



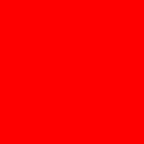
ORACLE®

GlassFish v3 - A Taste of a Next Generation Application Server

Peter Doschkinow
Senior Java Architect

Agenda

- GlassFish overview and positioning
- GlassFish v3 architecture
- Features beyond Java EE 6
 - Productivity
 - Modularity, OSGi support
 - Management and Monitoring
 - Scripting



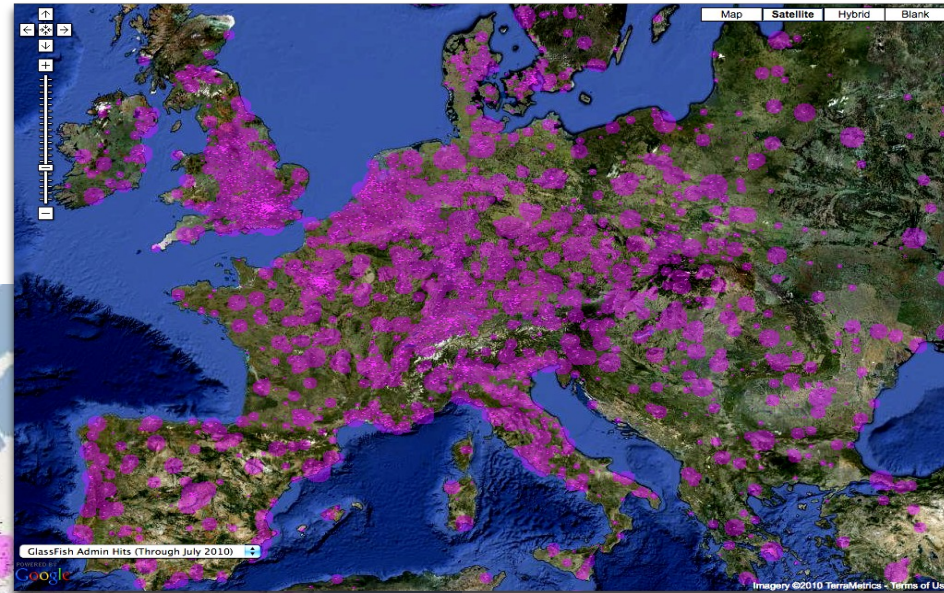
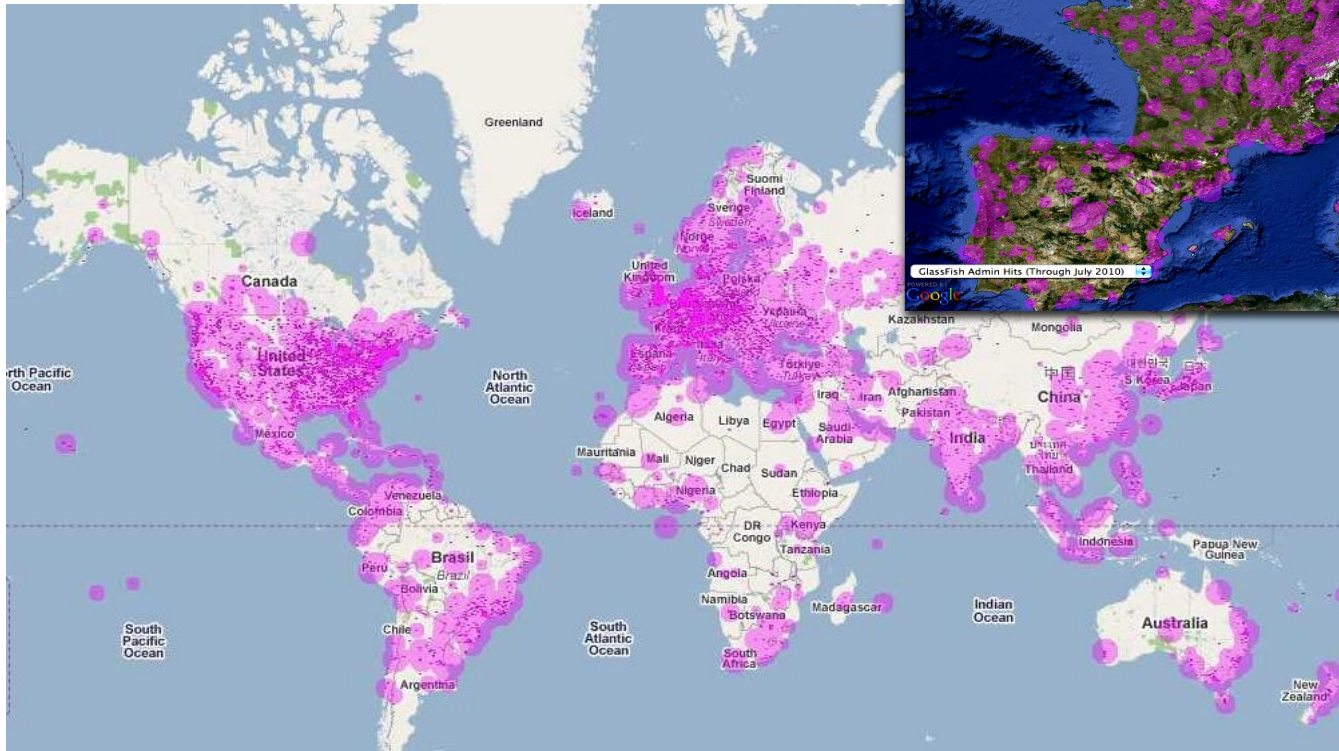
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Project Glassfish

- Java EE RI
 - Java EE 5.0, Java EE 6.0
 - Included in Java EE SDK
- Strong Developer Adoption
- Production Quality
- Open Source
- Strong Community
 - Sources, bug DBs, discussions at Java.Net
 - Roadmaps, Architecture Documents

GlassFish Around You

<http://maps.glassfish.org>



GlassFish Deployment

blogs.sun.com/stories



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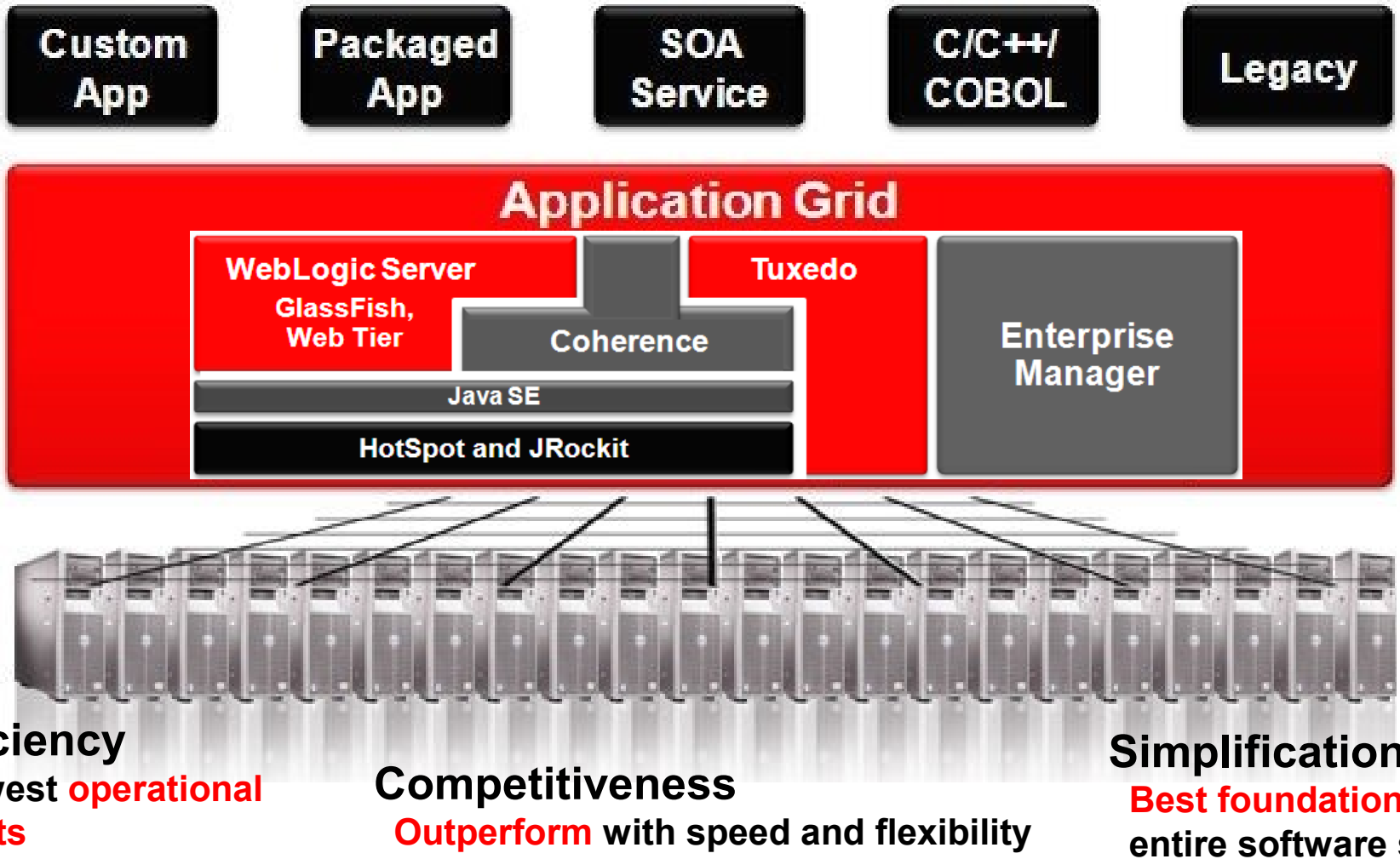
Federal Aviation Administration

GlassFish

Distributions Available Today

| Distribution | License | Features |
|-------------------------------------|--------------|--|
| GlassFish Open Source Edition 3.0.1 | CDDL & GPLv2 | <ul style="list-style-type: none">• Java EE 6 compatibility• Web Profile distribution• Single instance• mod_jk for load balancing |
| GlassFish Open Source Edition 2.1.1 | CDDL & GPLv2 | <ul style="list-style-type: none">• Java EE 5 compatibility• In memory replication / clustering• Centralized administration |
| Oracle GlassFish Server 3.0.1 | Commercial | <ul style="list-style-type: none">• Adds<ul style="list-style-type: none">• Oracle GlassFish Server Control• Patches, support, knowledge base |
| Oracle GlassFish Server 2.1.1 | Commercial | <ul style="list-style-type: none">• Adds<ul style="list-style-type: none">• Enterprise Manager• Patches, support, knowledge base |

Oracle Application Grid



Efficiency

Lowest **operational costs**

Competitiveness

Outperform with speed and flexibility

Simplification

Best foundation for entire software stack

GlassFish and WebLogic Together

- Best open source application server with support from Oracle
- Open source platform of choice for light-weight Web applications
- Focus on latest Java EE standards and community driven innovation
- Certified interoperability with Fusion Middleware
- Differentiated innovation



Production Java
Application Deployment

GlassFish Server

- Best commercial application server for transactional Java EE applications
- Platform of choice for standardization
- Focus on lowest operational cost and mission critical applications
- integration with Oracle Database, Fusion Middleware & Fusion Applications



Production Java
Application Deployment

WebLogic Server

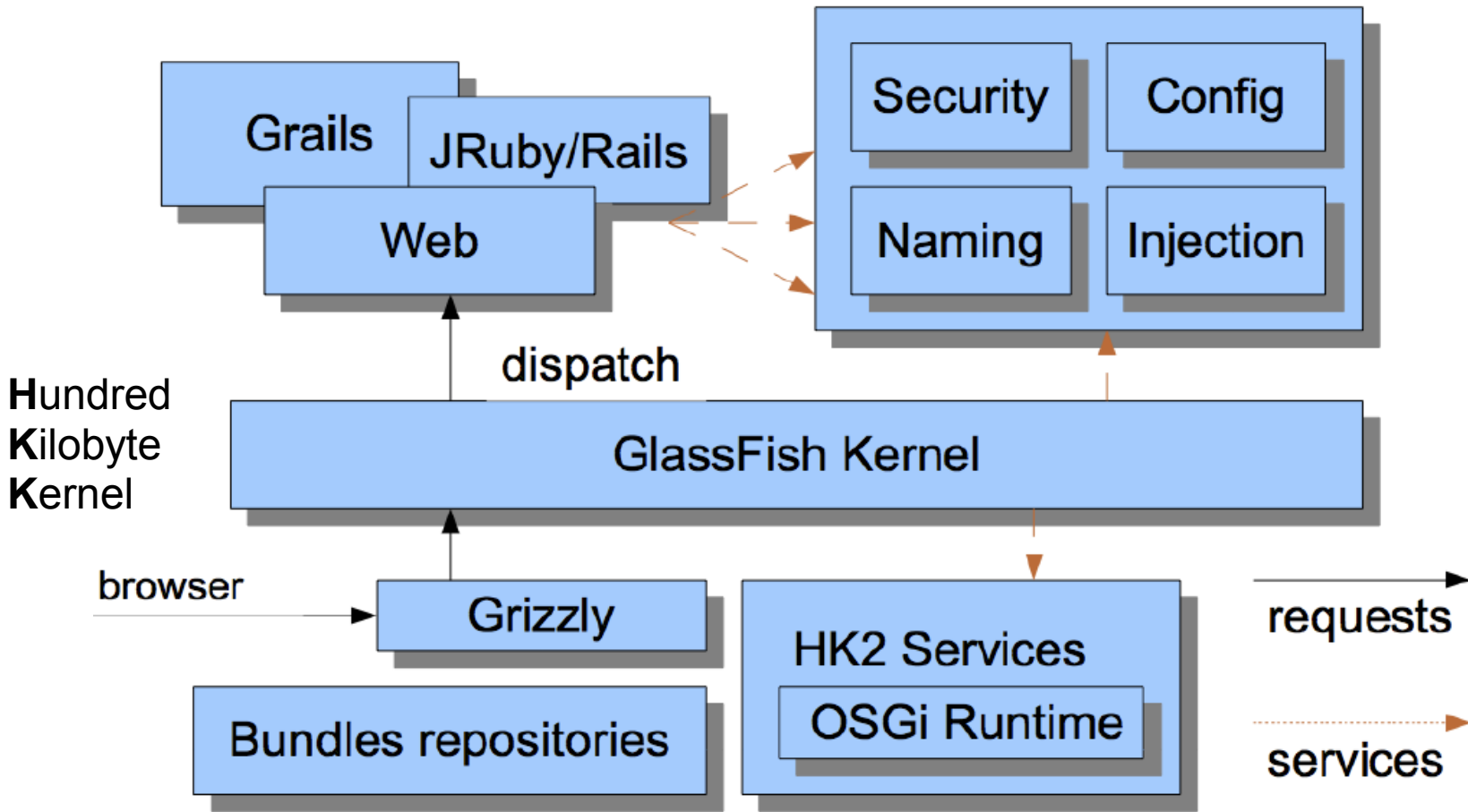
GlassFish Server Goals

| Java EE 6 Themes | Oracle GlassFish Server |
|--|---|
| <ul style="list-style-type: none">• Flexibility | <ul style="list-style-type: none">• Flexibility |
| <ul style="list-style-type: none">• Extensibility | <ul style="list-style-type: none">• Extensibility |
| <ul style="list-style-type: none">• Developer Productivity | <ul style="list-style-type: none">• Developer Productivity |
| | <ul style="list-style-type: none">• Modularity / OSGi / Hybrid Apps |
| | <ul style="list-style-type: none">• Manageability |
| | <ul style="list-style-type: none">• High availability clustering |
| | <ul style="list-style-type: none">• 24 x 7 x 365 support |

GlassFish v3 Features

- Java EE 6 reference implementation
- Beyond Java EE 6
 - Developer productivity (will be treated separately)
 - Modular
 - Extensible
 - Embeddable
 - Observable
 - Hot technologies
 - Metro (Web Services)
 - Update Center
 - Scripting
 - Grizzly (HTTP Engine, Comet, mod_jk)

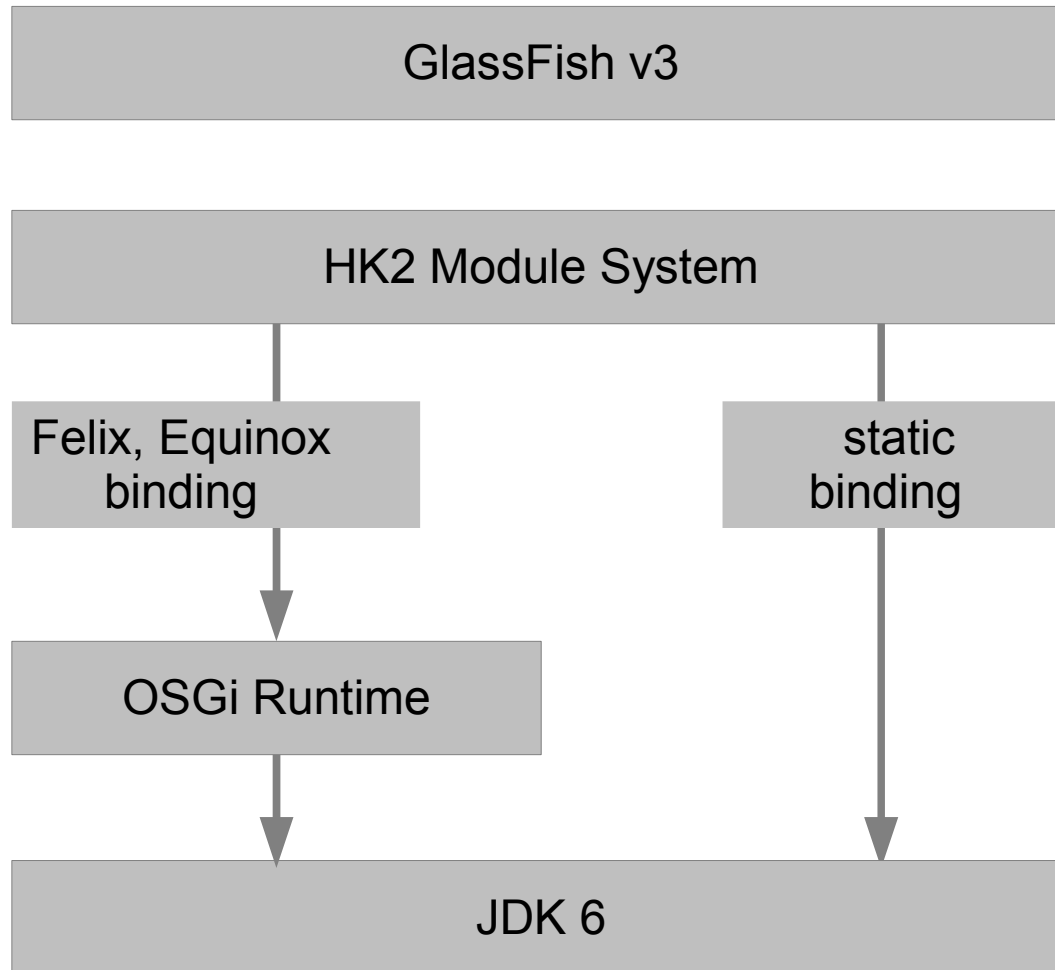
GlassFish v3 Architecture



GlassFish v3 Modularization and Extensibility

- Based on OSGi
- Extensible
 - Extensive APIs to replace or extend features
 - OSGi also provides extensions capabilities
- SOA based architecture
 - Services implement different types of interfaces
 - Java SE style with a META-INF/services file
 - OSGi style
 - HK2
 - Lazy loading based on usage patterns
- Makes it easier to provide support for new container types

GlassFish v3 Runtime



Developer Productivity

- Getting Started
 - Small download
 - Fast startup time
 - Admin console with intuitive user interface
- Using GlassFish
 - Lightweight
 - Low resource utilization
 - Command Line Interface
 - Maven support
 - Rapid iterative development
 - Extensive IDE support

GlassFish v3 Tooling

- As usual, vi/emacs are Java EE 6 certified
 - Simpler to use: less code to type, less XML, less Interfaces to synchronized, more default values,...
- NetBeans 6.9.1 Java EE 6 ready
- Eclipse GlassFish Plugin 1.50 and above
- GlassFish Tools Bundle for Eclipse 1.2
- Oracle Enterprise Pack for Eclipse 11g
- IntelliJ IDEA 9
- Build your own: using GlassFish REST Admin APIs

Deploying Applications and Components

- Deploy Packaged component or expanded directory
- Automatic Deployment
- JSP Precompile
- Deploy Java EE Application Client through Java WebStart
- Dynamic Reloading (great during development)
- Keep Session on redeploy (great during development)

Session Retention

- Deployment option to maintain stateful sessions across re-deployments
- `asadmin redeploy --properties keepSessions=true myapp.war`
- Greatly simplifies the development paradigm
- Integrated in tools

GlassFish and OSGi

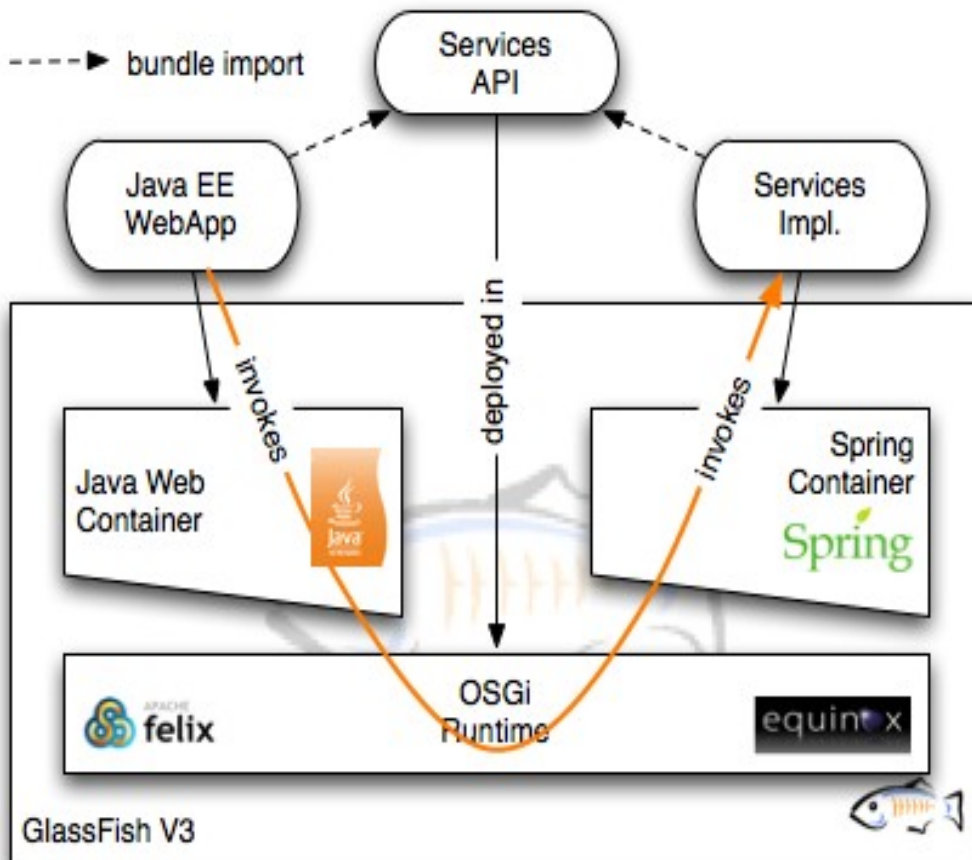
- Runs on top of OSGi (Felix by default)
 - Also runs unmodified on Knopflerfish and Equinox
 - GlassFish ships with 100+ bundles
 - Can run without OSGi (Static mode, thanks to HK2)
 - Can use OSGi management tools (CLI or Web)
- Extending GlassFish through OSGi
 - Any OSGi bundle will run in GlassFish Server
 - Drop it in glassfish/modules
 - Can also asadmin deploy it using “asadmin --type osgi ...”

GlassFish and OSGi

- OSGi visibility extended from GlassFish developers to GlassFish users
- OSGi services can be easily used in any Java EE application
 - `@Resource(mappedName="checkOsgiService")`
 - `CheckService checkService;`
 - Client code portable, does not use any OSGi specific API
 - Restriction: OSGi dynamism does not work
 - Converged applications needed
- Implementation of OSGi Enterprise specifications
 - HTTP Service, Web Container, JPA, JTA, JDBC

Extending GlassFish v3 with OSGi

http://blogs.sun.com/dochez/entry/glassfish_v3_extensions_part_4



- Extend GlassFish with an unmodified Spring dm container
- Simple Spring bean implementing the service
- Invoke the service from a servlet using standard @Resource injection
- Still no use of a GlassFish API
- Single runtime for both Spring and full Java EE

Hybrid Applications

use advantages from both worlds

- OSGi + Java EE = Hybrid application
- Hybrid application
 - An OSGi bundle
 - And a Java EE Archive
- Leverage the capabilities of both the platforms
 - Enterprise applications can
 - be built as modular OSGi bundles
 - use OBR, Config Admin, service tracking, etc.
 - OSGi bundles can use Java EE services like JTA, JPA
- Require a runtime that supports both standards

Web Application Bundle (WAB)

OSGi/Web Application

- WAR + OSGi bundle configuration

Manifest-Version: 1.0

Import-Package: javax.servlet.http; javax.persistence

Bundle-ClassPath: WEB-INF/classes/,WEB-INF/lib/entities.jar

Bundle-Version: 1.0

Bundle-ManifestVersion: 2

Web-ContextPath: /hello

Bundle-SymbolicName: test.hellowab

- Lifecycle now can be driven by OSGi

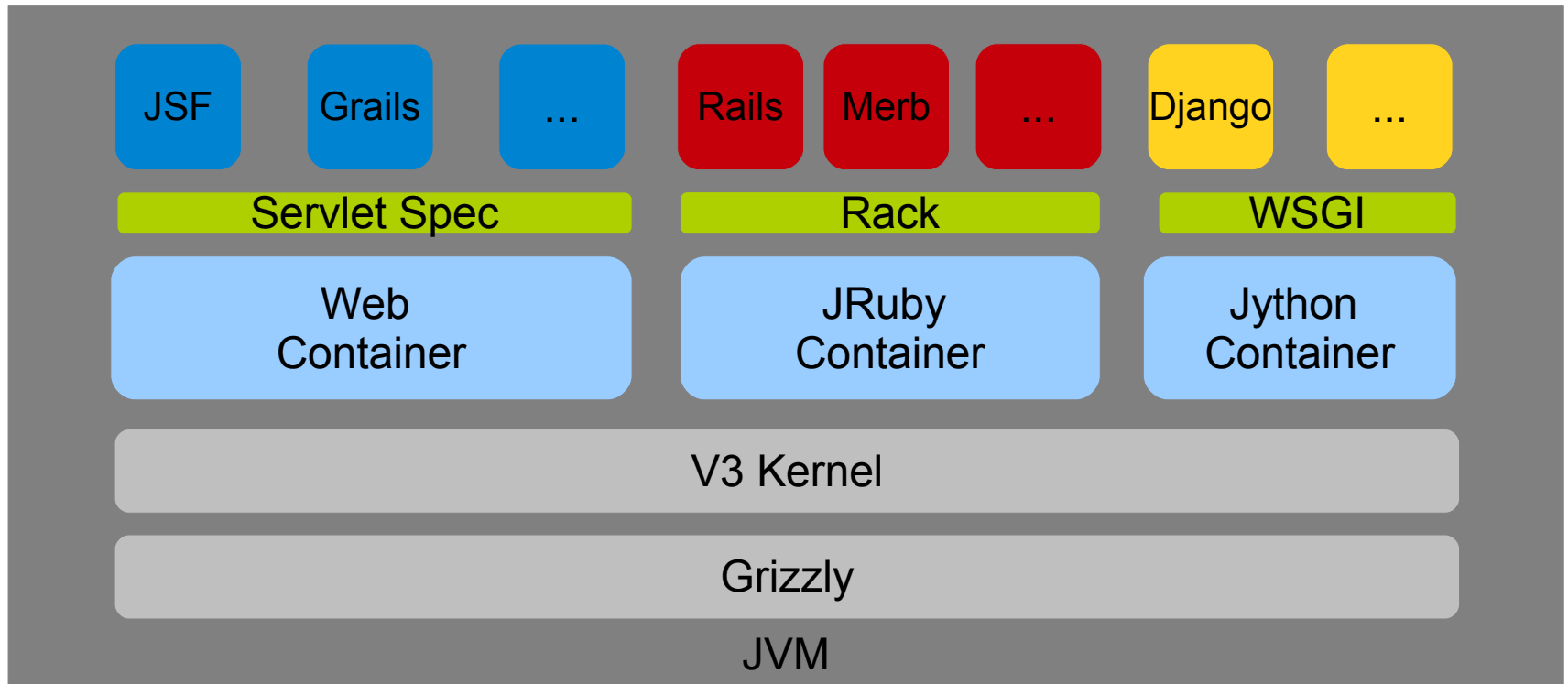
- Wrapped WAR Support

- **webbundle**:file:///myWebApp.war?Web-ContextPath=/hello

CDI Extension for OSGi in GlassFish

- `@Inject @OSGiService` MyOsgiService svc;
- Eliminates boilerplate code in OSGi service clients
 - For finding, binding and tracking OSGi service references
- Typesafe, in contrast to XML based Blueprint Service
- Available attributes for `@OSGiService`
 - Service discovery criteria in standard OSGi Filter syntax
 - Wait timeout
 - Dynamic binding for service dynamism through container injected proxy
- Applicable in WAB
 - Since BundleContext is needed

GlassFish v3 Extensibility – Adding Scripting Frameworks



Embedded Glassfish

- Start GlassFish inside your Java Application
 - API for life-cycle, configuration and deployment
- Use cases
 - In Unit Tests (without a GlassFish installation)
 - As a plugin for Maven 2 project
 - glassfish-embedded goals: run, start, stop, deploy, ...
 - As a “custom” app server
- Distribution
 - Standalone jars for web and full profile without a GF installation
 - Standalone jar for an existing GF installation
 - Maven plugin: <http://download.java.net/maven/glassfish/>

Embedded Glassfish

```
@BeforeClass public static void initContainer() {  
    Server.Builder builder = new Server.Builder();  
    Server server = builder.build();  
  
    ContainerBuilder b =  
        server.createConfig(ContainerBuilder.Type.web);  
    server.addContainer(b);  
  
    File archive = new File("hello.war");  
    server.getDeployer().deploy(archive);  
}  
  
@Test public static void pingApplication() {  
    ...  
}
```

Manageability: Flexible Administration



Home Version

User: anonymous Domain: domain1 Server: localhost

GlassFish™ v3 Administration Console

Tree

- Common Tasks
 - Registration
 - GlassFish News
 - Application Server
 - Applications
 - Lifecycle Modules
- Resources
 - JDBC
 - JNDI
 - JavaMail Sessions
 - Connectors
 - JMS Resources
- Configuration
 - JVM Settings
 - Logger Settings
 - Admin Service
 - Security
 - EJB Container

Common Tasks

GlassFish News

- Registration
- GlassFish News
- Subscriptions

Deployment

- List Deployed Applications
- Deploy an Application

GlassFish REST Interface - Mozilla Firefox

http://localhost:4848/management/domain

GlassFish REST Interface

Domain

Attributes

log-root:

application-root:

locale:

version:

Child Resources

- [configs](#)
- [resources](#)
- [servers](#)
- [property](#)
- [applications](#)
- [system-applications](#)
- [stop](#)
- [restart](#)
- [uptime](#)
- [version](#)

```
$ asadmin start-domain
Waiting for DAS to start.
Admin port for the domain: [4848].
Command start-domain executed successfully.
$ asadmin deploy hello.war
Command deploy executed successfully.
$
```

Monitoring and Management

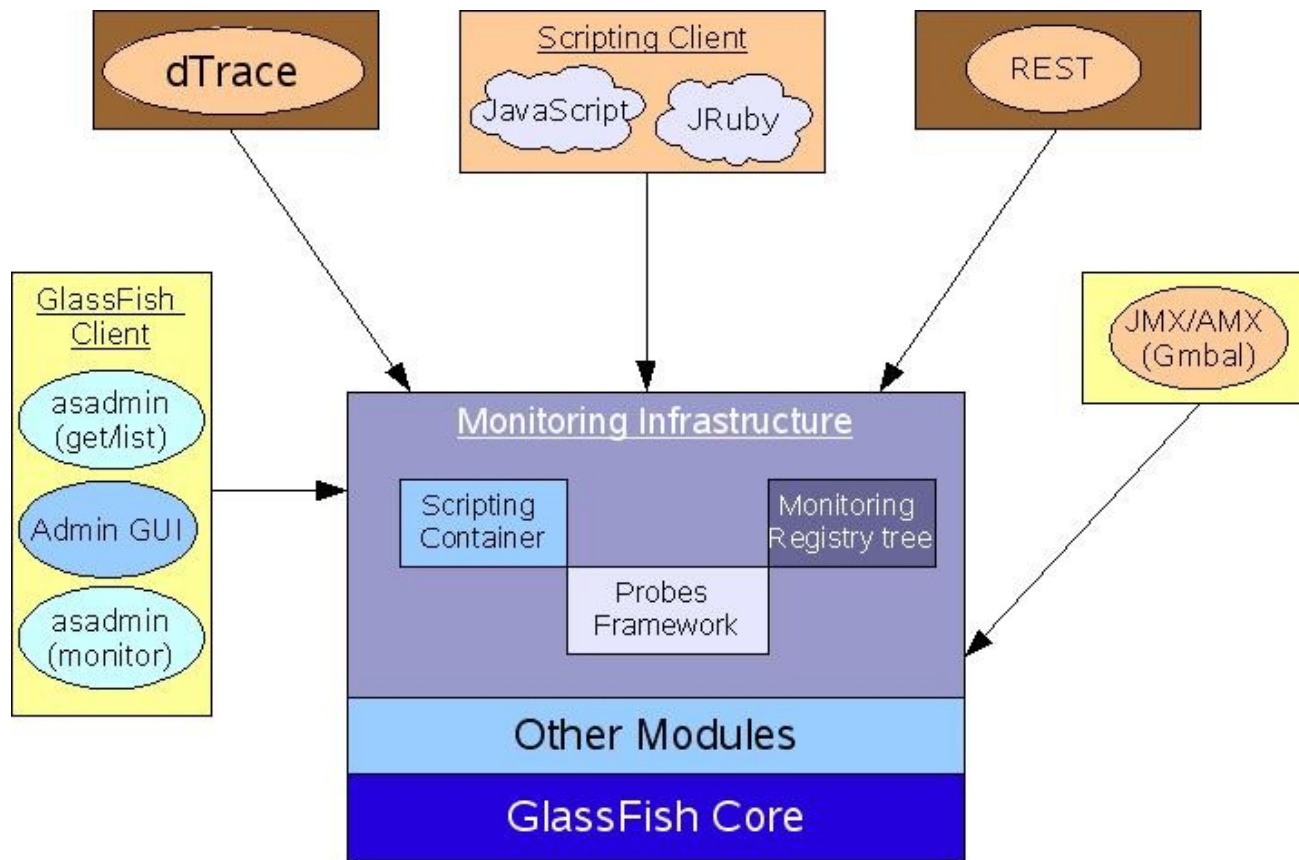
- Dynamic and non-intrusive monitoring
- BTrace integration
 - Portable, dynamic and safe tracing tool for Java
 - Btrace annotations and API to write scripts
 - Java-defined Probe Providers
 - DTrace for end-to-end
- JavaScript Monitoring tool (add-on)
- Still exposed via AMX/JMX
 - jconsole and visualvm as natural clients

RESTful Administration

Ready for the Cloud

- JAX-RS/Jersey offers REST-Interface to
 - Runtime configuration (via GET, POST, DELETE)
 - admin command execution (restart, stop, deploy, etc..)
 - Monitoring (GET only)
- Start at
 - <http://localhost:4848/management/domain>
 - <http://localhost:4848/monitoring/domain>
- Use of REST-Clients instead of Admin-GUI
 - build on your preferred scripting language or tool
- Data format as XML, HTML or JSON
- Extensible

GlassFish v3 Monitoring



- based on probes, similar to DTrace
- new: client-side scripting and DTrace monitoring support

GlassFish Update Center



Web Browser

Home Version

User: admin Domain: domain1 Server: localhost

GlassFish™ v3 Administration Console

Tree

- Common Tasks
 - Registration
 - GlassFish News
 - Enterprise Server
 - Applications
 - Lifecycle Modules
 - Resources
 - JDBC
 - Connectors
 - Resource Adapter Configs
 - JMS Resources
 - JavaMail Sessions
 - JNDI
 - Configuration
 - JVM Settings
 - Logger Settings
 - Web Container
 - EJB Container
 - Ruby Container
 - Java Message Service
 - Security
 - Transaction Service
 - HTTP Service

Available Add-Ons Available Updates Installed Components

Available Add-Ons

This page lists the add-on components that are available. Use this page to install the components.

Installation Path: /Users/johnclingan/apps/glassfishv3

Available Add-Ons (31)

| Component | Category |
|---|-----------------------------|
| <input type="checkbox"/> glassfish-osgi-http | Application Servers |
| <input type="checkbox"/> glassfish-generic-ra | Application Servers |
| <input type="checkbox"/> glassfish-web-110n | Application Servers |
| <input type="checkbox"/> pkg-extra-tools | System Tools |
| <input type="checkbox"/> jruby-gems | Scripting |
| <input type="checkbox"/> glassfish-jdbc-110n | Application Servers |
| <input type="checkbox"/> javadb-demo | Databases and Tools |
| <input type="checkbox"/> jython-runtime | Scripting |
| <input type="checkbox"/> mq-docs | Message-Oriented Middleware |
| <input type="checkbox"/> jython-container | Scripting |
| <input type="checkbox"/> hibernate | Frameworks |
| <input type="checkbox"/> glassfish-upgrade-110n | Application Servers |
| <input type="checkbox"/> glassfish-scripting-110n | Application Servers |
| <input type="checkbox"/> glassfish-ica-110n | Application Servers |

Rich Client

Update Tool

Search

| Component | Category | Published | Version | Install Size | Source |
|---|---------------------|------------|-----------|--------------|---------------------|
| <input type="checkbox"/> GlassFish JDBC Localization | Application Servers | 11/19/2009 | 3.0-31.1 | 91.3 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish JMS Localization | Application Servers | 11/19/2009 | 3.0-31.1 | 113.9 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish XA Transaction Support L... | Application Servers | 11/19/2009 | 3.0-31.1 | 56.6 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish Nucleus Localization | Application Servers | 11/19/2009 | 3.0-31.1 | 371.6 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish OSGI HTTP Service | Application Servers | 11/25/2009 | 3.0-74 | 57.8 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish Scripting Localization | Application Servers | 11/19/2009 | 3.0-31.1 | 58.5 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish Upgrade Tool Localization | Application Servers | 11/19/2009 | 3.0-31.1 | 230.3 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish Verifier Tool | Application Servers | 11/25/2009 | 3.0-74 | 1.4 MB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish Web Container Localization | Application Servers | 11/19/2009 | 3.0-31.1 | 133.9 KB | dev.glassfish.org |
| <input type="checkbox"/> GlassFish support for Grails framew... | Scripting | 06/15/2009 | 1.0.5-1.3 | 50.0 MB | contrib.glassfis... |
| <input type="checkbox"/> Hibernate JPA | Frameworks | 11/23/2009 | 3.5.0-0.2 | 5.3 MB | contrib.glassfis... |

GlassFish OSGI HTTP Service

Overview Files Dependencies License

GlassFish OSGI HTTP Service bundle is an implementation of org.osgi.service.http package version 1.2.0. The HTTP Service allows other bundles in the OSGI environment to dynamically register resources and servlets into the URI namespace of HTTP Service. To learn more about this service, please refer to the javadocs for this package available at <http://www.osgi.org/javadoc/r4v42/org/osgi/service/http/package-summary.html>. GlassFish v3 is the reference implementation of Java EE 6 Platform as defined by JCP (Java Community Process, www.jcp.org). In addition to the latest Java EE standards, GlassFish v3 includes scripting support built on top of the new modular GlassFish kernel running on OSGI platform.

Package Name: glassfish-osgi-http
Version: 3.0-74

Command Line

```

$ ./pkg install jrubyregistration
DOWNLOAD          PKGS  mq-FILES  XFER (MB)
jruby4gpe_ug...  0/2    1199/14810  0.9/37.0

```

GlassFish Server 3.1 Developer Highlights

- Developer Productivity
 - Improved embedded API support
 - Updated NetBeans and Eclipse plugin
- Updated Technologies
 - Grizzly WebSocket support
 - Technology refresh – JSF, CDI, Grizzly, OSGi, JPA, Jersey, Bean Validation, Metro, UC, etc.
 - Implementation of various Enterprise OSGi Specs

GlassFish Server 3.1 Clustering/HA Highlights

- Shoal GMS over HTTP (Grizzly) implementation
 - Removes the need for TCP broadcast network setup
- Consistent hash based session replication
- Preferred fail-over by load-balancer plugin
- Metro HA: Reliable messaging sequence failover, Secure conversation session failover
- Support for conventional clustering of MQ brokers in embedded mode
- Improved automatic delegated transaction recovery with shared file system

GlassFish Server 3.1 Manageability Highlights

- Application versioning support
- Application scoped resources
- Statement leak detection and reclaim
- Improved monitoring
- Support for PAM realm
- SSH based remote management and provisioning
- Console based on RESTful API

GlassFish Server Open Source Edition Roadmap

- No change to operation of project
 - License, governance, transparency

CY 2010

- **GlassFish 3.0.1**
 - Branding, Patches
 - Multi-Lingual Support
 - New platform support
 - Oracle product interoperability
-

CY 2011

- **GlassFish 3.1**
 - High availability
 - Centralized admin.
 - Coherence*Web Support
 - Improved application portability to WLS
 - Application versioning
- **GlassFish 3.2**
 - OSGi Enterprise
 - Improved administration monitoring and
 - Virtualization

TBD

- **GlassFish 4**
 - Java EE 7 Compatibility
 - More shared components with Oracle WebLogic Server

GlassFish v3 Summary

Java EE 6 Themes

Flexibility

Extensibility

Productivity



GlassFish v3

Flexible

Extensible

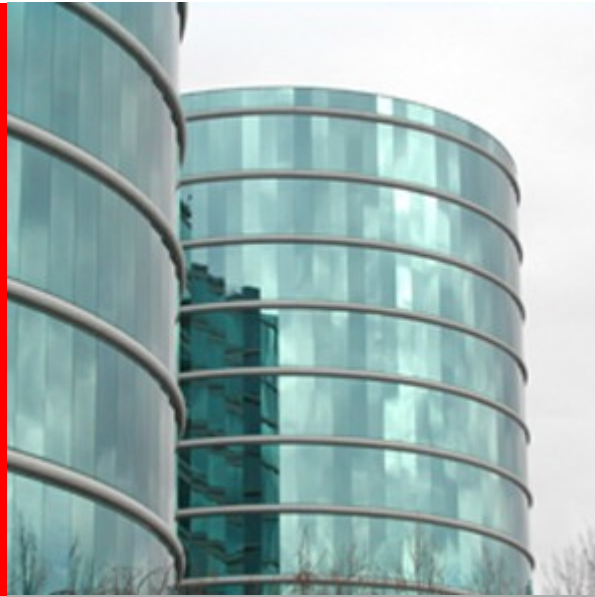
Productive

... + ...

High Developer Productivity

Bleeding Edge Technologies

Enterprise Quality



ORACLE®

GlassFish v3 - A Taste of a Next Generation Application Server

Peter Doschkinow
Senior Java Architect

Java EE 6 Demo

- Focus on ease of use with GlassFish 3.0.1 and NetBeans 6.9.1
- HelloWorld type demos showcasing
 - EJB 3.1
 - JSF 2.0
 - JPA 2.0
 - CDI
 - JAX-RS 1.1

Oracle Enterprise Pack for Eclipse 11g

- A free set of Eclipse plug-ins for development of Java EE applications for Oracle Fusion Middleware
 - Supports newest Eclipse 3.6 Helios release
- Includes Java EE 6 tools with support for
 - JSF 2.0, Facelets, JSF 2.0 composite components
 - Servlet 3.0, JPA 2.0, EJB 3.0 and more
- Extended support for GlassFish
 - Life-cycle, configuration, deployment, debugging
- Extends support for WebLogic and Coherence