Managing the Data Center Using the JBoss Enterprise SOA Platform

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Service Architectures

- **Software as a Service (SaaS) Architectures**
  - Cloud Infrastructure
    - IaaS
    - PaaS
    - SaaS

- **Platform as a Service (PaaS) Architectures**
  - Cloud Infrastructure
    - IaaS
    - PaaS

- **Infrastructure as a Service (IaaS) Architectures**
  - Cloud Infrastructure
    - IaaS

Source: NIST, Information Technology Laboratory
http://csrc.nist.gov/groups/SNS/cloud-computing/cloud-computing-v25.ppt
As a Service or at your service?

How can I build my web hosting business?
How can I manage my customer relationships?
How can I run my company's IT department?

Data Center

Capability Provisioning
Enterprise Service Providers

How can I collaborate across the enterprise?
How can I view my corporate sales data?

Software

Application Provisioning
Service Composition
Composable Applications

How do I store & retrieve my inventory data?
How do I deploy my web services?

Platform

Database Provisioning
Web Site Provisioning and Hosting

How do I get the most of my IT and personnel resources?

Infrastructure

Server, Storage, and Network provisioning

The Intelligent Data Center is built on top of separate service layers that make it easier to address individual business concerns across different technical domains. It marks the shift from technology and business driven solutions to the era where technology and business both share the driver's seat.
I need 3 servers to use for the development of a proof of concept. It's going to be the next big thing!

3 Virtual Servers:
• 1 – 1 CPU, 2 GB Ram, 40 GB Disk
• 2 – 2 CPU, 1 GB RAM, 10 GB Disk
The Obligatory Call for Standards

- The call for cloud and grid standards is deafening

- Some new standards are being developed:
  - Distributed Management Task Force
  - Open Grid Forum
  - Sun Cloud API – Project Kenai

- Some have existed for a while:
  - Open Grid Services Architecture
  - WS-Management, WS-Resource, WS-Distributed Management, etc...

- Some are becoming de facto standards:
  - Amazon EC2 APIs
One Standard to Rule Them All?

- Open standards...not standards that are reverse engineered from vendor apis.
  - Favor standards driven by the community's needs

- Standards provide semantic context
  - As long as we can communicate, we don't have to dominate

Conway's Law: “Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.”
The Open Grid Services Architecture

- Adopted as a grid architecture by a number of grid projects including the Globus Alliance
- Includes multiple service categories:
  - Infrastructure services
  - Execution Management
  - Data Services
  - Resource Management Services
  - Security Services
  - Self-management Services
  - Information Services
- Uses WS-Resource Framework and WS-Management specifications
- Check out for more info: http://www.ogf.org/OGSA_Primer/

WS-Resource Framework


- **Multiple Java Frameworks available:**

- Provides a framework in which any manipulated resource can be identified and described via an exchange of messages

- **Comprised of several specifications:**
  - WS-Resource specification
  - WS-ResourceProperties (WSRF-RP) specification
  - WS-ResourceLifetime (WSRF-RL) specification
  - WS-ServiceGroup (WSRF-SG) specification
  - WS-BaseFaults (WSRF-BF) specification
Communication, Communication, Communication

• If technology has taught us anything, it's that there's always more than one way to say the same thing.

• With all the evolving standards, a mediation layer is needed for:
  • Message Mediation
  • Message Routing
  • Protocol Transformation
  • Service Registration

• Sounds like an Enterprise Service Bus?
JBoss SOA Platform

- The SOA Platform can be used between the Platform as a Service and Infrastructure as a Service layers
- Business processes can be defined to coordinate the deployment of new infrastructure
- Message Mediation via Smooks
- Message Routing using Drools for Content-based Routing
- Protocol Transformation via built-in transformations for FTP, JMS, SMTP, File, WSDL, etc
- Service Registration via the built-in jUDDI registry
Management in Action – User Requests Web Site Hosting

• Scenario:
  • Request for dedicated web site hosting

• Actions:
  • Receive the hosting request
  • Send provisioning request to infrastructure platform
  • Infrastructure builds new Apache node instance
  • New web virtual host configuration file created
  • Default web site created with appropriate user permissions
  • Notification sent to end user about server availability
Platform as a Service (PaaS)

Web Hosting Provision Service

HTTP
- Transform WS-Resource Request
- Check if server space available
- Create Apache Virtual Host
- Copy "Hello, World" Web Site
- Reload Apache Settings
- Send Confirmation Notification

JMS
- Transform Job Request
- Create Disk Partition
- Create Web VM
- Create Web Server
- Register System in Monitor System

Notify Provisioning Server

Web Server Provisioning Service

Infrastructure as a Service (IaaS)

- Durability
  - HA Cluster
  - Grid
- Container Partitioning
  - Messaging
  - Service Hosting
  - Database
  - Virtual Servers
- Data Consistency
  - Distributed Storage
  - Content Delivery
- Resource Pools
  - Network
  - Storage
  - Memory
  - Compute
Enablers

- Infrastructure Management
  - Cobbler
  - Puppet
  - Satellite
  - FUNC
  - Directory Server
- Middleware
  - JBoss SOA Platform
  - JBoss BRMS
- Clusters, Grids and Virtualization
  - RHCS
  - GFS
- Monitoring
  - Hyperic HQ
  - Audit
Tomorrow’s data center will be radically different in both form & function

The commodity nature of the hardware and software components allows decision makers to move away from expensive maintenance contracts and to replace components as they fail.

The need for traditional disaster recovery sites will be drastically reduced as any service can be instantiated anywhere in the environment.

The final resting place for data will continue to move closer to its computational resources. The key question is where will the data reside.

Mobile devices continue to enable users to create massive amount of content. This content will continue to get archived, sorted, and re-deployed to other people in new and interesting ways.

Our mobile devices will evolve into sensors that are producers of information as well as consumers.

The network will continue to be the biggest bottleneck in distributed computing.

The dynamic data center will be a necessity and smaller, lighter and more agile data centers will become a reality.
A complete management strategy for the data center will require a harmonizing of business objectives with information technology infrastructure across eight navigational areas...

- **Reputation**: It takes a lifetime to build a good reputation and one system-wide outage to ruin it.
- **Partnerships**: The data center is a heterogeneous assembly of vendor products. Partnerships help develop interoperability.
- **Empowerment**: Empowering employees and communities encourages growth and development of new capabilities.
- **Community**: The community extends both inside and outside the organization.
- **Mission**: The alignment organization's business objective and the technology potential should support the mission.
- **Policy**: Business objectives and/or the technology potential should help shape policy.
- **Employees**: Employees should have a vested interest in the effectiveness of the data center.
- **Opportunity**: Focus on potential while identifying roadblocks and speed bumps.
...and this alignment can only be achieved through open architecture, open standards, and the open source community

- Open Source Promotes Faster Deployment
- Open Standards and Specifications encourage open collaboration
- Transparent Sharing of Distributed Resources by Multiple Clients
- Reuse of Business Components
- Agile Infrastructure
- Commodity based approach
- Low Start-Up and Maintenance Costs
- Lower Technology Refresh Expenses
- Emphasizes community
- Takes advantage of the scalability obtainable through Internet-based virtual organizations

Conway’s Law: “Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure.”
As community engagement practitioners, we seek to build ongoing, permanent relationships for the purpose of applying a collective vision for the benefit of the community.

inCommon, Inc was started to advocate the use of Open Source and Open Architecture solutions in the U.S. government market.

As part of this mission, we seek to educate individuals on the value of Virtual, Grid and SOA architectures based on Open Source and Open Architecture constructs.

We work with clients to efficiently and effectively accelerate systems delivery while maximizing existing resources whenever possible.
QUESTIONS?

TELL US WHAT YOU THINK:
REDHAT.COM/JBOSSWORLD-SURVEY