WebSphere Application Server – Being the Backup Administrator

Mike Loos
IBM
Session 11375
Tuesday, August 7, 2012
4:30 PM
mikeloos@us.ibm.com
<table>
<thead>
<tr>
<th>Session</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
<th>Title</th>
<th>Speaker</th>
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<tr>
<td>11377</td>
<td>Monday</td>
<td>11:00</td>
<td>Grand Ballroom Salon B</td>
<td>What Can I Do With the SMF 120s?</td>
<td>David Follis</td>
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<td>11371</td>
<td>Monday</td>
<td>3:00</td>
<td>Orange County Salon 2/3</td>
<td>Administrator Hands On Lab</td>
<td>David Follis / Michael Stephen / Ken Irwin</td>
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<td>11378</td>
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<td>Spelunking the Admin Console</td>
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<td>11375</td>
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<td>Grand Ballroom Salon B</td>
<td>Being the Back-Up Administrator</td>
<td>Mike Loos</td>
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<td>11374</td>
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<td>Liberty Profile – Rumors Dispelled</td>
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<td>11376</td>
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<td>Platinum Ballrom Salon 10</td>
<td>zWAS – In Real Life</td>
<td>David Follis / Rod Feak</td>
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The Backup Administrator

• Needs to know:
  • Something about Unix.
    - Simple set of commands.
    - Filesystem layout and setup.
  • Something about Websphere.
    - Basic architecture.
    - Your naming convention.
    - Your port numbering convention.
    - Navigation of the adminconsole.
    - Any local "procedures"
The Backup Administrator

• Needs to know:
  • Some systems programming topics.
    - PROCLIB location.
    - WLM stuff.
    - RMF stuff.
  • Security Topics.
    - Unix stuff.
    - z/OS stuff.
    - Hybrid stuff.
      • FACILITY class.
      • UNIXPRIV class
      • WebSphere stuff.
Something about UNIX

• Shells...
  • ISHELL Unix tricycle.
  • OMVS Unix on training wheels
  • Telnet Unix.
  • 3.14 Interesting...
Something about UNIX

• Some commands
  • pwd
  • chmod
  • chown
  • ls
  • mkdir
  • rm
  • cat
  • vim (and avim)
  • mount
  • unmount

• chmount
• df
• zfsadm
• netstat
• man
• bpxmtext
How We Generally See the File Systems Deployed

Here's a picture that shows how the file system would be created and mounted based on the jobs generated using the PRS4686* planning spreadsheets:

- **/ (root)**: Root file system is typically relatively small.
- **/wasv85config**: We recommend a version directory with its own relatively small file system so the root is not exposed to writes and out of space issues.
- **/aacell**: We recommend a cell directory file system for each cell so the ID "home" directories can be built here and house any Java dumps.
- **/aadmnode**: Owned by LPAR on which DMGR is running.
- **/aanodea**: Owned by LPAR A.
- **/aanodeb**: Owned by LPAR B.
- **/nnccell**: Owned by LPAR on which DMGR is running.

These are the file systems created by the generated jobs. Config and cell are manually created and mounted by you. They can be quite large depending on the number and size of applications deployed.
The Essential Structure of DMGR Configuration Tree

Here's a snapshot of some of the key elements of the configuration structure:

```
wasv85config/aacell/aadmnode/DeploymentManager
```

- **/installableApps**
- **/java**
- **/java64**
- **/lib**
- **/profiles**
  - **/default**
    - **/bin**
    - **/config**
      - **/cells**
        - `<cell_long_name>`
          - **/nodes**
            - `<node_long_name>`
              - **/servers**
                - `<server_long_name>`
          - **/logs**
          - **/properties**
          - **/wstemp**

**Shell scripts, JAR files and shared object modules**

**Java symlinked from here**

**Deployment Manager's mount point and root**

**Other platforms use "profiles" to allow multiple cell configurations in the same install root. But on z/OS we separate configuration from install so one profile is sufficient**

This is the heart of it

**All the nodes and all the servers and their properties for the whole cell represented here**

Identical to distributed in basic structure; different in certain ways we'll show

**Logs** -- where things like WSADMIN logging goes

**Properties** -- key properties files for functions and activities

**Wstemp** -- temporary directory that you can clean periodically

Complete your sessions evaluation online at SHARE.org/AnaheimEval

Node file system ...
Each Managed Node Has Similar Configuration

The key difference is in that it maintains only partial awareness of other nodes but full awareness of itself:

```
/wasv85config/aacell/aanodea/AppServer
  /bin
  /installableApps
  /java
  /java64
  /lib
  /profiles
    /default
      /bin
      /config
        /cells
          /<cell_long_name>
            XML Files
          /nodes
            /<node_long_name>
              XML Files
            /servers
              /<server_long_name>
                XML Files
          /logs
          /properties
          /wstemp
```

The mount point and the node root are different because this is a different node from the Deployment Manager node.

It will have a directory for each node. Other nodes have some metadata files that provides the partial information. But the node directory for itself and the servers under it are fully populated with detailed XML.
Relationship to "Install Image"

The "install image" is the file system that contains the product binaries. The configuration file systems link to that via symbolic links:

```
/wasv85config/aacell/aadmnode/DeploymentManager
  /bin
  /java
  /lib
  /profiles
    /default
    /config
```

```
/wasv85config/aacell/aanodea/AppServer
  /bin
  /java
  /lib
  /profiles
    /default
    /config
```

```
/wasv85config/aacell/aanodeb/AppServer
  /bin
  /java
  /lib
  /profiles
    /default
    /config
```

```
/usr/lpp/zWebSphere/V8R5M0
  /bin
  /java
  /lib
  /profiles
    /default
    /config
```

But this is not quite the total picture ...
**Intermediate Symbolic Links**

We've taken this symlink structure one step further by introducing an "intermediate symbolic link" for each node between the node and the install image:

```
/wasv85config/aacell/aadmnode/DeploymentManager
    |-------|------|------|------|------|
    |SymLink |dmgr_link|SymLink |
    |SymLink |SymLink |
    /bin    |/java   |/lib   |
    /profiles |/default |/config |

/wasv85config/aacell/aanodea/AppServer
    |-------|------|------|------|------|
    |SymLink |nodea_link|SymLink |
    /bin    |/java   |/lib   |
    /profiles |/default |/config |

/wasv85config/aacell/aanodeb/AppServer
    |-------|------|------|------|------|
    |SymLink |nodeb_link|SymLink |
    /bin    |/java   |/lib   |
    /profiles |/default |/config |
```

"Swing" the node to the new service level by changing intermediate symlink to point to new install image.

Product at 8.5.0.0

Product at 8.5.0.1

"Swing" the node to the new service level by changing intermediate symlink to point to new install image.

Product at 8.5.0.1

"Swing" the node to the new service level by changing intermediate symlink to point to new install image.

Complete your sessions evaluation online at SHARE.org/AnaheimEval
WebSphere Basic Architecture

- WebSphere configuration consists of:
  - Cells
    - Nodes
      - Servers
      - Nodeagents
    - Multinode config is appropriate for:
      - Clusters of servers
A WebSphere 'ND' Cell
A Naming Convention...

WAS z/OS Short Names

Short names are part of WAS z/OS because of key length limitations imposed by the OS, and also as a way to associate WAS resources with lower-level z/OS resources:

- z/OS has an 8 character limit for many things. WLM is going to take the last to append an "S" for servant.
- That leaves 7 characters to work with.
- How will you allocate that? The spreadsheet does this:

```
1 2 3 4 5 6 7 8
```

<table>
<thead>
<tr>
<th>Cell Identifier</th>
<th>Server Identifier</th>
<th>System Identifier</th>
<th>Reserved for WLM</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Y S R 0 1 A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Must reserve the 8th for WLM.

Starting every short name in a cell with the same characters is key ... it insures uniqueness between cells and allows you to quickly see everything related to a given cell.

Variations exist to accommodate specific requirements.
Admininconsole navigation.

Left-Side Navigator Bar for Admin Console
At this level the Admin Console is common across all platforms. The areas of focus for us in this workshop are indicated below:

- Administration of servers in cell
- Deploying and managing applications
- Configuring access to data resources
- Setting environment variables
- Administration of nodes, Node Agents and the DMGR
- Configuring logging and tracing

Previous "Job Manager" function
Web Services
Focus of WSW07 workshop
With SAF in effect these roles are ignored
Performance Monitoring Tools
Configuration of the SIBus inside of WAS
Adminconsole navigation.
Local Procedures.

• Automation.
• Backup.
• Parmlib update serialization.
• Security.
• Basically, find out what the 'rules' are:
  • Follow them!
System Programming Topics.

- **PROCLIB.**
  - Where the one that is used for Started Task procedures is located.
  - Do you have access?
  - Names of the PROCs for a server.

- **WLM Stuff.**
  - Where the classification.xml file goes.
    - `wlm_classification_file` environment variable.
  - Which classes are available for your use.
  - Who is the local guru?
System Programming Topics.

• RMF stuff.
  • The most interesting info is in the type 72 record.
  • Run a Workload Activity Report to get the info into readable formats.
    - Keywords.
      SYSRPTS(WLMGL(SCPER(CBCLASS,CBFAST,CBSLOW))))
      SYSRPTS(WLMGL(RCPER))
Security Topics

• Unix stuff.
  • mode bits
    - drwxrwxrwx    octal representation
    - d755    directory, user can do everything (read, write, search), group member can read and search, others can read and search.
    - Each octet (111) (rwx) the corresponding bit allows access.
    - For files the low order bit allows the file to be executed, for directories it allows the directory to be searched.
  • Ownership
    - group:user
Security Topics

• z/OS stuff.
  • RACF STARTED class
  • RACF SERVER class
  • RACF FACILITY class
  • Certificate Stuff.

• Hybrid stuff.
  • FACILITY class stuff that is WebSphere specific.
  • BBO.TRUSTEDAPPS.**
  • BBO.SYNC.**
  • etc.
Security Topics

• Hybrid stuff...
  • UNIXPRIV class.
    - SUPERUSER.FILESYS
    - SUPERUSER.FILESYS.CHOWN
    - SUPERUSER.FILESYS.CHANGEPERMS
    - SUPERUSER.FILESYS.MOUNT
    - SUPERUSER.FILESYS.PFSCTL
    - etc.
  • WebSphere stuff.
    - RACF Classes.
      • EJBROLE, CBIND, SERVER.
Other Resources

• The WebSphere InfoCenter.
  • There is a link off of the adminconsole Welcome page.
• Techdocs website.
  • http://www.ibm.com/support/techdocs
• SHARE website for previous presentations.
  • By: Follis, Bagwell, Hutchinson, Loos, Kearney, Stephens, Boone.
• USS Manuals.
  • z/OS V1R10.0 UNIX System Services Command Reference – SA22-7802-xx
  • z/OS V1R10.0 UNIX System Services Planning – GA22-7800-xx
• My email address is: mikeloos@us.ibm.com
Summary

• Unix.
• WebSphere
• Security
• Don't be reluctant to ask for help.
System z Social Media

- System z official Twitter handle:
  - @ibm_system_z

- Top Facebook pages related to System z:
  - Systemz Mainframe
  - IBM System z on Campus
  - IBM Mainframe Professionals
  - Millennial Mainframer

- Top LinkedIn Groups related to System z:
  - Mainframe Experts Network
  - Mainframe
  - IBM Mainframe
  - System z Advocates
  - Cloud Mainframe Computing

- YouTube
  - IBM System z

- Leading Blogs related to System z:
  - Evangelizing Mainframe (Destination z blog)
  - Mainframe Performance Topics
  - Common Sense
  - Enterprise Class Innovation: System z perspectives
  - Mainframe
  - MainframeZone
  - Smarter Computing Blog
  - Millennial Mainframer
Questions?