Spring Portlet MVC Tutorial

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Topics:

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Introduction To Portlets

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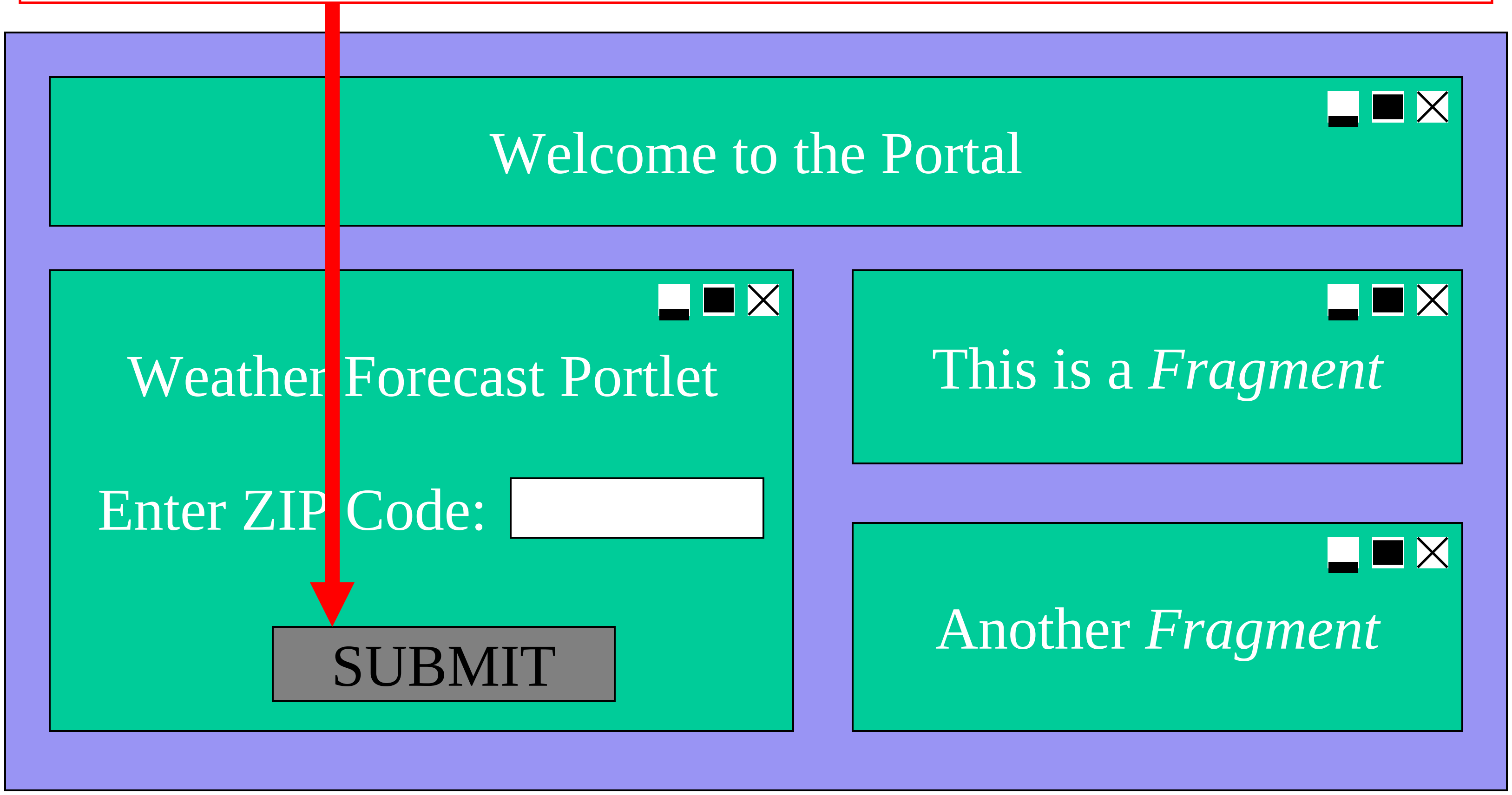
The Portlet Specification: JSR-168

“Portlets are web components - ***like Servlets*** - specifically designed to be aggregated in the context of a ***composite page***. Usually, many Portlets are ***invoked in the single request*** of a Portal page. Each Portlet ***produces a fragment of markup*** that is combined with the markup of other Portlets, all within the Portal page markup.”

Portlets within a Portal layout

When the button is pressed, an *ACTION* is handled by that Portlet only, but each of the Portlets will *RENDER*.



Portlet Modes

- View

  Render data or show a form for user interaction.

- Edit

  Modify user preferences.

- Help

  Display information to assist the user.

Window States

- Normal

  Portlets share the screen space according to the configuration of layouts in the Portal environment.

- Maximized

  Optionally display more information.

- Minimized

  Minimal or no rendering is necessary.

Exercise 1(a)

Minimum Steps to Create JSR 168 Portlet

- Create a valid web.xml (can be empty)
- Create an implementation of javax.portlet.Portlet
- Create a portlet.xml referencing your Portlet
- Package these three things in a Web Application Archive (.war) file

Overview of Spring Web MVC

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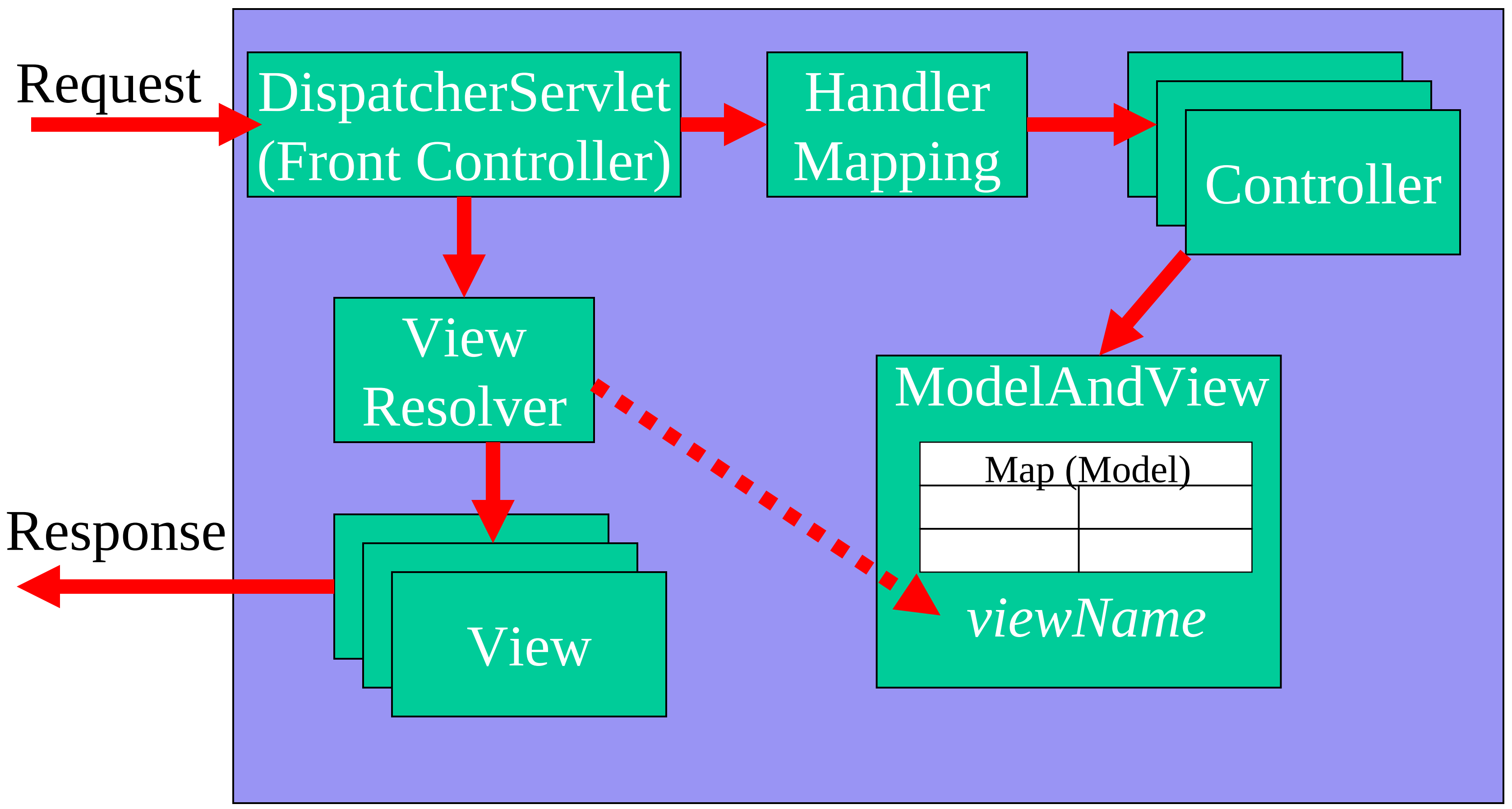
Spring Web MVC Basics

- Model
  - A `java.util.Map` containing domain objects
  - The *contract* between `Controller` and `View`
- View
  - Definition used to render the `Model` data
- Controller
  - Handles the Request
  - Delegates to the Service Layer
  - Prepares the `Model`
  - Chooses a *logical view name*

Spring Web MVC Architecture



Spring Web MVC Controllers

The `Controller` interface defines a handle method:

```
public ModelAndView handleRequest(
           HttpServletRequest request,
           HttpServletResponse response)
  throws Exception;
```

Implement the interface or extend a base class:

- `AbstractController`
- `MultiActionController`
- `AbstractCommandController`
- `SimpleFormController`
- … *and more*

Data Binding, Validation, and Forms

Spring Web MVC’s *Command* Controllers enable:

- Powerful data-binding to graphs of domain objects
  - Using Spring’s `ServletRequestDataBinder`
  - Extensible via Property Editors for converting between Strings and Objects
- Pluggable validation with a simple `Validator` interface that is *not* web-specific.

The `SimpleFormController` builds on this functionality and adds workflow (display, bind+validate, process)

Spring Web MVC Views

The `View` interface defines a method for rendering:

```
public void render(Map model,
           HttpServletRequest request,
           HttpServletResponse response)
  throws Exception;
```

Implement the interface or use one of these implementations:

- `JstlView`
- `FreeMarkerView`
- `VelocityView`
- `AbstractExcelView`
- `AbstractPdfView`
- `XsltView`
- *… and more*

Other Features of Spring Web MVC

- Handler Interceptors
  - `preHandle(request, response, handler)`
  - `postHandle(request, response, handler, modelAndView)`
  - `afterCompletion(request, response, handler, exception)`
- Handler Exception Resolvers
  - `resolveException(request, response, handler, exception)`
  - Returns a `ModelAndView`
- Multipart Resolvers
  - If a Multipart is present, wraps the request
  - Provides access to the File(s)
  - Property Editors available for binding to String or byte array

Introduction to Spring Portlet MVC

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Similarities to Web MVC

- *Mostly* parallel with Spring's Servlet-based Web MVC framework:
  - `DispatcherPortlet`
  - `HandlerMapping`
  - `HandlerInterceptor`
  - `Controller`
  - `PortletRequestDataBinder`
  - `HandlerExceptionResolver`
  - `MultipartResolver`

Differences in Portlet MVC

However, there are a few significant differences…

- 2 Phases of Request: *Action* and *Render*
  - **One** Portlet may perform an action, **All** will render
  - Instead of *`handleRequest`*`(..)` in Controllers:
    - `handleActionRequest(..)`
    - `handleRenderRequest(..)`
- To pass parameters from the action phase to the render phase call:

```
actionResponse.setRenderParameter(name, value)
```

Differences in Portlet MVC (cont)

- URL is controlled by the Portlet Container:

  “The API will provide a URL-rewriting mechanism for creating links to trigger actions within a Portlet without requiring knowledge of how URLs are structured in the particular web application.”

  – *JSR-168 Specification*

- What are the implications?
  - Unable to provide meaning in the URL’s path
  - Therefore no equivalent of `BeanNameUrlHandler`:

```
<bean name=“/search.html” class=“SearchController”/>
```

Portlet Modes, Windows States and Request Parameters are used to determine navigation instead

Configuration of Spring Portlets

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Configuring `web.xml` (1)

Set the *parent* `ApplicationContext`

- Shared by all portlets within the WebApp
- Use `ContextLoaderListener` to load the parent context

(Same as in Spring Web MVC)

```
<listener>
  <listener-class>
   org.springframework.web.context.ContextLoaderListener
  </listener-class>
</listener>
```

Configuring `web.xml` (2)

Set `contextConfigLocation` parameter to list bean definition file(s) for `ContextLoaderListener`

(Again same as in Spring Web MVC)

```
<context-param>
   <param-name>contextConfigLocation</param-name>
   <param-value>
       /WEB-INF/service-context.xml
       /WEB-INF/data-context.xml
   </param-value>
</context-param>
```

Configuring `web.xml` (3)

Add the `ViewRendererServlet`:

```
<servlet>
    <servlet-name>view-servlet</servlet-name>
    <servlet-class>
        org.springframework.web.servlet.ViewRendererServlet
    </servlet-class>
    <load-on-startup>1</load-on-startup>
</servlet>
<servlet-mapping>
    <servlet-name>view-servlet</servlet-name>
    <url-pattern>/WEB-INF/servlet/view</url-pattern>
</servlet-mapping>
```

The `ViewRendererServlet`

- `ViewRendererServlet` acts as a bridge between a Portlet request and a Servlet request.
- It allows a Spring Portlet MVC application to leverage the full capabilities of Spring Web MVC for creating, defining, resolving, and rendering views.
- Therefore, you are able to use the same `ViewResolver` and `View` implementations.

Configuring `portlet.xml`

```
<portlet>
   <portlet-name>example</portlet-name>
   <portlet-class>
        org.springframework.web.portlet.DispatcherPortlet
   </portlet-class>
   <init-param>
      <name>contextConfigLocation</name>
      <value>/WEB-INF/context/example-portlet.xml</value>
   </init-param>
   <supports>
      <mime-type>text/html</mime-type>
      <portlet-mode>view</portlet-mode>
      <portlet-mode>edit</portlet-mode>
      <portlet-mode>help</portlet-mode>
   </supports>
   <portlet-info>
      <title>Example Portlet</title>
   </portlet-info>
</portlet>
```

A “Front Controller” for *this* Portlet

Bean definitions for *this* Portlet’s own `ApplicationContext`

Exercise 1(b)

Minimum Steps to Create a Spring Portlet MVC Application

- Create an Application Context file
- Create a Spring Portlet MVC “portlet” context file
- Create a web.xml (with Spring Portlet MVC additions)
- Create a Spring Portlet MVC portlet.xml referencing your “portlet” context
- Package these 4 things and the corresponding Spring Portlet MVC libraries (.jar files) in a Web Application Archive (.war) file
- NO JAVA CODE must be written!

The Spring Portlet API

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The `DispatcherPortlet` (1)

- *Each Portlet* will use a single `DispatcherPortlet`.
- It will play a *Front Controller* role as with Spring MVC's `DispatcherServlet`.
- The portlet-specific bean definitions to be used by the `DispatcherPortlet` should be specified in an individual application context file *per Portlet*.
- Bean definitions that are shared between Portlets or with other Servlets, etc. should be in the parent application context file.

The `DispatcherPortlet` (2)

- The `DispatcherPortlet` uses `HandlerMappings` to determine which `Controller` should handle each `PortletRequest`.

- The DispatcherPortlet automatically detects certain bean definitions, such as the HandlerMappings, HandlerExceptionResolvers, and MultipartResolvers.

Handler Mappings

- `PortletModeHandlerMapping`
  - Map to a Controller based on current PortletMode
- `ParameterHandlerMapping`
  - Map to a Controller based on a Parameter value
- `PortletModeParameterHandlerMapping`
  - Map to a Controller based on current PortletMode *and* a Parameter value
- Or create your own custom `HandlerMapping` …

PortletModeHandlerMapping

```
<bean id="portletModeHandlerMapping"
  class="org.springframework.web.portlet.handler.
  PortletModeHandlerMapping">
   <property name="portletModeMap">
      <map>
         <entry key="view" value-ref="viewController"/>
         <entry key="edit" value-ref="editController"/>
         <entry key="help" value-ref="helpController"/>
      </map>
   </property>
</bean>
<bean id="viewController" class="ViewController"/>
...
```

The `Controller` Interface

```
public interface Controller {

     ModelAndView handleRenderRequest (
          RenderRequest request,
          RenderResponse response)
          throws Exception;

     void handleActionRequest (
          ActionRequest request,
          ActionResponse response)
          throws Exception;
}
```

`AbstractController`

An example of the *Template Method* pattern

Implement one or both of:

- `handleActionRequestInternal(..)`
- `handleRenderRequestInternal(..)`

Provides common properties (with defaults):

- `requiresSession` (false)
- `cacheSeconds` (-1, uses container settings)
- `renderWhenMinimized` (false)

Exercise 2

Converting a Simple Portlet to Spring Portlet MVC

- Follow the Minimum Steps outlined previously
- Convert any javax.portlet.Portlet implementations to AbstractControllers
- Convert the portlet.xml file from JSR 168 to Spring Portlet MVC
- Reference your controllers in your “portlet” context file

ParameterHandlerMapping

```
<bean id="handlerMapping“
 class="org.springframework.web.portlet.handler.
   ParameterHandlerMapping">
   <property name="parameterMap">
      <map>
         <entry key="add" value-ref="addHandler"/>
         <entry key="remove" value-ref="removeHandler"/>
      </map>
   </property>
</bean>
```

(can optionally set the `parameterName` property – the default value is ‘action’)

PortletModeParameterHandlerMapping

```
<bean id="handlerMapping"
    class="...PortletModeParameterHandlerMapping">
  <property name="portletModeParameterMap">
    <map>
      <entry key="view">
        <map>
          <entry key="add" value-ref="addHandler"/>
          <entry key="remove" value-ref="removeHandler"/>
        </map>
      </entry>
      <entry key="edit">
        <map><entry key="prefs” value-ref="prefsHandler"/></map>
      </entry>
    </map>
  </property>
</bean>
```

More on `HandlerMappings` (1)

- As with Spring's Servlet-based Web MVC framework, a `DispatcherPortlet` can use multiple `HandlerMappings`.
- The *`order`* property can be set to create a chain, and the first mapping to find a handler wins.
- For example, you can use a `PortletModeParameterHandlerMapping` to detect an optional parameter followed by a `PortletModeHandlerMapping` with default handlers for each mode.

More on `HandlerMappings` (2)

`Interceptors` can be assigned to the `HandlerMapping` in the same way as Spring Web MVC:

```
<property name="interceptors">
   <list>
      <ref bean="someInterceptor"/>
      <ref bean="anotherInterceptor"/>
   </list>
</property>
```

More on `HandlerMappings` (3)

- For an Action Request, the handler mapping will be consulted **twice** – once for the *action phase* and again for the *render phase*.
- During the action phase, you can manipulate the criteria used for mapping (such as a request parameter).
- This can result in the render phase getting mapped to a **different Controller** – a great technique since there is no portlet redirect.

HandlerInterceptor

```
public interface HandlerInterceptor {

    boolean preHandle(PortletRequest request,
                      PortletResponse response,
                      Object handler) throws Exception;

    void postHandle(RenderRequest request,
                    RenderResponse response,
                    Object handler,
                    ModelAndView mav) throws Exception;

    void afterCompletion(PortletRequest request,
                         PortletResponse response,
                         Object handler,
                         Exception ex) throws Exception;
}
```

The Controllers

- `Controller` (The Interface)
- `AbstractController`
- `SimpleFormController`
- `PortletWrappingController`
- `PortletModeNameViewController`
- Several others!

The Controller Interface

```
public interface Controller {

    ModelAndView handleRenderRequest (
        RenderRequest request,
        RenderResponse response)
        throws Exception;

    void handleActionRequest (
        ActionRequest request,
        ActionResponse response)
        throws Exception;
}
```

`AbstractController`

An example of the *Template Method* pattern

Implement one or both of:

- `handleActionRequestInternal(..)`
- `handleRenderRequestInternal(..)`

Provides common properties (with defaults):

- `requiresSession` (false)
- `cacheSeconds` (-1, uses container settings)
- `renderWhenMinimized` (false)

`SimpleFormController` (1)

- Very similar to its Spring Web MVC counterpart.
- Handles the form workflow including display of the *formView*, binding and validation of submitted data, and a chain of methods for handling a successfully validated form submission.
- Due to the two phases of a portlet request, the *onSubmit(..)* methods each have two versions: *onSubmitAction(..)* and *onSubmitRender(..)*.
- In most cases, the default *onSubmitRender(..)* will be sufficient as it simply renders the configured *successView*.
- By defining the command class, a form view and a success view, no code is required except to customize behavior

`SimpleFormController` (2)

Some methods for controlling the form:

- `formBackingObject(..)` – the default implementation simply creates a new instance of the *command* Class
- `initBinder(..)` – register custom property editors
- `referenceData(..)` – provide additional data to the model for use in the form
- `showForm(..)` – the default implementation renders the *formView*

`SimpleFormController` (3)

Some methods for controlling processing of the form submission:

- `onBind(..)` & `onBindAndValidate(..)` – callback for post-processing after binding and validating
- `onSubmitAction(..)` & `onSubmitRender(..)` – callbacks for successful submit with no binding or validation errors

Several others, including ones inherited from AbstractFormController, BaseCommandController

Break

(and Exercise 3)

Exercise 3

`PortletWrappingController` (1)

A `Controller` implementation for managing a JSR-168 compliant Portlet’s lifecycle within a Spring environment.

Example Uses:

- Apply `Interceptors` to the wrapped `Portlet`
- Use dependency injection for init-parameters

PortletWrappingController (2)

```
<bean id=“wrappedPortlet”
  class=“org.springframework.web.portlet.mvc.
  PortletWrappingController”>
   <property name=“portletClass”
  value=“xyz.SomePortlet”/>
   <property name=“useSharedPortletConfig”
  value=“false”/>
   <property name=“portletName” value=“wrapped-portlet”/>
   <property name=“initParameters”>
      <props>
         <prop key=“someParam”>some value</prop>
      </props>
   </property>
</bean>
```

Exercise 4

`PortletModeNameViewController` (1)

- This `Controller` simply returns the current `PortletMode` as the view name so that a view can be resolved and rendered.
- Example: *PortletMode.HELP* would result in a *viewName* of “help” and an `InternalResourceViewResolver` may use /WEB-INF/jsp/help.jsp as the View.
- This means you can use JSP in a portlet with no Java classes to write at all!

PortletModeNameViewController (2)

```
<bean id="modeNameViewController"
  class="org.springframework.web.portlet.mvc.
PortletModeNameViewController"/>


<bean id="viewResolver"
  class="org.springframework.web.servlet.view.
InternalResourceViewResolver">
   <property name="viewClass"
value="org.springframework.web.servlet.view.JstlView
  "/>
   <property name="prefix" value="/WEB-INF/jsp/"/>
   <property name="suffix" value=".jsp"/>
</bean>
```

Resolving Exceptions

```
<bean id="exceptionResolver"
   class="org.springframework.web.portlet.handler.
   SimpleMappingExceptionResolver">
  <property name="defaultErrorView" value="error"/>
  <property name="exceptionMappings">
    <value>
        javax.portlet.PortletSecurityException=unauthorized
        javax.portlet.UnavailableException=unavailable
    </value>
  </property>
</bean>
```

Map Exceptions to viewNames

Exercise 5

Handling File Uploads (1)

- Just specify a `MultipartResolver` bean
- `DispatcherPortlet` will automatically detect it

```
<bean id="portletMultipartResolver"
   class="org.springframework.web.portlet.multipart.
CommonsPortletMultipartResolver">
    <property name="maxUploadSize“ value=“2048”/>
</bean>
```

Handling File Uploads (2)

If a multipart file is detected, the portlet request will be wrapped:

```
public void onSubmitAction(ActionRequest request,
       ActionResponse response, Object command,
       BindException errors) throws Exception {

       if (request instanceof MultipartActionRequest) {

              MultipartActionRequest multipartRequest =
                     (MultipartActionRequest) request;

              MultipartFile multipartFile =
                     multipartRequest.getFile("file");

              byte[] fileBytes = multipartFile.getBytes();

              ...

}
```

Handling File Uploads (3)

- Spring also provides 2 `PropertyEditors` for working with `MultipartFiles`:
  - `ByteArrayMultipartFileEditor`
  - `StringMultipartFileEditor`
- These allow multipart content to be directly bound to `ByteArray` or `String` attributes of a command Class in `SimpleFormController` or `AbstractFormController`

Integration with Spring Web Flow

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Introduction to `PortletFlowController`

- The `PortletFlowController` is a Spring Web Flow Front Controller for use within a Portlet environment.
- Portlet requests (in view mode) can be mapped to the `PortletFlowController` to create or participate in an existing Flow execution.
- Flow definitions are not tied in any way to the Portlet environment. They can be reused in any supported environment - such as Spring Web MVC, Struts, or JSF.

Configuring `PortletFlowController`

```
<bean id="portletModeControllerMapping"
    class="org.springframework.web.portlet.handler.
PortletModeHandlerMapping">
  <property name="portletModeMap">
    <map>
      <entry key="view" value-ref="flowController"/>
    </map>
  </property>
</bean>
<bean id="flowController"
        class="org.springframework.webflow.executor.mvc.
PortletFlowController">
  <property name="flowExecutor" ref="flowExecutor"/>
  <property name="defaultFlowId" value="search-flow"/>
</bean>
```

Example Applications

Summary

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Summary (1)

- As much as possible, Spring's Portlet support mirrors the Servlet-based Spring Web MVC framework.
- The most significant differences result from the two-phase nature of Portlet requests.
- The handler mapping is also quite different, because the Portlet container has complete control over the formation of and meaning associated with URLs.

Summary (2)

- The actual view rendering is delegated to the Spring MVC `ViewResolver` and View implementations via the `ViewRendererServlet` which acts as a bridge from Portlet requests to Servlet requests.
- Several Controller base classes are provided - mostly parallel to Spring MVC.
- There are also some Portlet-specific Controllers such as `PortletModeNameViewController` and `PortletWrappingController`

Summary (3)

- Because they are so similar, porting code between Spring Web MVC and Spring Portlet MVC is pretty simple.
- Spring Portlet MVC preserves the dual phases of portlet requests -- one of the real strengths of the JSR-168 spec (example: dynamic search results)
  - Most other portlet MVC frameworks hide the phases (such as Apache Portal Bridges) – losing this key feature

Resources

Resources

- Spring Framework Reference Manual
  - Chapter 16: Portlet MVC Framework
  - http://static.springframework.org/spring/docs/2.0.x/reference/portlet.html
- Spring Framework Java Docs
  - Package org.springframework.web.portlet
  - http://static.springframework.org/spring/docs/2.0.x/api/index.html
- Spring Portlet MVC Wiki Site
  - News, Downloads, Sample Apps, FAQs, etc.
  - http://opensource.atlassian.com/confluence/spring/display/JSR168/

Questions?

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