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Creating Custom Monitoring Plug-ins for JBoss Operations Network

Steve Giovannetti
CTO, Hub City Media, Inc.
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Agenda

- Introduction to JON (and me, briefly)
- Customer Use Case
- Creating a Custom Plugin
- Code and Demonstration
- Q&A

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Introduction

Hi I'm Steve, CTO Hub City Media, Inc.

- System Integration and Software Development Specialists
- Founded in 1999
- Headquarters, Edison, NJ
- 45 people and growing (We're hiring, if you are interested.)
- Majority of the content for today's talk was compiled from a customer engagement from 2009-2010

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What is JBoss Operations Network?

- Powerful Administrative Tool for JBoss Middleware
 - Discovery
 - Configuration
 - App Deployment
 - Availability and Performance Management
 - Patch Management
- Based on the Open Source Jopr project

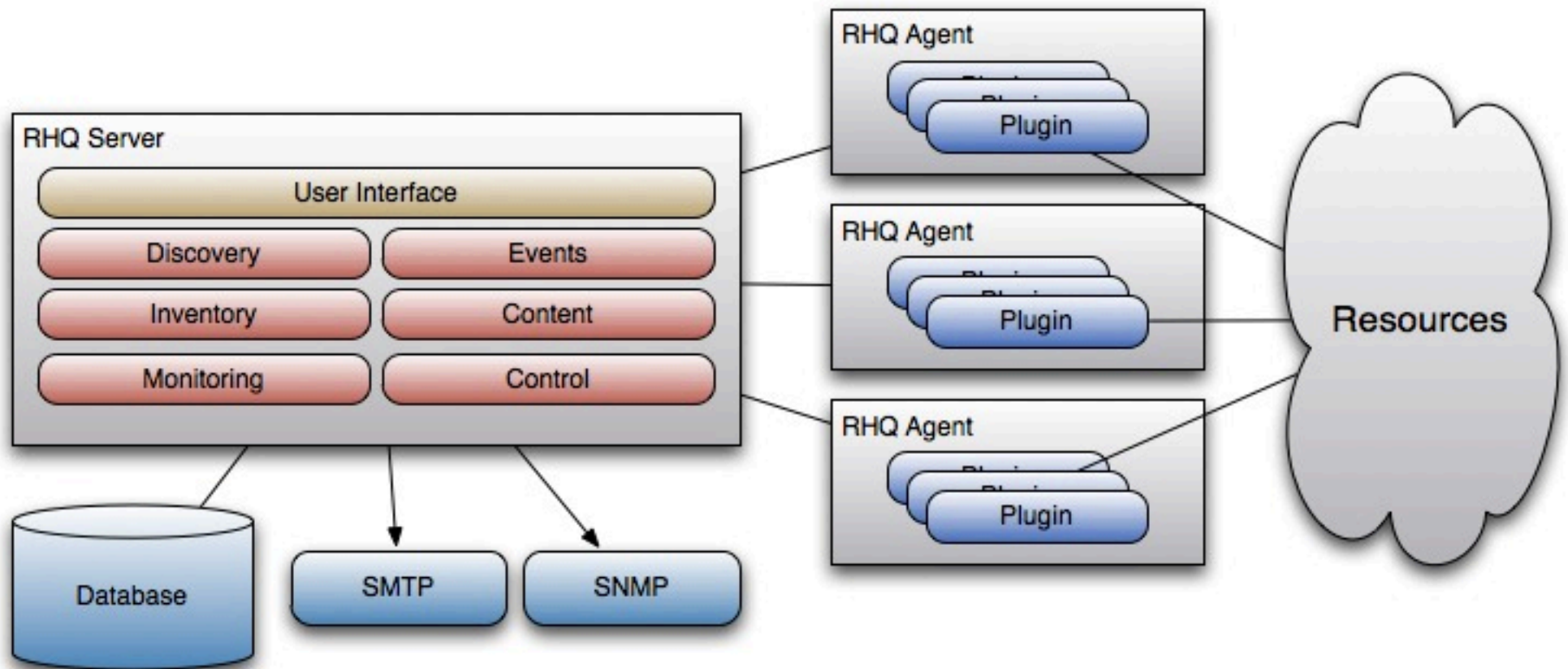
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JBoss ON Architecture



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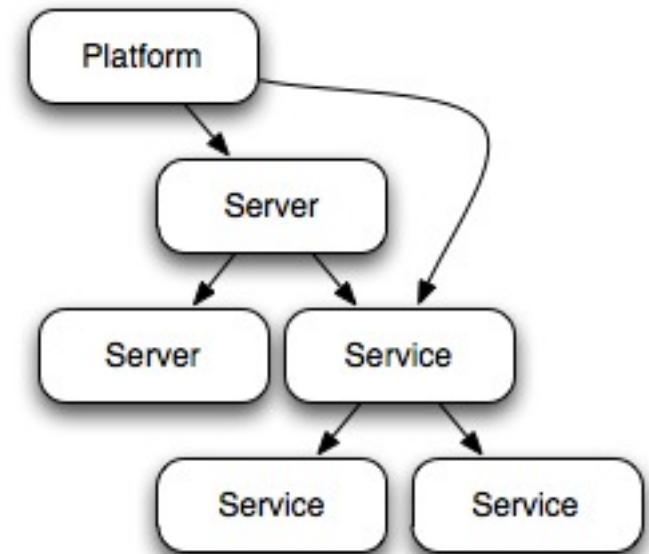


What are Resources?

Platform - A host that things run on

Server - software server, i.e. JBoss AS, Postgresql, etc.

Service - services offered by a server, i.e. JMS, JMX, etc. but it can also be a platform service like CPU, memory, or filesystem



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What resources can you manage out of the box?

Platforms	AIX, FreeBSD, HP-UX, Java VM, Linux, Mac OS, Solaris, Windows
Platform Services	CPU, Network, and Filesystem
Servers	Apache HTTP, GRUB Server, Hibernate, Hudson, IIS, JBoss AS, JBoss Cache Subsystem, JMS, JMX, MySQL, Postgresql, Oracle, JBoss ON Server/ Agent, and many more...

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No plugin for your platform, server, or server?

- No Problem!
- Writing a custom plug-in is quite simple.
 - Start with some skeleton code.
 - The task requires some basic Java skills.
- More importantly it requires some planning.
 - What do you want to monitor and how?
 - What JBoss ON features do you want?

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Before we jump to the code, some context.

The Customer Case Study

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Customer Case Study: The Customer

- Customer is a large commercial utility in US and Canada.
- Working with another firm to develop a customer self-service portal based on Spring and JBoss.
- The new application was customer facing and required quite a few servers.
- Completely New to JBoss and Java EE applications.

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Customer Case Study: The Challenges

- The customer had no way to monitor all the components in this new system.
 - RHEL Servers (12 servers total)
 - JBoss AS (4 instances)
 - JBoss Web Server (4 instances)
 - OpenLDAP (4 instances)
 - Database MS SQL (2 instances)
- These systems were distributed across two sites.
- NOC was considered a third site.

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Customer Case Study: Our Solution

- Deploy JBoss ON in the NOC.
- Deploy JBoss ON Agents to each server.
- Write a custom plugin for OpenLDAP
 - We were surprised one didn't exist already.
- Set up simple monitoring and patching first, move to more advanced features later.

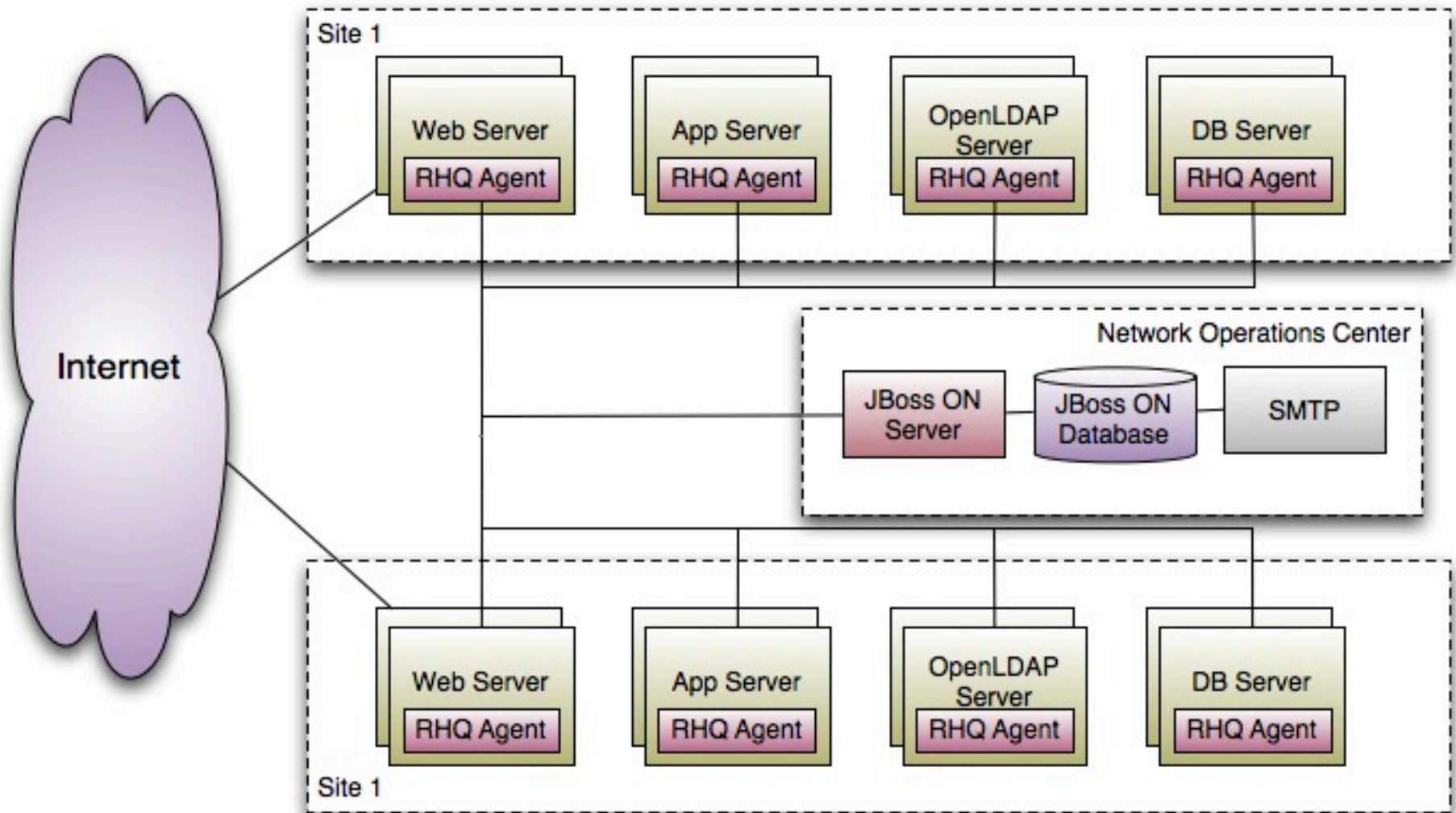
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Customer Case Study: Solution Architecture



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Creating the Plugin

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Steps for Creating Your Plugin

- Understand what you want.
 - JBoss ON features you want to support
 - Discovery
 - Monitoring
 - etc
- Gather the necessary tools and install JBoss On
- Code, build, test....repeat as needed.
- Deploy to JBoss ON

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Our Goals for the LDAP plugin.

- Provide basic discovery of OpenLDAP running on a server.
- Provide UP/Down status.
- Provide statistics available in `cn=monitor`

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What you will need to get started.

- Java SE SDK Installed on your system.
 - Download from <http://developers.sun.com/downloads/>
- Maven installed.
 - Download from <http://maven.apache.org/>
- A copy of an existing plug-in.
 - Try the RHQ SVN repository at <http://svn.rhq-project.org/repos>
 - There are a number of modules in trunk/modules/plugins
 - Pick on that's close to what you want to do.

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What are the main components to a plugin?

- Plugin descriptor - rhq-plugin.xml
- A Discovery Component
- A Plug-in Server Component

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Plug-in Project Directory

```
openldap/  
  pom.xml      # maven pom  
  src/  
    main/  
    java/  
      org/rhq/plugins/openldapplugin/OpenLDAPPluginDiscoveryComponent.java  
      org/rhq/plugins/openldapplugin/OpenLDAPPluginServerComponent.java  
  resources/  
    META-INF/rhq-plugin.xml      #plugin descriptor
```

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Modifying the POM

In Most cases, you will just need to update the POM info

```
<groupId>com.rhq</groupId>
<artifactId>rhq-openldap-plugin</artifactId>
<packaging>jar</packaging>
<version>1.1.2.SP1</version>
<name>RHQ OpenLDAP Plugin</name>
<description>A plugin to monitor OpenLDAP</description>

<properties>
  <rhq.version>1.0.0.GA</rhq.version>
</properties>
```

If you have any third party dependencies you can include them in the normal `<dependencies>` section.

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Creating the plug-in descriptor: rhq-plugin.xml

First set up the plugin and the resource type:

```
<plugin name="OpenLdapPlugin"
  displayName="OpenLDAP Plugin"
  package="com.rhq.plugin.openldapplugin"
  description="Plugin for OpenLDAP"
  version="1.1.2.SP1"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns="urn:xmlns:rhq-plugin"
  xmlns:c="urn:xmlns:rhq-configuration">

<server name="OpenLDAP Plugin Server"
  discovery="OpenLDAPPluginDiscoveryComponent"
  class="OpenLDAPPluginServerComponent"
  supportsManualAdd="true"
  description="OpenLDAP Plugin">
```

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Creating the plug-in descriptor: rhq-plugin.xml

Include configuration parameters:

```
<plugin-configuration>
    <c:simple-property name="ldapDriver"
default="com.sun.jndi.ldap.LdapCtxFactory" description="LDAP driver Class"/>
    <c:simple-property name="ldapHostURL" default="ldap://localhost:389"
description="LDAP Host URL"/>
    <c:simple-property name="ldapAuthType" default="simple" description="LDAP
Authentication Type"/>
    <c:simple-property name="principal" default="cn=Manager,dc=hcm,dc=com"
description="LDAP Path To DN"/>
    <c:simple-property name="credentials" type="password" displayName="Bind
password"/>
</plugin-configuration>
```

And Process Scan entry:

```
<process-scan name="OpenLDAP" query="process|basename|match=^slapd.*,process|basename|
nomatch|parent=slapd.*"/>
```

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Creating the plug-in descriptor: rhq-plugin.xml

Then define some metrics you want to collect from the server:

```
<metric property="cn=Entries,cn=Statistics,cn=Monitor:monitorCounter"
    displayName="Number of Entries Sent"
    category="throughput"
    description="Number of Entries Sent"
    displayType="summary"
    units="none"/>
<metric property="cn=Total,cn=Connections,cn=Monitor:monitorCounter"
    displayName="Total number of connections"
    category="throughput"
    description="Total number of connections"
    displayType="summary"
    units="none"/>
<metric property="cn=Current,cn=Connections,cn=Monitor:monitorCounter"
    displayName="Current open connections"
    category="throughput"
    description="Current open connections"
    displayType="summary"
    units="none"/>
```

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Creating the Discovery Component

```
public Set discoverResources(ResourceDiscoveryContext resourceDiscoveryContext)
    throws InvalidPluginConfigurationException, Exception {

    Set<DiscoveredResourceDetails> details = new
    HashSet<DiscoveredResourceDetails>();

    for (ProcessScanResult result : ((List<ProcessScanResult>)
    resourceDiscoveryContext.getAutoDiscoveredProcesses())) {

        ProcessInfo info = result.getProcessInfo();

        DiscoveredResourceDetails detail =
            new DiscoveredResourceDetails
            (resourceDiscoveryContext.getResourceType(), "slapd", "OpenLDAP slapd", "2.2.x",
            "Open LDAP daemon " + info.getName(), null, null);

        details.add(detail);
    }

    return details;
}
```

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Creating the Plugin Server Component

```
public DirContext getDirContext()
    throws NamingException
{
    if (ctx != null)
        return ctx;
    synchronized(OpenLDAPPluginServerComponent.class)
    {
        Hashtable ldapEnv = new Hashtable();
        this.configuration = this.resourceContext.getPluginConfiguration();
        String ldapDriver =
            this.configuration.getSimple("ldapDriver").getStringValue();
        String ldapHostURL =
            this.configuration.getSimple("ldapHostURL").getStringValue();
        .....
        ldapEnv.put(Context.INITIAL_CONTEXT_FACTORY, ldapDriver);
        ldapEnv.put(Context.PROVIDER_URL, ldapHostURL);
        .....
        ctx = new InitialDirContext(ldapEnv);

        return ctx;
    }
}
```

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Plugin Server Component: What you support

Class Declaration:

If we were supporting all operations available via JBoss ON:

```
public class OpenLDAPPluginServerComponent implements ResourceComponent, MeasurementFacet,  
    OperationFacet,  
    ConfigurationFacet, ContentFacet, DeleteResourceFacet, CreateChildResourceFacet  
{ ... }
```

But since we are only supporting a subset of operations:

```
public class OpenLDAPPluginServerComponent implements ResourceComponent, MeasurementFacet  
{ ... }
```

Which means we only need to implement:

```
ResourceComponent.getAvailability()  
MeasurementFacet.getValues()
```

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Plugin Server Component: getAvailability()

```
public AvailabilityType getAvailability() {  
    try {  
        if (getDirContext() != null) {  
            return AvailabilityType.UP;  
        } else {  
            return AvailabilityType.DOWN;  
        }  
    } catch (NamingException e) {  
        log.error("OpenLDAPPluginServerComponent.getAvailability Exception " +  
ee.toString(), e);  
        return AvailabilityType.DOWN;  
    }  
}
```

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Plugin Server Component: getValues()

```
public void getValues(MeasurementReport report, Set<MeasurementScheduleRequest> metrics)
    throws Exception {
    try {
        for (MeasurementScheduleRequest request : metrics) {
            String alias = request.getName();
            if (alias.indexOf(":") > 0){
                String[] attrs = alias.split(":");
                String attrQry = attrs[0];
                String attr = attrs[1];

                String value = getMetric(attrQry, attr);

                if (value != null) {
                    value = value.substring(value.indexOf(":") + 1);
                    report.addData(new MeasurementDataNumeric(request,
                                                                new Double(value)));
                }
            }
        }
    } catch (Exception e) {
        log.error("Exception " + pp.toString(), e);
    }
}
```

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That's All!
Build, Test, Deploy!

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Demonstration

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Additional Resources

- JBoss ON - <http://www.jboss.com/products/jbosson/>
- Jopr - <http://www.jboss.org/jopr>
- Hub City Media - <http://www.hubcitymedia.com>

- My Contact Info
 - Email: steve@hubcitymedia.com
 - Twitter: @stevegio

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