Get Unstuck with JBoss

John Liptak
Get Unstuck with JBoss – An Evolutionary Approach
June 25, 2015
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• Principal Architect in the Technology & Strategy group

• Responsible for:
  • Company-wide open source policies and adoption
  • Java performance monitoring and management
  • Architecture lead for our ongoing WLS → JBoss migration and PaaS introduction
  • External consulting engagements
CenturyLink

- Third largest telecom company in the U.S.
- Broadband, Voice, Cloud, Managed Hosting and IT Services
- Operates 58 data centers in North America, Europe and Asia
- 250,000-route-mile U.S. fiber network and a 300,000-route-mile international transport network
**Our Transformation**

1930

- **75 Telephone Customers**

1997 – 2007

- Successful history of acquiring and integrating companies; added 2.0M access lines between 1997 and 2007
- And expanded our footprint

2003

- Acquisition of EMBARQ; 7.5 million access lines, 2.1 million broadband customers and 450K video customers in 33 states

2009

- Qwest acquisition created 3rd largest telco with revenues of more than $18 billion, a robust national fiber network, a significantly larger enterprise customer base

2011

- Addition of **Hosting/Cloud & IT Services** capabilities through acquisitions of Savvis, AppFog, Tier3, DataGardens, Cognilytics & Orchestrate

2012 - 2015
Technology Adoption

Everything you need to know you learned before kindergarten:

Why?

How?

What’s Next?
Turning the light bulb on
How Stuck Are You?
Sprint: Migrating to JBoss Enterprise Middleware in a Big Way

In April of 2011, Sprint approved and funded a major program to replace legacy Oracle WebLogic and IBM WebSphere with JBoss Enterprise Application Platform. As of June 2012, Sprint expects to have migrated over 160 applications utilizing 1,000 CPUs of WebLogic and 100,000 PVUs of WebSphere. Within the scope of this program, Sprint also modernized its infrastructure, migrated stand-alone servers into virtual machines, replaced legacy web servers with Apache, and implemented an architecture that significantly increased IT application scalability, flexibility, and supportability at Sprint.

Evolution

Incremental Improvements
Multiple small improvements over time leading to a transformation of the IT ecosystem
Some improvements don’t work and they are not propagated to the next generation.

Extinction
Some products die off because they can’t keep up.
JBoss Value Chain

- JBoss Enterprise Web Server (EWS)
- JBoss Operational Network (JON)
- JBoss Enterprise Application Server (EAP)
- JBoss Fuse
Open Source Freedom

Freedom from closed source provides needed flexibility.

Example: object slicing problem
Hibernate uses ROW_NUM to limit query results.
If you use setMaxResults(5)
Fixed by using analytic
DENSE_RANK over partition
by primary key and duplicated order by clause
HISTORY
“A disciplined, consistent effort to develop, propagate, and exploit them [innovations] should indeed yield an order-of-magnitude improvement” – Fred Brook

“All problems in computer science can be solved by another level of indirection” – Butler Lampson
Historic Progression

Dedicated hardware

Stacked
• Standard Operating Environment
• Requirements

Virtualized
Standard Deployment

- Load Balanced
- Highly Available
- Multiple Application Servers
- Separate Database Server
Field of Dreams

Build it and they will come:
MySQL
Tomcat (5.5)
Didn’t come

• No monitoring support
• No Admin support
• No platform support
Learn from Failure

• Business Case – break even on hardware replacement and reduced memory usage
• Density – Move from old hardware with 1G heaps to new hardware with 256M
• Manageability – Have to provide same or better support to development teams
Required Ingredients

- Management Support
- Business Case ROI
- Facts vs. Fear
FOSS Migration

Migration Progress to date
JBoss Value Chain

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Process Evolution Too!

This single process evolved over time to a process with multiple options
Organizational Flexibility

One size did not fit everyone.

Provide options:
- Directing application team work
- Factory model
- Ad-hoc consulting/Mentoring
Factory Model

• Get access to source code – work just like developers on the existing team
• Update Application
  • Code
  • Build Process
  • Deliverable
• Running version in development/integration
• Code review and hand-back step
Standards

- What we provide
  - Middleware
  - Services access

- What we allow
  - No editing of configuration files

- How we deploy it

Load Balancer

Apache
mod_ajp
mod_cluster

App Server
EWS
EAP
WLS

Database
Oracle
MySQL
SQLServer

NAS
NFS v3
Winning Standardization

• Make standards easier than custom efforts
  • Provide reasonable defaults
  • Provide multiple options
  • Make teams do the extra work for customization

• Solicit input from subject matter experts
  • Web developers
  • Database experts
  • Networking
  • Security

• Have a reasonable exception process
  • Third party software
  • Existing contracts
  • High cost conversions
  • Time

• Backup
• Recovery
• Security
• Patching
• Etc.
Training

Red Hat Consulting

• JBoss ON
• EAP
• Fuse

Train the trainer consulting

Wiki for converting applications
THE IMPLEMENTATION
Adoption Selection

Pick 3 Apps

- Small, simple, easy win
- Large, simple, visible
- Complex application with flexibility

Include a Technology POC

My list: EJB, JMS, TIBCO RV, Camel, Struts 2, Spring, AspectJ, JAX-RPC, JAX-WS, REST, native Hibernate and JPA
What to Upgrade?

Required
• JDK 7+
• Remove or replace end of service life products
• Remove or replace components no longer approved

Application wish list
• Framework changes
• Services updates
Cost arguments

- JPA vs. Entity upgrade
- RMI
- Corba
- Portal
Operational Readiness Review

TIBCO
JMS
EJB
XA Transactions
Spring
Session Replication
BPM
Load and Performance
Load Test

Require a Load Test

Java Mission Control
VisualVM
Eclipse
Memory Analysis Tool (MAT)
Deployment

+ Standard deployment
+ Application artifacts
+ Environment (logging, cron jobs, etc.)
  = running application
Layers to validate

SSL
Load balancing
Failover
Security
JBoss PRODUCT SPECIFICS
EWS

Simple –

No editing xml files
  • Use META-INF/context.xml for resources

Property file deployment

No libraries provided

Auto add truststore or keystore if provided
Applications

- Epicentric Portal to iText
- Integration Gateways
- Large numbers of web applications
JBoss Operational Network

Operations
• Used to track and view performance across multiple layers
• Use custom scripts for deployment

Development access
• Allowing development teams to view data is key
• Share in all environments via LDAP groups

History
• Historical data is the most valuable feature
• What was my application doing last Tuesday at 2:00 a.m.?
EAP

Run multiple servers in standalone mode
Startup scripts allow for automatic creation of clones with port offsets
Includes custom JAAS realms for application security
No editing standalone.xml
Property file deployment
Re-sync on startup
XA support
Session Replication
EAP Modules

Provide operations curated modules
• Database Drivers
• Security
Take advantage of multiple versions if necessary
• JAXB versions

File URI
  vfs:// vs. file://

Learn about jboss-deployment-structure.xml
EAP CLI Scripts

Allow applications to start with different configurations (standalone, full, full-ha)

Use CLI to customize

• Database pools
• JMS pools
• Database drivers
• URL endpoints for WSDL
Applications

• Account services
  MDB issues [https://access.redhat.com/solutions/475193](https://access.redhat.com/solutions/475193) caused by GC pauses
    @ActivationConfigProperty(propertyName = "clientFailureCheckPeriod", propertyValue = "600000")
    @ActivationConfigProperty(propertyName = "connectionTTL", propertyValue = "-1")

• Quote to order
  Multithreaded deployment issues resolved by adding CDI injected references
  Manual JNDI lookups can leave unresolved deployment references
  -Dorg.jboss.server.bootstrap.maxThreads=10
Fuse & Fabric8

Features – no random bundles
Take advantage of the , separated directories for configuration directories

Discovery protocol for ActiveMQ

Delaying Fabric8 to 6.2 for application endpoints
Branching fabric GIT repository for multiple applications needed deeper understanding and working version was not GA.
Applications

• Multiple Model Driven Workflow (MDW) applications upgrading
• OSGi/ServiceMix applications supporting critical billing functionality
What’s Next

Journey to the Cloud


CenturyLink IT team has made a commitment to migrate 90% of our strategic applications to the cloud.
FOSS Migration

Migration Progress to date
QUESTIONS & DISCUSSION