



IBM Software Group

# IBM WebSphere® Application Server V6

## *Resource Scopes*



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This presentation will focus on the scoping of application server resources and WebSphere variables in version six.

## Goals

- Describe IBM WebSphere Application Server V6 System Resource Scoping and new scoping introduced in V6
- Pre-requisites:
  - ▶ Basic understanding of WebSphere Application Server V6 System Administration architecture, topology and terminology

The goal of this presentation is to describe the WebSphere Application Server version six System Resource scoping and the new scoping options introduced in version six.

## Section

# ***System management resource scopes***

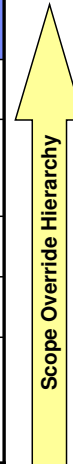
The WebSphere Application Server architecture is built in layers. There is the Cell level, then the Node layer, then the Application Server layer. These levels are present even in the stand-alone server installation; however, they mean less in that environment.

Resources can be defined at any of these levels – and more, as you will see shortly. By default, an Application Server will look first at the Application Server level to locate a resource. If the resource is not found, it will look at the node level. If the resource is not defined at the node level, then the Application Server will look at the Cell level. Where a particular resource is visible from is called the scope.

## Resource and variable scopes

- Resources (Java™ Messaging Service (JMS), JDBC, and so on) and Environment variables can be defined at several different scopes, as listed in the table
- Scope Override hierarchy applies when resources/variables with same name are defined at different scopes

Resources/Variables Defined at:	Scope
<b>Cell</b>	Resources available to all nodes and servers within the cell
<b>Cluster</b> (Network Deployment cell only)	Resources available to all cluster members of that cluster. New cluster member automatically gets the cluster scoped resources.
<b>Node</b>	Resources available to all servers within the node
<b>Server</b>	Resources available only to the specific server
<b>Application</b>	Resources are tied with the application and are available to the specific application running on a server. If application deployment target changes, the resources move with the application



In version five there are three scoping levels, Cell level, Node level, and Server level. The configuration repository hierarchy reflects these three levels. When you define a resource at a Cell level, every process has access to that resource. When you define a resource at the Node level, every process on that node has access to that resource. And when you define at the application server level, then only that application server on that node has access to that resource.

Network Deployment in version six adds another level called Cluster level. When resources are defined at the cluster level, then all cluster members in that cluster have access to that resource on whatever machine they're running. What is relevant to Express on the stand-alone Node is the Application scoping. Another module discusses Enhanced EAR files – those EARs that contain application code and resource definitions. Because the resources are defined in the deployment descriptors of the enhanced EAR file, when the application is moved in the Network Deployment environment from one location to another, those application scoped resources will be moved with the application.

From the perspective of Express, this reduces the number of steps required to make your application run. An administrator does not need to configure these resources at the Node level or at the Cell level when they're packaged in the enhanced EAR file.

If you have resources that are defined with the identical name at more than one level, the application server will see the resource that is defined closest to the application. This means that if you have the same resource defined on the Node and on the Cell, then the Node resource is the one that the application will use.

## Application scope

- EAR file contains configuration information
  - ▶ Resources, Shared libraries, Virtual hosts
  - ▶ In the application META-INF\ibm-config directory - files resemble the V6 Configuration repository
- Application install/redeployment:
  - ▶ resources.xml, variables.xml and deployment.xml files are configured under application scope
  - ▶ Libraries.xml under server
- Support for WebSphere Rapid Deployment
  - ▶ Develop in Rational® tools or Application Server Toolkit (AST)
  - ▶ Quick (re-)deployment to WebSphere Application Server V6
- Identical resources defined in multiple applications running in the same V6 server are not in conflict
  - ▶ These resources are visible only for the application
- On an uninstall of an application, the non-global resources are also removed



Here is some more detail about the Application Scope. The EAR file contains the configuration information that was covered on the previous slide. The application installation or redeployment will take these things into account, so the resources and the variables will be configured under the application scope. If your enhanced EAR file has virtual hosts defined, these will be configured at the server level.

WebSphere Rapid Deployment makes extensive use of this application scoping for both Quick Redeployment and Fine Grained Application Update.

Identical resources defined in multiple applications are not in conflict; you can have two applications installed with the same resource, and the resources are tied to the application and therefore there is no conflict.

Finally, when application is uninstalled, the non-global resources will also be removed. Things like virtual host definitions will remain, but resources used by the application and not shared with other applications will be removed.

## Selecting scopes in the Administrative Console

- Resources and Variables defined with the applications will have application scope
- Specify the scope before defining or listing Resources and Environment variables

**WebSphere Variables**

Substitution variables allow specifying a level of indirection for values defined in the system, such as filesystem roots. Variables can be defined at the server, node, or cell level. When variables in different scopes have the same name, the order of resolution is server variables, then node variables, then cell variables.

☐ Scope: Cell=**RHGCell**

To specify cell scope, clear the node and server fields and click Apply.  
To select a cluster scope, type in or browse for a cluster.  
To select a node scope, type in or browse for a node, then clear the server field and click Apply.  
To select a server scope, select a node scope first, then type in or browse for a server, and click Apply.  
When new items are created in this view, they will be created within the current scope.

→ Cell  
RHGCell

Node

Cluster

Server



In the Administrative Console, you can define the scopes. In the stand-alone node, you will not see the Cluster scope, you would only see the Cell and the Node and the Server. You will not see the application scoping because that is tied to the application itself, and you would go to the application to configure those scoped variables or resources.

## Resource and variable scoping example

Scope Level	Variable value
Cell	APP_INSTALL_ROOT = \${USER_INSTALL_ROOT}/installedApps
Cluster	APP_INSTALL_ROOT =
Node	APP_INSTALL_ROOT = c:\MyApps\installedApps
Server	APP_INSTALL_ROOT = c:\Server1_Apps\installedApps
Application	APP_INSTALL_ROOT =

Here is a quick example, where a resource called installedApps is defined at the Server level, and at the Node level, and at the Cell level. The variable defined at the finest scope will take precedence. In this example, the installedApps resource defined at the Server level will take precedence over the variables defined at the Node and Cell level.

## Summary

- Two new additional scoping levels (clusters and applications), will provides more flexibility in defining common resources

In summary, with the addition of the Application Scoping for Stand-alone nodes and the addition of Cluster Scoping for Network Deployment, there will be fewer steps for the system administrator to manage both the Stand-alone Node and the Network Deployment cell.



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