



**OSGi Alliance Community Event**  
June 26th - 27th, 2007  
Siemens AG Campus - Munich, Germany



# **OSGi Alliance Community Event**

## **Building Server-Side Eclipse based Web applications**

### **Part 1 – Basics**

**Technical Sessions – Short Talks, 2007-06-27**



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## The presenters

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Eclipse Committer

**Based on materials contributed by Jochen Hiller, Simon Kaegi, Martin Lippert, Gunnar Wagenknecht for EclipseCon 2007 tutorials**



## What is Server-Side Eclipse (SSE)?

Recognition... that many of the features that have made RCP successful are equally applicable in server-side contexts.

- Standardized component model (OSGi)
- Pervasive extensibility – Extension Registry
- Runtime provisioning

Integration... with existing server-side infrastructure and technologies

- J2EE Application Servers
- Servlets and JSPs
- Application Frameworks
- ...

Jeff McAffer stated at EclipseCon 2007, Equinox BOF (03/06/2007):

Server-Side Eclipse is a concept, a marketing name, to illustrate possible usage scenarios (like RCP).

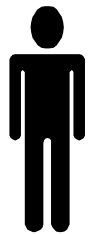


## What is SSE from an OSGi perspective?

- An OSGi implementation (Equinox)
- Different HttpService implementation(s) (Equinox)
  - Embedded Jetty
  - ServletBridge with JavaEE Web Container
- Enhanced Http Support (Equinox)
  - Declarative contribution to HttpService
  - JSP Support
  - Additional adapter helpers
- Extensive Toolset (Eclipse PDE)
  - Development tooling
  - Deployment support



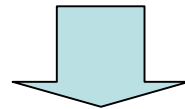
# What motivates developers to use SSE?



Web developer

Java™ EE  
application

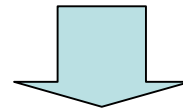
+ component model  
+ use 3<sup>rd</sup> party plugins



RCP developer

RCP  
application

+ server support  
+ re-use plugins  
+ distributed  
applications

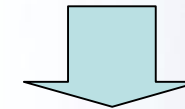


Infrastructure developer

application  
framework

+ component model

- modular
- flexible
- dynamic



Server-Side Eclipse



## What is the OSGi HttpService?

- HttpService is part of OSGi v4 component specification
- Provides HttpService based on Servlet 2.1 spec
- Key concepts:
  - HttpService
  - Servlets, Resources
  - HttpContext
- Unified URI space
- Focused on small, embedded devices

```
/* © Copyright OSGi Alliance */
package org.osgi.service.http;

public interface HttpService {

    public HttpContext createDefaultHttpContext();
    public void registerResources(String alias,
        String name,
        HttpContext context)
        throws NamespaceException;
    public void registerServlet(String alias,
        Servlet servlet,
        Dictionary initparams,
        HttpContext context)
        throws ServletException, NamespaceException;
    public void unregister(String alias);
}

public interface HttpContext {

    public String getMimeType(String name);
    public URL getResource(String name);
    public boolean handleSecurity(
        HttpServletRequest request,
        HttpServletResponse response)
        throws IOException;
}
```



## HttpRegistry extension point

- Provides a declarative alternative to using the `HttpService` directly in code.
  - [httpcontexts] – supports creation of a basic parameterized `HttpContext` or user-defined `HttpContext`
  - [servlets] – provides the equivalent semantics of the `HttpService.registerServlet(...)` call.
  - [resources] – provides the equivalent semantics of the `HttpService.registerResource(...)` call.
- One difference: registration lifecycle
  - Follows Eclipse extension point approach è not dynamic
  - resolve/unresolve vs. start/stop



# HttpRegistry extension point – example

```
<!-- © Copyright 2007 Jochen Hiller, Simon Kaegi, Martin Lippert, Gunnar Wagenknecht, IBM Corp.; All rights reserved. This source code is
made available under the terms of the Eclipse Public License, v1.0. -->
<?xml version="1.0" encoding="UTF-8"?>
<?eclipse version="3.2"?>
<plugin>
  <extension point="org.eclipse.equinox.http.registry.httpcontexts">
    <httpcontext id="root-context">
      <resource-mapping
        path="/WebContent">
      </resource-mapping >
    </httpcontext>
  </extension>
  <extension point="org.eclipse.equinox.http.registry.resources">
    <resource
      alias="/sample"
      base-name="/"
      httpcontextId="root-context" />
  </extension>
  <extension point="org.eclipse.equinox.http.registry.servlets">
    <servlet
      alias="/sample/hello"
      class="sample.HelloServlet"
      httpcontextId="root-context" />
    <serviceSelector filter="(http.port=8080)" />
  </extension>
</plugin>
```

HttpContext maps to resources

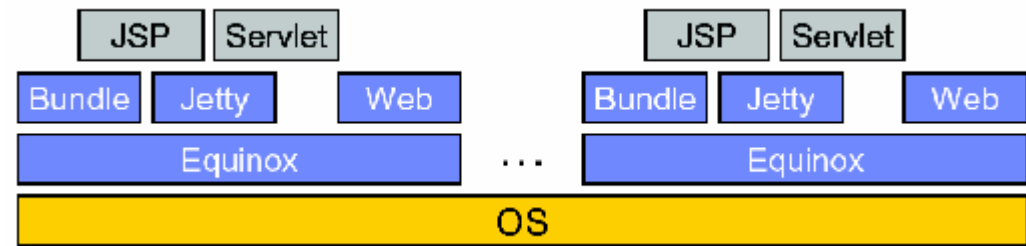
Register resources for URL

Register servlets for URL  
Filter for specific HttpService

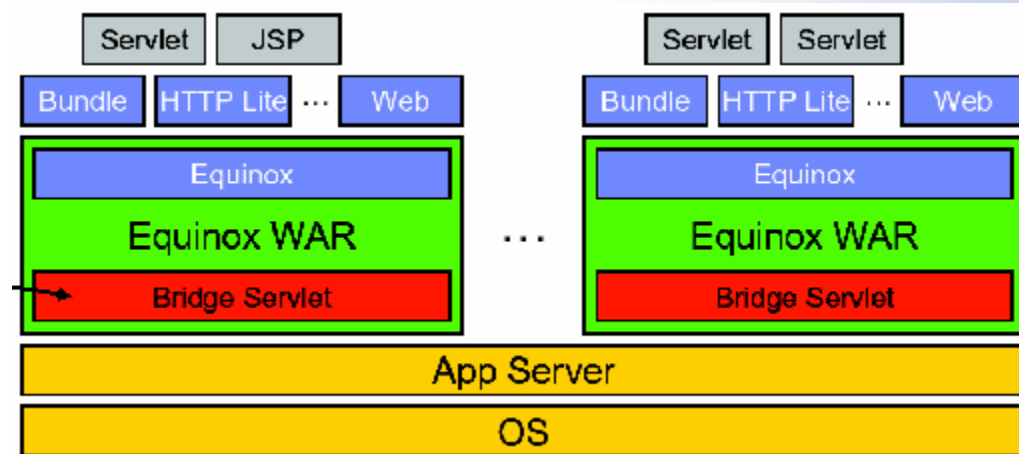


## Deployment scenarios of Server-Side Eclipse

- Equinox embedding a HttpService
  - e.g. based on Jetty



- Application Server running an embedded Equinox
  - Bridging aspect is referred to as the *Servletbridge*
  - Isolation between multiple web applications/Equinox instances



Source: Jeff McAffer, Eclipse Summit Europe, Server-Side Symposium, Oct 12nd 2006



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# Demo

- Servlet Sample
- Http Service Tracker
- Stop / start bundles
- Service Tracker vs. Http Registry



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# **OSGi Alliance Community Event**

## **Building Server-Side Eclipse based Web applications**

### **Part 2 – User Interfaces**

**Technical Sessions – Short Talks, 2007-06-27**



## Different approaches for Server-Side UI's

- Java EE standards
  - Based on Java EE technologies (JSP, Struts, ...)
  - Proposal for RSP-UI from Infonoia and others
  - See: <http://www.eclipse.org/proposals/rsp/>
- Rich AJAX Platform
  - Accepted as Eclipse technology project
  - RCP styled development approach
  - See: <http://www.eclipse.org/rap/>
- Google Web Toolkit
  - Client-centric UI approach
  - See: <http://code.google.com/webtoolkit/>

*Java EE*

*RAP*

*GWT*



## Java EE vs. the OSGi HttpService (1)

- Dynamic Registration
  - Replaces web deployment descriptor (e.g. `web.xml`)
  - Dynamic registration supports `register/unregister` of resources/servlets
  - Code based: tied to START/STOP lifecycle
    - e.g. during `BundleActivator.start()`
  - Declaration based: tied to RESOLVED/UNRESOLVED lifecycle
    - e.g. using Equinox `HttpRegistry`
  - Other options: Declarative services, OSGi-Spring
- URL mapping differences
  - `alias` roughly equivalent to `<url-mapping>`
  - No more than one registration per `alias` (worth planning, use relative URLs)
  - No welcome-file support (Mapping from `/` to `/index.html`)
  - No support for extension mappings



## Java EE vs. the OSGi HttpService (2)

- **HttpContext**
  - Maps 1:1 to a ServletContext
  - MIME type retrieval, resource retrieval, authentication
  - Whats missing:
    - `getNamedDispatcher`,
    - `getResourcePaths`
    - `getInitParameters (*)`,
    - "Context Path" (\*)
- **Servlets and Filters: Whats missing:**
  - `Filter(*)`, `HttpSessionListener's`,  
`ServletContextListener's(*)`, `ServletRequestListener's`

```
/* © Copyright OSGi Alliance */  
package org.osgi.service.http;  
  
public interface HttpContext {  
  
    public String getMimeType(String name);  
    public URL getResource(String name);  
    public boolean handleSecurity(  
        HttpServletRequest request,  
        HttpServletResponse response)  
        throws IOException;  
}
```

```
/* Supported in Equinox (via Reflection). */  
  
public Set getResourcePaths (String path);
```

(\*) Workarounds available: Wrapper technique.

See `org.eclipse.equinox.http.helper[s]` in Equinox Incubator (not API yet)



## Equinox JSP Support

- Use `{path}/*.jsp` style alias for JSPs.
- JSP lookup consistent with OSGi `HttpService` resource registration
- Provides JSP support for Help / UA in the Eclipse 3.3 SDK
- Work with RSP-UI to provide further framework integrations
- JSP Tag Library Discovery supported along bundle classpath
- Supported under the Servletbridge...
  - Allows for portable pre-compiled JSPs
- Provided by: `org.eclipse.equinox.jsp.jasper.JspServlet`
  - `public JspServlet(Bundle bundle,  
String bundleResourcePath, String alias)`
- JSP Extension Registry Support provided



# What is Rich AJAX Platform (RAP)?

Brings Eclipse RCP based development style to Web 2.0 era

RAP is:

- An Eclipse technology project (proposed by Inoopract and others)
- Java based UI / AJAX development
  - Using RAP Widget Toolkit (RWT), subset of SWT API
  - Based on JavaScript client-side framework (qooxdoo)
- Eclipse Workbench concept extended for the web
  - incl. Session support
- API compliant with SWT, JFace, Workbench, extension point namespaces

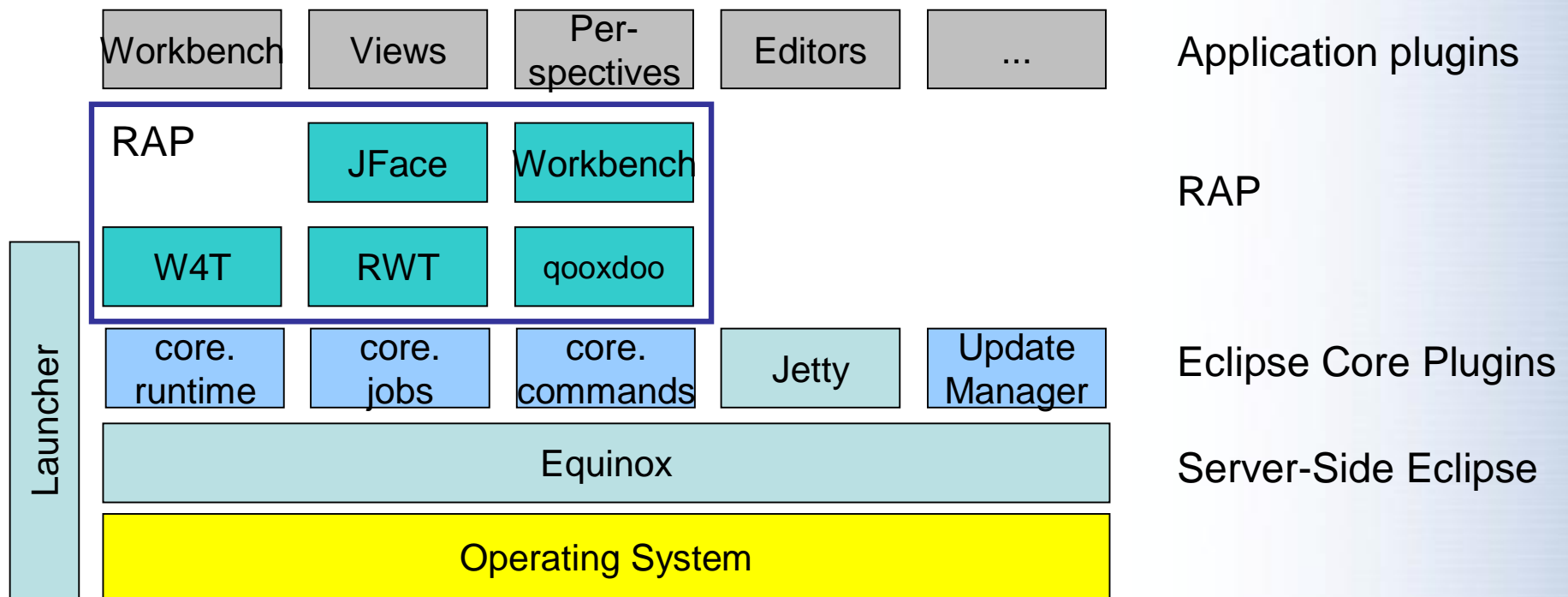
See also:

- <http://www.eclipse.org/rap/>
- Active community, great interest



# What are the RAP components?

- qooodoo: underlying client-side JavaScript framework
- RWT: RAP Widget Toolkit (migrated from W4T), subset of SWT
- JFace, Workbench: RAP based implementations of Eclipse RCP





# The Google Web Toolkit (GWT)

- Build AJAX apps in the Java language
- Embed components in existing HTML
- Full desktop app clones
- Apache 2.0 license
- Vibrant community



# Deploying as Eclipse Server-Side Bundles

- One GWT module à Two OSGi bundles
- Server-side bundle
  - RPC service implementation
  - Exposed using `org.eclipse.equinox.http.registry.servlets`
- Client-side bundle
  - Compiled GWT code (Java + JavaScript) together with HTML, style sheets, images, etc.
  - Exposed using `org.eclipse.equinox.http.registry.resources`



## Demo

- PlanetEclipse – FeedReader demo
- RAP FeedReader
- GWT FeedReader
- Starting / stopping bundles using Knopflerfish console
- Install new bundles



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## For more information...

EclipseCon 2007 Short tutorials:

<http://www.eclipsecon.org/2007/index.php?page=sub/&id=3607>

<http://www.eclipsecon.org/2007/index.php?page=sub/&id=3719>

Project hub:

<http://www.eclipse.org/equinox/server>

Newsgroup:

<news://news.eclipse.org/eclipse.technology.equinox>

Dev Mailing List:

[equinox-dev@eclipse.org](mailto:equinox-dev@eclipse.org)

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Thank-you



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