



IBM Software Group

IBM WebSphere Application Server v6

System Management



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Agenda

- Comparison of System Management Tasks in WebSphere v5 and WebSphere v6
- Application Server Administration
 - ▶ New features in WebSphere v6
 - Configuration Archives
 - Server Templates
 - Node group
 - Support J2EE 1.4
 - System Applications
 - New wsadmin Command: AdminTask
- Summary

Section

Comparison WebSphere v5 to v6: System Management Features

Comparison: WebSphere v5 to v6

Task or Topic	WebSphere v5 → WebSphere v6
Topology	New WebSphere Profiles for Standalone Node, Managed Node and DMgr, sharing the same product install
System Management model	Same administration model using JMX MBeans
Configuration Repository	Similar Repository structure with some new v6 files and directories
Administrative Clients	Similar Admin Clients with some new enhancements in Browser admin console and new wsadmin AdminTask
Start, Stop WebSphere processes	Similar to v5, except "-profile" option to start a server for a specific profile
Monitor WebSphere process	Similar to v5
Admin Security	Similar to v5
Commands	Most of the commands similar to v5 New v6 commands: wasProfile (replaces wsinstance)

Comparison: WebSphere v5 to v6 cont.

Task or Topic	WebSphere v5 → WebSphere v6
Application Administration	New in v6: <ul style="list-style-type: none">• Fine Grain Update new in v6• System Application
Resources Administration	New in v6: <ul style="list-style-type: none">• Management of SIBus resources and JMS resources using SIBus Same as v5: <ul style="list-style-type: none">• JDBC, Java Mail. Etc.

Comparison: WebSphere Network Deployment v5 to v6

Task or Topic	WebSphere v5 → WebSphere v6
Building Cell – Add/remove Nodes	Similar to v5
Configuration Repository File Synchronization from DMgr to the Managed Node	Similar to v5
Mixed v5 and v6 Nodes in a v6 Cell	New in v6
Node Groups	New in v6
Core Groups	New in v6
Application Administration	Enhanced Application Ripple update for Cluster

System Management Features

- v6 System Management model is based on v5
 - ▶ Will reduce the System Administration learning curve from v5 to v6
- Based on open Java Management Extensions (JMX) to allow easier integration with 3rd party System Management vendors
 - ▶ WebSphere Administrative Clients use the same JMX interface that is exposed to 3rd party vendors
- Common terminology, topology, programming and system management model between Distributed and z/OS platforms
 - ▶ While continuing to exploit z/OS Sysplex capabilities



The system management functionality of IBM WebSphere Application Server Network Deployment has a number of key features:

The use of Java Management Extensions (JMX). This provides a number of benefits:

– Management of WebSphere using multiple protocols. For example:

- SOAP, RMI/IIOP (current)
 - Application servers have less reliance on a central repository or administration server for basic functions and bringup.
 - No administrative repository database is required. Instead, the configuration is stored in XML format files.
 - Each managed process, node agent, and Deployment Manager starts with its own configuration file.

WebSphere managed processes are organized into groups. All managed processes configured and running on the same node must enroll with the local node agent. All node agent processes configured in the same cell must

enroll with the Deployment Manager.

management beans (MBeans).

- MBeans are defined in an XML file.
- Allows developers to use JMX to manage their own applications.
- The management interface is open and easy to integrate with third-party management tools.

Resources within WebSphere managed processes are represented by individual management interfaces implemented as JMX MBeans. These managed resources are accessible from other processes through one of the WebSphere AdminService proxies.

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New Features Configuration Archives

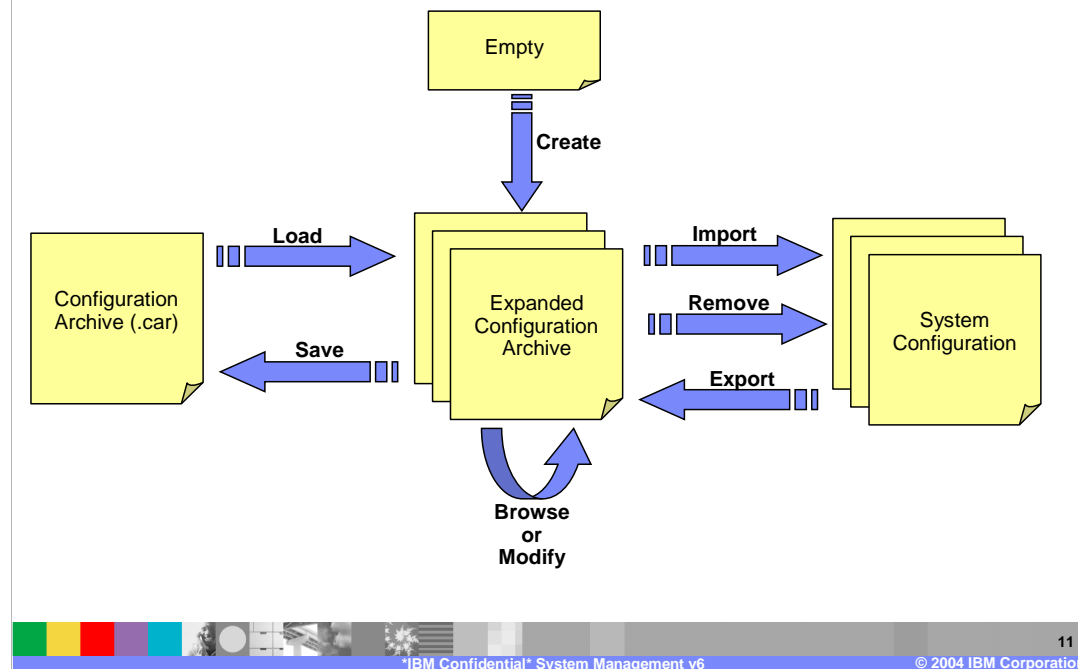
WebSphere Configuration Archive

- It's a set of complete or subset of WebSphere configuration archive
 - ▶ Basically the same as the real WebSphere configuration except that it may be partial
 - ▶ The configuration information is virtualized to make it portable – removes any install specific information, like the host name
- WebSphere Configuration Archive is used to import/export configurations into or from WebSphere
 - ▶ Allows declarative way to modify WebSphere configurations

WebSphere Configuration Archive: Example

- Example:
 - ▶ Users export the WebSphere Configuration Archive
 - ▶ Modify the configurations
 - ▶ The exported WebSphere Configuration Archive can be used to import on the same or other systems
- Allows users to set up configurations quickly and easily without learning any configuration operation syntax and semantics
- Provides powerful way to manage the configurations of a large number of similar systems
 - ▶ Within the cell boundary or across cell boundary, such as server farm scenario or retail scenario

Configuration Archive: Life Cycle



The picture above illustrates the life cycle of a configuration archive and operations that can be applied on it. A configuration archive is basically a zip file. We recommend users use the extension of “car” for archive files, but it is not required. We also support expanded format for configuration archives. While an archive package is easier to be carried over across systems, it is more efficient to operate on the configuration archive if it is in an expanded format. Thus, the configuration archive is loaded into a workspace in an expanded format before import operation. An empty configuration archive can be created in the workspace. Loading a configuration archive into workspace basically expands the archive into the workspace while saving a configuration archive is the opposite process which packages the expanded configuration archive in the workspace into a single file archive. Once a configuration archive is loaded into the workspace, users may browse or modify the configuration archive as their wish. Configurations in the system can be exported into configuration archive while configuration archives can be imported into the system.

WebSphere Configuration Archive: Export

- Export converts the real configuration into templates
 - ▶ Breaks any relationship of configuration in the archive and the system configuration
- Clusters
 - ▶ When an individual cluster member is exported, the reference to cluster is stripped off
 - ▶ When a cluster is exported, the relationship between the cluster and its members is preserved
- Configuration may also refer to system resources outside scope: database driver library, database name, etc.
- Limited types of export targets
 - ▶ server and wasprofile
- Examples
 - ▶ `$AdminTask exportServer { -archive c:\myServer.car -nodeName node1 -serverName server1 }`
 - ▶ `$AdminTask exportWasprofile { -archive c:\myCell.car }`

WebSphere Configuration Archive: Import

- Importing a configuration archive is the process of updating/creating system configuration with contents in configuration archive
- Target config object type either matches source config object or is a parent
 - ▶ server to server (same type) – configuration merged
 - ▶ server to node (parent) – new object type created for config archive
 - In this case, configuration must be complete as new server created
- Import operation also compares node properties between source and target
 - ▶ Example: If config archive is for base, may not work for WBISF
- Examples
 - ▶ `$AdminTask importServer {- archive c:\myServer.car [-nodeInArchive node1] [-serverInArchive server1] [-nodeName node1] [-serverName server1] }`
 - ▶ `$AdminTask importWasprofile {-archive c:\myCell.car}`

Section

New Features Server Templates

Server Templates

- Facilitate creation of servers with similar configurations.
- Support for different types of servers
 - ▶ Application server, web server
- Named template created from existing server
- Choose from list of templates to create a new server.
- Operations on templates:
 - ▶ Create, List, and Delete

Section

New Features Node Group

- Enables mixing nodes with different capabilities within the same cell
 - ▶ z/OS and Distributed Nodes
 - ▶ WBI nodes and Base Nodes
 - ▶ Mechanism that allows validation of the node capability before perform certain functions
 - Example: Creating a cluster of nodes – cannot mix servers from z/OS and distributed nodes within a cluster
- Default configuration with single node group is sufficient unless you want to mix platforms within cell



Default Node Group

- Node group, called “**DefaultNodeGroup**” is automatically created, based on the DMgr platform
- New nodes for that platform type are automatically added to the DefaultNodeGroup
- DefaultNodeGroup cannot be deleted – DMgr is always part of this Node Group
- For most topologies you do not have to do anything for Node group management
 - ▶ DefaultNodeGroup will take care of the grouping

Node Groups in Distributed and/or z/OS nodes

- In purely Distributed or z/OS single sysplex cell
 - ▶ “DefaultNodeGroup” will manage the grouping and nodes will be automatically be added to the Node Group
- Mixed Distributed and z/OS nodes across sysplex
 - ▶ Separate Node groups will be needed as follows:
 - Minimum one for all nodes on distributed platforms
 - Minimum one for each z/OS sysplex
 - ▶ DefaultNodeGroup will be where DMgr node is running
 - ▶ New Node group will have to be administratively created, prior to adding a node of different type (like z/OS node in a Distributed cell or vice-versa)

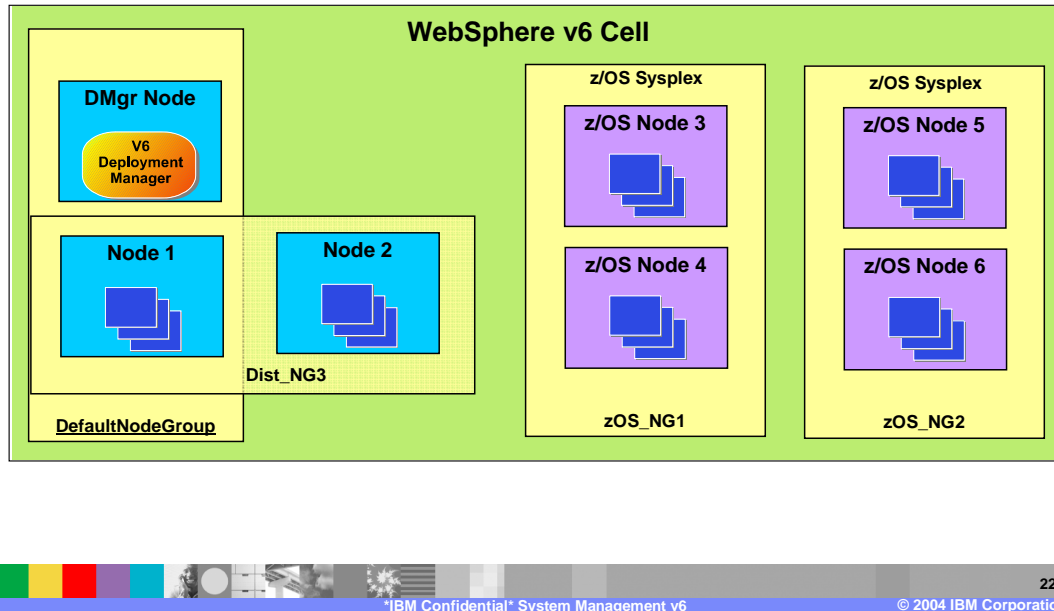
Node Group Administration

- A node must be a member of one or more Node Groups
- Functions
 - ▶ Create New Node Group
 - ▶ Delete Node Group
 - It must not have any Nodes in its membership
 - ▶ Add Nodes to the Node Groups
 - ▶ Remove Nodes from Node Groups

addNode Command changes

- addNode will have a new option [-nodegroup <name>] to allow adding Node to a specific Node group
- If not specified, “DefaultNodeGroup” is assumed
 - ▶ For most common topology, you do not have to provide “-nodegroup” option
- addNode will validate to ensure that the node being added as the same capability as the nodegroup
 - ▶ Example: adding a Distributed node to node group of z/OS nodes (in a sysplex) will result in an error

Topology Example



Node group that contains the DMgr node is the “Default” Node group

Unified Security domain

- WebSphere security model is comprised of a single cell-wide security domain
 - ▶ Consists of policy, configuration, and registries, that governs security across the entire cell for both administrative function and applications
 - ▶ Individual servers are able to override a subset of the cell-level security configuration
- When using mixed cell, comprised of z/OS and distributed nodes, the security domain features will be merged
 - ▶ User registry must be LDAP

Node Group Optional Resource Validation

- J2EE resources can only be used if they are defined to the deployment targets (server or cluster) selected for the application being installed
 - ▶ No validation was done in v5
- v6 will perform optional validation to identify resources used that are not within the scope of deployment target
 - ▶ Example: If an application is deployed to a server on Node1, but assigned a JDBC data source defined to Node2
 - Warning message: **ADMAnnnnW Mapped resources are detected outside the deployment target scope**
- Node group(s) within which the deployment target(s) exist will define the maximal scope of this validation
 - ▶ Any resource not found within Node Group containing the deployment target will be considered 'outside the scope' and reported

Section

New Features J2EE 1.4 Support

J2EE 1.4: JMX 1.2, JSR77, JSR88

- JMX 1.2
 - ▶ Uses an open source mx4j package, instead of TMX4J package that Tivoli products use (v5).
 - ▶ No behavior change to JMX MBeans in Application Server
- JSR77- Management
 - ▶ Defines how external management applications interact with underlying layers (protocols, APIs, etc.)
 - ▶ Not part of J2EE platform
- JSR88- Deployment
 - ▶ Defines standard APIs to enable deployment of J2EE apps

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Describes the several J2EE 1.4 requirements for application server vendors to implement in support of administration, as well as the improved integration of embedded messaging support into application server administration.

Java Management Extensions (JMX 1.2)

J2EE Management Specification (JSR 77) The management layer of the Java Management Extensions (JMX) architecture uses an implementation of the distributed services specification (JSR-077), which is not yet part of the Java 2 platform, Enterprise Edition (J2EE) specification. The management layer defines how external management applications can interact with the underlying layers in terms of protocols, APIs, and so on.

J2EE Deployment (JSR 88) You can install J2EE modules on an application server provided by WebSphere Application Server using the J2EE Deployment API Specification (JSR-88). JSR-88 defines standard APIs to enable deployment of J2EE applications and standalone modules to J2EE product platforms. WebSphere Application Server is a J2EE 1.4 specification-compliant platform that implements the JSR-88 APIs. JSR-88 defines a contract between a tool provider and a platform that enables tools from multiple vendors to configure, deploy and manage applications on any J2EE product platform. The tool provider typically supplies software tools and an integrated development environment for developing and assembly of J2EE application modules. The J2EE platform provides application management functions that deploy, undeploy, start, stop, and otherwise manage J2EE applications. You can read about JSR-88 and APIs used to manage applications at <http://java.sun.com/j2ee/tools/deployment/>. The J2EE Deployment Specification Version 1.1 is available at <http://java.sun.com/j2ee/tools/deployment/reference/docs/index.html> as part of the J2EE 1.4 Application Server Developer.

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J2EE 1.4: JCA 1.5

- **Inbound Communication**

- ▶ Allows external EIS systems to communicate with the application components deployed on the Application Server

- **Transaction Inflow**

- ▶ Allows a Resource Adapter to propagate an existing two phase transaction into an Application Server

- **Message Inflow**

- ▶ Generic contract to plug-in a variety of Message Providers into an Application Server

- **Lifecycle Management**

- ▶ This feature provides the J2EE Application Server with the ability to control the life cycle of the Resource Adapter deployed in it's environment.

- **Work Management**

- ▶ External EIS systems can now submit work to the Application Server and the submitted work is executed in the Application Server's address space

Section

New Features System Applications

System Applications

- Special applications like Admin Console, File Transfer
- Receive special treatment by WebSphere System Administration
 - ▶ Prevents accidental removal, downtime, update
 - ▶ Considered part of WebSphere product binaries
 - ▶ Shares configuration between multiple WebSphere profiles
- WebSphere v6 maintains a special registry of system applications
 - ▶ Started when the server starts up

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The System Applications are those applications that are part of WebSphere, but not part of the actual application server. WebSphere is built from multiple application servers, and in the interest of performance and simplicity, those functions that are not required on every application server are implemented as Enterprise Applications. System Management is a prime example. While the ability to control resources is needed in every place that those resources can run, the user interface is only needed in one place – in front of the user!

AdminConsole.ear is the enterprise application that is responsible for the graphical user interface between the Administrator and the administrated. Filetransfer.ear is the mechanism that allows remotely installing applications, and synchronizing repository information from the deployment manager to each of the nodes. WebSphere will still function if these applications are removed, but this should happen only in very limited scenarios. If the Admin Console application is removed, then system management is limited to the command line interface (or other JMX custom application).

Management of System Applications

- Standalone Node (server) Configuration
 - ▶ All profiles share the application binaries for system applications
- Network Deployment environment
 - ▶ System application running on a node will match the WebSphere product version on that node
- Are not exposed as MBeans
- System applications are product specific and updated by Update Installation Wizard

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In single server (base) configuration when multiple configuration instances (wsinstances) are created for a given WebSphere installation all of them should share the application binaries for system applications.

In an ND environment the system application running on a node should match the WebSphere product version on that node. It is not possible to store a single master copy of system application in WebSphere master repository on Deployment Manager that will serve different nodes at different versions. Therefore, configuration synchronization mechanism which is used to deliver new or updated applications to individual nodes in ND can not be used to manage system applications.

Due to these design considerations, a system application will have its application binaries and WebSphere-specific deployment metadata collocated with WebSphere product binaries.

An application can be defined as a system application when it is installed using the AppManagement. installApplication interface. Since system applications are generally installed and uninstalled by WAS product installation code, the needed system application definition parameters will be supplied by WAS product installation. The lifecycle of system applications, unlike customer applications, is tied closely to the WebSphere product lifecycle. The system applications are typically delivered for a specific release of WebSphere product and therefore should be installed, updated or uninstalled with the corresponding WebSphere product instance. System Apps will not be exposed as MBeans as they will not be started/stopped by customer actions

Section

New Features wsadmin Command - AdminTask

wsadmin: AdminTask

- Use to access set of administrative commands to provide alternate way to access configuration commands
- Runs simple and complex commands
 - `$AdminTask commandName {-interactive}`
- Commands discovered dynamically when starting scripting client
- Grouped based on their function
 - Example: Commands related to security are grouped into a security management command group
- Can be run in batch or interactive mode
- Can be run in connected or local mode
 - If run in local mode not all commands available

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Use the AdminTask object to access a set of administrative commands that provide an alternative way to access the configuration commands and the running object management commands. The administrative commands run simple and complex commands. They provide more user friendly and task-oriented commands. The administrative commands are discovered dynamically when you start a scripting client. The set of available administrative commands depends on the edition of WebSphere Application Server you install. You can use the AdminTask object commands to access these commands.

Administrative commands are grouped based on their function. You can use administrative command groups to find related commands. For example, the administrative commands that are related to server management are grouped into a server management command group. The administrative commands that are related to the security management are grouped into a security management command group. An administrative command can be associated with multiple command groups because it can be useful for multiple areas of system management. Both administrative commands and administrative command groups are uniquely identified by their name.

Two run modes are always available for each administrative command, namely the *batch* and *interactive mode*. When you use an administrative command in interactive mode, you go through a series of steps to collect your input interactively. This process provides users a text-based wizard and a similar user experience to the wizard in the administrative console. You can also use the help command to obtain help for any administrative command and the AdminTask object.

The administrative commands do not replace any existing configuration commands or running object management commands but provide a way to access these commands and organize the inputs. Depending on the administrative command, it can be available in connected or local mode. The set of available administrative commands is determined when you start a scripting client in connected or local mode. If a server is running, it is not recommended that you run the scripting client in local mode because any configuration changes made in local mode are not reflected in the running server configuration and vice versa. If you save a conflicting configuration, you could corrupt the configuration. In a deployment manager environment, configuration updates are available only if a scripting client is connected to a deployment manager. When connected to a node agent or a managed application server, you will not be able to update the configuration because the configuration for these server processes are copies of the master configuration which resides in the deployment manager. The copies are created on a node machine when a configuration synchronization occurs between the deployment manager and the node agent. Make configuration changes to the server processes by connecting a scripting client to a deployment manager. For this reason, to change a configuration, do not run a scripting client in local mode on a node machine. It is not a supported configuration.

Section

Summary and Reference

Summary

- Compared the system management features of v5 with v6 of WebSphere Application Server
- Covered new key features of system management in WebSphere v6
 - ▶ Configuration Archives
 - ▶ Server Templates
 - ▶ Node Groups
 - ▶ J2EE 1.4 Support
 - ▶ System Applications
 - ▶ wsadmin: AdminTask command

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