write the following in your "designer.js" file:

```
CustomWidget.addEvent({
  'name': 'customevent',
  'description': 'On Custom Event',
  'category': 'My Custom Events'
});
```



Example

In the following example, we create a custom event attached to the standard DOM "click" event. In the widget.js file, we write the following:

```
CustomWidget.prototype.init = function() {
  this.fire('myEvent');
};
CustomWidget.mapDomEvents( { 'click': 'myEvent' } );
```

You can customize how the event appears in the GUI Designer even though it's not necessary, by writing:

```
CustomWidget.addEvent({
  'name': 'myEvent',
  'description': 'On My Event',
  'category': 'My Custom Events'
```

```
});
```

When you click on your custom widget, the "myEvent" event will be launched.

Example

You can also declare a DOM event using jQuery that will not have a way to intercept it in the GUI Designer:

```
CustomWidget.prototype.init = function() {  
    $(this.node).on('click', function(event) {  
        // do something  
    }).bind(this);  
};
```

Using Wakanda's generic CSS classes

When you create a custom widget, you can use a few of Wakanda's generic CSS classes:

- waf-ui-box
- waf-ui-button
- waf-ui-header
- waf-ui-footer
- waf-ui-table

These classes are defined per theme and therefore the widget appears differently when you change the page's theme. For example, on the left are Wakanda's widgets and on the right are custom widgets with Wakanda's generic CSS classes added to each one.

Default theme

Name	Birthday
Julie	January 1, 1967
Matthew	March 3, 1977
Christopher	June 6, 1986

+ - 3 item(s)

Button

waf-ui-box

waf-ui-button

waf-ui-header

waf-ui-footer

Lilac theme

Name	Birthday
Julie	January 1, 1967
Matthew	March 3, 1977
Christopher	June 6, 1986

+ - 3 item(s)

Button

waf-ui-box

waf-ui-button

waf-ui-header

waf-ui-footer

waf-ui-box

The **waf-ui-box** class inherits the classes defined for a Wakanda's **Container** widget.

waf-ui-button

The **waf-ui-button** class inherits the classes defined for a Wakanda's **Button** widget.

waf-ui-header

The **waf-ui-header** class inherits the classes used for the header portion of Wakanda's **Grid** widget.

waf-ui-footer

The **waf-ui-footer** class inherits the classes used for the footer portion of Wakanda's **Grid** widget.

waf-ui-table

The **waf-ui-table** class is for all widgets that use the `<table>` tag.

designer.js

In the "designer.js" file, you define the way your custom widget appears in the Wakanda Studio by defining the style settings to display and how properties, previously defined in the "widget.js" file, appear.

You can customize the following tabs for your custom widget:

- Properties,
- Events,
- Design, and
- Styles.

Important Note: You must close and reopen any open Pages in the GUI Designer after modifying the "designer.js" file. You might also need to recreate the instance of your custom widget on the Page because, depending on the modifications you make, the widget might not be updated accordingly.

Defining the widget in the designer.js file

To define the widget's properties, styles, and overall design in the GUI Designer, you can do so in the widget's "designer.js" file with the help of the functions in the **Studio** class.

By default, the following lines of code are included in the "designer.js" file:

```
(function(CustomWidget) {
    //Customize properties (previously defined in the widget.js file)
    //Add events to the Events tab (previously defined in the widget.js file)
    //Define settings for the Styles and Design tabs
});
```

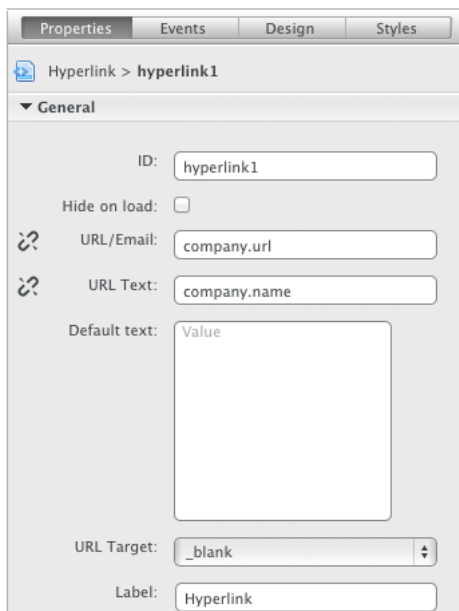
Widget properties

Every widget has two properties defined by default:

- ID
- Hide on load

To add properties to your custom widget, you must do so in the "widgets.js" file. Afterwards, you can customize them using the **customizeProperty()** function in the "designer.js" file.

Below is an example of our custom widget's **Properties** tab:



Customizing properties

After you add a property in the "widget.js" file by using **addProperty()**, you can then customize it in the "designer.js" file by using the **customizeProperty()** function. For more information, refer to **Defining a widget's properties**.

```
/*Customize existing properties*/
Hyperlink.customizeProperty('url', {
    title: 'URL/Email',
    description: 'A datasource containing a URL or email.',
    display: true,
    sourceDisplay: true
});
Hyperlink.customizeProperty('urlText', {
    title: 'URL Text',
    description: 'A datasource containing the text to display for the hyperlink.',
    display: true,
    sourceDisplay: true
});
Hyperlink.customizeProperty('defaultText', {
```

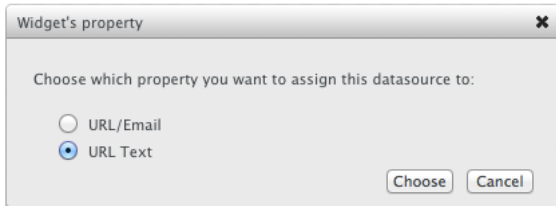
```

    title: 'Default text',
    multiline: 'true',
    description: 'The default text to display if the URL Text is blank.',
    display: true,
    sourceDisplay: false
  });
  Hyperlink.customizeProperty('target', {
    title: 'URL Target',
    description: 'Target for the URL.'
  });
});

```

Multiple bindable properties

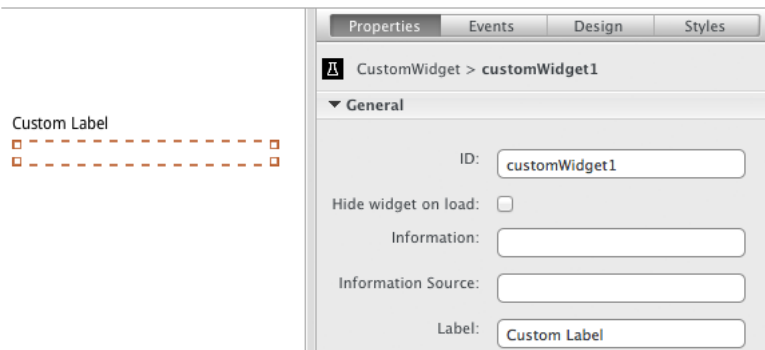
When you have more than one bindable property defined for your custom widget, the following dialog appears so that you can select the datasource property to which the datasource will be bound when you drop a datasource on top of the custom widget:



Label property

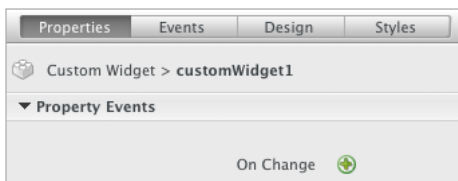
If you want to define a label property for your widget, which is managed by Wakanda, you can use the `addLabel()` function. This property adds a Label widget to your widget if a value is defined for it.

In the GUI Designer, the **Label** property appears on the **Properties** tab. When a value is entered in the Label property, a Label widget is created and attached to the custom widget.



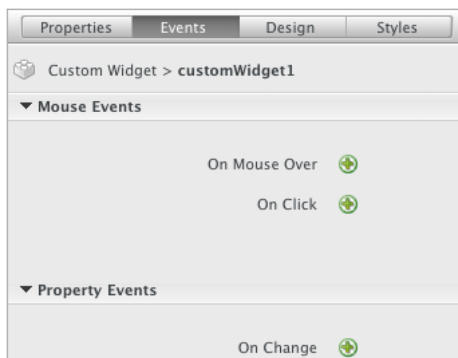
Widget events

By default, your custom widget has no events until you create at least one property. In this case, the "On Change" event is added:



To add an event, the `mapDomEvents()` function in the "widget.js" file. Afterwards, you can add the same event to the **Events** tab by using the `addEvent()` or `addEvents()` functions.

Below is an example of our widget's **Events** tab:



Here is the code associated to this example:

```

CustomWidget.addEvents([ {

```

```

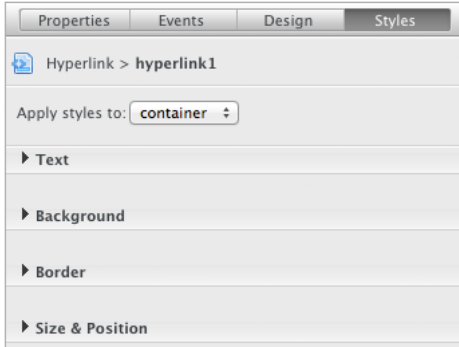
    'name': 'Click',
    'description': 'On Click',
    'category': 'Mouse Events'
  }, {
    'name': 'Mouseover',
    'description': 'On Mouse Over',
    'category': 'Mouse Events'
  }
  ]]);

```

In the **widget.js** file, you declare the events. For more information, refer to .

Widget styles

By default, no styles are added to your widget. To define the sections available in the "Design" and "Styles" tabs, use the **setPanelStyle()** function. The styles appear as shown below (in our case, a value was entered in the Label property):



Here is the code we used to define the styles for our custom widget:

```

CustomWidget.setPanelStyle({
  'fClass': true, //This property is for the design panel
  'text': true,
  'background': true,
  'border': true,
  'sizePosition': true,
  'label': true,
  'disabled': ['border-radius']
});

```

Widget's default size

The **setWidth()** and **setHeight()** functions allow you to define the widget's default width and height when it is added to a Page. By default, the size is 200px by 200px.

For example, you can write the following to set the width to 200 pixels and the height to 20 pixels:

```

CustomWidget.setWidth('200');
CustomWidget.setHeight('20');

```

Widget's display name

To define your widget's display name, you modify the "studioName" property in the **package.json** file. This name can be different from the widget's name that you defined initially. For example, if your widget's name (its class) is "CustomWidget", you can rename the widget to be "Custom Widget". This name will appear in the **Widgets list**, **Overview**, and **Properties** tab.

Widget's init

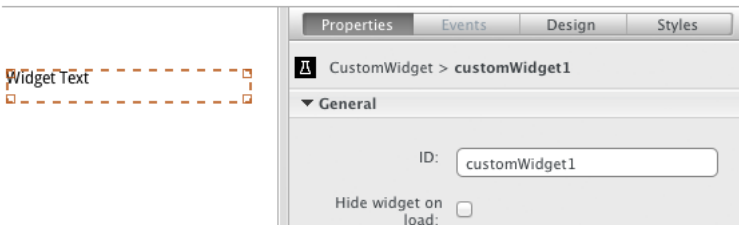
In this file, you can override the custom widget's initialization by writing code in this function:

```

CustomWidget.prototype.init = function() {
  this.node.innerHTML = "Widget Text";          /* Include text inside the widget */
}

```

In our example, the "Widget Text" will display inside the custom widget:



widget.js

In the "widget.js" file, you define how your custom widget looks and behaves at runtime.

In this file, you can:

- Define properties
- Modify the widget's HTML tag
- Create events
- Create public and private functions

For more information about creating events for your custom widget, refer to [Defining events](#).

widget.js template

By default, the following lines of code are included in this file. In our example, "CustomWidget" is the widget's name:

```
WAF.define('CustomWidget', ['waf-core/widget'], function(widget) {
  var CustomWidget = widget.create('CustomWidget', 'parentWidget', {

    /* Modify tag */
    tagName: 'li',

    init: function() {
      /* Define custom events */
    },
    /* Create functions for the widget */
    publicWidgetFunction: function() {},
    _privateWidgetFunction: function() {},

    /* Create properties */
    propertyOne: widget.property(),
    propertyTwo: widget.property({
      defaultValue: 'first'
    })
  });
});
```

You can also create the widget as shown below:

```
WAF.define('CustomWidget', function() {
  var widget = WAF.require('waf-core/widget');
  var CustomWidget = widget.create('CustomWidget');

  CustomWidget.prototype.init = function() {};

  /* Create functions for the widget */
  CustomWidget.prototype.publicWidgetFunction = function() {};
  CustomWidget.prototype._privateWidgetFunction = function() {};

  /* Modify tag */
  CustomWidget.tagName = 'li';

  /* Create properties */
  CustomWidget.addProperty('propertyOne');
  CustomWidget.addProperty('propertyTwo', {
    defaultValue: '#first'
  });
});
```

WAF.define()

The `WAF.define()` function accepts three parameters:

Parameter	Type	Description
widgetName	String	Widget's name
requires	Array	Behaviors to require for the custom widget, e.g., ['waf-core/widget', 'waf-behavior/layout/container']
widgetFunction	Function	Function defining the custom widget, which includes the widget.create() function

widget.create()

The `widget.create()` function accepts three parameters:

Parameter	Type	Description
widgetName	String	Widget's name
widgetParentName	String	Widget's parent name (optional)
definition	Object	Define the widget's tag, init function, public and private functions, and properties

For more information on creating a function for your custom widget, refer to [Creating a function for your custom widget](#).

widget.property()

The `widget.property()` function allows you to define a property for the widget.

Parameter	Type	Description
widgetName	String	Widget name
options	Object	Options for the property (for more information, see options property)

Modifying the widget's HTML tag

You can modify the custom widget's HTML tag, which is "div" by default, by using the **tagName** property.

For example, you can write the following to change the "div" tag to an "input" tag:

```
WAF.define('CustomWidget', ['waf-core/widget'], function(widget) {
  var CustomWidget = widget.create('CustomWidget', {
    init: function() { },
    test: widget.property({
      onChange: function(newValue) {
        this.node.innerHTML = this.test();
      }
    })
  });
  CustomWidget.tagName = 'input';
  return CustomWidget;
});
```

Or

```
WAF.define('CustomWidget', ['waf-core/widget'], function(widget) {
  var CustomWidget = widget.create('CustomWidget', {
    init: function() { },
    tagName = 'input',
    test: widget.property({
      onChange: function(newValue) {
        this.node.innerHTML = this.test();
      }
    })
  });
  return CustomWidget;
});
```

Creating a function for your custom widget

In order to create a function for your custom widget, you can do so by declaring it in the **widget.create()**'s *options* object:

```
publicWidgetFunction: function() {}
```

You can also declare a function outside of the object:

```
CustomWidget.prototype.myFunction = function()
{
  // do what you'd like here
}
```

This function can be accessed at runtime, by writing:

```
$$('customWidget1').myFunction(); //call the function on the instance of your widget
```

You can also create instance or class methods for your widget by using the functions in the **Methods Helper** category.

Note: Use an underscore as a prefix to your function's name to specify that it is private.

widget.css

In the "widget.css" file, you have the following code by default:

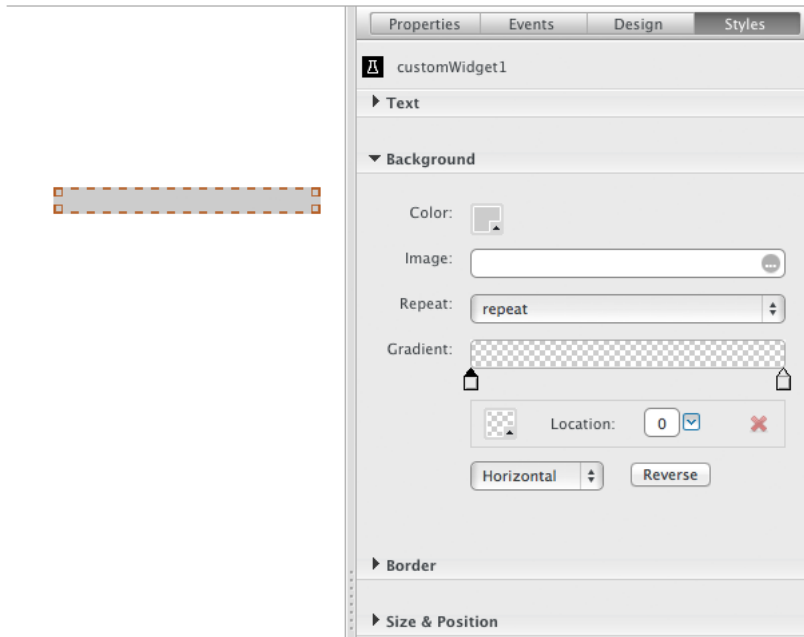
```
.waf-widget.waf-customwidget {  
  //add any CSS information here  
}
```

The first class, "waf-widget", is used for all of Wakanda's widgets. The second class is the one that is created for your widget. By default, it is written in lowercase. This second class (which in our case is named "waf-customwidget") is assigned to your widget when it is added to a Page.

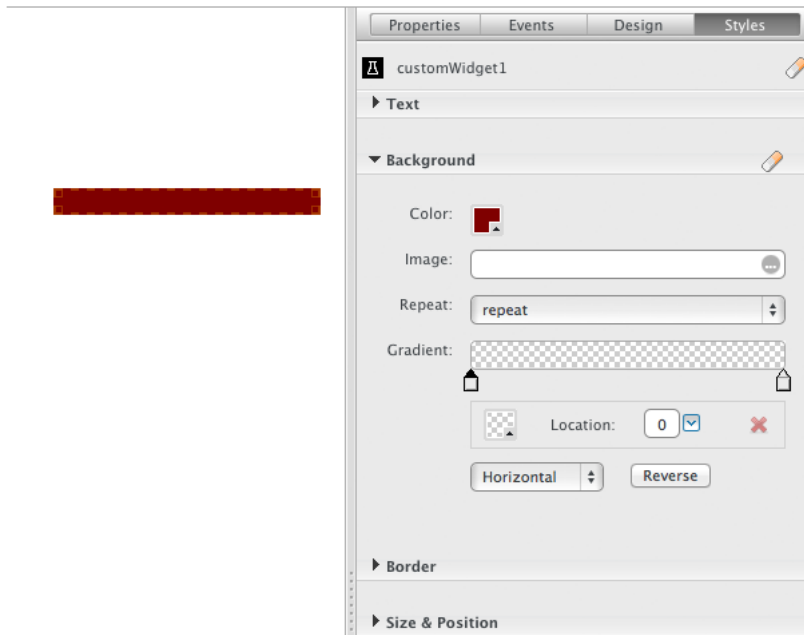
Information displayed in the Styles tab

The information you define in this CSS file will be the default values for your widget.

If you have defined that the background color be grey (#ccc), when you drag the widget to the Page, it will have a grey background. In the Styles tab, that setting will also be displayed.



If your user modifies the color in the Styles tab, it will be taken into account. The eraser icon appears next to the setting to show that it can be reverted to the original setting, which you defined in the "widget.css" file.



package.json

This file describes general information about your custom widget as well as the files necessary to build the custom widget (in the *loadDependencies* array). For more information about this file, refer to .

package.json file

The JSON object for a custom widget by default is as follows:

```
{
  "name": "CustomWidget",
  "author": "Widget Developer",
  "studioName": "Custom Widget",
  "category": "My Category",
  "iconPath": "/icons/customwidget.png",
  "contributors": [
    "Developer 1",
    "Developer 2"
  ],
  "externalWidgets": ["https://github.com/developer/DependentWidget.git"],
  "version": "1.0.0",
  "copyright": "(c) 2014 Widget Developer",
  "repository": {
    "type": "git",
    "url": "https://github.com/developer/CustomWidget.git"
  },
  "keywords": ["wakanda", "widget"],
  "engines": {"wakanda": ">= 8"},
  "license": "MIT",
  "studioPlatform": ["smartphone", "desktop"],
  "loadDependencies": [
    {"id": "Widget_V2"},
    {"id": "CustomWidget/widget.js", "version": "1.0.0", "path": "WIDGETS_CUSTOM"},
    {"id": "CustomWidget/css/widget.css", "version": "1.0.0", "path": "WIDGETS_CUSTOM"},
    {"id": "CustomWidget/designer.js", "studioOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM"},
    {"id": "CustomWidget/runtime.js", "runtimeOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM"}
  ]
}
```

Here are the main properties:

Property	Description
name	Custom widget's actual name
author	Author of the custom widget
studioName	Display name of the custom widget in the GUI Designer. By default, it's the widget's actual name as written in the "name" property above.
category	Category for the custom widget in the GUI Designer. By default, it is "Custom Widget". If you set it to "Hidden", your custom widget will not appear in the widget list in the GUI Designer.
iconPath	Path to the custom widget's icon to display in the GUI Designer. This path, which is relative, begins with a "/" because the icon must be in the custom widget's folder.
externalWidgets	An array of the repositories for the widgets that must also be installed for the proper functioning of your custom widget.
studioPlatform	Platforms (views in the GUI Designer) for which the custom widget is available ("desktop", "tablet", or "smartphone"). For more information, refer to Defining your widget's platform .
loadDependencies	Array describing the widget's dependent files (see loadDependencies array).

loadDependencies array

Here are the properties of the objects in the *loadDependencies* array:

Property	Description
id	File name with its local path " <i>widgetName/filename.js</i> "
version	Version number (optional)
runtimeOnly	True/False = access this file only at runtime
studioOnly	True/False = access this file in Wakanda Studio's GUI Designer
path	"WIDGETS_CUSTOM", which is a virtual path to define where the custom widgets are located

We use the "designer.js" file to define the widget's properties, styles, and events as well as how it is displayed in the GUI Designer. You can use any JavaScript file; however, you have to make sure that you define *studioOnly* property to true in the *loadDependencies* array. This file will not be accessed during runtime.

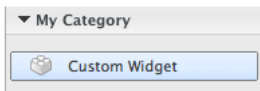
To define a file be accessed only at runtime, you have to set the *runtimeOnly* property to true in the *loadDependencies* array.

Customizing the widget

In this package.json file, you can define the following attributes:

- Display name,
- Category, and
- Icon

Here are the results after we modified the three properties (studioName, category, and iconPath) as shown in the JSON object above:



Defining your widget's platform

In the package.json file, you can define the platform(s) for your custom widget, which can be desktop, smartphone, and/or tablet. If this property is missing, the custom widget is available for all platforms in the GUI Designer.

To do so, use the `studioPlatform` property and define in an array the platform(s) as shown below:

```
"studioPlatform": ["smartphone", "desktop", "tablet"]
```

The following platforms are possible:

Platform	Description
smartphone	For smartphone pages
desktop	For desktop pages
tablet	For tablet pages

If you want your widget to only be used on the desktop, you can write the following:

```
"studioPlatform": ["desktop"]
```

Note: The value defined in the `studioPlatform` property is the same as the `suffix` property in the `targets.json` file. For more information, refer to [Routing Pages](#).

External libraries and other dependencies

In the `loadDependencies` array, you can:

- add other libraries to your custom widget,
- include another widget to your custom widget, and
- share a library between widgets

During the installation process, however, you must define which widgets are necessary for the proper functioning of your custom widget by specifying its depository in the `externalWidgets` property.

Adding other libraries to your custom widget

If you want to add other libraries to your widget, you can include them in this file.

For example, if you have a "WidgetLibrary" folder containing two files ("code.js" and "styles.css") that your widget needs, you can write the following:

```
"loadDependencies": [  
  {"id": "Widget_V2"},  
  {"id": "CustomWidget/widget.js", "path": "WIDGETS_CUSTOM"},  
  {"id": "CustomWidget/WidgetLibrary/code.js", "path": "WIDGETS_CUSTOM"}, //custom library's code.js file  
  {"id": "CustomWidget/WidgetLibrary/styles.css", "path": "WIDGETS_CUSTOM"}, //custom library's css file  
  {"id": "CustomWidget/designer.js", "studioOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM"}  
]
```

Adding another custom widget

If you want to add another custom widget that has already been installed in the "Widgets" folder, you can do so in the package.json file.

For example, if you have a "TestWidget" widget that you want to add to your "Custom Widget", you can write the following:

```
"loadDependencies": [  
  {"id": "Widget_V2"},  
  {"id": "TestWidget/package.json", "path": "WIDGETS_CUSTOM"}, // Add the custom widget's package.json file  
  {"id": "CustomWidget/widget.js", "path": "WIDGETS_CUSTOM"},  
  {"id": "CustomWidget/designer.js", "studioOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM"}  
]
```

Sharing a library between widgets

If you want to share a library between multiple widgets, you can do the following:

1. Create a folder in your Custom Widgets folder. In our example, we call it "libs".
2. Add your external script JS files to this folder. We have included only one for our example, "externalScript.js".
3. In the library folder, create a package.json folder that defines the files in the folder that you want to use:

```
{  
  "name": "libs",  
  "loadDependencies": [  
    {"id": "libs/externalScript.js", "runtimeOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM"}  
  ]  
}
```

In your custom widget's package.json file, you indicate this package as shown below in the last object in the "loadDependencies" array:

```
"loadDependencies": [  
  {"id": "Widget_V2"},  
  {"id": "testWidget/widget.js", "version": "1.0.0", "path": "WIDGETS_CUSTOM"},  
  {"id": "testWidget/css/widget.css", "version": "1.0.0", "path": "WIDGETS_CUSTOM"},  
  {"id": "libs", "studioOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM"}  
]
```

```
{ "id": "testWidget/designer.js", "studioOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM" },  
{ "id": "libs/package.json", "runtimeOnly": true, "version": "1.0.0", "path": "WIDGETS_CUSTOM" }
```

```
]
```