

Apache Geronimo: A Peek Under the Hood

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What Is Apache Geronimo?

It is Not...

- Yet another lightweight container
- Yet another web framework
- Yet another AOP framework
- An MVC framework

It is...

- Designed for long running servers
- Designed to tolerate partial component failures
- System oriented services





From the Ground on Down

- Open Source Enterprise Infrastructure
- Highly modular architecture
- Initial manifestation as a J2EE Server
- Other possible configurations
 - Native Spring Integration
 - Bi-directional PicoContainer Integration
 - Native Portlet Integration
 - Native Web Services Integration
 - Deployment Chaining
 - and many more ...





Geronimo Kernel

- Fundamental Core
 - Small memory consumption ~150KB code
 - Component Configuration
 - Component Registration
 - Integrated Repository
 - Lifecycle Control
 - Dependency Manager
- Components are called GBeans
 - Simple object, plus some metadata



What Are GBeans?

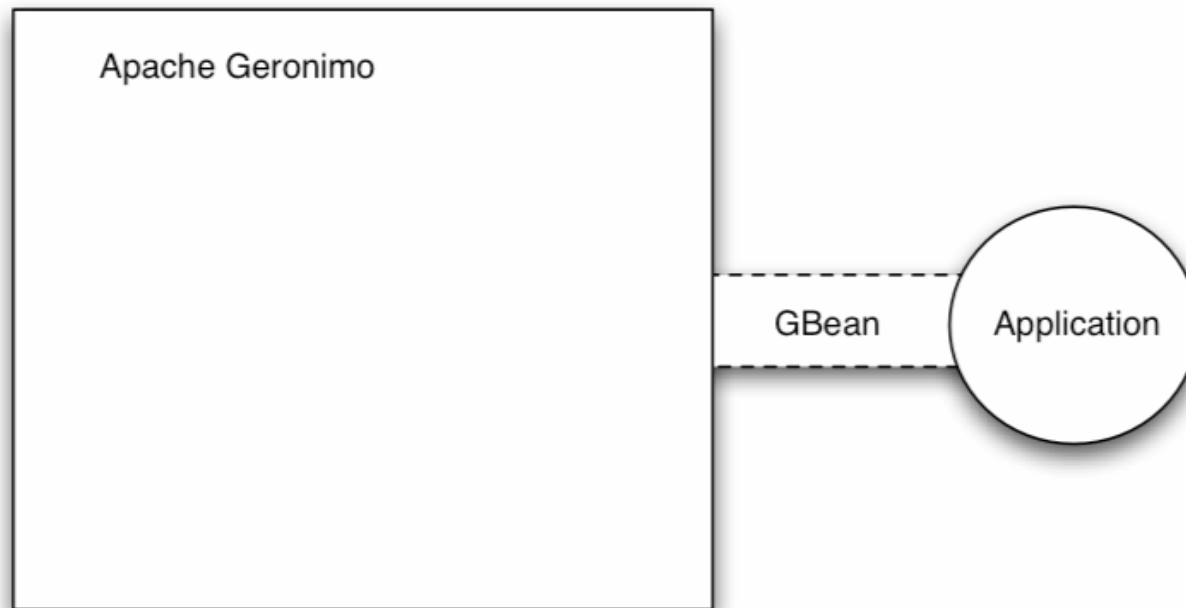
- A J2EE managed object (MBeans)
- Used to bridge JSR-77 lifecycle requirements
- GBean wrappers allow just about anything to be plugged in to Geronimo
- Implement the `GBeanLifecycle` interface

```
public interface GBeanLifecycle
{
    void doStart() throws WaitingException, Exception;
    void doStop() throws WaitingException, Exception;
    void doFail();
}
```





What Are GBeans? *(Continued)*





GBean Archive

- A JAR file containing:
 - Persisted GBean instances
 - GBean metadata
 - Required Java classes reside:
 - Either in the jar, or
 - As dependencies from a central repository
- Must have a unique ID
- Can be signed for distribution
- Can be executable





GBean Descriptor Example

- Provides IoC configuration for a GBean
- `<gbean>` elements can be placed in any descriptor
 - **usually** `geronimo-application.xml`

```
<gbean name="geronimo.system:role=LogAppender,type=ConsoleAppender"  
  class="org.apache.geronimo.system.logging.log4j.appender.ConsoleAppenderService">  
  <attribute name="threshold" type="java.lang.String">INFO</attribute>  
  <attribute name="layoutPattern" type="java.lang.String">  
    %d{ABSOLUTE} %-5p [%c{1}] %m%n  
  </attribute>  
  <attribute name="target" type="java.lang.String">System.out</attribute>  
</gbean>
```





Demo (Time Permitting)

- Demonstrate simple GBean wrapper





Repository

- Structured collection of jars
 - Designed to work in conjunction with Maven
 - Pluggable implementation
 - Every jar has a unique group and artifact ID, *e.g.*
 - geronimo-spec
 - geronimo-j2ee-1.4-RC2
- Default repository is local file system
 - Others allow auto-download





Basic Configuration Builder

- Deployers are J2EE specific
 - JSR-88
- Builders are Geronimo specific
 - Create configuration objects containing GBeans
 - Serialized to a file upon shutdown
- From a pure GBean configuration
 - Very raw – used to bootstrap a server
 - You specify GBeans in an XML descriptor
 - Not intended for end users



Application Builders

- Two stages make up deployment (JSR-88)
 - Deployment
 - Read the ear file and the server config(s)
 - Distribution
 - Send the ear file and server config(s) to the server
- Geronimo handles both stages in single step for the user
- Application-specific configurations



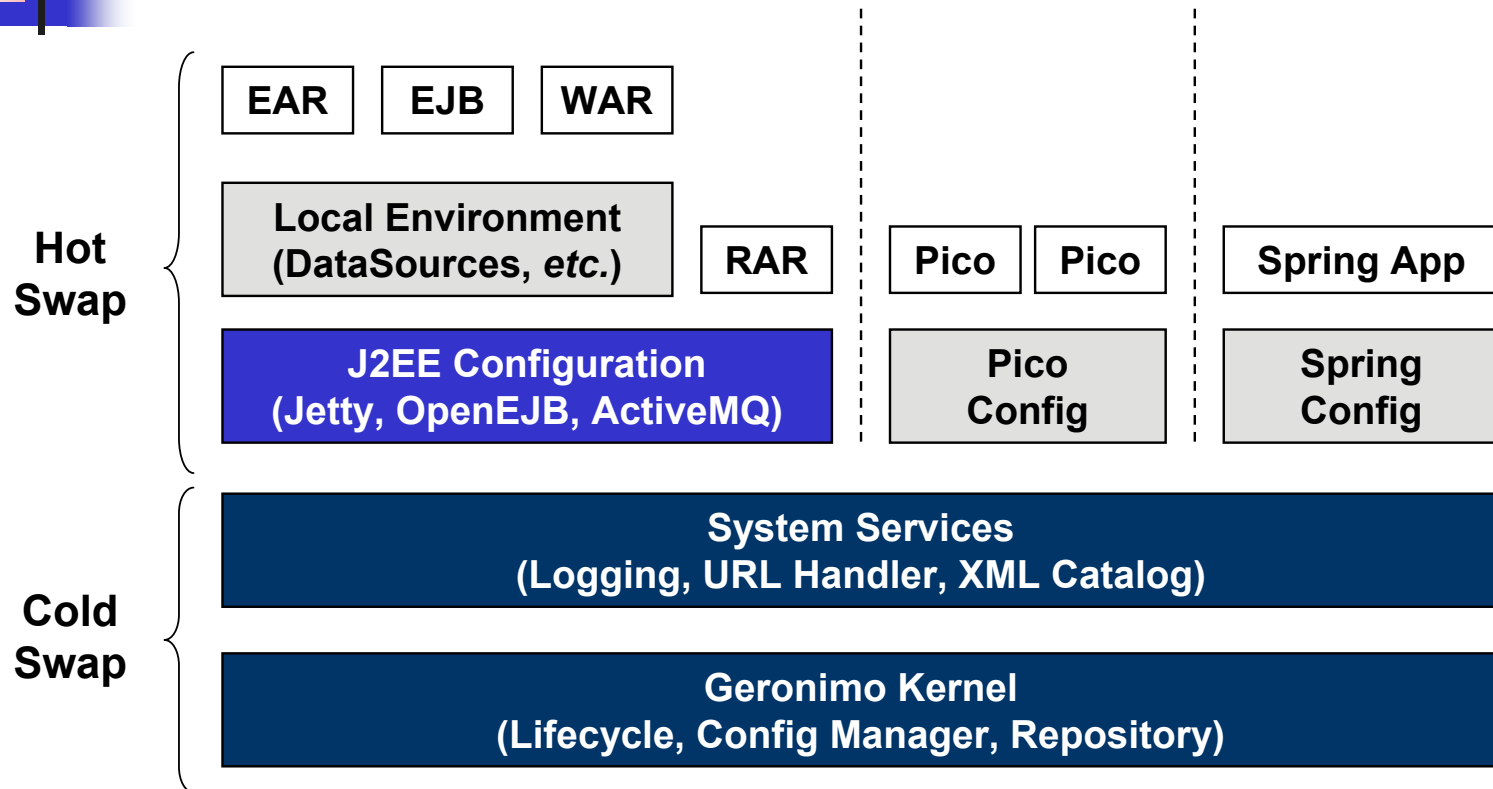


Application Builders *(Continued)*

- Most complex Builder is J2EE deployer
 - Implements JSR-88 deployment specification
 - Take EJB-jars, wars, rars
 - Add in a deployment plan (XML)
 - Output a Geronimo Configuration ARchive (.car)
- Can produce very complex GBean definitions
 - *e.g.* entire EJB gets mapped to a GBean
- Allows for deploy-time optimizations
 - *e.g.* Precompile EJBQL, MessageSelectors, *etc.*



Configurations





Running the Server

```
$ java -jar bin/server.jar <config>
```

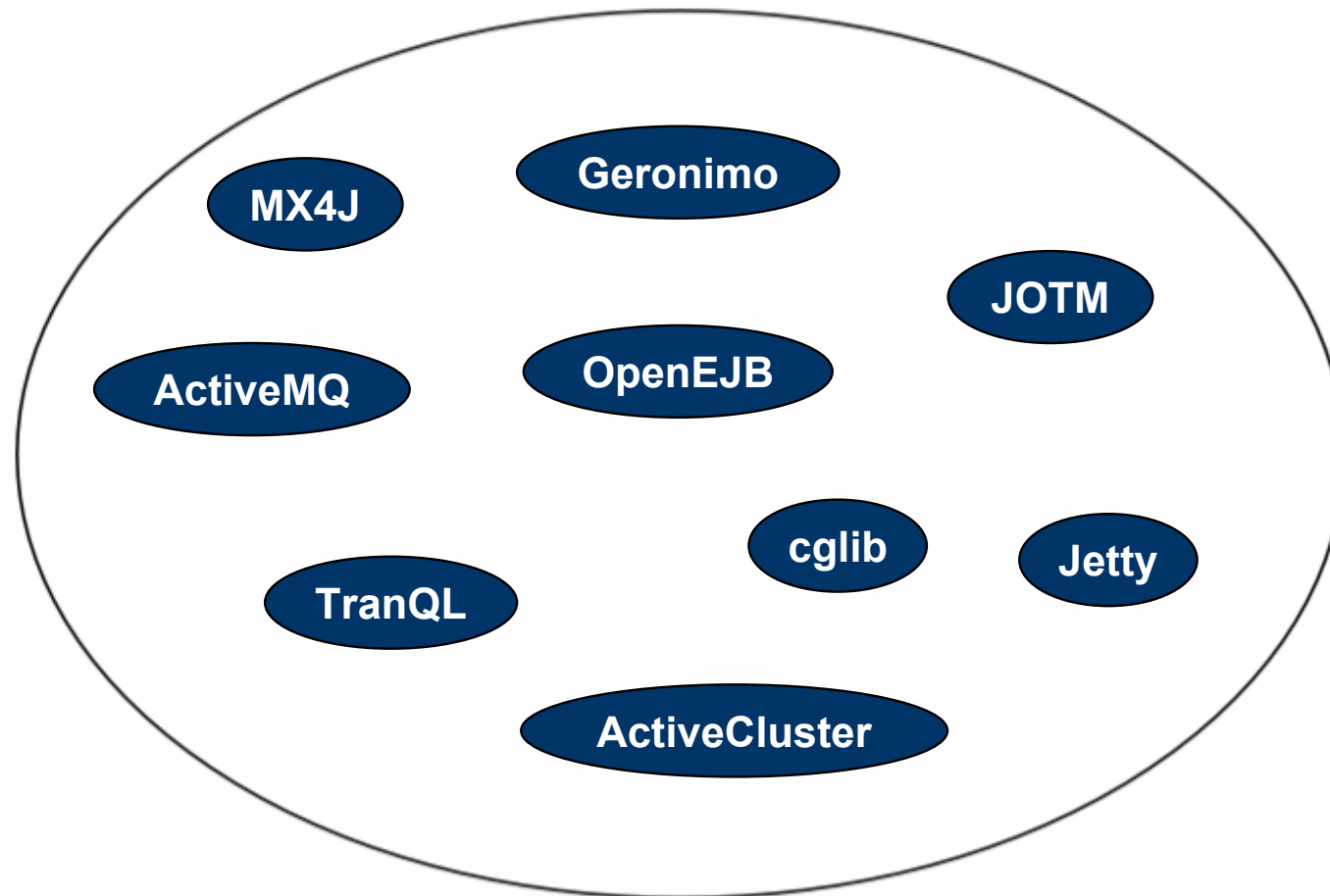
```
$ java -jar bin/server.jar
```

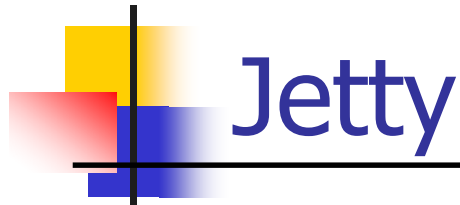
- `<config>` is a specific configuration to boot
- With M2, default is to restart all configurations that were running on last clean shutdown
- Maven Geronimo deploy plugin simplifies this greatly





Geronimo Community





- Well established web container
- Implements Servlet 2.4 specification
- Designed for embedding and high performance

- Why not Apache Tomcat yet?
 - No real reason, just hasn't been done yet



The logo graphic for OpenEJB consists of several overlapping colored squares (yellow, red, blue) and a vertical black line that intersects them.

OpenEJB

- Well established EJB container
- Upgraded from 1.1 to 2.1 specification
 - No, it doesn't do EJB3 (yet)
- Fully integrated into Geronimo
- Optimized for highly concurrent workloads



The logo graphic for ActiveMQ consists of several overlapping squares in yellow, red, and blue, with a vertical black line passing through them.

ActiveMQ

- Yes, it's another JMS implementation
 - Looked at OpenJMS and JORAM
 - Needed BSD, JMS1.1 and JCA1.5
- Designed for performance
 - NIO
 - Content based routing
 - Rules based routing (drools)



The logo graphic consists of a vertical black line intersected by a horizontal black line. To the left of the intersection, there are three overlapping squares: a yellow one at the top, a red one in the middle, and a blue one at the bottom. The word "TranQL" is written in a blue, sans-serif font to the right of the vertical line.

TranQL

- Framework for Persistence Frameworks
- Common data model across frameworks
- Multiple front ends:
 - EJB CMP, JDO, Castor, JDBC, Groovy DO
- Multiple back ends:
 - SQL92, SQL03, XML, LDAP, JCA



The logo graphic for MX4J consists of a vertical black line intersected by a horizontal black line. To the left of the vertical line, there are three overlapping squares: a yellow one at the top, a red one in the middle, and a blue one at the bottom. The text 'MX4J' is positioned to the right of the vertical line, in a blue, sans-serif font.

MX4J

- Well established JMX implementation
- Fully compliant JMX and JMX Remote API (JSR-160)
- Highly robust
- Widely used



ObjectWeb JOTM

- Java Open Transaction Manager
- Well established transaction manager
- Implements the JTA API
 - Full XA support
 - RMI/JRMP
 - RMI/IIOP



The logo graphic consists of a vertical black line intersecting a horizontal black line. To the left of the intersection, there are three overlapping squares: a yellow one at the top, a red one in the middle, and a blue one at the bottom. The word "ActiveCluster" is written in a blue, sans-serif font to the right of the vertical line.

ActiveCluster

- Framework for creating cluster-based applications
- Small, simple implementation
- Pluggable service providers
 - Sockets
 - JMS
 - JGroups
 - Jabber





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- High performance code generation library
 - Well established class enhancer
 - Provides runtime byte code manipulation





Security

- Built in at low level
 - Secure network protocols
 - Support security manager (sandbox)
- JAAS and JACC
 - Possible pluggable policy providers
 - HIPPA
 - SOX
- Kerberos integration (including .NET)
- Apache Directory integration (LDAP)



Transactions

- Lightweight Transaction Manager
 - XA Coordinator
 - XATerminator for JCA transaction import
 - Logging (HOWL) and basic recovery
- Future is JOTM integration





Project Status

- A top-level Apache project
- J2EE 1.4 CTS testing in progress
 - Three people working on certification
- Official unofficial release date: ?/?/2004
 - Open Source: It's done, when it's done
- M1 milestone release in May
- M2 milestone release in August





M2 Release Features

- Geronimo Kernel is stable
- Web integration complete
- OpenEJB stable
 - Mostly working, except some bits of CMP2.1
- ActiveMQ stable
- Transaction and Connector Complete
- Enabled Hot (re)-deployment
- To-do
 - Finish web services, application client, CORBA



Who Is Bruce Snyder?

- Independent software consultant
- Speaker at software conferences
 - JavaOne
 - ApacheCon
 - Colorado Software Summit
- The Castor Project (<http://www.castor.org/>)
- Apache Geronimo (<http://geronimo.apache.org/>)
- TranQL Project (<http://tranql.codehaus.org/>)
- Author

 ➤ Castor Live (SourceBeat Publishing)



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- Jules Gosnell
- Simone Bordot





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- Open up for Questions and Answers

