The Java™ Platform Portlet Specification 2.0 (JSR 286)

Stefan Hepper, Portal Architect, IBM

TS-4817

IBM

Java

Sun microsystems

- Learn about the new features of the Java™ Platform Portlet Specification V 2.0 and how you can leverage these new features

Agenda

- JSR 286 Overview
- New Features in JSR 286
  - Coordination
  - Resource Serving
  - Cookies and Headers
  - Portlet Filter
  - Other additions
- Using AJAX with Portlets
- Compatibility to V 1.0
- Relation to Web Services for Remote Portlets (WSRP)
- Summary

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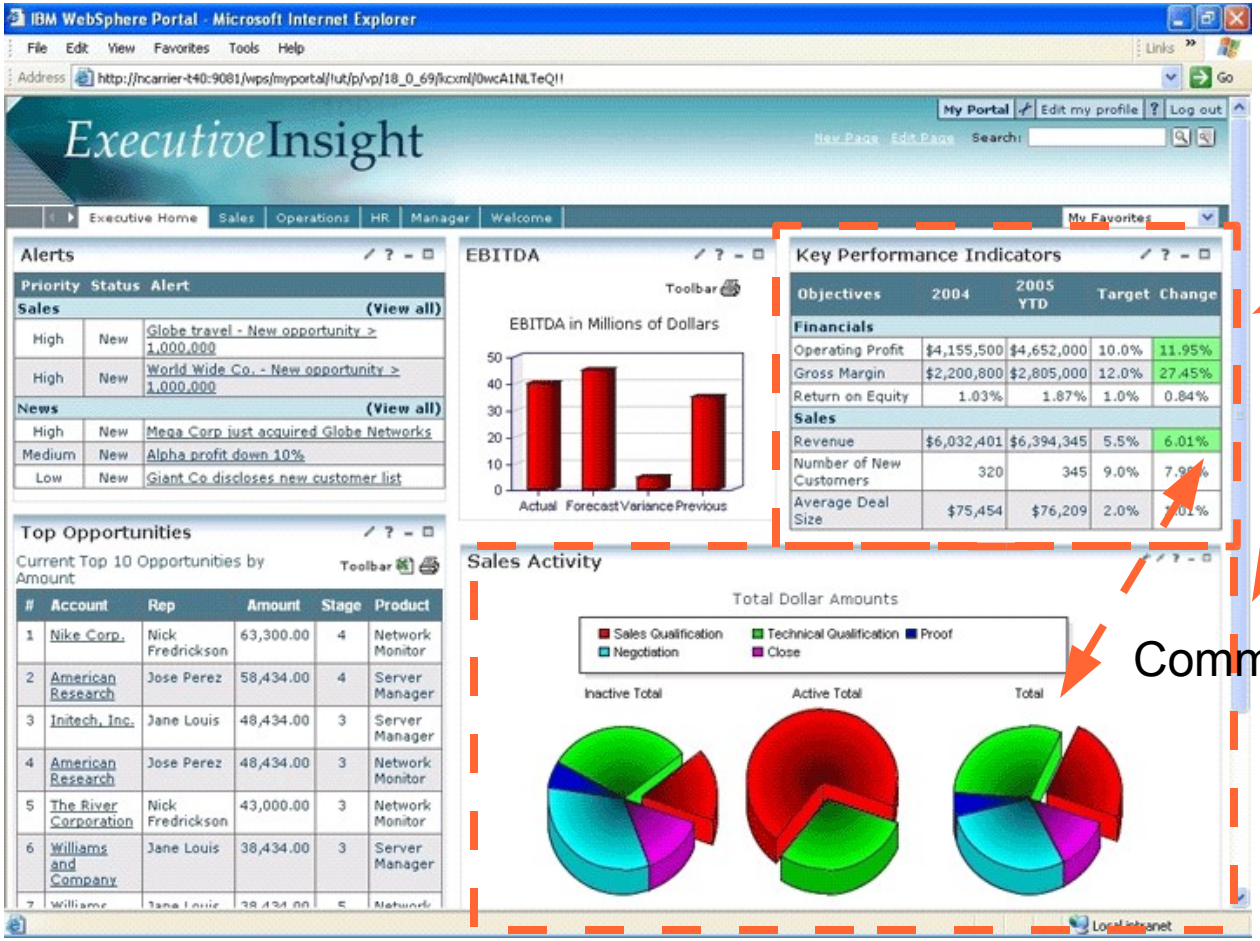
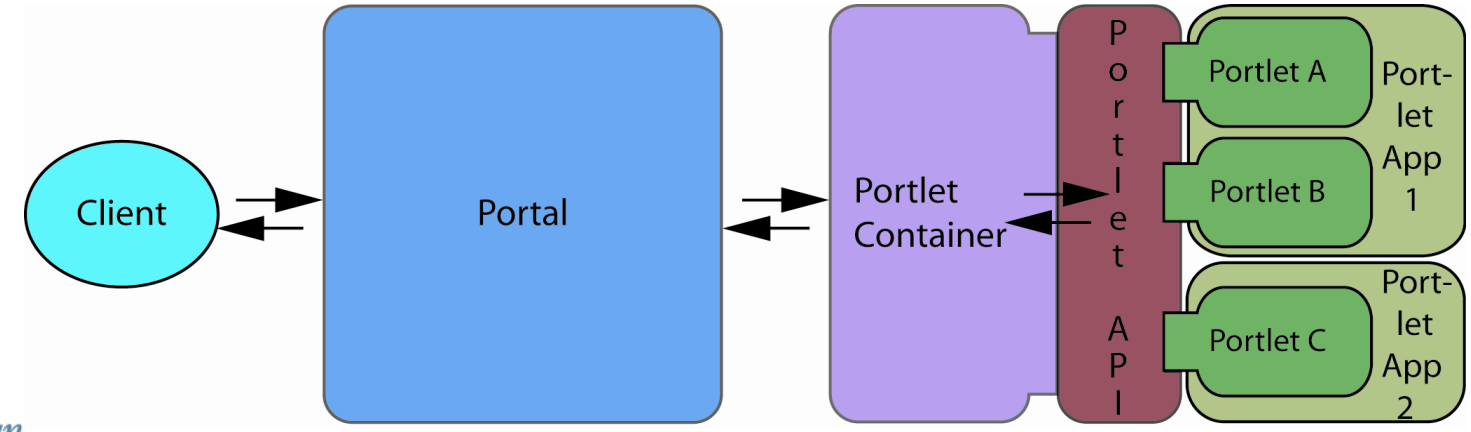
Overview Portal Model



- Integration-at-the-glass – performed by the portal
- Components may or may not work on the same backends

Scope of the Java Technology Portlet Specification

- Portlet API and portlet container
- Contract between the API and the container
- Deployment unit: portlet application
- Not
  - Aggregation, layout management
  - Page personalization and configuration engines
  - Portal administration and configuration



Where do we want to go from V1.0?

- V 1.0 (JSR 168)
  - Provide the programming model for standalone, pluggable UI application components
- V 2.0 (JSR 286)
  - Enable coordination between portlets and allow building composite applications based on portlet components
  - Serving resources
  - Allow for a better user experience using AJAX patterns
  - Better support for Web Frameworks like JSF and Struts
  - Alignment with Web Service for Remote Portlets (WSRP) 2.0

JSR 286 Expert Group

- IBM is leading this JSR, all major Java technology portal (commercial and open source) vendors represented in the EG
- Expert Group members
  - Companies: Adobe®, Apache, BEA, eXo, IBM, Liferay, Novell, Oracle,
    Red Hat, SAP, Sun, SunGard Higher Education, TIBCO, University Jena, Vignette
  - Individuals: R. Butler, P. Dabke, D. DeWolf, C. Doremus, A. Douma, S. Frid, K. Mann, S. Millidge, J. Novotny, P. Pandey, C. Severance, H. Suleiman
- Reference implementation will be provided at Apache
  - As Apache Pluto 2.0
  - http://portals.apache.org/pluto
- TCK will be available for free
  - Will extend the JSR 168 TCK

JSR 286 Schedule

- Kick-off: Feb 06
- Early draft 1: Aug 06
- Early draft 2: April 07
- Public draft: July 07
- Final draft: Dec 07
- Approved: Mar 08

- *Size of specification and API more than doubled compared to V 1.0*

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Why is coordination so important?

- The #1 complaint about v1.0 was the missing capability to send events between portlets
  - v1.0 only has the portlet application session scope for coordination
  - Only usable within the one portlet application, not across portlet applications
- v2.0 will add additional coordination capabilities
  - Eventing
  - Public render parameters across portlets
- Coordination allows business users building composite applications out of portlet components
  - Can be done at runtime, without programming

Demo Events

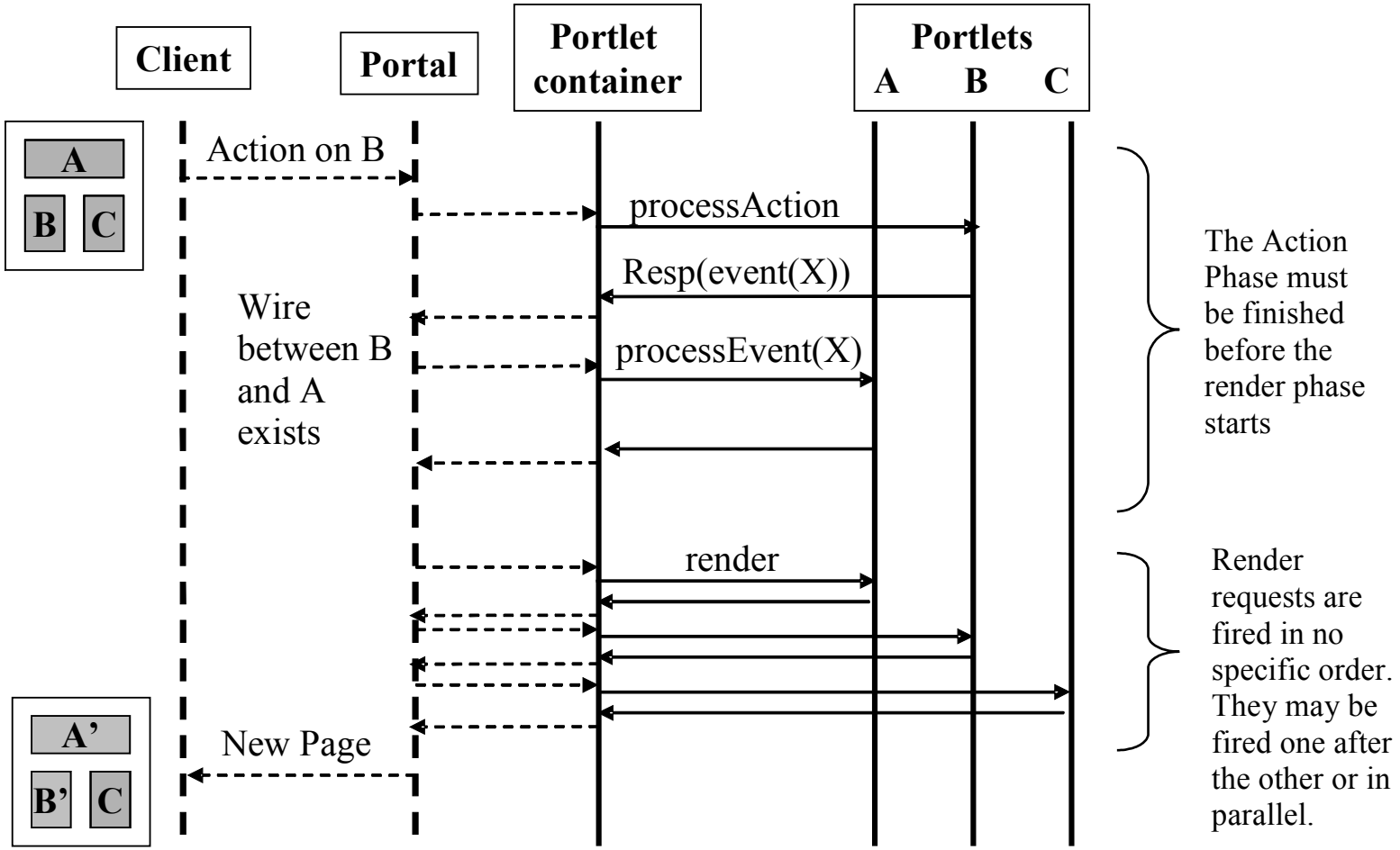
Events

- JSR 286 introduces a loosely coupled event paradigm
  - A portlet can declare events it wants to receive and events it wants to emit
  - The portal / portlet container will act as broker and distribute the events
  - Allows wiring of portlets at runtime
  - Dynamic event declaration only for sending events
- Event handling will be an additional step in the overall action phase
  - State changes are allowed
  - Event handling must be finished before rendering starts
-

Events

- Event types
  - Are defined in the portlet deployment descriptor via the Java class name
  - Can be complex, but must be Java platform and Java Architecture for XML Binding (JAXB) software serializable
  - String or XML simple types strongly recommended to reduce coupling
  - Use complex types only as last resort
- Event names
  - Are defined as QNames in the DD
  - As full QName (namespace + local part)
    <qname xmlns:x="http://www.ibm.com/">x:emailAddress822</qname>
  - Only local part of the QName + default namespace
    <default-namespace>http://www.ibm.com/xmlns/prod/datatype</default-namespace>
    <event-definition>
    <name>emailAddress822.AddToAddressBook</name>
    </event-definition>
- May have additional aliases for automatic event mapping

Event request flow



---------- Not defined by the Java Portlet Specification

Deployment descriptor sample for sending an event

Event defined in the DD:

```
<event-definition>
      <qname xmlns:x="http:examples.com/events">
            x:Address
      </qname>
      <value-type>com.examples.Address</value-type>
</event-definition>

<portlet>
      <supported-publishing-event>
            <qname xmlns:x="http:examples.com/events">
              x:Address
            </qname>
      </supported-publishing-event>
</portlet>
```

Event processing in the portlet

```
@XmlRootElement
    public class Address implements Serializable {
       private String street; private String city;
       public void setStreet(String s) {street = s;}
       public String getStreet() { return street;}
       public void setCity(String c) { city = c;}
       public String getCity() { return city;}
    }
void processAction(ActionRequest req, ActionResponse resp) {
       Address sampleAddress = new Address();
       sampleAddress.setStreet("myStreet");
       sampleAddress.setCity("myCity");
       QName name = new QName ("http:examples.com/events",
                               "Address");
       resp.setEvent(name, sampleAddress);
}
```

Deployment descriptor sample for receiving an Event

```
<event-definition>
        <qname xmlns:x="http://examples.com/">
            x:AddToAddressBook
        </qname>
        <alias xmlns:x="http://examples.com/">
            x:emailAddress822
        </alias>
        <value-type>java.lang.String</value-type>
</event-definition>
<portlet>
        <supported-processing-event>
                <qname xmlns:x="http://examples.com">
                    x:AddToAddressBook
                <qname>
        </supported-processing-event>
</portlet>
```

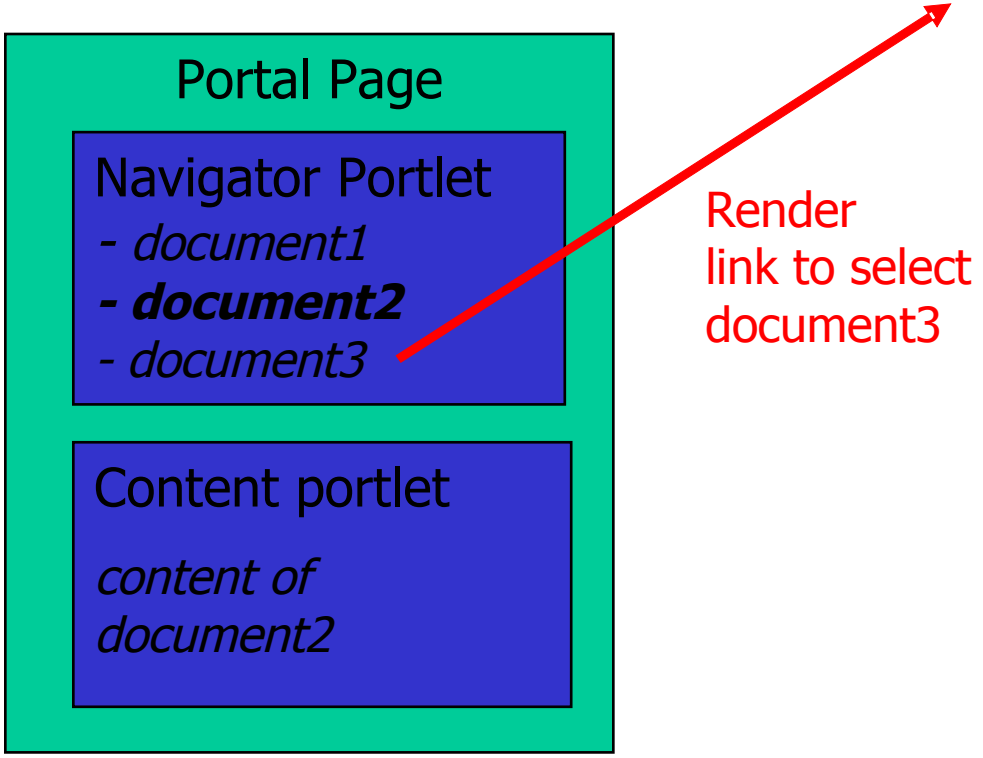
Event processing in the portlet

```
void processEvent(EventRequest req, EventResponse resp)
{
        ...
        Event event = req.getEvent();
        if ( event.getName().equals("AddToAddressBook") )
        {
                String emailAddress = event.getValue();
                ...
        }
}
```

Demo Public Parameters

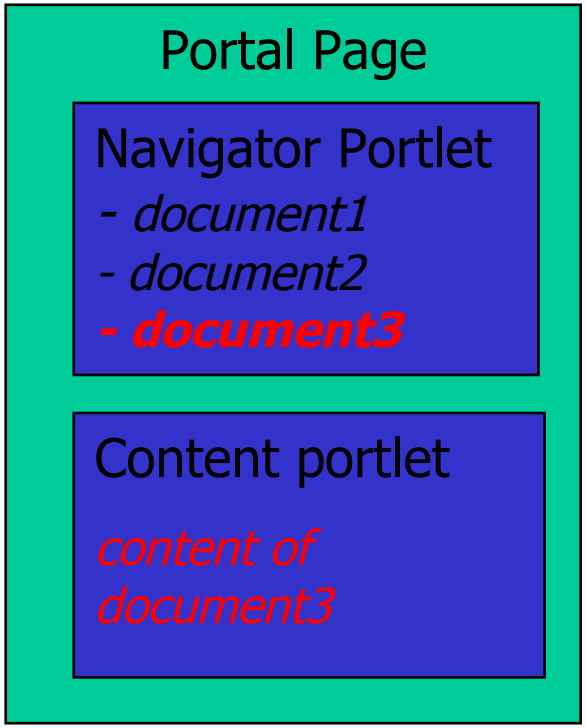
Public parameters in portal URLs

http://portal.com/...docid=document2...



Render link to select document3

http://portal.com/...docid=document3...



Public parameters

- Allow render parameters to be shared across portlets
  - Not restricted to the portlet application
  - May be even across pages
  - Lightweight coordination based on HTTP GET
- Example
  - The zip code of a selected city allowing different portlets (map, tourist information, weather) to display information for this city
- Semantic
  - Parameters are visible to the portal and allowed to be shared with other components

Public Parameters

- Re-use existing render parameter APIs
  - Allows to even enable JSR 168 portlets to use public render params by just giving them an JSR 286 deployment descriptor
- Define in the portlet.xml which render parameters are public
  - Has an simple string ID that the portlet can use in the code
  - Provides a QName and optional alias names for wiring the parameter
- Allow getting all public params via the PortletContext at runtime

Public parameters vs. Events

- Different HTTP semantics
  - Public parameters: GET semantic, render parameters can be changed via render links and define view state
  - Events: POST semantics, part of the action phase, allowed to change persistent state
- Advantages of using public parameters
  - Less processing overhead, no action phase required
  - Parallel rendering of portlets possible
- Limitations when using public render parameters
  - No active notification that something has changed
- Public render parameters are encoded in the URL in some portals, like the RI or IBM WebSphere Portal
  - Bookmarkablity
  - Support of browser back/forward button
  - Caching in the browser

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Resource serving

- Resource serving in JSR 168: direct serving via the portal / portlet container
  - Via using encodeURL(resourceURL)
  - No portlet runtime context available
- Additional in JSR 286: resource serving via the portlet
  - New ResourceURLs that trigger a new lifecycle method serveResource
  - Portlet context available (render params, portlet mode, window state, preferences...)
  - No state changes on navigation state (render params, portlet mode, window state) or shared state allowed
  - Protected via the portal access control
- Resource Ids
  - You can set a specific resource ID on a resource URL
  - Default behavior of GenericPortlet is to try to forward the resource serving to the resource ID specified

Resource serving

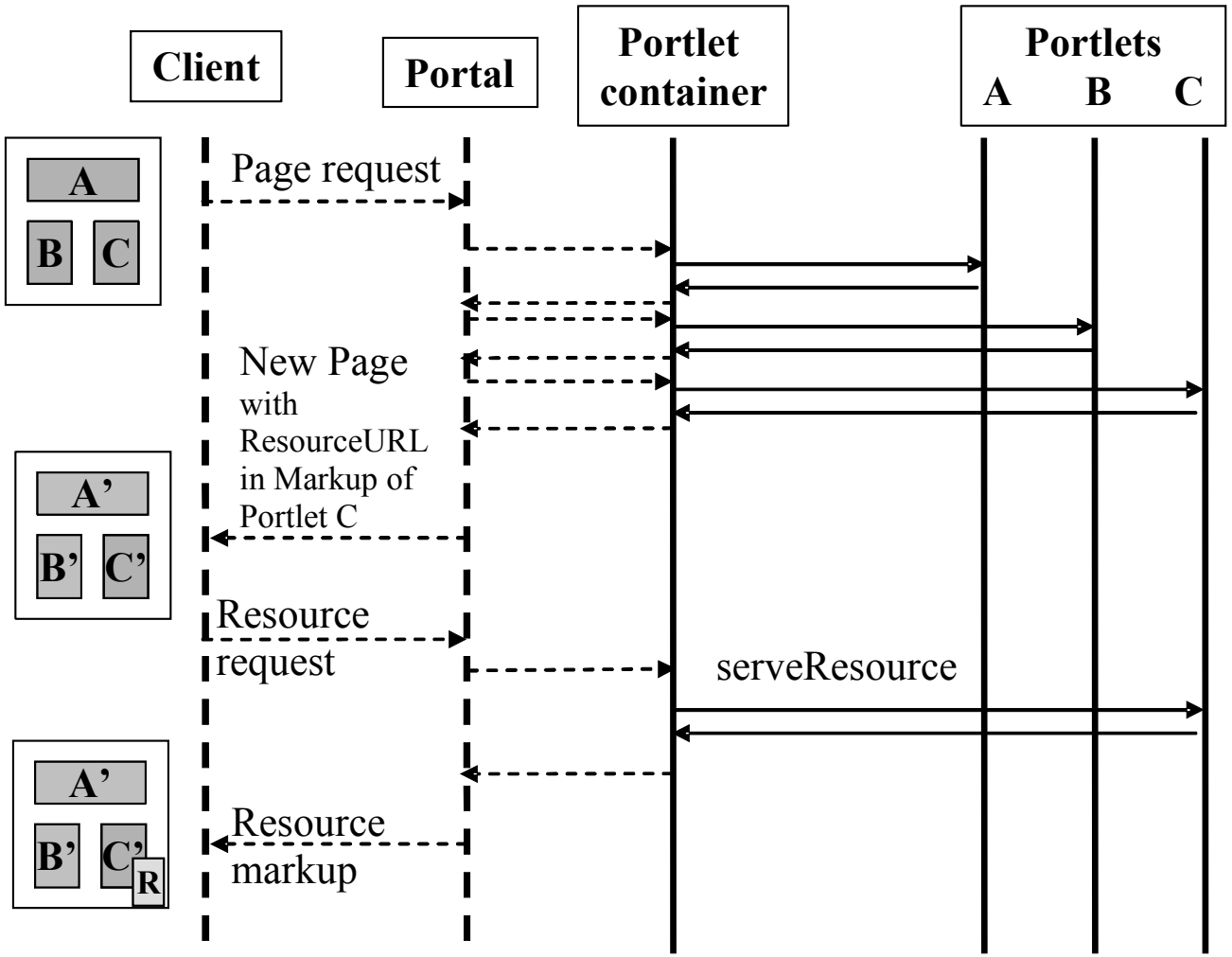
- Different cache levels of resource URLs
  - For supporting caching of the resource at the browser
  - Three types introduced: FULL, PORTLET, PAGE
  - FULL
    - Resource content is fully cacheable in the browser
    - No access to the portlet mode, window state, render parameters
    - No Portlet URLs besides Resource URLs of type FULL
    - May even be shared across portlets using the property ResourceURL.SHARED and a QName
  - PORTLET
    - Resource content is cacheable on a portlet level
    - Can be cached in the browser as long the portlet state does not change
    - No Portlet URLs besides Resource URLs of type FULL and PORTLET
  - PAGE
    - Resource content is cacheable on the portal page level
    - Any change of state on the portal page requires a reload of the resource
    - All Portlet URLs are allowed

Resource serving API

- ResourceURL
  - setResourceID(String id)
  - setCacheability(String cacheLevel)
  - cacheLevels: full, portlet, page
- resourceURL tag

- New lifecycle interface ResourceServingPortlet
  - void serveResource (ResourceRequest req, ResourceResponse resp)
  - Support for different HTTP methods (GET, POST…)
    - Via getMethod()
  - ResourceRequest
    - Like render request + ability to get uploaded data
  - ResourceResponse
    - Like render response + full control over the output stream
  - Allow changing preferences

R


Client
Portal
Portlet container
Portlets
A
B
C
Page request
New Page with ResourceURL in Markup of Portlet C
Resource request
serveResource
Resource markup
A
B
C
A'
B'
C'
A'
B'
C'
R

Code sample resource serving

- JavaServer Pages™ (JSP™) technology generating the resourceURL

```
<portlet:resourceURL var="searchUrl"/>
<input id="combobox" dojoType="StateSelector"
 value="Start typing"
 dataUrl="<%=searchUrl%>search=%{searchString}"
 mode="remote">
```

- Portlet code

```
public void serveResource(ResourceRequest request,
  ResourceResponse response)
  throws PortletException, IOException {
   if (request.getParameter("search") != null) {
      // do search, e.g. return JSON fragment for Dojo
        widget
   }
}
```

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Setting cookies and HTTP headers / HTML head attributes

- Portlets in v1.0 could not set cookies and HTTP headers
  - Portal has the control over the output stream to the client and body content may already be written
- Portlets in v2.0 can set cookies and HTTP headers / HTML head attributes
  - In render and resource life cycle methods
  - Restrictions for render response
    - Need to be done in the RENDER_HEADERS part of the render phase
    - May be overridden by the portal or other portlets
  - Restrictions on cookies
    - Cookies may be stored on the portal or get re-written and thus not accessible on the client

API

- HTTP headers
  - Setting: via the set / add property methods on the response
  - Retrieving: via the getProperty methods on the request
- HTML head attributes
  - Setting: via addProperty(String, org.w3c.dom.Element)
- Cookies
  - Setting: addProperty(javax.servlet.http.Cookie)
  - Retrieving: javax.servlet.http.Cookie[] getCookies()

Supporting setting Headers / Head elements / Cookies in render

- Headers / Cookies needs to be set before the document body starts
  - Buffer all output and at the end create the response to the client
    - Very inefficient
  - Split render into two parts: headers and markup
- JSR 286 allows portals to set a render request attribute RENDER_PART with values
  - RENDER_HEADERS for setting headers, cookies, title
  - RENDER_MARKUP for rendering the markup
- GenericPortlet takes care of this request attribute
  - for RENDER_HEADERS calls
    - doHeaders,
    - setNextPossiblePortletModes
    - setTitle
  - Calls dispatch to doXYZ or RenderMode annotation for RENDER_MARKUP

Code sample for setting cookies

- Setting cookies

```
public class MyPortlet extends GenericPortlet {
protected doHeaders(RenderRequest req, RenderResponse resp)
  {
        Cookie cookie = new Cookie("myCookie", "42");
        resp.setProperty(cookie);
}
```

- Retrieving cookies

```
protected doView(RenderRequest req, RenderResponse resp) {
        Cookie[] cookies = req.getCookies();
        if ( cookies != null ) {
                    // find my cookie in the array and
  retrieve
                    // value with cookie.getValue()
        }
```

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Portlet filters

- Portlet filters and request / response wrappers available
  - Similar in large parts to the servlet filter model
  - Filters are declared in the DD via the filter and filter-mapping element
  - Filters can be restricted to specific portlet lifecycle methods in the DD via the filter-mapping element
  - One filter interface per portlet lifecycle
    - But implementations can implement multiple interfaces
  - Filter chain that gets called by the portlet container
- Available via new javax.portlet.filter package

Code sample Portlet Filters

- Portlet Deployment Descriptor

```
// filter declaration
<filter>
        <filter-name>PortletFilter</filter-name>
        <filter-class>com.example.PortletFilter</filter-class>
        <lifecycle>RENDER</lifecycle>
</filter>

// filter mapping
<filter-mapping>
        <filter-name>PortletFilter</filter-name>
        <portlet-name>MyPortlet</portlet-name>
</filter-mapping>
```

Code sample Portlet Filters

- Portlet Filter Code

```
public class PortletFilter implements RenderFilter {

  public void doFilter(RenderRequest req, RenderResponse
  resp, FilterChain chain) throws .. {
       PrintWriter pw = resp.getWriter();
       pw.write("Pre-processing");

       MyRenderResponseWrapper resWrapper =
                    new MyRenderResponseWrapper(res);
       chain.doFilter(req, resWraper);

       pw.write("Post-processing");
  }
}
```

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Extended Request Dispatcher capabilities

- Goal: Better support servlet-based frameworks
- Request dispatch includes now allowed for all life cycle methods
  - For action / event no markup can be returned
  - Allows servlet-based bridges to handle controller logic via servlets
- Request dispatcher forward allowed for all life cycle methods
  - Delegate to servlets for action handling
  - Delegate to JSP™ for complete markup generation
  - Leveraged by GenericPortlet for resource serving by forwarding to the specified resource ID if that reflects the path of the resource

Caching

- New API CacheControl
  - Allows to get and set cache settings
- Shared cache entries
  - Response can be cached across users
    => large performance gain for non-customizable portlets
  - Default defined in deployment descriptor via the cache-scope tag
  - Can be set on each response
- Validation based caching
  - In addition to the expiry time the portlet can provide a token for the currently returned markup
  - When content is expired portlet gets called with the content token
  - The portlet either
    - re-validates the content and set a new expiry time for the token or
    - create new content with a new token and a new expiry time
  - Based on the HTTP ETag validation caching scheme

Tag lib additions

- New tag for creating resource URLs
- New variables available via defineObjects
  - portletSession
  - portletSessionScope: Map of portlet session attributes
  - portletPreferences
  - portletPreferencesValues: Map of portlet preference values
- New attributes for the URL tags
  - escapeXml for turning of XML escaping, like in JSTL
    - Per default URLs are XML escaped
    - Default can be change in the portlet.xml via a new container-runtime-option element and setting javax.portlet.escapeXml to false
  - copyCurrentRenderParameters for copying the current render parameters

Portlet managed modes

- Allow portlets to specify their own application-specific portlet modes
  - From the portal point of view they are treated like the View mode
  - Portlet can specify a text and description for that mode
  - Portal may include this additional mode in the navigation area
- Portlet can register for portlet mode change events
  - preset render params or data in prefs/backend systems
- Portlets can return a list of meaningful new portlet modes in each render
  - Hint for the portal to render the appropriate controls
- Example
  - ShowShoppingCart mode that displays the shopping cart content

Java 5 features

- Annotations
  - Events handling methods can be annotated with @ProcessEvent
  - Action handling methods can be annotated with @ProcessAction
    - action name must be set on the ActionURL as value of the parameter javax.portlet.action
  - Render handling methods for a specific portlet mode can be annotated with @RenderMode
- Enums
  - Enum for user info attributes
- Generics
  - Leveraged Generics in the interfaces
- Support for Java 1.4-based implementations
  - There is a jar file for 1.4-based implementations with the Java 5 features removed
  - Allows to write portlets that run on Java 1.4-based containers

Misc

- Extended runtime Ids
  - Namespace is now valid for the lifetime of the portlet window
  - Portlet can access the portlet window ID at the request
    - Use this ID if a per portlet window cache key is needed
- PortletURL now accepts a writer
  - Much more efficient than creating Strings
- CC/PP support (JSR 188)
  - Available as attribute on the request
- Restrict the custom window states for a given markup
- Additional listener support
  - URL listeners
  - Servlet 2.4 listeners
- Resource bundle for portlet application level texts
  - In 1.0 it needed to be inline in the portlet.xml

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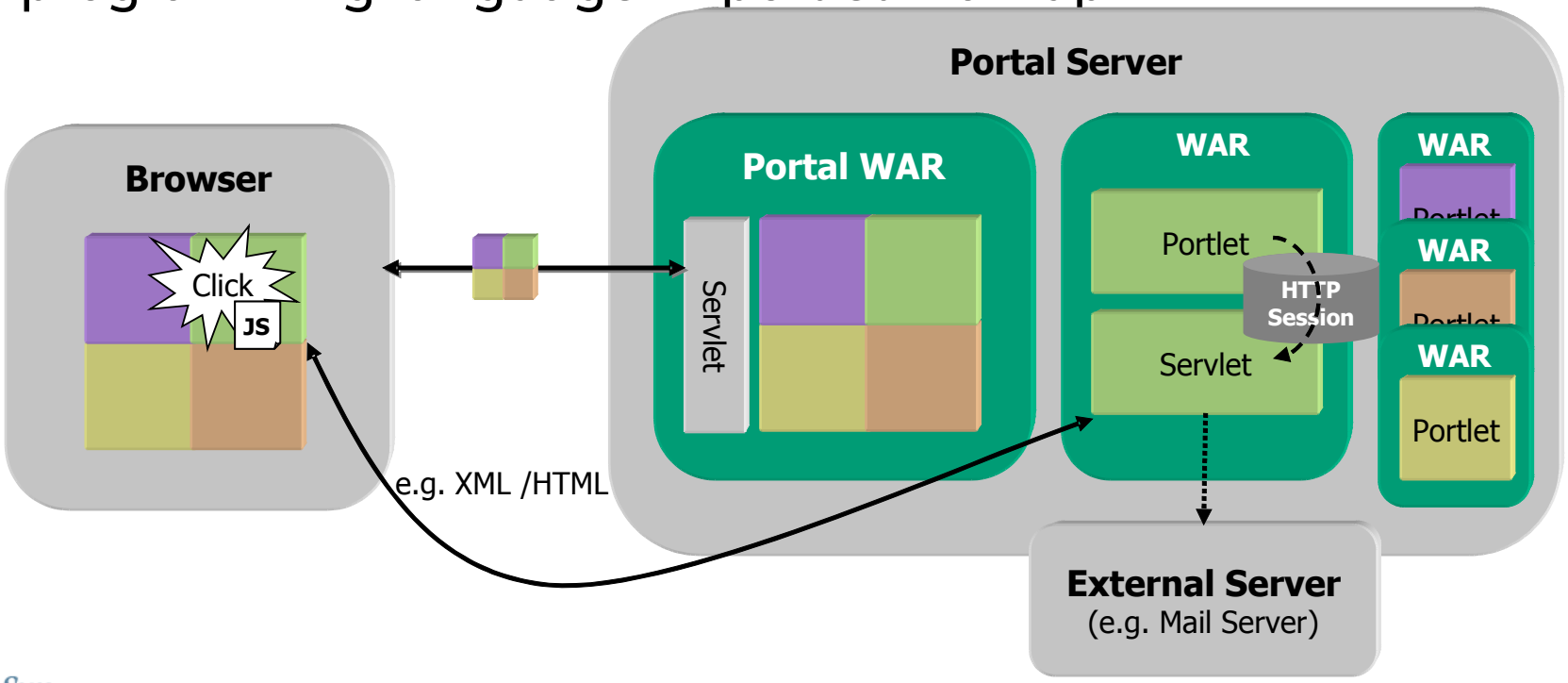
AJAX usages in a Portal environment – JSR 168

- Portal level
  - Portal does an aggregation on the client (browser)
  - Portal manages AJAX interaction
  - Transparent to the portlet
  - Possible with JSR 168 portlets
  - Example:
    - Client-side aggregation theme of the IBM WebSphere Portal 6.1
- Portlet level
  - Portlet brings its favorite AJAX library
  - Portlet has to manages end-point on its own
    - Provide servlet for serving the AJAX request
  - JSR 168 is limited
    - response without portlet context (served via servlet)
    - no state changes for state managed by the portlet container(portlet mode, window state, render parameters, portlet preferences, portlet session attributes)

AJAX usage pattern with JSR 168

- Portlet WAR contains one portlet and one servlet
- Portlet is embedded into markup like any other portlet
- Servlet is directly accessed through JavaScript™ programming language in portlet markup

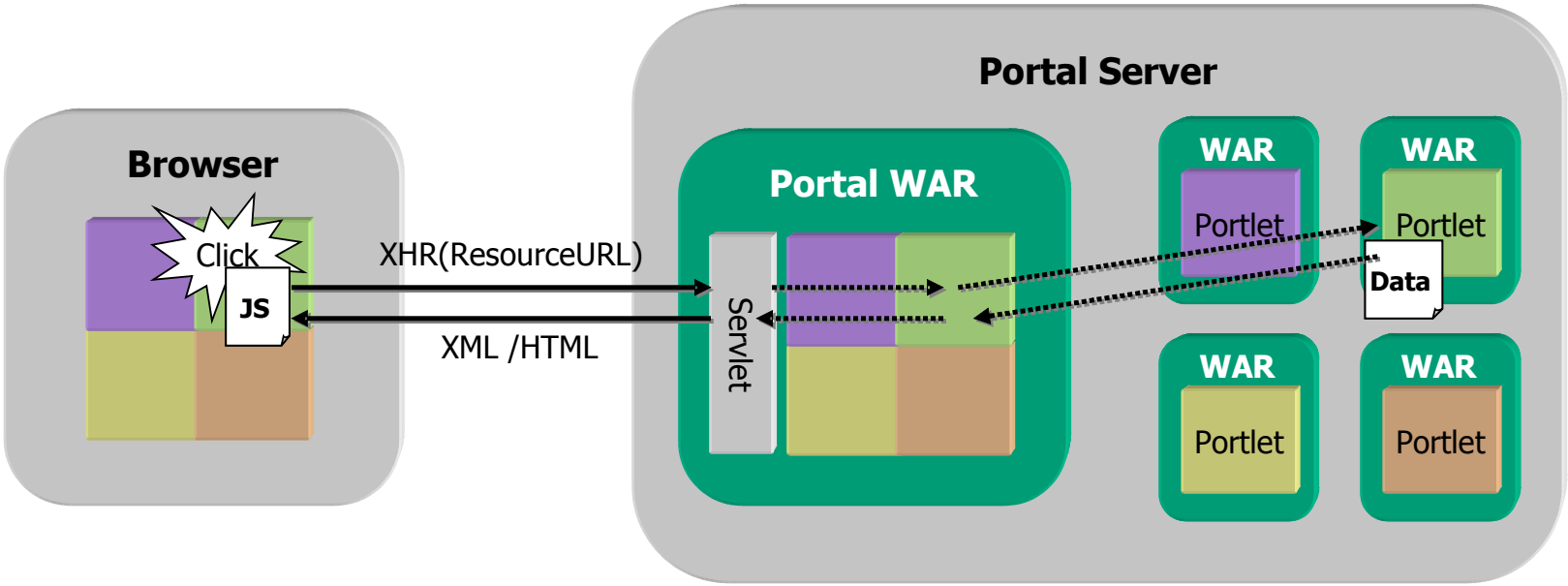


JSR 286 – leveraging resource serving

- Portlet owned AJAX calls
  - Full access to the portlet state
    - Via XmlHttpRequest and ResourceURLs
    - Allowed to change portlet preferences and portlet-scoped session attributes
  - Functionality restricted:
    - No state changes for navigational state (portlet mode, window state, render parameters)
    - No support for events
- Coordinated between portal and portlet
  - Not covered by JSR 286, but vendor specific solutions exist
  - Needs to include a client side library that the portlet can leverage
    - E.g. for allowing the portal to update the URLs on the page if the portlet sets new render parameters
  - There may a some help from groups like OpenAjax in the future
    - Defining a generic client side gadget programming model

AJAX usage pattern with JSR 168

- JavaScript programming language call points to the Portal Application
- Portal Application dispatches resource serving call to portlet



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Portlet compatibility

- Interfaces are binary compatible between 1.0 and 2.0
  - JSR 168 portlets can run unchanged on a JSR 286 container
- Source compatibility achieved besides the following changes
  - RenderResponse.setContentType is no longer required before calling getWriter or getOutputstream.
    - Helps frameworks like JSF
  - getProtocol for included servlets / JSPs no longer returns null, but 'HTTP/1.1' in V2.0
    - Make behavior compatible with GenericServlet
- V 2.0 portlet deployment descriptor is an extension of V 1.0
  - You get a JSR 286 portlet by just changing the line in the portlet.xml that references the 2.0 xsd
- V 2.0 tag lib has a new namespace
  - Avoids clashes for portlets that get migrated from JSR 168

Important clarifications

- Come into play when migrating a JSR 168 portlet to a JSR 286 portlet
- XML escaping of portlet URLs produced via the portlet tag library
  - V 2.0 clarifies that the default is all portlet URLs are XML escaped
  - Default can be changed with the portlet container runtime option javax.portlet.escapeXml
- Defining multiple values for the same parameter name in the Portlet param tag
  - V 2.0 clarifies that if the same name of a parameter occurs more than once within PortletURLs the values must be delivered as parameter value array with the values in the order of the declaration within the URL tag
- Parameters set on the portlet URL and the post body are aggregated into the request parameter set

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Web Services for Remote Portlets V2.0

- Standard protocol for accessing portlets as web service
- Defined at OASIS, chaired by IBM
- Members of the TC
  - BEA, R. Brooks, CA, NetUnity Software, Novell, Microsoft, Oracle, Tibco, SAP, Sun, Vignette…
- Schedule
  - Final since March 2008
- Closely aligned with JSR 286
  - Enables writing JSR 286 portlets and publish them as WSRP services at runtime
  - Contains all the coordination features and resource serving of JSR 286
  - Portlet developer does not need to know anything about WSRP
  - Portal administrators can simply decide to run portlets on remote servers

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Summary

- JSR 286 is a large step forward
  - The size of the specification and the API more than doubled compared to V 1.0
- JSR 286 supports building composite application
  - via coordination means events and public parameters
- JSR 286 allows for additional AJAX use cases
  - Using resource serving through the portlet
- Better integration of portlets with servlet-based frameworks
  - Setting HTTP headers / cookies, filters, request dispatching
- Better scalability
  - Different cache levels for resource serving, shared cache entries, validation-based caching, PortletURL.write
- WSRP 2.0 and JSR 286 are closely aligned
  - publish a JSR 286 portlet as WSRP service

For More Information

- JSR 286
  - http://jcp.org/en/jsr/detail?id=286
- Reference Implementation
  - http://portals.apache.org/pluto/
- WSRP
  - http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=wsrp

THANK YOU

Stefan Hepper