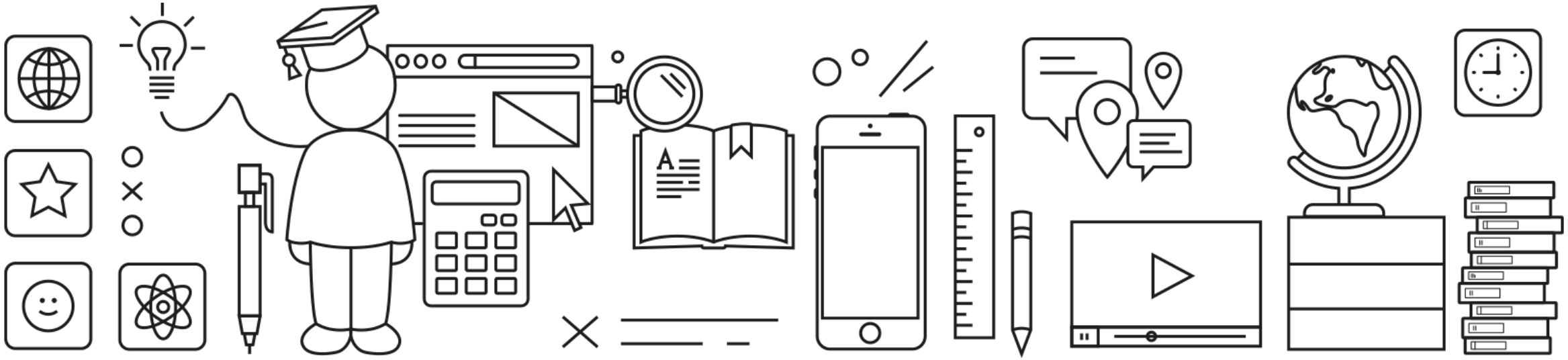
SAP Customer Experience

SAP Commerce Cloud Backoffice Framework Developer Training

Actions and Editors

THE BEST RUN SAP



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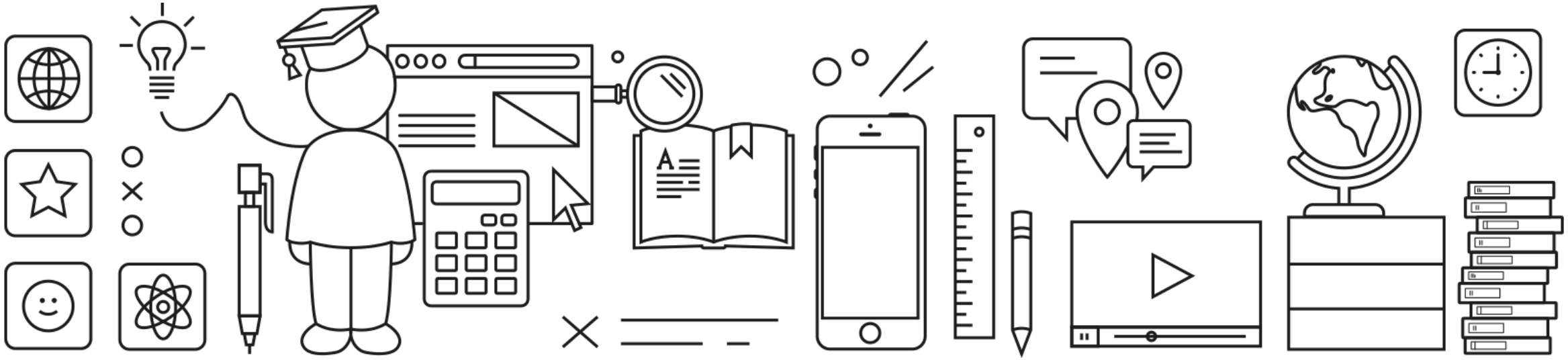
Editors and Actions

- **Actions and Editors are components that can be used INSIDE widgets**

- **Editors** manage the input, display, and handling of a single value of a given type
  - **Key Concept:** *Display and Handle Data* within a Widget's view
  - E.g. **Boolean data types** can use an editor that displays on/off radio buttons to the user
  - E.g. **Date data types** can have an input with format and validation or a custom date picker
- **Actions** are responsible for the invocation of custom code within Backoffice
  - **Key Concept:** *Do Something in Java*, triggered by clicking on an icon
  - E.g. **creating** a new type-based Item (e.g. a Product, Order, or Customer)
  - E.g. **changing** the state of a Product's availability from 'available' to 'unavailable'
  - Often invoked using a button control or menu option

Editors and Actions

- The Backoffice Framework provides standard Editors and Actions OOTB
- Process of *defining* custom Editors and Actions is similar to defining a Widget (...but Editors and Actions are NOT specialized kinds of Widgets)
- Actions and Editors can also have context-based UI configurations
- Actions and Editors are not *socket-aware,* but they can be made socket-capable using STUBS (This will be discussed later)



Available Editors Gallery

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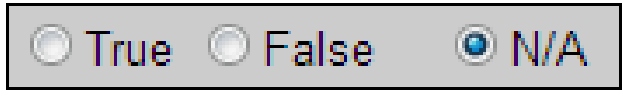
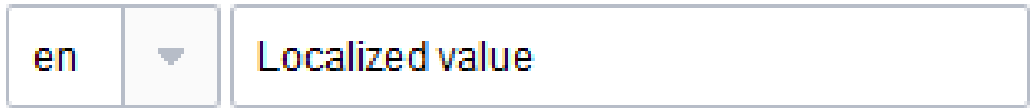
Available Editors Gallery

- **Default Boolean:**



- **Check Box Boolean:**

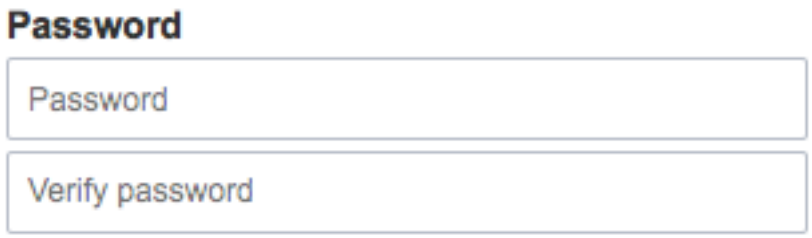
- **Localized Simple Editor:**



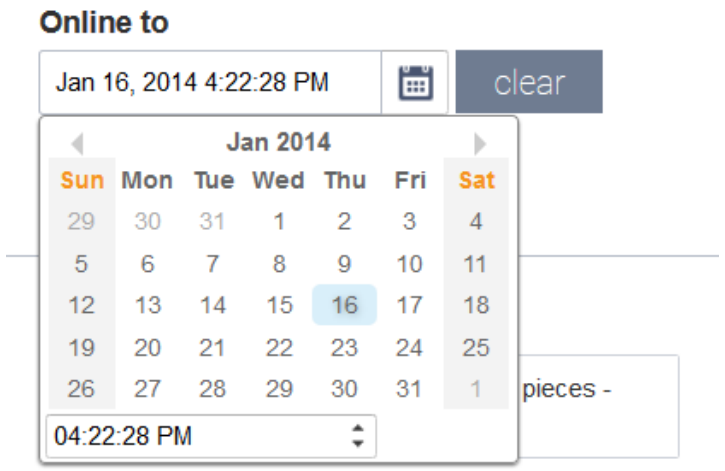
- **Default Big Decimal Editor:**

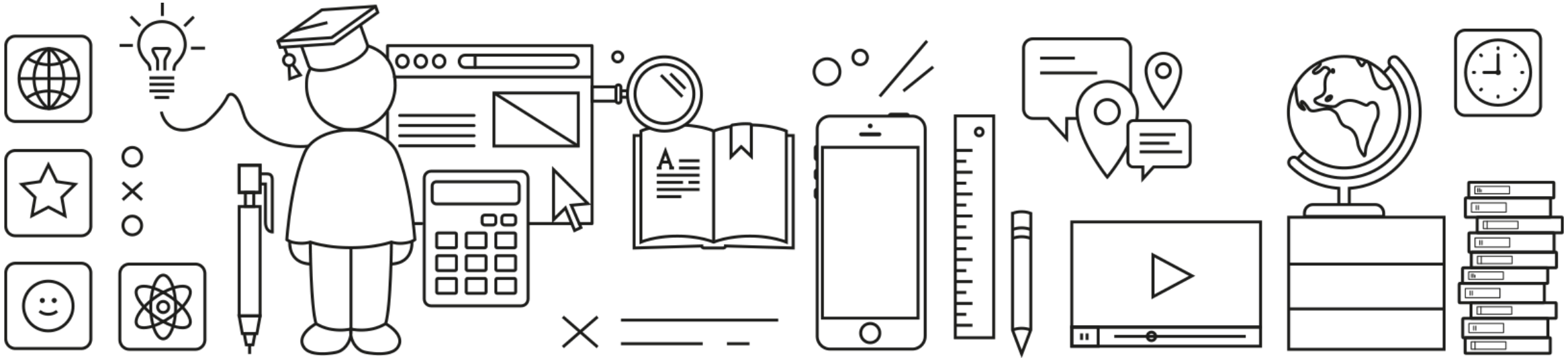
Available Editors Gallery

- **Default Password Editor:**



- **Default Date Editor:**





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Using a Default (Type-Mapped) Editor In a Widget

- Editor *instances* can be added to a widget via `myWidget.zul`
  - Assign an ID to the view element
  - *Imply* which editor *definition* to use by specifying the data type for the field
  - Each data type is mapped to its default editor in `standard-editors-spring.xml`
  - Backoffice uses the default editor *definition* mapped to this type

myWidget.zul

```
<widget …>
  …
  <label value="First Name:" />
  <editor id="firstNameFieldEditor" type="java.lang.String" />
  …
  <label value="Last Name:" />
  <editor id="lastNameFieldEditor" type="java.lang.String" />
  …
</widget>
```

Using a Specific Editor In a Widget

An *editor definition id* may be explicitly specified, instead of implicitly via type:

- Assign an ID to the instance
- Specify the editor definition to use for the instance
  - Use the defaultEditor attribute
  - Specify the *editor definition id*
  - In this case, Backoffice's WYSIWYG editor is used for this field instead of the default

myWidget.zul

```
<widget ...>
  ...
  <label value="Username:" />
  <editor id="userNameFieldEditor"
          defaultEditor="com.hybris.cockpitng.editor.wysiwyg" />
  ...
</widget>
```

Binding the Editor to a Widget Model Property (via ZUL)

- Bind the editor to a property in the widget model using the *property* attribute
- Two-way binding:
  - The property value will be displayed in the editor upon rendering
  - When a user changes the value in the editor, the model property is automatically updated

MyWidgetController.java

```
WidgetModel model = getModel();
model.put("product", product);
```

myWidget.zul

```
<label value="Product code:" />
<editor type="java.lang.String" property="product.code" />

<label value="Category:" />
<editor type="java.lang.String" property="product.category.name" />
```

Specifying Attribute Editors via Configuration (1)

- Often, in practice, widget types require that you *indirectly configure* ***what*** fields to display and ***how*** to display them (i.e., **editors**, sections, tabs, etc.)
  - Configured via **<context..>** XML entries in ***-config.xml** (as opposed to explicitly specifying the composition of ZUL components)
  - The XML syntax for each **<context..>** element body depends on the JAXB configuration type the widget controller expects

- Based on this configuration, the widget controller dynamically *generates* ZUL display components (and binds editors to the display components)

Specifying Attribute Editors via Configuration (2)

- For example:

  Advanced Search widget instances expect a JAXB construct containing element

  <field name="*attrib*" editor="*editor.definition.id*" >

mycustombackoffice-backoffice-config.xml

```
<context type="Shoe" component="advanced-search" >
  <advanced-search:advanced-search
      xmlns:advanced-search ="http://www.hybris.com/cockpitng/config/advancedsearch" >
    <advanced-search:field-list>
      ...
      <advanced-search:field  name="waterproof" selected="false"
                    editor="com.hybris.cockpitng.editor.boolean.checkbox" />
    </advanced-search:field-list>
  </advanced-search:advanced-search>
</context>
```

Specifying Attribute Editors via Configuration (3)

Whereas:

Editor Area widget instances expect a JAXB construct containing element
<attribute qualifier="*attrib*" editor="*editor.definition.id*" >

mycustombackoffice-backoffice-config.xml

```
<context merge-by="type" parent="Product" type="Shoe" component="editor-area" >
  <editorArea:editorArea
        xmlns:editorArea ="http://www.hybris.com/cockpitng/component/editorArea" >
    ...
    <editorArea:attribute  qualifier="size"
                editor="my.shoestore.backoffice.editor.customSizeEditor" />
    <editorArea:attribute qualifier="color" />
  </editorArea:editorArea>
</context>
```

Recall: Details of each widget type's configuration data structure at https://help.hybris.com , search term "available widgets"

Specifying an Initial Value via ZUL

- Specify an initial value by adding a *value* attribute

myWidget.zul

```
<widget ...>
  ...
  <editor id="firstNameFieldEditor" type="java.lang.String"
     property="customer.firstName" value="Some text" />
  ...
</widget>
```

Specifying Value-Change Handler via ZUL

- Handling a changed value (returned by an Editor) *without* binding to a property:
- (Handle the **onValueChanged** event)
  - Option 1 - define binding from the widget's view

myWidget.zul

```
<widget ...>
  ...
  <editor id="userNameFieldEditor" type="java.lang.String"
      onValueChanged="widgetController.doSomeThing()" />
  ...
</widget>
```

special variable to reference the actual bound Widget Controller instance

Specifying Value-Change Handler via Java Annotation

- Handling a changed value (returned by an Editor) *without* binding to a property
  - Option 2 - Define **onValueChanged** event handling in the widget's controller with *@ViewEvent*

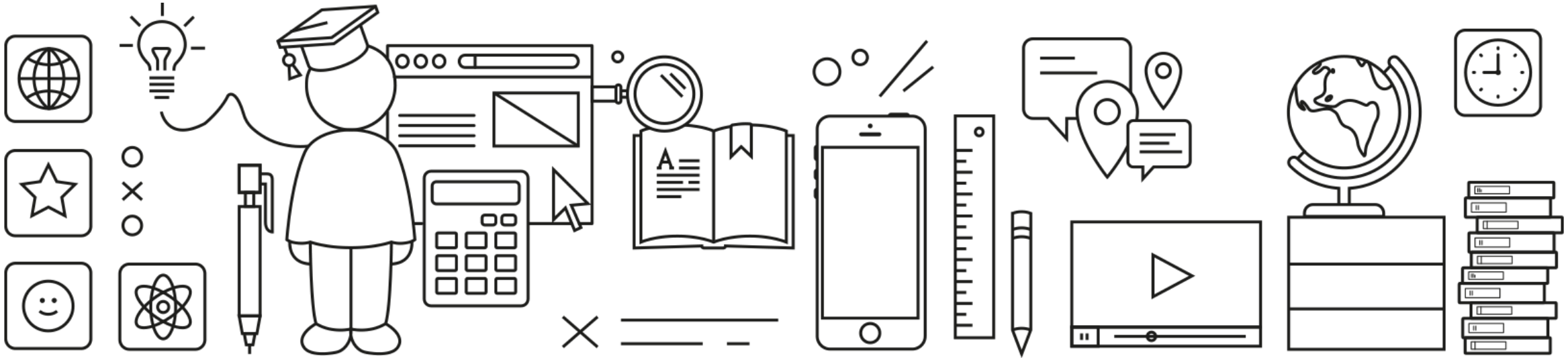
myWidget.zul

```
<widget ...>
  ...
  <editor id="userNameTextField" type="java.lang.String" />
  ...
</widget>
```

MyWidgetController.java

```
public class MyWidgetController extends DefaultWidgetController
{
  private Editor userNameTextFieldEditor;

  @ViewEvent(componentID="userNameTextField", eventName="onValueChanged" )
  public void doSomething()
  {
    final String tmp = (String) userNameTextFieldEditor.getValue();
    // do something
  }...
}
```



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Creating an Editor 1 – Definition File

- Definition file:

bookstorebackoffice/backoffice/resources/widgets/**editors/mySimpleTextEditor**/definition.xml

```
<editor-definition id="com.corp.cockpitng.editor.mysimpletexteditor" >
    <name>My Simple Text Editor</name>
    <description>Simple text editor</description>
    <!--The type of the value this editor is capable of handling. Used for type-mapping -->
    <type>java.lang.String</type>
    <editorClassName>org.myextension.editor.simpletext.MySimpleTextEditor</editorClassName>
</editor-definition>
```

Creating an Editor 2 – Rendering via Custom Class

- Editor class must implement CockpitEditorRenderer:

MySimpleTextEditor.java

```
public class MySimpleTextEditor implements CockpitEditorRenderer<String>
{
  public void render(Component parent, EditorDefinition editorDefinition,
                                    EditorContext<String> context, EditorListener<String> listener)
  {
    Textbox editorView = new Textbox();
    editorView.setValue(context.getInitialValue());
    . . .
    editorView.addEventListener(Events.ON_CHANGE,
      new EventListener<Event>() {
        public void onEvent(final Event e) throws Exception
        {
                . . .
              }
      }
    );
    editorView.setParent(parent);
    . . .
```

Determines return type and parameter type for many controller methods

Read Editor parameters (from ZUL) via EditorContext:

`cxt.getParameter(name)`

Creating an Editor 3 – Rendering via .zul File

- An editor can be rendered using a `.zul` file instead of a via custom Java class:

bookstorebackoffice/backoffice/resources/widgets/**editors/mySimpleBoolEditor**/definition.xml

```
<editor-definition id="com.corp.cockpitng.editor.mysimpleboolleditor" >
    <name>My Simple Boolean Editor</name>
    <description>Simple boolean editor</description>
    <type>java.lang.Boolean</type>
    <view src="boolEditorView.zul" />
</editor-definition>
```

boolEditorView.zul

```
<hlayout id="boolEditor">
    <radiogroup id="rgr" />
    <radio label="True" radiogroup="rgr" forward='onCheck=boolEditor.onEditorValueChanged(${true})'
     checked="${arg.initialValue == true}" />
    <radio label="False" radiogroup="rgr" forward='onCheck=boolEditor.onEditorValueChanged(${false})'
     checked="${arg.initialValue == false}" />
    <radio label="n/a" radiogroup="rgr" forward='onCheck=boolEditor.onEditorValueChanged(${null})'
     checked="${arg.initialValue == null}" />
</hlayout>
```

- Here, view events are “forwarded” to the event handlers bound to the root element

Communication with the Widget Model

EDITOR SETUP

```
editor.setProperty("currentObject.title")
```

COMMUNICATION

EDITOR ↔ WIDGET MODEL

EDITOR INITIALIZATION

Get initial value
from widget model

Add model observer →

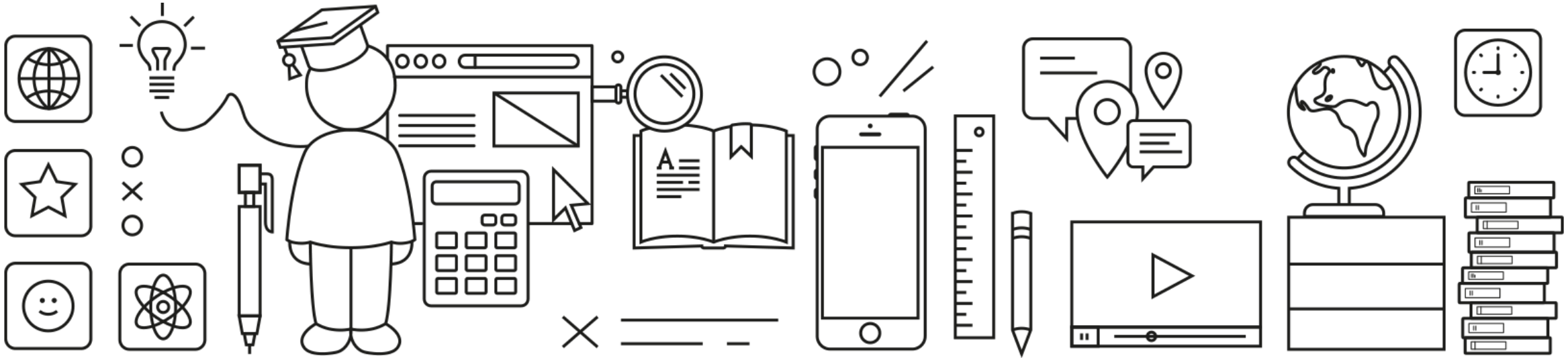
```
widgetModel.addObserver(getProperty(),modelObserver)
```

Call when model changed externally

```
modelChanged()
{
    reload editor
}
```

Create editor listener →

```
onValueChanged() // e.g. User types something
{
    widgetModel.setValue(getProperty(),changedValue)
}
```



Available Actions Gallery

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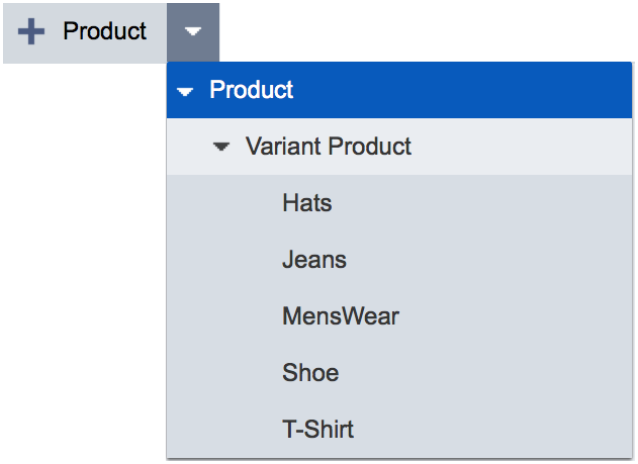
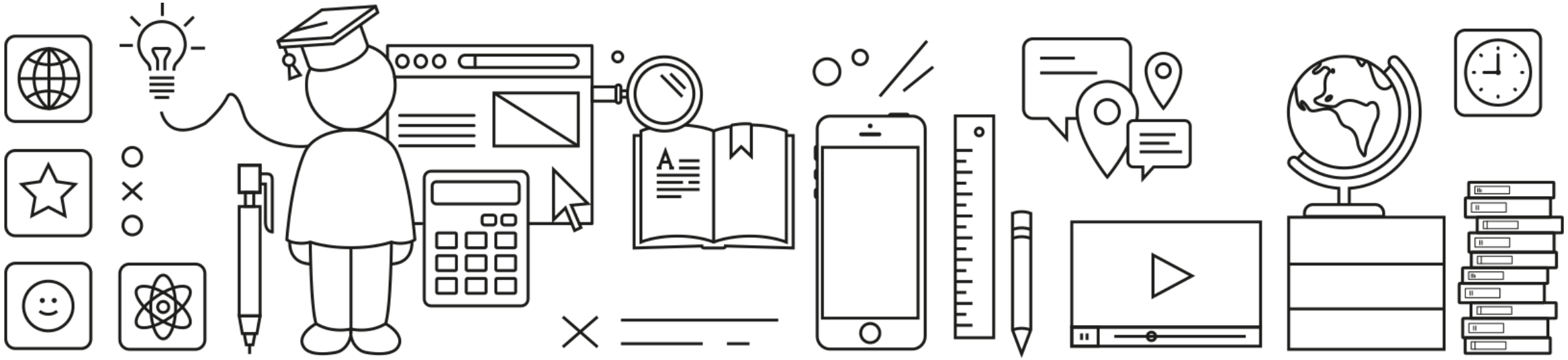
- ***Create* Action**:



- ***Delete* Action:**

- **Launch *Permission Management*:**



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Using Actions in Widgets – ADD to Widget – via ZUL

- Add the Action to the widget **view** (any number of <action> elements allowed)
- Bind each action to an ‘attribute’ of the widget model via XML ***property*** attribute
  - Auto-adds an *observer* to the widget model for handling changes
  - Bound attributes are copied/synced into the Action’s ActionContext

myWidget.zul

```
<widget …>
  …
  <action actionId="org.myextension.action.myAction" property="product"/>
  …
</widget>
```

MyWidgetController.java

```
WidgetModel model = getModel();
model.put("product", product);
```

MyActionController.java

```
public ReturnType everyActionMethod ( ActionContext<ProductModel> ctx ) {
  ProductModel boundProduct = ctx.getData();
  …
}
```

Using Actions in Widgets – ADD to Widget – via Config

- A more advanced way to add action(s) to a widget in the view
  - Enables grouping of your actions to control visibility in a context-sensitive way
- Same as basic option, except Action is added *indirectly* to the widget view

myWidget.zul

```
<widget ...>
  ...
  <actions config="myActionsSlotConfig"  group="common"  sclass="yw-actionsSlot" />
  ...
</widget>
```

myExtension/resources/myExtenstion-backoffice-config.xml

```
<context component="myActionsSlotConfig" type="Product" >
        <y:actions xmlns:y="http://www.hybris.com/cockpit/config/hybris">
                <y:group qualifier="common">
                        <y:label>actiongroup.common</y:label>
                        <y:action action-id="org.myextension.action.myAction"
                  property="currentBook" />
                </y:group>
        </y:actions>
</context>
```

Using Actions in Widgets – onActionPerformed – Opt. A

OPTIONAL: You can specify the handler (for an Action's successful `perform()`) from widget's controller via @ViewEvent annotation using `onActionPerformed` event name and id of <action> ZUL component

myWidget.zul

```
<widget ...>
  ...
  <action id="myActionInstance" property="product"
                                actionId="org.myextension.action.myAction" />
  ...
</widget>
```

MyWidgetController.java

```
public class MyWidgetController extends defaultWidgetController
{
    @ViewEvent(componentID="myActionInstance", eventName="onActionPerformed" )
    public void doSomething()
        {
     ...
```

Using Actions in Widgets – onActionPerformed – Opt. B

OPTIONAL: You can specify the handler (for an Action's successful perform()) **from widget's controller** via **@ViewEvent** annotation, `onActionPerformed` event name and id of <actions> ZUL component

myWidget.zul

```
<widget ...>
  <actions id="myActionsInsatnce" sclass="yw-actionsSlot"
           group="common"    config="myActionsSlotConfig" />
</widget>
```

MyWidgetController.java

```
public class MyWidgetController extends defaultWidgetController
{
    @ViewEvent(componentID="myActionsInstance", eventName="onActionPerformed" )
    public void doSomething()    { ... }
```

myExtension/resources/myExtenstion-backoffice-config.xml

```
<context component="myActionsSlotConfig" type="Product" >
  <y:actions>
    <y:group qualifier="common">
      <y:action action-id="org.myextension.action.myAction" property="currentBook" />
    </y:group>
  </y:actions>
```

Using Actions in Widgets – onActionPerformed – Opt. C

- OPTIONAL: You can specify a handler (for a successful Action perform()) from within widget's .ZUL file via the onActionPerformed tag attribute

myWidget.zul

```
<widget ...>
  ...
  <action actionId="org.myextension.action.myAction"  property="product"
            onActionPerformed="my.extensionbackoffice.widgets.MyWidgetController.saveProduct()" />
<!-- OR, to bind one handler for ANY succesful Action within an <actions> group -->
  <actions id="myActionsInsatnce"  group="common"  config="myActionsSlotConfig"
     onActionPerformed="my.extensionbackoffice.widgets.MyWidgetController.saveProduct()" />
  ...
</widget>
```

MyWidgetController.java

```
package my.extensionbackoffice.widgets;

public class MyWidgetController extends DefaultWidgetController {
    public static void saveProduct()  {
        . . .
    }
}
```

Using Actions in Widgets – onActionPerformed – Opt. D

- OPTIONAL: You can specify a handler (for a successful Action perform()) from within widget's .ZUL file via the onActionPerformed tag attribute

myWidget.zul

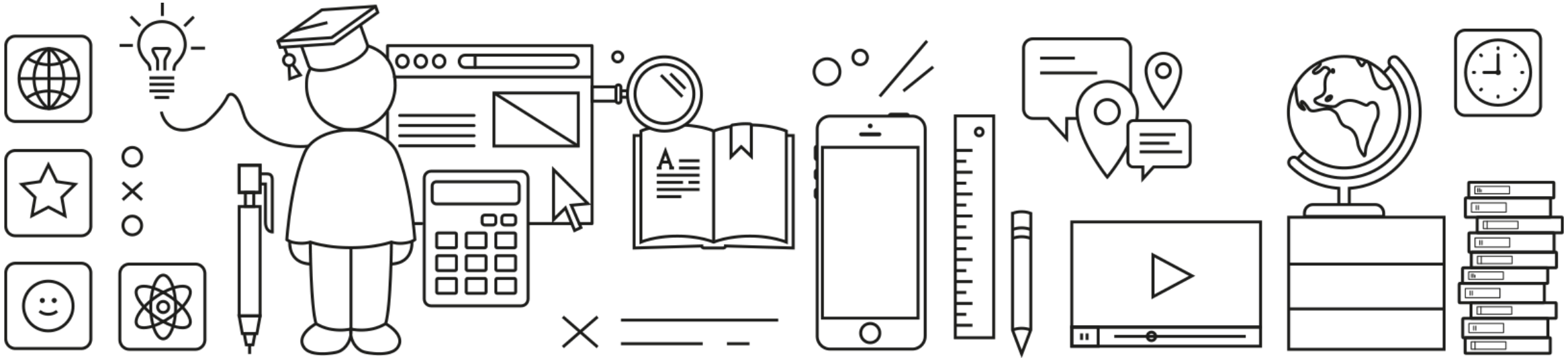
```
<widget ...>
  ...
  <action actionId="org.myextension.action.myAction"  property="product"
              onActionPerformed="widgetController.saveProduct()" />
<!-- OR, to bind one handler  for ALL successful Actions in an <actions> group -->
  <actions id="myActionsInsatnce"  group="common"  config="myActionsSlotConfig"
        onActionPerformed="widgetController.saveProduct()" />
  ...
</widget>
```

special variable to reference the actual bound Widget Controller instance

MyWidgetController.java

```
package my.extensionbackoffice.widgets;

public class MyWidgetController extends DefaultWidgetController {
    public void saveProduct()  {
        . . .
    }
}
```



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Creating an Action 1 – Definition File

- Definition file:

bookstorebackoffice/backoffice/resources/widgets/**actions/myAction**/definition.xml

```
<action-definition id="org.myextension.action.myaction"  ... >
        <name>MyAction</name>
        <description>MyAction</description>
        <actionClassName>org.myextension.actions.MyAction</actionClassName>

        <iconUri>icons/hwicon.png</iconUri>
        <iconHoverUri>icons/hwicon_hover.png</iconHoverUri>
        <iconDisabledUri>icons/hwicon_disabled.png</iconDisabledUri>

</action-definition>
```

Creating an Action 2 – Implementation Class

Action class implements CockpitAction<I, O>

- I specifies the Input type (of data attached to ActionContext)
- O specifies the Output type (of data that will be attached to ActionResult)
  - Method signature: ActionResult<O> perform(ActionContext<I> ctx)

CreateSummary.java

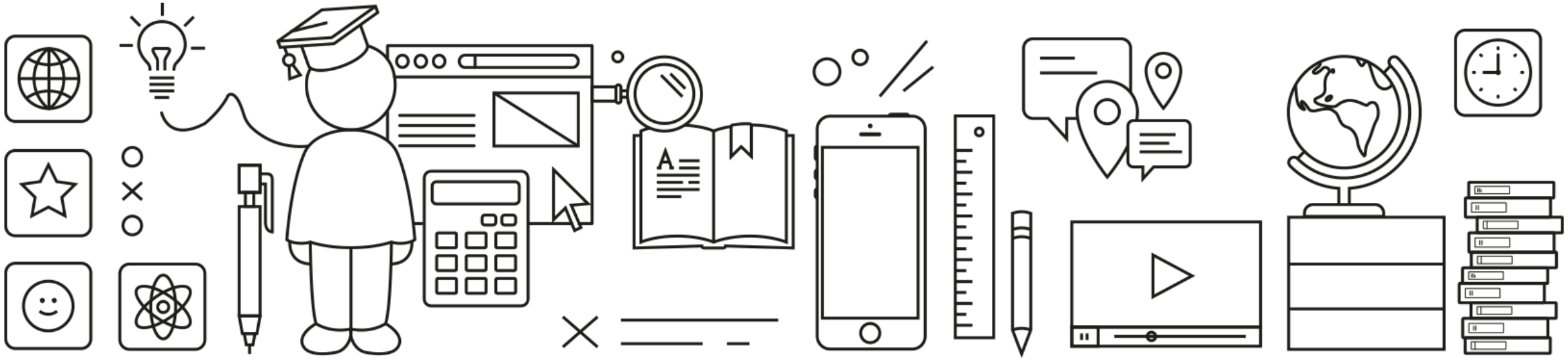
```
public class CreateSummary implements CockpitAction<BookModel, String>
{
  @Override
  public ActionResult<String> perform(ActionContext<BookModel> context)
  {
    …
```

Creating an Action 3 – Obtaining Data

- Action's *attached data* can be obtained from its context:

```
@Override                                                                    MyAction.java
public ActionResult<String> perform(final ActionContext<BookModel> context )
{
        ActionResult<String> result = null;
        final BookModel ctxBook = context.getData();
        final String bookSummary = generateSummary(ctxBook);
        if (bookSummary != null) {
                result = new ActionResult<String>(ActionResult.SUCCESS, bookSummary );
        }
        else {
                result = new ActionResult<String>(ActionResult.ERROR);
        }
        Messagebox.show(result.getData() + " (" + result.getResultCode() + ")" );
        return result;
}
```

perform() returns a new ActionResult instance:
- first constructor arg: ActionResult.***SUCCESS*** or ActionResult.***ERROR***
- second constructor arg: returned (payload) data



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Socket-Aware Editors & Actions 1 – Definition

- Editor or Action socket configuration inside `definition.xml` file
  - The XML syntax is the same as that for a widget
  - The *actual* socket-awareness is added in the implementation class

definition.xml

```
<editor-definition …>
   <name>Example Text Editor</name>
   <editorClassName>com.my.corp.backoffice.editors.ExampleEditor</editorClassName>
   …
   <sockets>
      <input id="testInput"/>
      <output id="testOutput"/>
   </sockets>
</editor-definition>
```

Socket-Aware Editors & Actions 2 – Custom Class

- Backing class must implement AbstractComponentWidgetAdapterAware:

```
public class ExampleEditor
            extends AbstractComponentWidgetAdapterAware
            implements CockpitEditorRenderer<Object>
{
  public void render(final Component parent,
    final EditorContext<Object> context, final EditorListener<Object> listener)
  {
    addSocketInputEventListener("testInput", new EventListener<SocketEvent>()
    {
      public void onEvent(final SocketEvent event)
      {
        label.setValue("Got " + event.getData() + " from widget " + event.getSourceWidgetID());
            }
          })
          ...
     sendOutput( "testOutput", context );
          ...
  }
}
```

Socket-Aware Editors & Actions 3 – Socket Methods

In the example on the previous slide:

- Use `addSocketInputEventListener("testInput", context)` to receive data through input socket
- Use `sendOutput("testOutput", context)` to send data through output socket

Socket-Aware Editors & Actions 4 – Connections

- An action/editor is NOT a widget (it's a component *within* a widget):
  - Virtual sockets not supported
  - It has no widget instance ID necessary for a <widget-connection>
    - Instead, a "STUB widget ID" is used, formed by prepending the action/editor definition ID with "STUB_"

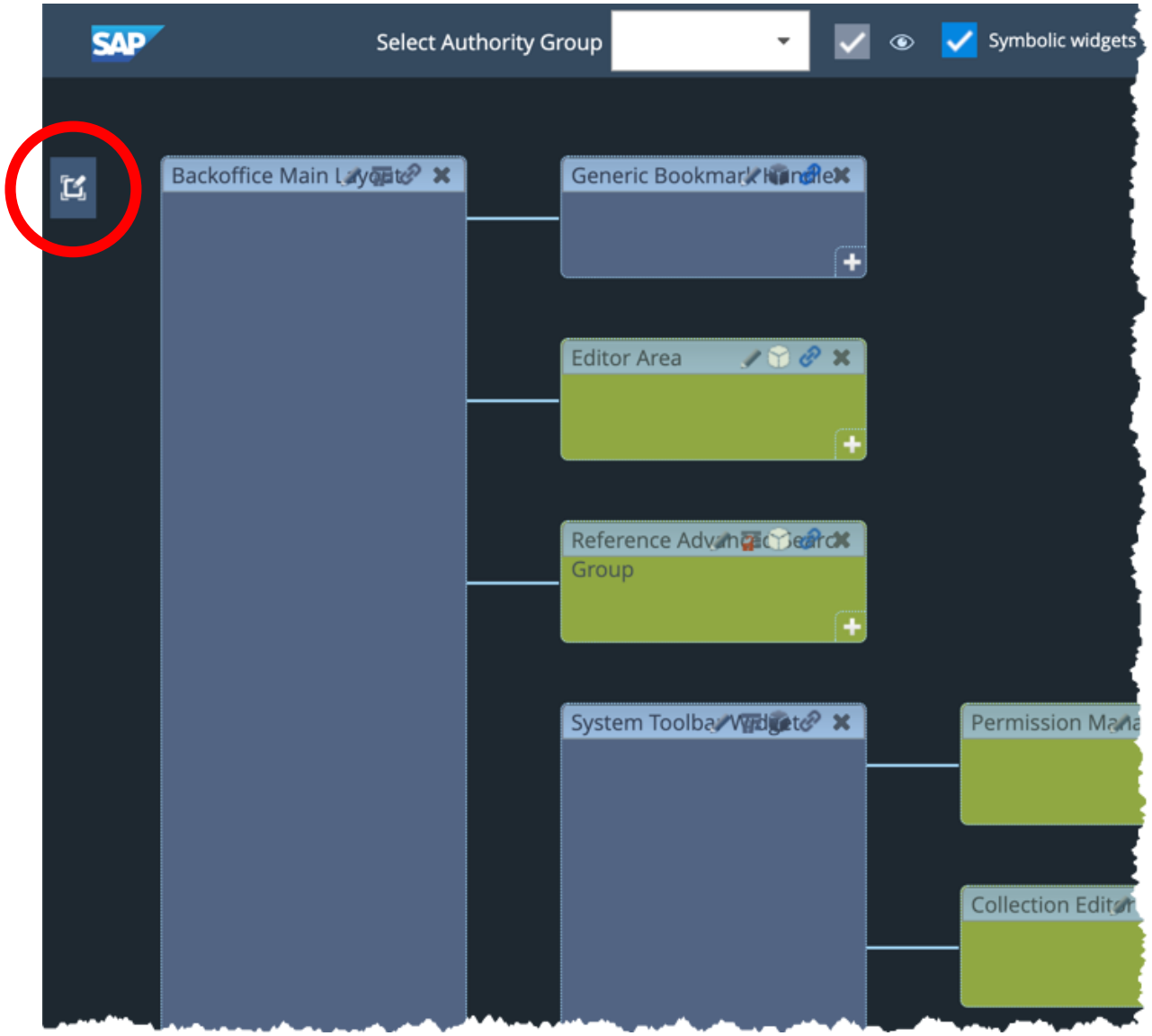
```
<widget-connection
        sourceWidgetId="STUB_com.corp.cockpitng.editor.mycustomereditor"
        outputId="objectToEdit"
        targetWidgetId="borrowerEditorArea"
        inputId="inputObject" />
```

  - Because this stub ID is based on the action/editor *definition* ID, an action/editor connection applies to ALL INSTANCES of the action/editor definition
  - Conversely, all widgets that use an instance of this action/editor will get the same communications behavior from this Action/Editor

Socket-Aware Editors & Actions 5 – Component Holder

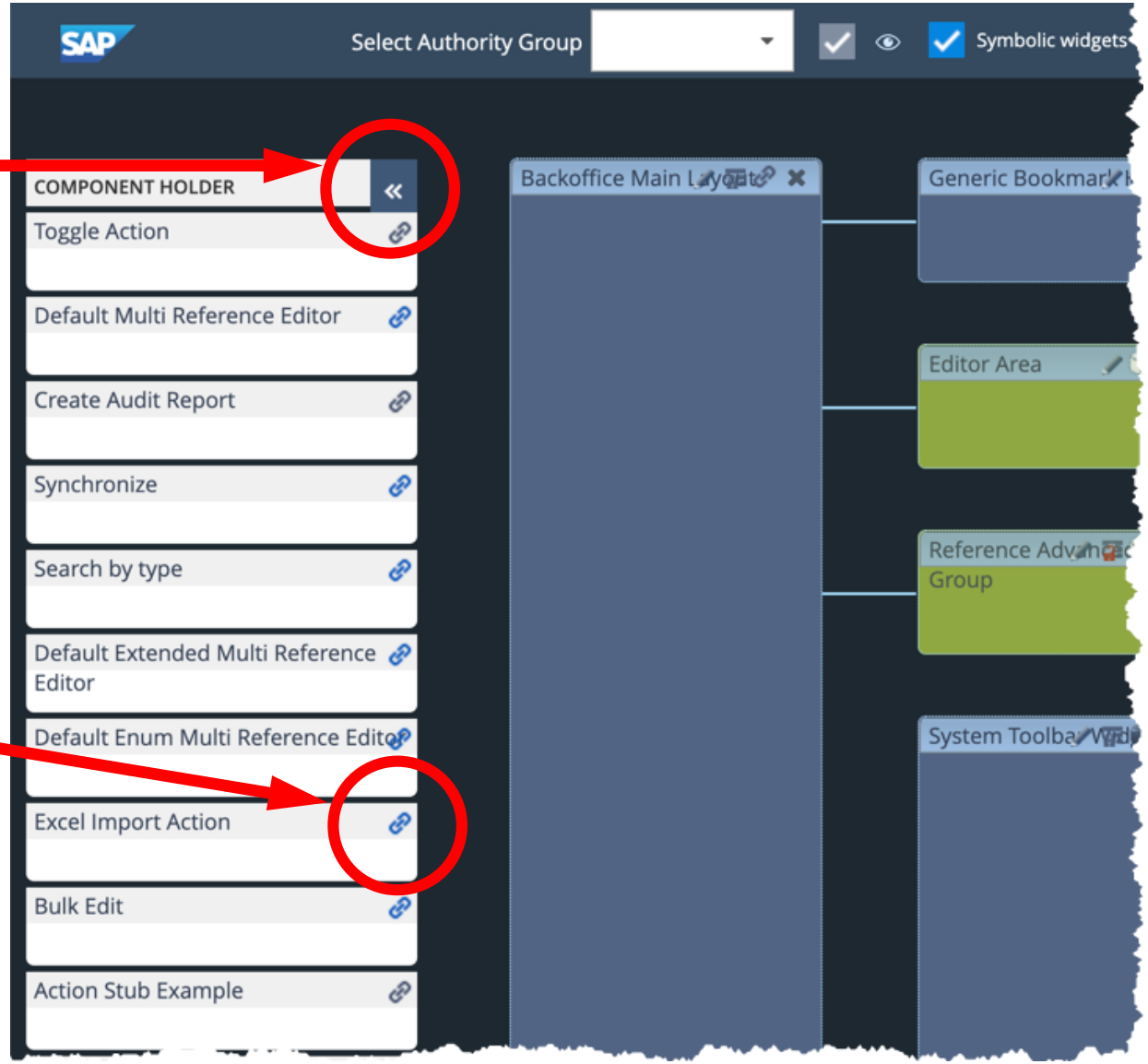
The Application Orchestrator's **Component Holder**:
(click on it to reveal contents)

- Holds all actions/editors that are "socket-aware"



Socket-Aware Editors & Actions 5 – Component Holder

- The Application Orchestrator's **Component Holder**: (expanded – click to close)
  - There is only one visual representation of a socket-aware action/editor for all instances, due to the "STUB widget ID"
- NOTE: An action/editor is ONLY able to connect to a widget instance



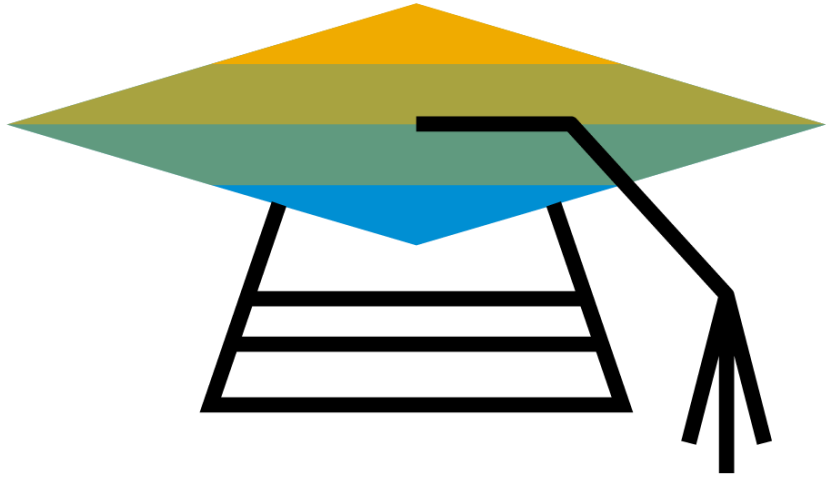
Exercise 8

Exercise 8 – Create Custom Editors and Actions

1. Create a custom editor for the publisher attribute
   - Validates the input text
   - Saves only if the input is validated
   - Gives a warning if numeric values are typed in the field

2. Create an action to toggle the *rentability* of a book
   - Books are by default not rentable
   - Create a button in the Book Details widget that switches the rentability status

Thank you.



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