

# JBoss Application Server 5

and Beyond...

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# Dimitris.Andreadis@redhat.com

- > Based out of Athens
- > 7y. telco background (NMS/ OSS)
  
- > 2001, JBoss User
- > 2003, JBoss Committer
- > 2004, JBoss Full-time Core Developer
- > 2006 - 2008, JBoss AS Lead (v3.2.8+ , v4.0.4+ , v4.2.x, 5.0.x)
- > 2009 - present, Manager of JBoss AS Team

# “And remember, we love you!”



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# AGENDA

- > A bit of History
- > JBoss 5 Architecture
  - Microcontainer
  - Deployers
  - Layout / Boot
- > Feature Highlights
- > Work in Progress
- > Q & A

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# A bit of History

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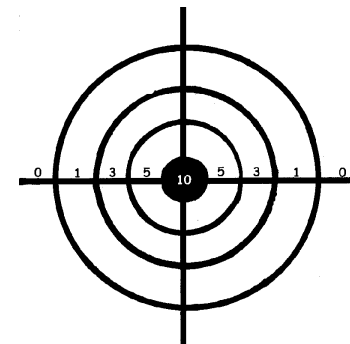
# JBoss 3.x/ 4.x JMX Microkernel cons



- > NO native support for POJOs
- > NO configuration API
  - Hard to persist configuration changes
  - Hard to provide advance tool support
- > Ad-hoc extensibility
  - Implicit/ hidden dependencies
  - Few clean internal APIs/ SPIs
- > Ability to Embed and/ or Unit test
  - JMX dependency
  - No standalone project

# JBoss 5 Goals (1)

- > Java EE 5 Certification
  
- > Take every major subsystem to the next level
  - Clustering infrastructure
  - Messaging service
  - Security modules
  - Transaction manager
  - Web services stack
  - Web server
  - ...



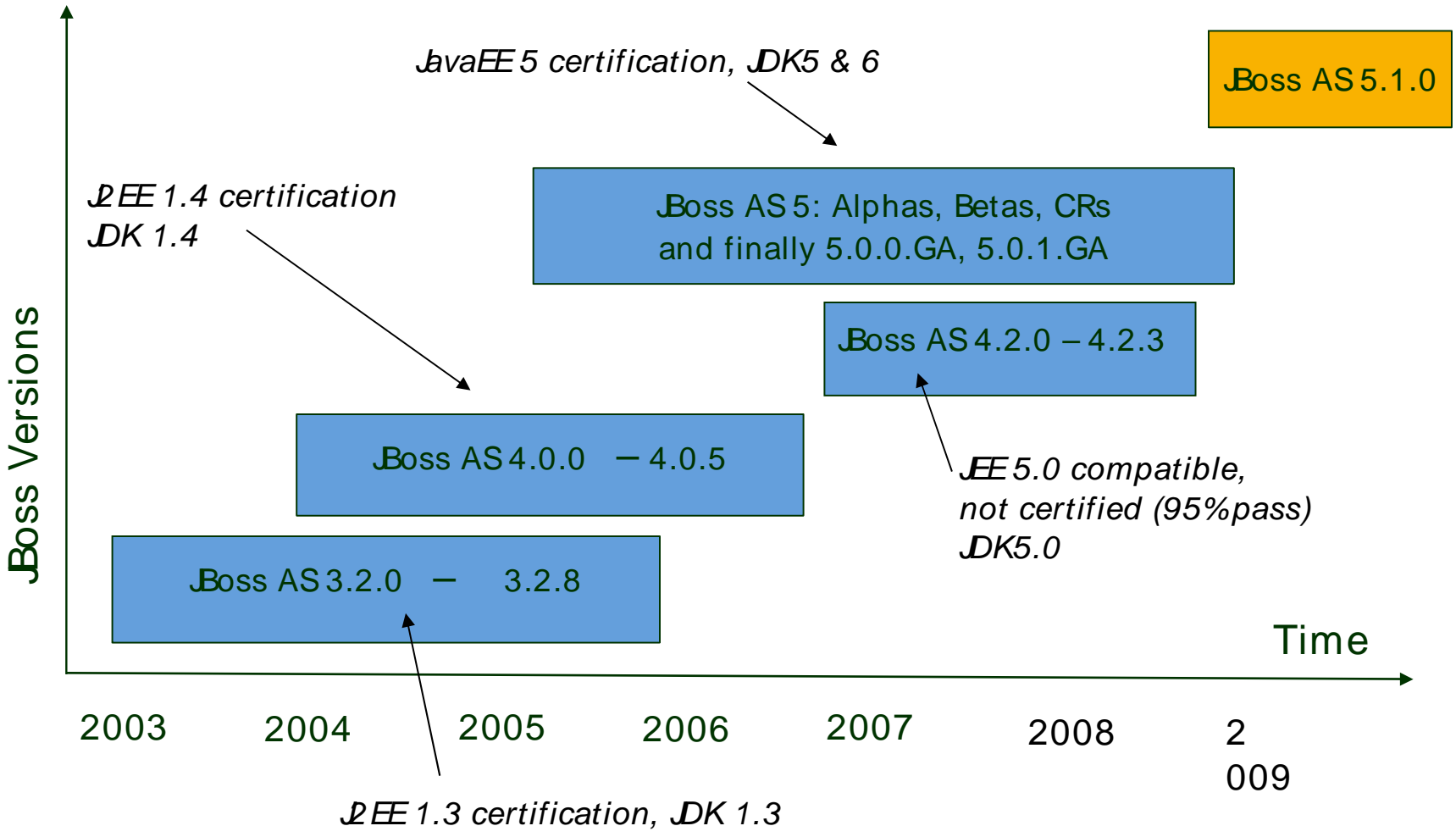
## JBoss 5 Goals (2)

- > Build a NextGen server runtime architecture
  - POJO based kernel (JBoss Microcontainer)
  - Small, Standalone, Embedable, Testable
- > New Aspectized Deployer Framework
- > New Configuration API (Profile Service)
- > New Classloading Architecture
- > Multi-component model support
  - POJOs
  - Legacy JMX MBean services
  - OSGi bundles
  - ... whatever comes next





# JBoss AS Timeline



# Release Early – Release Often ?

Date	Release
20- Nov- 2006	5.0.0.Beta1
06- Apr- 2006	5.0.0.Beta2
21- Dec- 2007	5.0.0.Beta3
11- Feb- 2007	5.0.0.Beta4
30- Jun- 2008	5.0.0.CR1
17- Sep-	5.0.0.CR2
05- Dec- 2008	5.0.0.GA
23- Feb- 2008	5.0.1.GA
13- Mar- 2009	5.1.0.Beta1
29- Apr- 2009	5.1.0.CR1
23- May- 2009	5.1.0.GA

Beta cycle, 4 - 8 months



CR cycle, 3 - 4 months



Beta, CR/ month  
Final/ Quarter



# JBoss 5 Architecture

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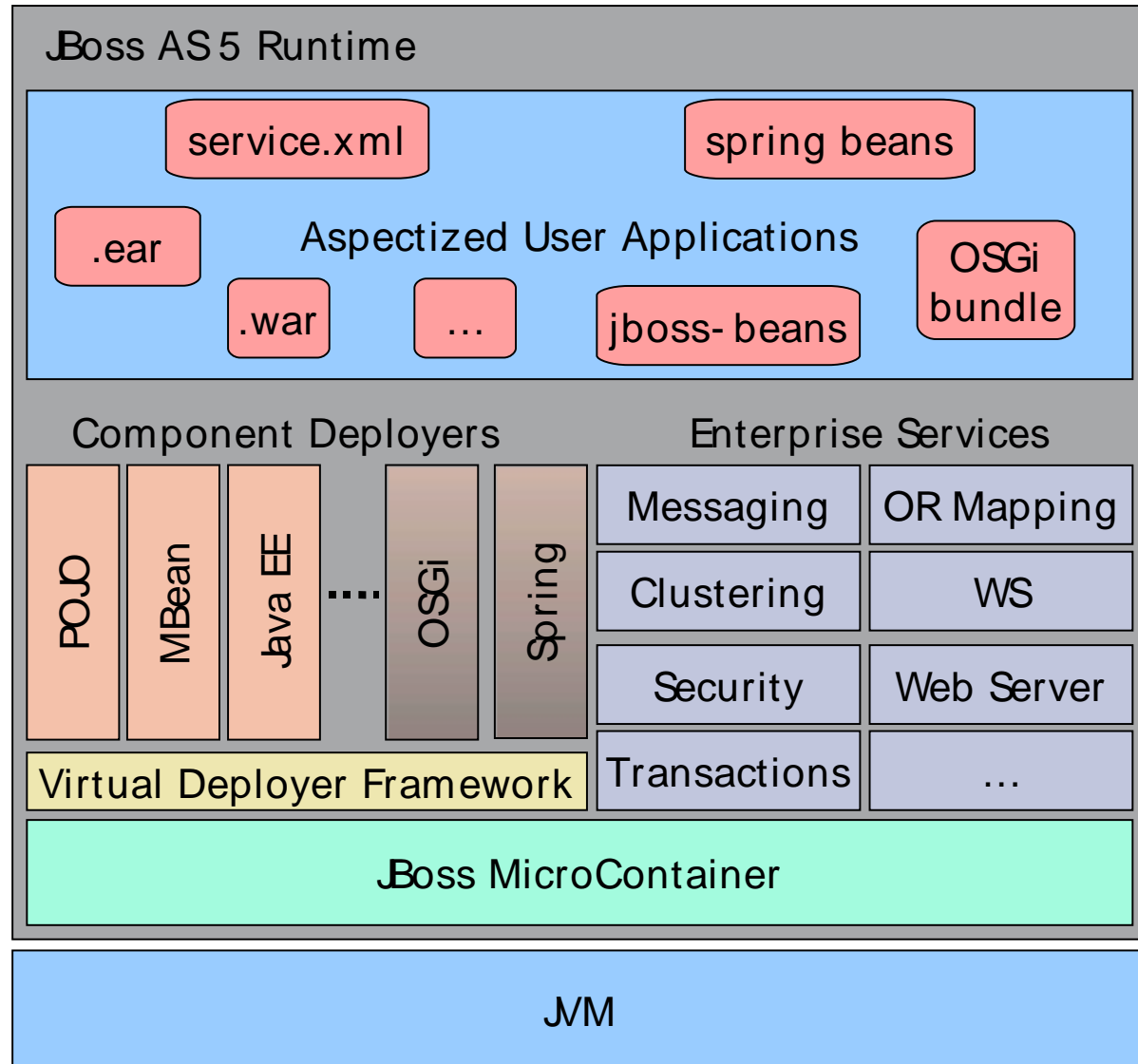


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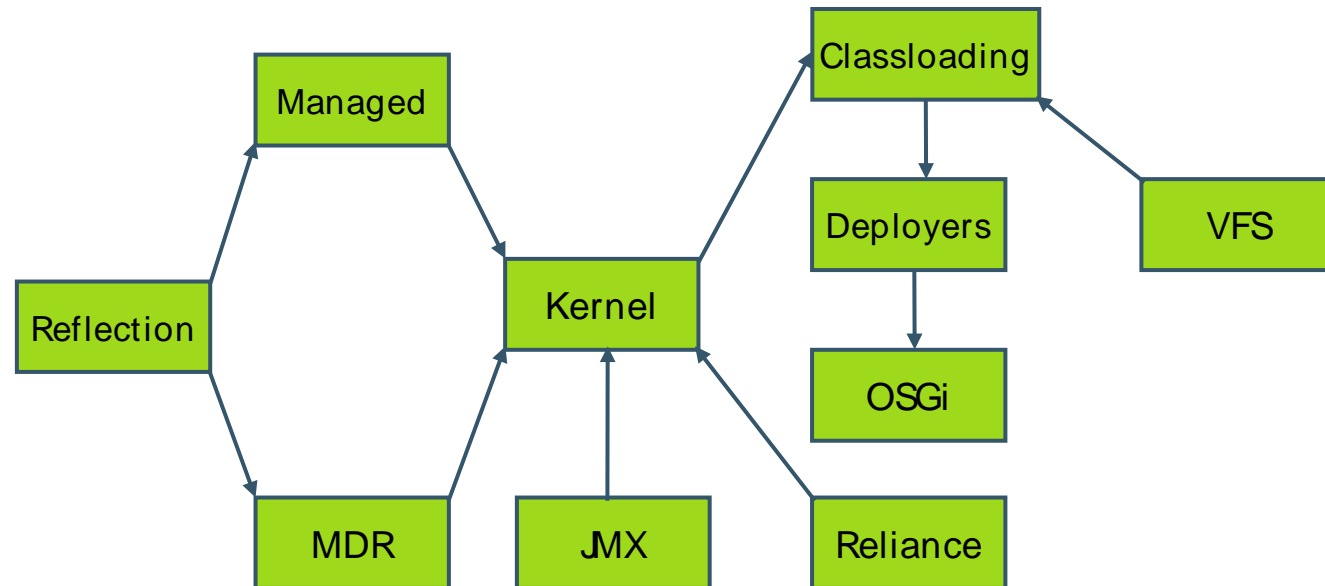
# The Big Picture

- > Runtime components wired together by the Microcontainer with dependencies [and aspects] applied across component models
- > Support any existing (and future) component model that makes sense



# JBoss Microcontainer (MC)

- > A complete IoC framework
- > A kernel for managing services
- > With tight JBoss AOP integration
- > Virtual Deployment Framework
- > Fully extensible

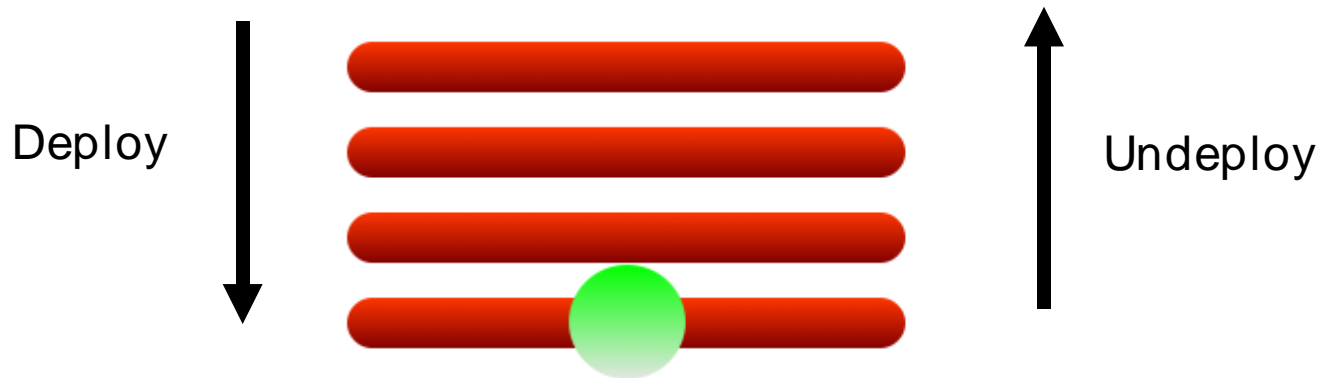


# Not Invented Here (NIH) Syndrome?

- > Why not just use an existing OSGi runtime?
  - Remember the JMX-based Microkernel?
  - Avoid repeating the same mistakes!
  
- > Full control of the runtime
  - A superset of what existing technologies offer
  - Allow deep integration with the deployment machinery
  
- > A future-proof base
  - Do not change core with the next technology swift
  - Make components of different type, first class citizens

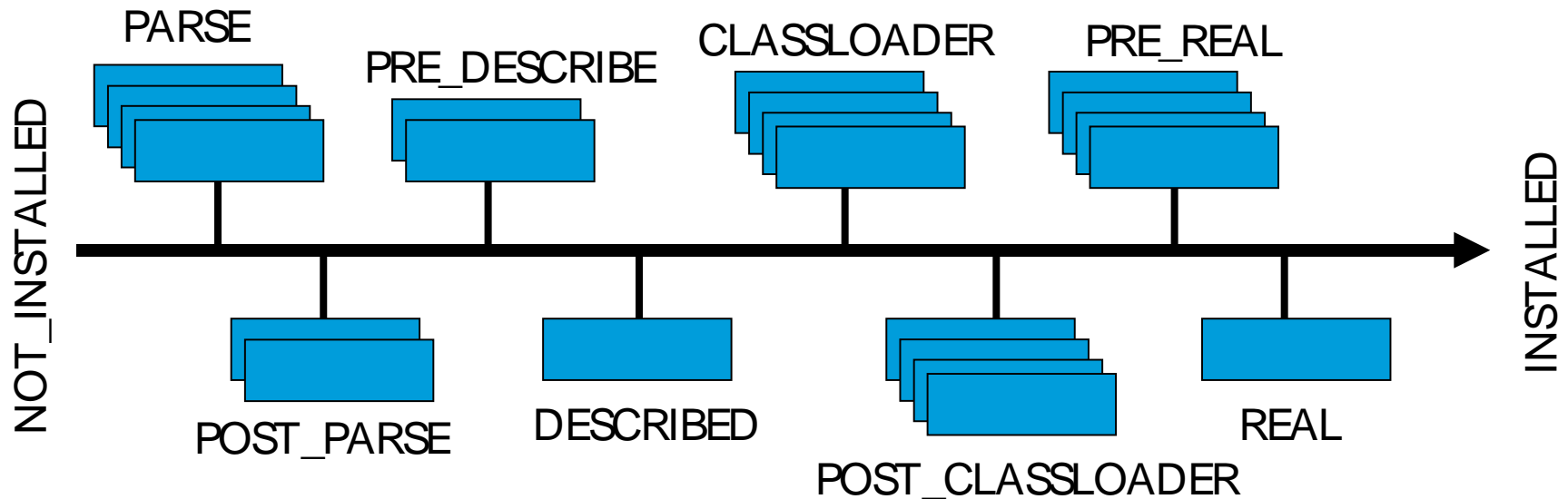
# JBoss Microcontainer Kernel

- > The JBoss MC Kernel is essentially a state machine
- > It transforms a complete metadata description into runtime objects
- > Moving them through a set of states to control their lifecycle and configuration



# Virtual Deployment Framework

- > Processing pipeline that transforms input to output metadata
- > Ordered by Phases and Inputs/ Outputs
- > Manipulating the deployment metadata (attachments)
- > Integrate at **any** given point in the chain!
- > A VFS abstracts the actual deployments



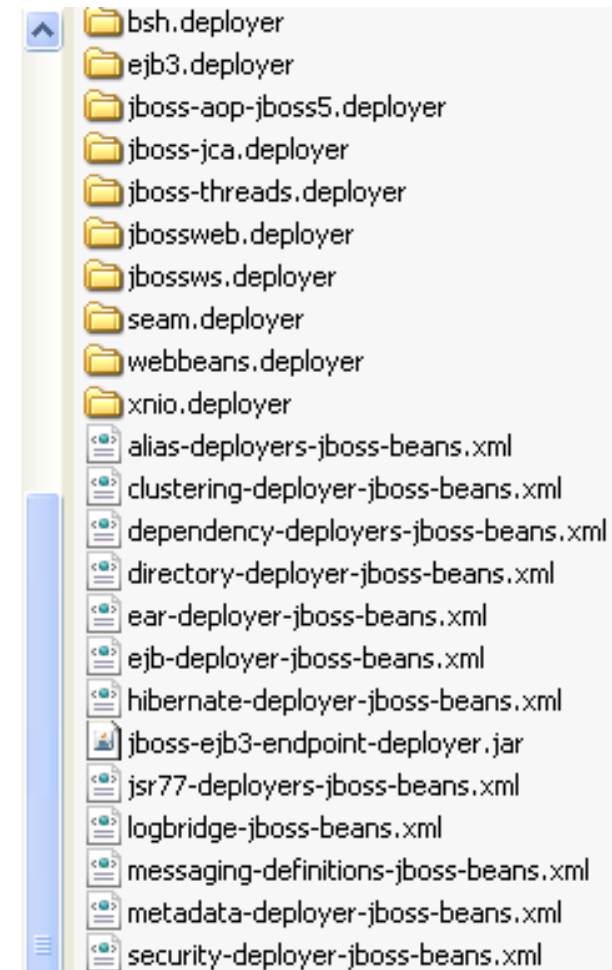
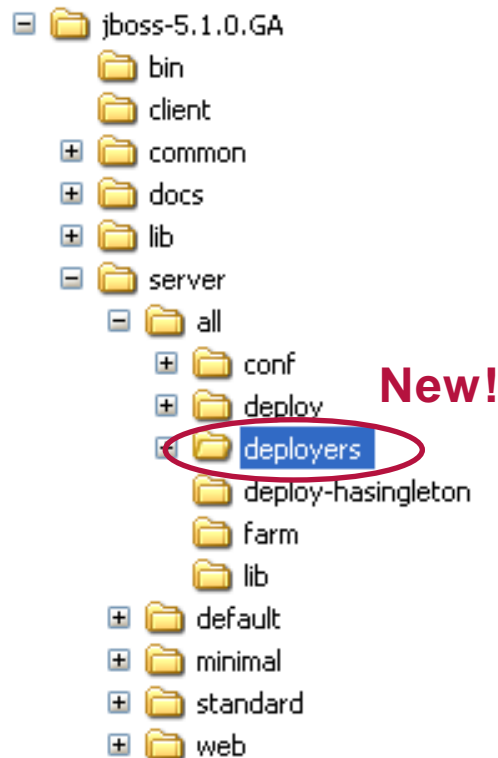


# Deployer Phases

- > NOT\_INSTALLED, start here
- > PARSE, generate metadata (from xml, properties, etc.)
- > POST\_PARSE, transform metadata
- > PRE\_DESCRIBE, apply default dependencies
- > DESCRIBE, establish final dependencies
- > CLASSLOADER, create the classloaders
- > POST\_CLASSLOADER, classloader dependent work (AOP, annotations)
- > PRE\_REAL, last chance to transform metadata
- > REAL, create the runtime components
- > INSTALLED, fully initialized runtime component

# Deployers

- > New configuration dir **deployers**



# Example: JSR- 299 (Web Beans) deployers

```
[snip]
<!-- Responsible for discovering Web Bean files -->
  <bean name="WebBeansFilesDeployer"
class="org.jboss.webbeans.integration.deployer.metadata.WebBeansFilesDeployer"/ >

  <!-- Responsible for discovering Web Bean classes -->
  <bean name="WebBeansDiscoveryDeployer"
class="org.jboss.webbeans.integration.deployer.env.WebBeanDiscoveryDeployer"/ >

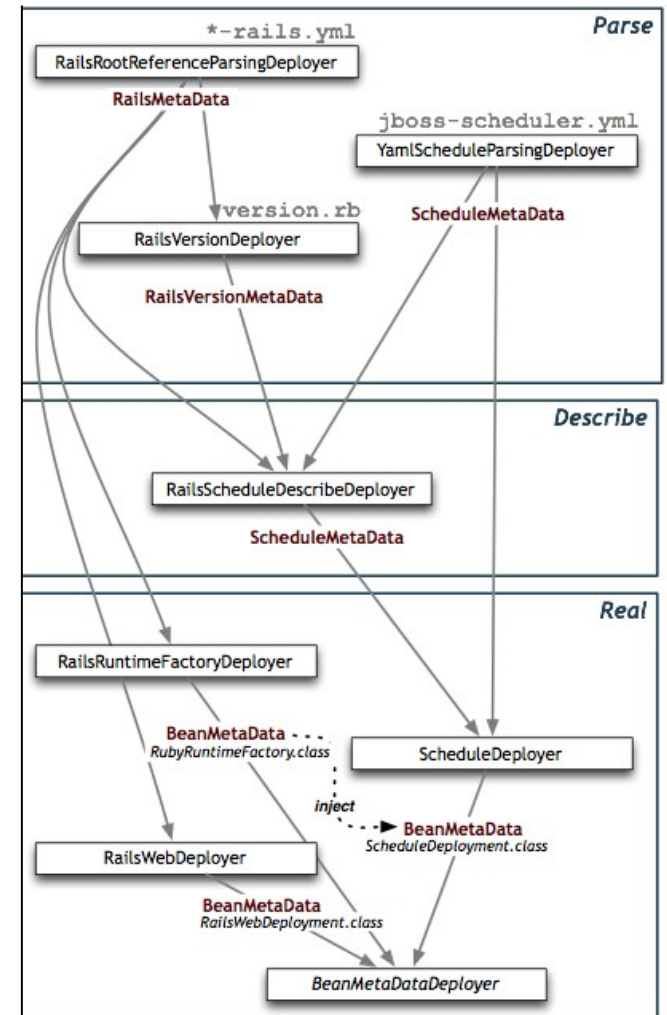
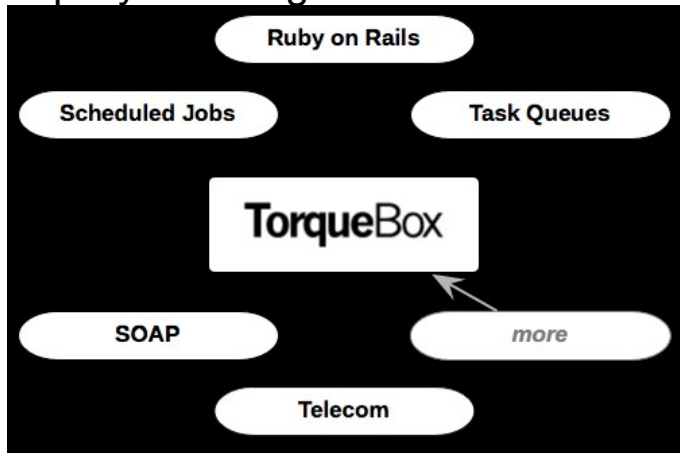
  <!-- Responsible for dynamic ejb dependency creation -->
  <bean name="DynamicDependencyCreator"
class="org.jboss.webbeans.integration.deployer.env.DynamicDependencyCreator"/ >

  <!-- Responsible for booting Web Beans -->
  <bean name="WebBeansBootstrapDeployer"
class="org.jboss.webbeans.integration.deployer.env.WebBeansBootstrapDeployer"/ >

  <!-- Responsible for pushing the Web Beans RI onto the application classpath -->
  <bean name="WebBeansWebUrlIntegrationDeployer"
class="org.jboss.webbeans.integration.deployer.cl.WebBeansWebUrlIntegrationDeployer"/ >
[snip]
```

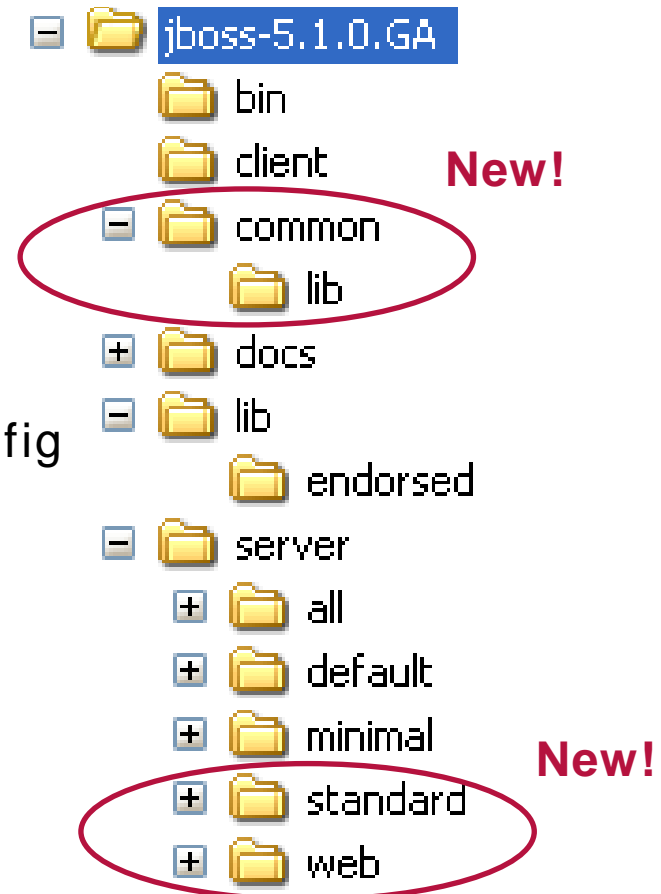
# TorqueBox.org (Beta)

- > Deploy Enterprise Ruby- on- Rails applications on JBoss
- > Include support for Jb Scheduling, Task Queues, SOAP handling, SIP(Telecom)
- > Get clustering functionality and cloud deployment right out- of- the- box



# Directory Layout

- > New top level dir - **common**
  - Libraries shared between configs
  - for now...
  
- > New configurations
  - **standard**, the EE5 TCK certified config
  - **web**, basis for EE6 web profile



# Boot Sequence

- > **bin/ run.sh** [-c < config> ]  
start Microcontainer using predefined < config>
- > Load **server/ xxx/ conf/ bootstrap.xml**

```
< ?xml version= "1.0" encoding= "UTF- 8"?>  
< bootstrap xmlns= "urn:jboss:bootstrap:1.0">  
  < url> bootstrap/ logging.xml< / url>  
  < url> bootstrap/ vfs.xml< / url>  
  < url> bootstrap/ classloader.xml< / url>  
  < url> bootstrap/ aop.xml< / url>  
  < url> bootstrap/ jmx.xml< / url>  
  < url> bootstrap/ deployers.xml< / url>  
  < url> bootstrap/ profile.xml< / url>  
< / bootstrap>
```

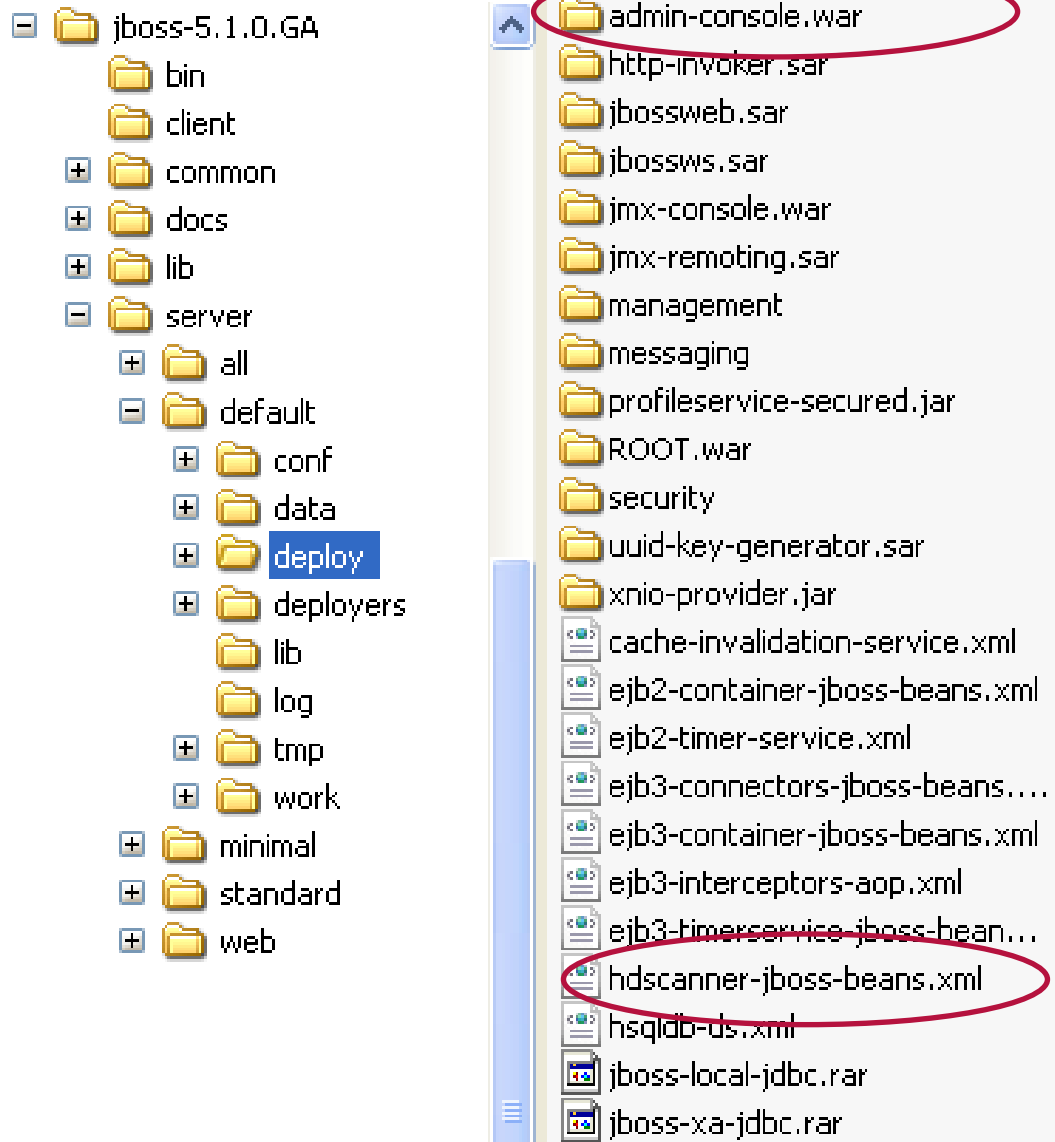
# Boot Sequence (cont.)

## > server/ xxx/ conf/ bootstrap/ profile.xml

```
[snip]
< bean name= "BootstrapProfileFactory"
    class= "org.jboss.system.server.profileservice.StaticClusteredProfileFactory">
    < property
name= "bindingsURI"> ${jboss.server.home.url}conf/ bindingservice.beans</ property>
    < property name= "bootstrapURI"> ${jboss.server.home.url}conf/ jboss-
service.xml</ property>
    < property name= "deployersURI"> ${jboss.server.home.url}deployers</ property>
    < property name= "applicationURIs">
    < list elementClass= "java.net.URI">
    < value> ${jboss.server.home.url}deploy</ value>
    </ list>
    </ property>
    < property name= "farmURIs">
    < list elementClass= "java.net.URI">
    < value> ${jboss.server.home.url}farm</ value>
    </ list>
    </ property>
    < property
name= "attachmentStoreRoot"> ${jboss.server.data.dir}/ attachments</ property>
    < property name= "profileFactory"> < inject bean= "ProfileFactory" / > </ property>
</ bean>
```

# Deploy Dir

- > New style –jboss- beans.xml services
- > Old style .sar / - service.xml services still supported
- > As well as the standard .jar, .war, .ear, .rar, etc.





# Feature Highlights

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# New Management Console in 5.1



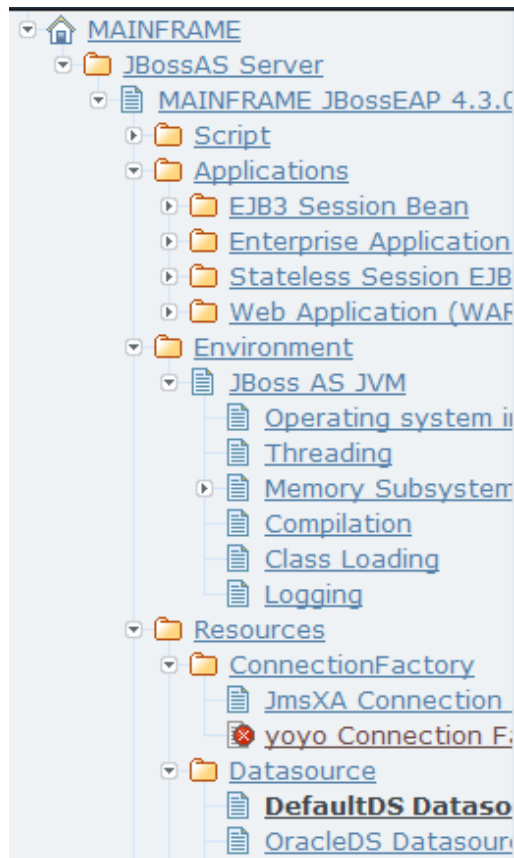
Home page: <http://jboss.org/embjopr>  
 Demo: <http://jboss.org/embjopr/demo>

- > Deploy, Configure, Monitor
  - Datasources
  - Message Queues
  - User Applications
- > Persists Changes
- > Extensible Plugin Architecture
- > Exercises new Configuration API

Embedded version of 

which is based on the 

# Embedded Jopr – screenshots (1)



Resources Tree

admin-console.war

Web App Stats

Summary Configuration Metrics Control Content Status: ✔ Available

View the numeric metrics and traits for this resource.

**Trait Values**

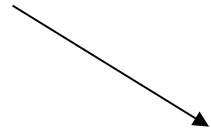
Context Root: admin-console Vhost: localhost

**Numeric Metric Values**

Name	Value	Description
<b>Category: performance</b>		
Min. Servlet Resp. Time	0.0ms	Minimum response time of a servlet
Avg. Servlet Resp. Time	154.5ms	Average response time of a servlet
Max. Servlet Resp. Time	2.2s	Maximum response time of a servlet
Total processing time	50.8s	Total processing time of the webapp
Requests served	329.0	Number of requests served by servlets
Errors while processing	0.0	Number of errors while processing
Currently Active Sessions	1.0	Number active sessions for the webapp right now

# Embedded Jopr – screenshots (2)

Configuration Updates  
are persisted



DefaultDS Datasource

Summary Configuration Metrics Control Content Status: ✔ Available

### Edit Resource

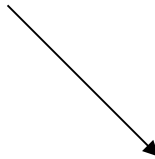
\* denotes a required field.

Connection Information <span style="float: right;">⌵ Collapse</span>			
Name	Unset	Value	Description
Type *		<input type="radio"/> No TX Datasource <input checked="" type="radio"/> Local TX Datasource <input type="radio"/> XA Datasource	
JNDI Name *		DefaultDS	The JNDI name under which the DataSource wrapper will be bound.
Driver Class *		org.hsqldb.jdbcDriver	The fully qualified name of the JDBC driver or datasource class
Connection Url *		jdbc:hsqldb:\$jboss.server.dat	The JDBC driver connection URL string
User Name	<input type="checkbox"/>	sa	
Password	<input type="checkbox"/>		
Min Pool Size	<input type="checkbox"/>	5	
Max Pool Size	<input type="checkbox"/>	20	

Advanced <span style="float: right;">⌵ Collapse</span>			
Name	Unset	Value	Description
Transaction Isolation	<input checked="" type="checkbox"/>	<input type="radio"/> Read Uncommitted <input type="radio"/> Read Committed <input type="radio"/> Repeatable Read <input type="radio"/> Serializable	The Transaction Isolation level. The default setting is to use whichever isolation level is provided by default by the database.

# Embedded Jopr – screenshots (3)

Performing operations on resources



**Threading**

Summary Configuration Metrics **Control** Content

Status: ✔ Available

Select from the available control operations for this resource.

**Reset Peak Thread Metrics**      Reset the peak number of threads

---

**Find Monitor Deadlocked Threads**      Finds cycles of threads that are in deadlock waiting to acquire object monitors

---

**Thread Dump**

**Previous Operations**

In order to see the latest status of an operation, please [refresh this page](#)

Executed At	Operation Name	Status
October 23, 2008 - 1:25 PM	Reset Peak Thread Metrics	Successful <a href="#">(Show/Hide Details)</a>
October 23, 2008 - 1:25 PM	Thread Dump	Successful <a href="#">(Show/Hide Details)</a>
October 23, 2008 - 1:25 PM	Find Monitor Deadlocked Threads	Successful <a href="#">(Show/Hide Details)</a>

Total: 3

# JBoss Messaging 1.4.3

- > High performance JMS 1.1 compliant provider (jdk5+ only)
  - > XA implementation/ integration with JBoss Transactions
  - > Clustered Queues&Topics (out- of- the- box)
  - > Intelligent message redistribution
  - > Transparent failover
  - > In- memory message replication mode
  - > Support for very large messages / paging
  - > DB support (Oracle, DB2, MySQL InnoDB, PostgreSQL, Sybase, SQLServer)
  - > HTTP/ SSL transports
  - > ...
- > Or, try out JBoss Messaging 2.0.0 Beta3!

## JBoss Web 2.1.3 (Tomcat on steroids)

- > Java Connectors over JBoss Native (over Apache APR) can match Apache httpd performance
  - High concurrency (10k+ connections)
  - Static file handling (low memory/ cpu usage)
  - Integrates OpenSSL (x6 – x10 performance)
  - Linux, HP-UX, Solaris, Windows
- > Just unzip jboss native in `JBOSS_HOME/bin/native`



...

INFO [AprLifecycleListener] Loaded Apache Tomcat Native library 1.1.11.

INFO [AprLifecycleListener] APR capabilities: IPv6 [true], sendfile [true], accept filters [false]

INFO [Http11AprProtocol] Initializing Coyote HTTP/1.1 on http-127.0.0.1-8080

INFO [AjpAprProtocol] Initializing Coyote AJP/1.3 on ajp-127.0.0.1-8009

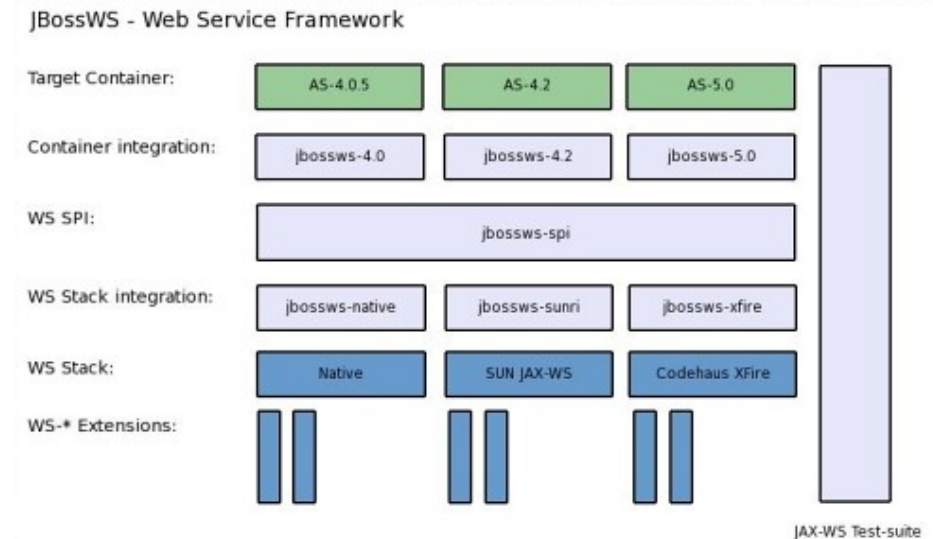
...

# JBoss Web Services 3.1.2

- > Full JAX- RPC and JAX- WS support
- > EJB 2.1, EJB3 and JSE endpoints
- > Attachments Profile Version 1.0
- > Support for MTOM/ XOP and SwA- Ref
- > WS- Security 1.0 for XML Encryption/ Signature of the SOAP message
- > WS- Addressing (W3C candidate release) and JSR- 261
- > WS- Eventing
- > WS- Policy

Supports 3 Java WS stacks

- > JBoss Native
- > Apache CXF
- > Sun Metro

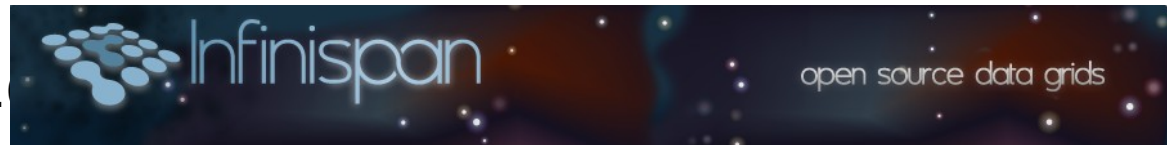




# Clustering (JBoss Cache 3.1.0 / JGroups 2.6.10)

- > Buddy replication for SFSBs
- > Multi Version Concurrency Control (MVCC)
- > Non-blocking state transfer
- > Much improved EJB3 Entity/ Hibernate Caching
- > Sharable JGroups channels
- > Performance improvements in JGroups
- > etc.

- > Coming Next, Infinispan 4. Alpha5, now available



# Work in Progress

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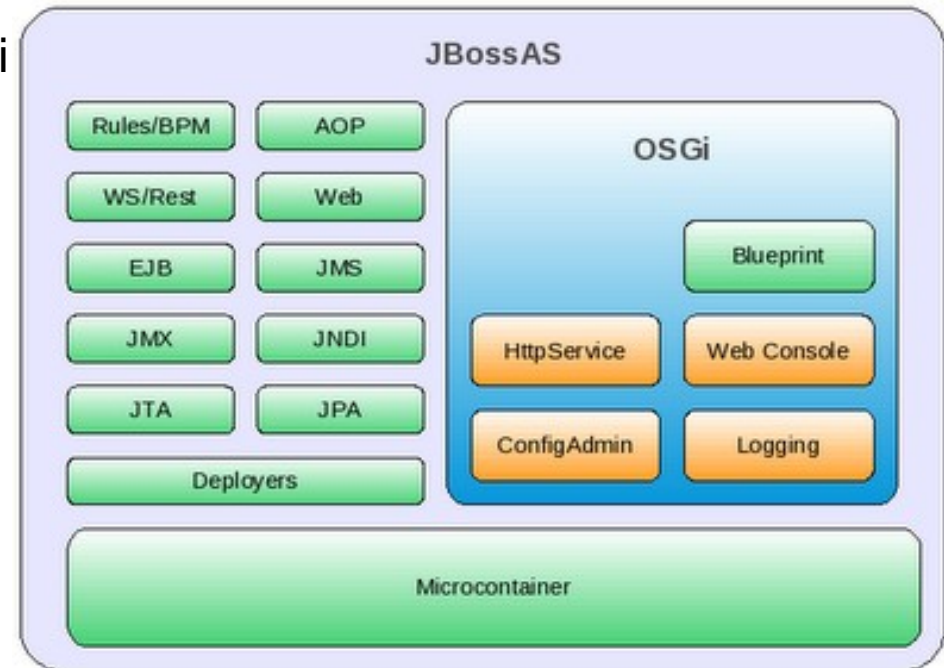


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# JBoss OSGi (v1.0.0.Beta2)

- > Add-on to a JBoss 5 installation
- > Drop OSGi bundles to the deploy dir
- > Integrates
  - Apache Felix
  - Equinox
  - Knopflerfish
- > Plans for implementing the OSGi spec as a MicroContainer Facade



see <http://jbossosgi.blogspot.com/>

# The Road Ahead (JBoss 5.2.x – 6.0.x)

- > Reduce Boot time
  - Reduce AOP usage
  - On-demand activation
  - Unify annotation scanning
  
- > EE 6 implementation
  - Start with Web Profile / EJB3.1
  
- > EJB3 standalone / JBoss Reloaded
  - Improve embedability
  - Improve testability

# Have fun and spread the word!

- > Document
- > Explain
- > Blog
- > Experiment
- > Test-drive

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# Q & A

# Thank You

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