PRESENTED BY RED HAT

LEARN. NETWORK.
EXPERIENCE OPEN SOURCE.

Configuration & Management with JBoss EAP 6 Domains

Brian Stansberry
Principal Software Engineer, Red Hat
06.28.12

Agenda

- Key Operations, Administration & Management (OA&M) Goals for JBoss EAP 6
- Managed Domain Mode & Standalone Mode
- CLI & Admin Console
- Domain Configuration
- Domain Topologies
- Demo
- Q&A

Key Goal – Centralized Configuration

- End user configuration centralized in one or two files
  - No longer scattered all over the distribution
- Config changes made via management tools are always persisted back to the config file
  - The config files provide a complete picture

Key Goal - User-focused Configuration

```
<deployment xmlns="urn:jboss:bean-deployer:2.0">
<bean name="ServiceBindingManager" class="org.jboss.services.binding.ServiceBindingManager">
      <annotation>@org.jboss.aop.microcontainer.aspects.jmx.JMX(...)</annotation>
      <constructor factoryMethod="getServiceBindingManager">
         <factory bean="ServiceBindingManagementObject"/>
      </constructor>
</bean>
  ...
<bean name="PortsDefaultBindings" class="org.jboss.services.binding.impl.ServiceBindingSet">
      <constructor>
         <parameter>ports-default</parameter>
         <parameter>${jboss.bind.address}</parameter>
         <parameter>0</parameter>
         <parameter><null/></parameter>
      </constructor>
</bean>
<bean name="StandardBindings" class="java.util.HashSet">
      <constructor>
         <parameter class="java.util.Collection">
            <set elementClass="org.jboss.services.binding.ServiceBindingMetadata">
            <bean class="org.jboss.services.binding.ServiceBindingMetadata">
               <property name="serviceName">jboss:service=Naming</property>
               <property name="bindingName">Port</property>
               <property name="port">1099</property>
               <property name="description">The listening socket for the Naming service</property>
            </bean>
```


Key Goal - User-focused Configuration

```
<interfaces>
    <interface name="public">
        <inet-address value="${jboss.bind.address:127.0.0.1}"/>
    </interface>
    <interface name="management">
        <inet-address value="${jboss.bind.address.management:127.0.0.1}"/>
    </interface>
</interfaces>

<socket-binding-group name="standard-sockets" default-interface="public"
                      port-offset="${jboss.socket.binding.port-offset:0}">

    <socket-binding name="management-native" interface="management"
                    port="${jboss.management.native.port:9999}"/>
    <socket-binding name="management-http" interface="management"
                    port="${jboss.management.http.port:9990}"/>

    <socket-binding name="http" port="8080"/>
    <socket-binding name="https" port="8443"/>

    <socket-binding name="jgroups-udp" port="55200"
                    multicast-address="${jboss.default.multicast.address:230.0.0.4}"
                    multicast-port="45688"/>

    . . . .
```


Key Goal – Robust Management API

- Complete: expose everything in the config schema
  - Plus metrics, runtime operations
- Stable: no incompatible changes across the entire EAP 6.x series

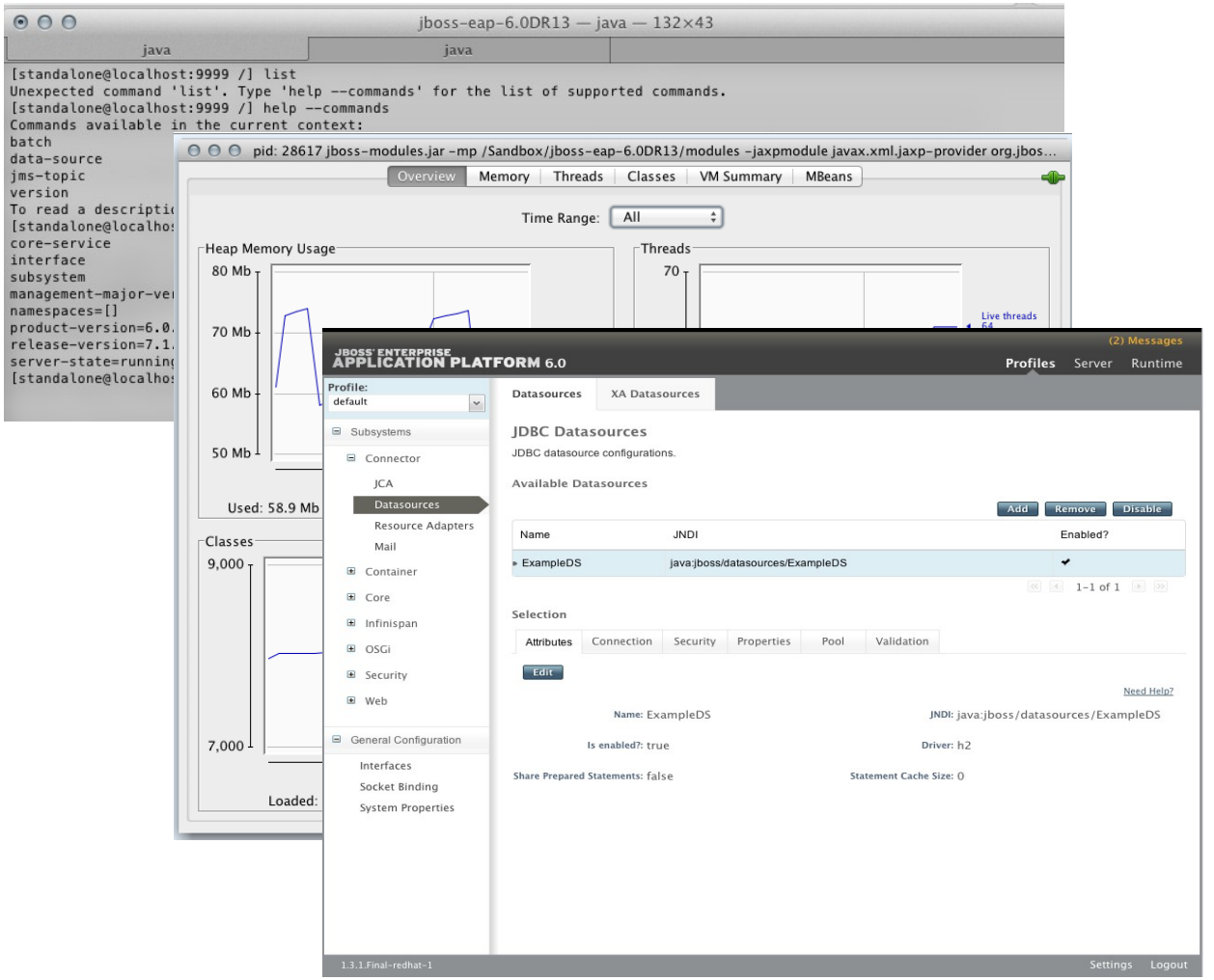
Management Interfaces

Tools

- CLI
- Web Console

Management APIs

- Java (DMR)
- HTTP/REST
- JMX



Management Resources

- Everything manageable is exposed via a tree of addressable resources
  - Address is an ordered list of key/value pairs
  - /profile=default/subsystem=web/connector=http
- Resources expose attributes & operations
- Quite similar to JMX Open MBeans
  - But, resources are organized in a tree
  - Atomic multi-step operations supported
  - Operations across servers supported

Key Goal – Multi-Server Management

- Multi-server management as a core part of JBoss EAP 6 itself

- Manage multiple servers from a single control point
  - Start/quiesce/stop servers
  - Rolling deployment to a set of servers
  - Roll a config change out to a set of servers
  - Roll back changes

Choices for How to Manage EAP 6 Instances

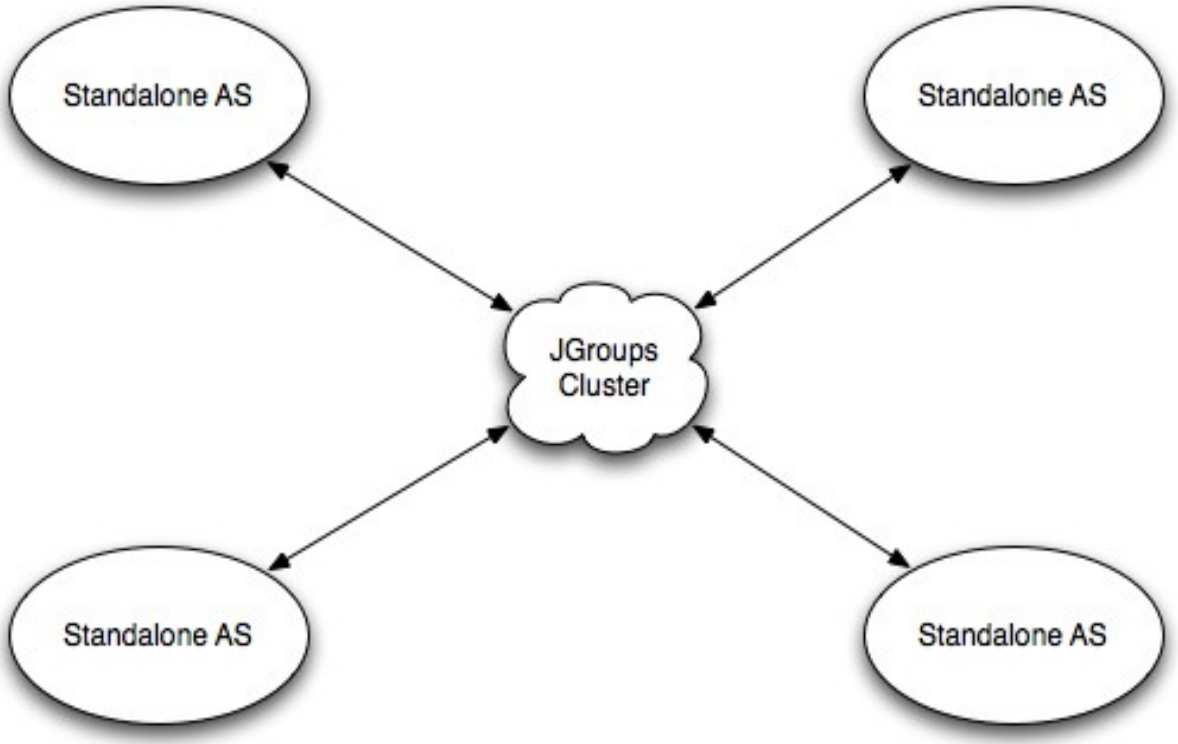
- Do you want to take advantage of our multi-server management features?
  - Yes: run a *Managed Domain*
    - `[bin]$ ./domain.sh`
  - No: run a *Standalone Server*
    - `[bin]$ ./standalone.sh`
- Either way, you still get simplified configuration & a robust management API

Standalone Server Mode

- Each server is independently managed, a la JBoss EAP 4 & 5
- User is responsible for coordinating changes across servers
- Single configuration file:
  - `standalone/configuration/standalone.xml`

Standalone Mode Allows HA Clusters

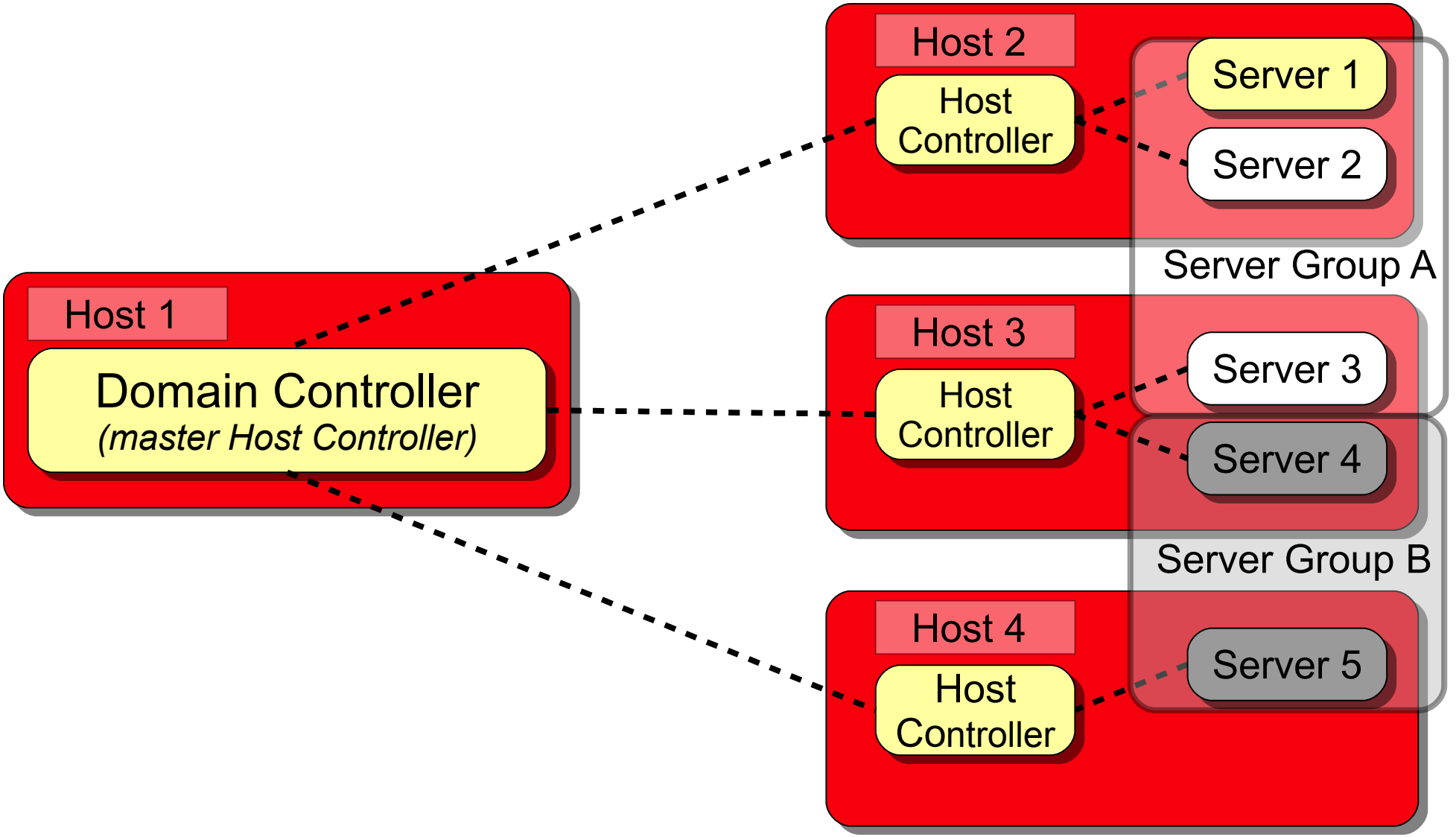
- Standalone mode is about *management*, not how managed services operate



Managed Domain Mode

- Provides EAP's multi-server management features
- **Domain:**
  - Set of servers with a common configuration policy
  - Policy is defined in the `domain.xml` config file
  - Servers can be heterogeneous in a domain
- EAP ensures that all servers in the domain run in accordance with that policy

Domain Topology



Host Controller

- Runs on each host machine
  - launched via `domain.sh` or `domain.bat`
- Starts/stops all servers on that host
- Coordinates any management changes made to those servers
  - “deploy helloworld.war”
- Exposes native & HTTP management interfaces to handle administrator requests
- Does not handle end user requests

Domain Controller

- One Host Controller is configured to act as the “master” – aka the *Domain Controller*
- Other Host Controllers are controlled by the DC
  - When they start they contact the master to get the central configuration
- Admins interact with the Domain Controller to make most administrative changes
- The DC coordinates pushing out the changes to the other Host Controllers & on to the servers

Server Groups

- Every application server in a managed domain is a member of a Server Group
- Domain can have many Server Groups
- Most aspects of a server's configuration are inherited from its Server Group
  - Deployments
  - Subsystems
  - Sockets

Management Tools: CLI

- Launch from `bin` dir via `jboss-cli.sh` or `jboss-cli.bat`
- Connect to any DC, slave HC or standalone server

```
bin $ ./jboss-cli.sh --connect
Connected to standalone controller at localhost:9999
[standalone@localhost:9999 /] :read-attribute(name=server-state)
{
    "outcome" => "success",
    "result" => "running"
}
[standalone@localhost:9999 /]
```


Management Tools: CLI

- Commands:
  - Low-level: provide resource address, operation name & params & you can invoke any operation exposed by any resource

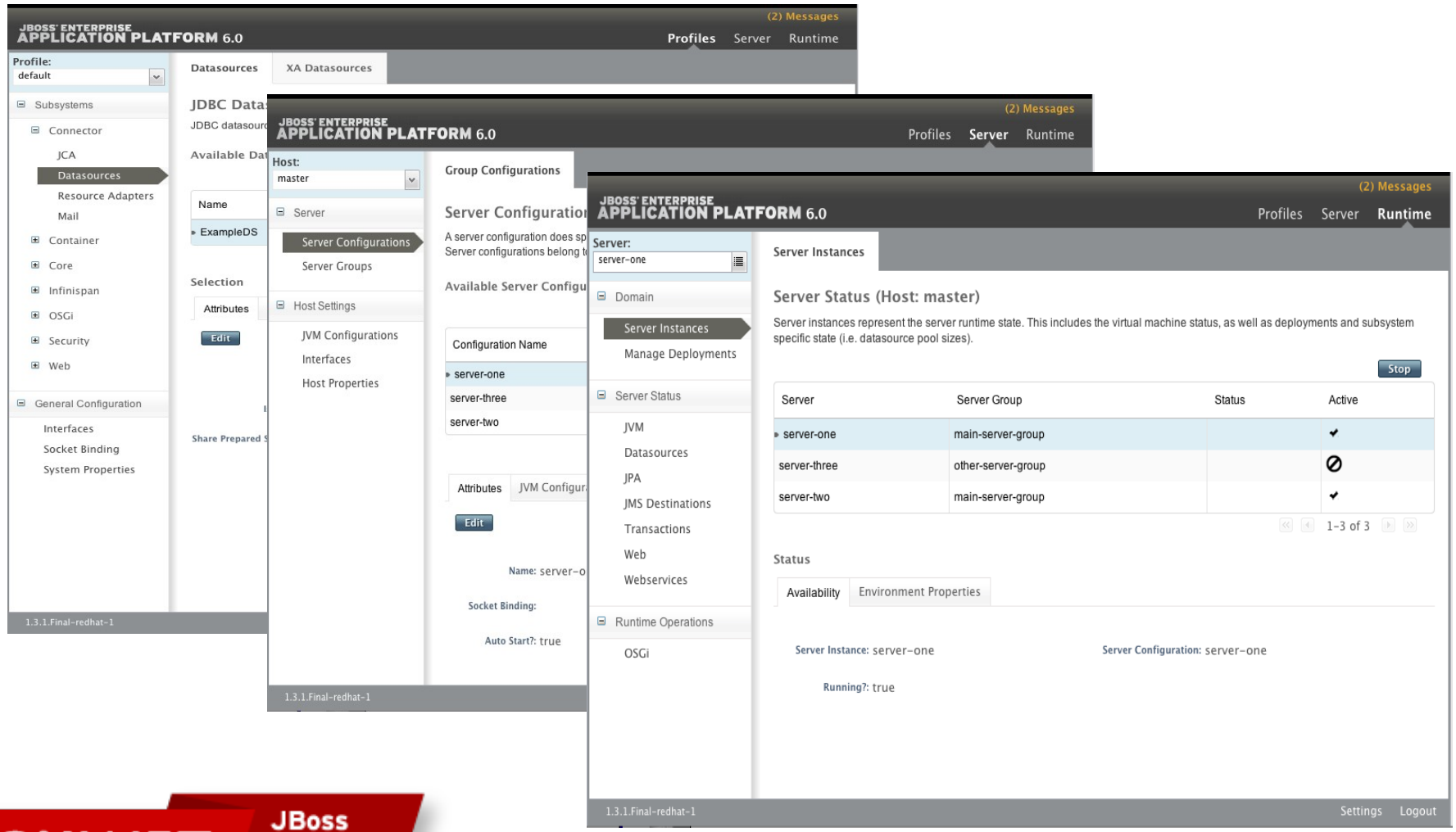
```
[domain@localhost:9999 /] /host=hostA/server=server1:read-attribute(name=server-state)
```

  - High-level: simple convenience commands for common tasks

```
[domain@localhost:9999 /] deploy –all-server-groups /home/admin/wars/helloworld.war
```

- CLI can read commands from command line, file or an interactive shell

Management Tools: Admin Console



Management Tools: Admin Console

- Available by default at:

  `http://localhost:9990/console`

- Available for both a standalone server or for a managed domain
  - consistent user interface for both

Domain Configuration - Subsystems

- Subsystem: a particular set of capabilities that extend the application server core
  - Webserver, Transaction Manager, EJB3, CDI, HornetQ, OSGi, JCA, JGroups, Infinispan, etc, are all subsystems
- Each subsystem has its own section in the configuration file (standalone.xml or domain.xml)
- Each subsystem has its own set of manageable resources accessible via EAP 6's CLI tool & its admin console

Domain Configuration - Profiles

- The set of subsystems run by a standalone server or all servers in a server group
  - Add/remove subsystems in your profile to expand or narrow the capabilities of your servers
- A standalone server has a single profile
- The domain configuration (domain.xml) can include many profile configurations, for use by different server groups

Example Profile configuration

```
<domain xmlns="urn:jboss:domain:1.3">
    ....
    <profile name=”web”>
        ....
        <subsystem xmlns="urn:jboss:domain:web:1.1">
            <connector name="http" protocol="HTTP/1.1"
                 socket-binding="http" scheme="http"/>
            <virtual-server name="localhost">
                <alias name="example.com"/>
            </virtual-server>
        </subsystem>
        <subsystem xmlns="urn:jboss:domain:weld:1.0"/>
    </profile>
    ....
```


Configuration of an EAP Instance in a Managed Domain

- An individual server's config comes from 2 sources
  - `domain/configuration/domain.xml` on host with DC
    - Elements that are consistent across the domain
  - `domain/configuration/host.xml` on each host
    - Elements specific to the host the server runs on
- Host Controller process combines domain.xml data + host.xml data to derive server config(s)

Domain-wide Configuration – domain.xml

- “Palettes” of config to apply to servers
  - One or more profiles (sets of subsystem configs)
  - One or more sets of socket configurations
  - Available deployments
- Server Groups
  - `<server-group>` element specifies which items from the “palettes” – the profile, sockets, deployments – to use on servers in the group

Example domain.xml

```
<domain xmlns="urn:jboss:domain:1.3">
 ...
 <profiles>
   <profile name="web">... details of subsystems used in the web profile</profile>
   <profile name="messaging">... details of the messaging profile</profile>
 </profiles>
 <socket-binding-groups>
   <socket-binding-group name="web-sockets" default-interface="public">
     ... details of sockets in the 'web-sockets' group
   </socket-binding-group>
   <socket-binding-group name="msg-sockets" default-interface="public">
     ... details of sockets in the 'msg-sockets' group
   </socket-binding-group>
 </socket-binding-groups>
 ...
 <server-groups>
   <server-group name="web-group" profile="web">
     <socket-binding-group ref="web-sockets"/>
   </server-group>
   <server-group name="messaging-group" profile="messaging">
     <socket-binding-group ref="msg-sockets"/>
   </server-group>
 </server-groups>
</domain>
```


Example host.xml

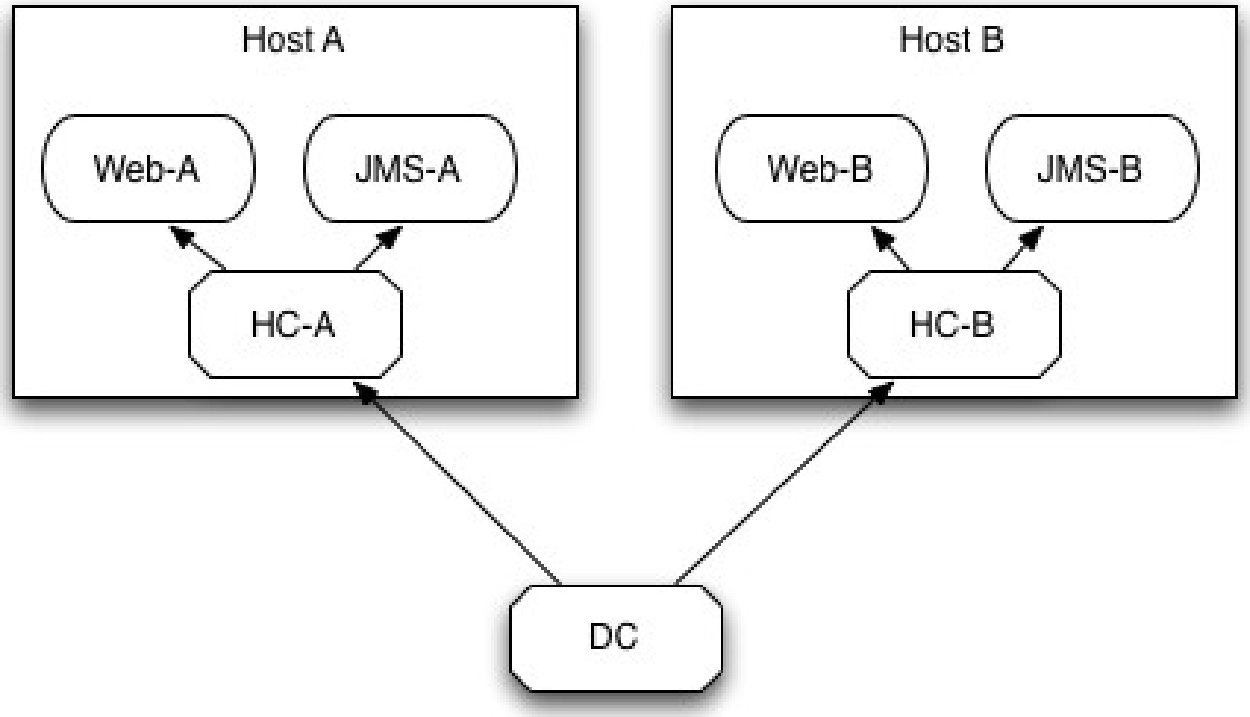
```
<host name="host-1" xmlns="urn:jboss:domain:1.3">
  <management>
    ....
    <management-interfaces>
      <native-interface security-realm="ManagementRealm">
        <socket interface="management" port="${jboss.management.native.port:9999}"/>
       </native-interface>
    </management-interfaces>
  </management>
  <domain-controller>
    <local/>  <!-- We are the Domain Controller →
    <!-- if not: <remote address=”192.168.204.1” port=”9999”/> -->
  </domain-controller>
  <interfaces>
    <interface name="management">
      <nic name="eth0"/>
    </interface>
  </interfaces>
  <servers>
    <server name="web-one" group="web-group"/>
    <server name="messaging-one" group="messaging-group"/>
  </servers>
</host>
```


Physical & Logical Domain Topologies

- Host Controllers can manage multiple servers
- Different servers under a Host Controller can belong to different server groups
- Physical Topology:
  - Organization of servers by host
- Logical Topology:
  - Organization of servers by server group

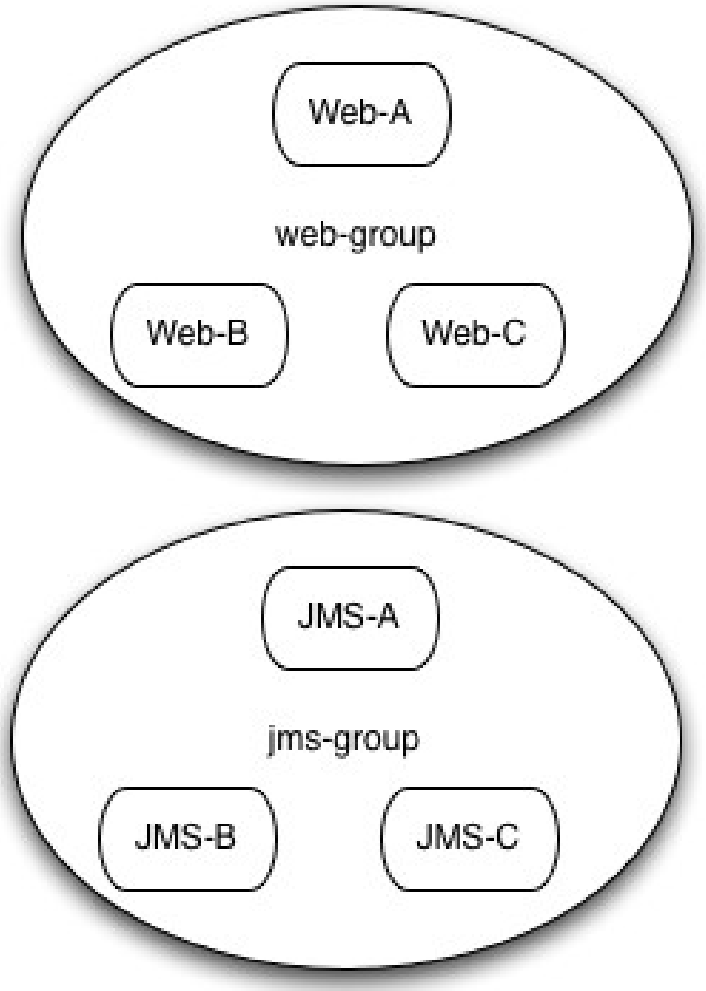
Simple HA Physical Topology

- Master, 2 other hosts, 2 server groups, 4 servers



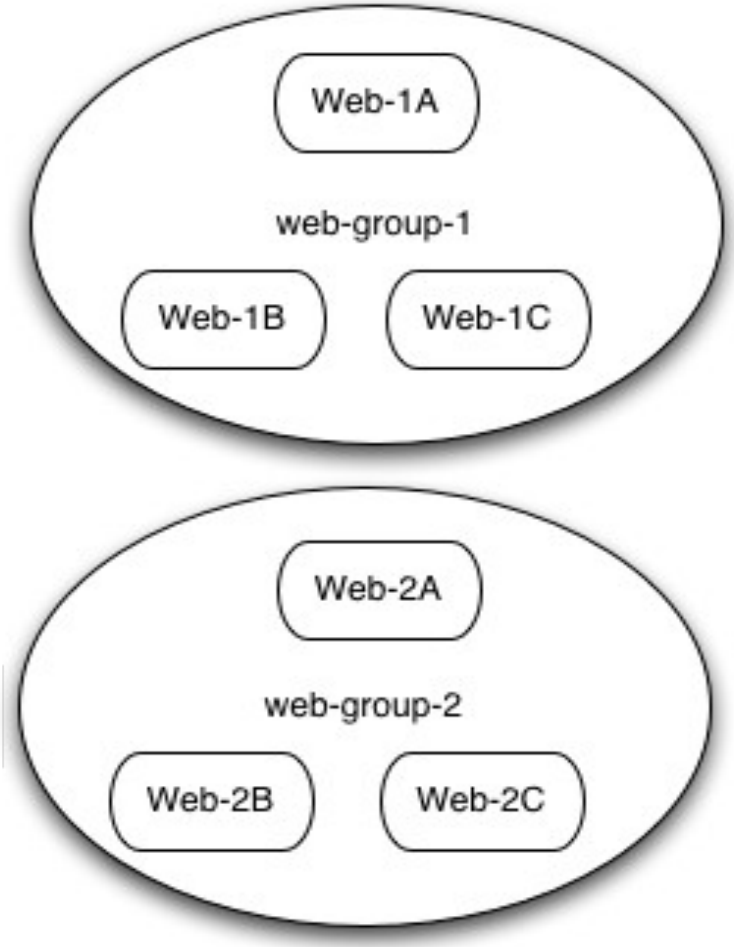
Logical Topology Examples – Tiers

- Server Group per tier
  - e.g. web tier, JMS+MDB tier
- Similarly, could also be server group per application



Logical Topologies – Rollover Groups

- Split your servers into 2 identical server groups
- Roll out deployment upgrades one group at a time
- Avoid 100% outages



Rollout Plans

- Control how changes get applied to multiple servers in your domain
- Concurrency
  - Apply to all server groups concurrently or in series
  - Apply to all servers in a group concurrently or in series
- Failure tolerance
  - Failure on > x servers or > y% of servers in a group triggers rollback (in that group or in all groups)
- Currently configurable via CLI only

Demo

Summary

- JBoss EAP 6 supports standalone servers or a managed domain
- Either way, you get centralized, user-focused configuration
- Either way, you get a robust management API
- Either way, you can use EAP's CLI tool or the admin console to manage your servers

Q&A

- Learn more here at JBoss World
  - EAP 6 Birds of a Feather – today at 2:20
  - JBoss Enterprise Application Platform 6 CLI - Ninja Management – tomorrow at 9:45

LIKE US ON FACEBOOK

www.facebook.com/redhatinc

FOLLOW US ON TWITTER

www.twitter.com/redhatsummit

TWEET ABOUT IT

#redhat

READ THE BLOG

summitblog.redhat.com

GIVE US FEEDBACK

www.redhat.com/summit/survey