



Redbooks

Application Deployment in WebSphere z/OS V5.0.1

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Agenda



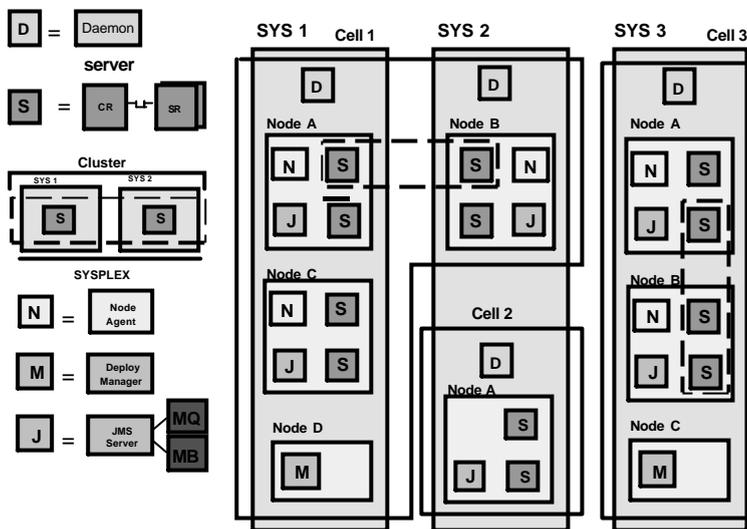
- **Application Deployment for the WebSphere system administrator . . .**
- What is your complete target topology?
 - There will be multiple test environments as well as Production
- Developer Tools
 - WebSphere Studio Application Developer (WSAD)
 - WebSphere Studio Enterprise Developer (WSED)
- WebSphere z/OS: Application Deployment
 - Java Management EXtension (JMX) APIs
 - Application Assembly Tool (AAT)
 - WebSphere Administrative Console
 - wsadmin scripts and Ant
 - Hot Deployment and Dynamic Reload

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<div style="text-align: right;"></div> <h1 style="text-align: center;">Topology</h1> <p style="text-align: center;">WebSphere z/OS V4 vs V5 Terminology Planning a complete test and production infrastructure</p>		
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<div style="text-align: right;"></div> <h2 style="text-align: center;">Summary of Terminology</h2> <table border="1" style="margin: 20px auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">WAS V4</th> <th style="padding: 5px;">WAS V5</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Node (approx)</td> <td style="padding: 5px;">Cell</td> </tr> <tr> <td style="padding: 5px;">Server</td> <td style="padding: 5px;">Cluster</td> </tr> <tr> <td style="padding: 5px;">Server Instance</td> <td style="padding: 5px;">Cluster member</td> </tr> <tr> <td style="padding: 5px;">Systems Management Server (approx)</td> <td style="padding: 5px;">Node Agent</td> </tr> <tr> <td style="padding: 5px;">Control Region</td> <td style="padding: 5px;">Control Region</td> </tr> <tr> <td style="padding: 5px;">Server Region</td> <td style="padding: 5px;">Server Region</td> </tr> </tbody> </table>			WAS V4	WAS V5	Node (approx)	Cell	Server	Cluster	Server Instance	Cluster member	Systems Management Server (approx)	Node Agent	Control Region	Control Region	Server Region	Server Region
WAS V4	WAS V5															
Node (approx)	Cell															
Server	Cluster															
Server Instance	Cluster member															
Systems Management Server (approx)	Node Agent															
Control Region	Control Region															
Server Region	Server Region															
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WebSphere z/OS V5 Topology

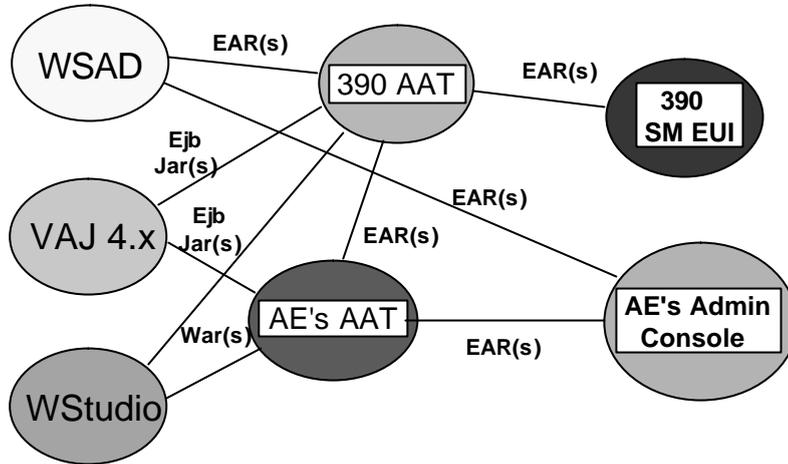


WebSphere z/OS V5.0 compared with V4.01

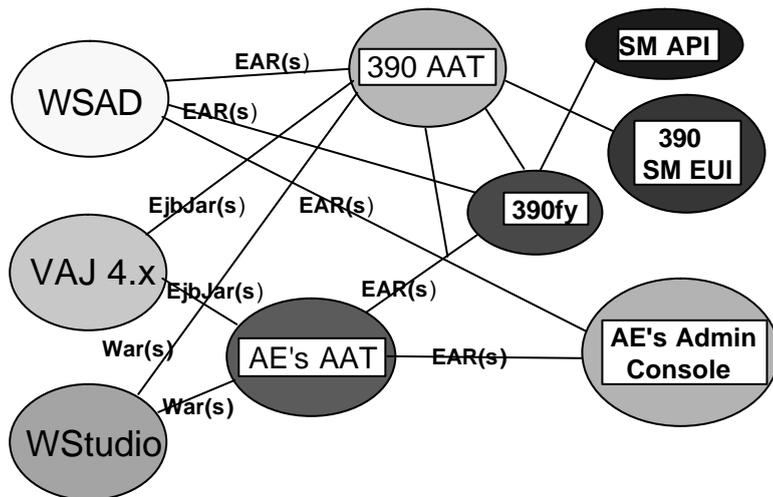


- | | |
|--|---|
| <ul style="list-style-type: none"> ▪ Complex Install/Bootstrap ▪ Replicated Server Topology ▪ Centralized Admin Repository ▪ "Fat" Admin Client ▪ SMAPI/REXX Scripting ▪ z/OS Proprietary SM Model | <ul style="list-style-type: none"> ▪ Greatly simplified Install/Bootstrap ▪ Clustered Server Topology ▪ Distributed Admin Repository ▪ "Thin" Browser Admin Client ▪ wsadmin/JACL scripting ▪ WAS Family SM Model |
|--|---|

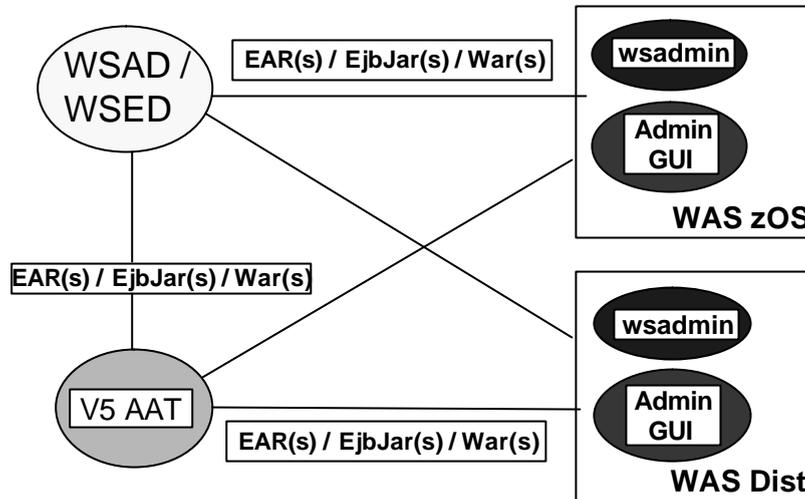
Deployment in WebSphere before 4.0.4



Deployment in WebSphere V4.0.4



Deployment with WebSphere V5

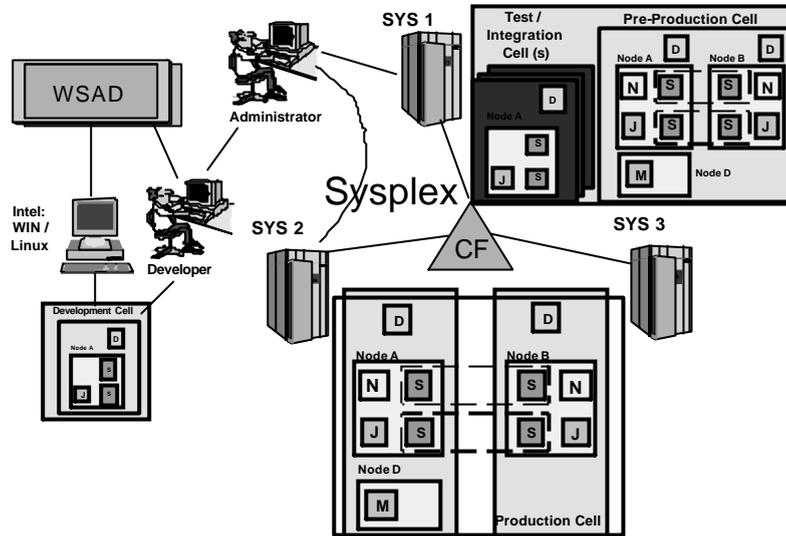


Administrative Environments



- Development Environment**
 - Developer is the administrator
 - Very tight integration with development tooling
 - Focus on one part of overall solution
 - Requires quick and easy admin. changes
 - WebSphere Base Application Server package
- Test and Integration Environment**
 - Aggregates several development environments
 - Focus on total solution domain
- Pre-Production**
 - Topology like production but smaller (re-sizable)
 - Test install / backout of changes
 - Test production security
 - Performance Test environment
- Production Environment**
 - Greater scaling requirements
 - Administrative robustness and failure tolerance
 - Managed and restricted administration activities
 - Centralized administration
 - WebSphere Network Deployment package

WebSphere Application Deployment Stages



Application Deployment 'phases'



- Phase 1: Developer to Test/Integration
 - Install EAR file via GUI
- Phase 1x: Test / Integration to other clones environments such as:
 - Financial testing with closing controlled data
 - Education system with data which is reset after course
 - Use scripts
- Phase 2: Test / Integration to Pre-Production (and backout)
 - Scripts
- Phase 3: Pre-production to Production (and backout)
 - Scripts created / tested in Pre-production
- Phase E: Developer to Pre-production (Emergency fix path)
 - Manual process / script

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<div style="text-align: right;"> Redbooks</div> <div style="text-align: center;"><h1>Developer Tools</h1></div> <div style="text-align: center;"><p>WebSphere Studio Application Developer (WSAD) WebSphere Studio Enterprise Developer (WSED)</p></div>		
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<div style="text-align: right;"> Redbooks</div> <div><h2>WSAD and WSED</h2></div> <ul style="list-style-type: none">■ Both WSAD and WSED are built on the Eclipse standard workbench so the 'look and feel' is similar.■ WSED contains support for procedural languages COBOL and PL/I in addition to Java.■ This is not a course in the use of WSAD. What we want to understand here is how the developer should prepare the deployment descriptors in the ear file so the application is ready to deploy.■ We will look at 2 aspects:<ul style="list-style-type: none">■ Resource Reference bindings for JCA adaptors■ Security role-userid mappings		

WSAD: Importing an application and RAR file.



1. File-Import

2. Import EJB

Note: If used, import the rar file for the JCA connector

Open J2ee Perspective

WSAD: Add RAR to SWIPECICSEJB Build path



1. Right click, Select 'Properties'

2. Select Projects tab

3. Check CICSECI project

4. Click 'OK'

WSAD: Resource Reference bindings (1)



The screenshot displays two windows from the WSAD IDE. On the left is the 'J2EE Hierarchy' window, showing a tree view of EJB Modules. Under the 'SWIPECICSEJB' module, a list of 'ResourceRef' entries is visible, with 'eis/cicslocalcontJCA3' highlighted. On the right is the 'J2EE Navigator' window, showing a tree view of the project structure. It includes folders for 'CICSECI', 'SWIPECICS', and 'SWIPECICSEJB'. Under 'SWIPECICSEJB', there is an 'EJB Deployment Descriptor' folder containing an 'ejbModule' folder with sub-folders for 'com.ibm.ejs.container', 'com.ibm.itso.swipe.cics.ejb', and 'com.ibm.websphere.csi'. Below these are files for 'META-INF', 'ejb-jar.xml', 'ibm-ejb-jar-bnd.xml', and 'ibm-ejb-jar-ext.xml'. At the bottom, there is a 'Libraries' folder containing 'SWIPECICWeb'. Callout boxes at the bottom of the image point to the 'J2EE Hierarchy view' and 'J2EE Navigator view' windows.

WSAD: Resource Reference bindings (2)



The screenshot shows the 'References' configuration window in WSAD. On the left is a list of resource references for the 'SWIPECICSEJB' module, including entries like 'eis/cicsremoteapplJCA5SSL', 'eis/cicsremotecontJCA4', and 'eis/cicslocalcontJCA1'. The 'eis/cicslocalcontJCA1' entry is selected. On the right, the configuration details for this reference are shown. The 'Name' field is 'eis/cicslocalcontJCA1'. The 'Description' is 'No JAAS Auth Alias used. (Should use Thread Identity) Local mode. Container managed.' The 'Type' is 'javax.resource.cci.ConnectionFactory'. The 'Authentication' is 'Container'. The 'Sharing scope' is 'Application'. Under the 'WebSphere' section, the 'JNDI name' is 'eis/cicslocalcontJCA1'. Under the 'WebSphere Extensions' section, the 'Isolation level' is 'TRANSACTION_NONE'. Callout boxes with numbers 1, 2, and 3 point to the 'JNDI name' field, the 'WebSphere Extensions' section, and the 'Authentication' field, respectively.

WSAD: Security Roles



WSAD: XML view of deployment descriptor



```

<resource-ref id="ResourceRef_1061244812937">
  <description>No J2EE Alias. Remote code. Application M...
  <res-ref-name>eis/cicsremotesapplJCASSL</res-ref-name>
  <res-type>javax.resource.cci.ConnectionFactory</res-ty...
  <res-auth>Application</res-auth>
  <res-sharing-scope>Shareable</res-sharing-scope>
</resource-ref>
</session>
</enterprise-beans>
<assembly-descriptor id="AssemblyDescriptor_ID">
  <security-role id="SecurityRole_1061244812934">
    <description>Maps to userid SERVMAN</description>
    <role-name>CICSServletManager</role-name>
  </security-role>
  <security-role id="SecurityRole_1061244812935">
    <description>Maps to userid EJEMAN</description>
    <role-name>CICSEJBManager</role-name>
  </security-role>
  <method-permission id="MethodPermission_1061244812934">
    <description>SWIPECICSPermission: + Authorization check on...
    <role-name>CICSServletManager</role-name>
    <role-name>CICSEJBManager</role-name>
    <method id="MethodElement_1061244812934">
      <ejb-name>"SWIPECICSTester"</ejb-name>
      <method-name>*</method-name>
    </method>
  </method-permission>
</assembly-descriptor>
</ejb-jar>
    
```

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WebSphere z/OS V5		
<h1>Application Deployment</h1> <p> Java Management Extensions (JMX) Application Assembly Tool (AAT) WebSphere Administrative Console Deploying application with MDBs wsadmin / JACL scripts and Ant Hot deployment and Dynamic Reload Classloaders </p>		
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WebSphere Management Facility Characteristics		
<ul style="list-style-type: none"> ▪ Full Function, Single API <ul style="list-style-type: none"> ▪ Based on JMX core framework ▪ Configuration, Operations, Events, Performance, Tuning ▪ Accessible through Java APIs, scripting language, web console GUI ▪ Standards Based Implementation <ul style="list-style-type: none"> ▪ Instrumentation - JMX, JSR77 ▪ Connectors - SOAP, RMI/IIOP, SNMP (later) ▪ Configuration - UML/MOF, XML ▪ Supports Multiple Administrators <ul style="list-style-type: none"> ▪ Update concurrency ▪ J2EE Role-based Security ▪ Customizable, Interoperable <ul style="list-style-type: none"> ▪ Extensible by adding JMX MBeans ▪ File-based, distributed SM repository ▪ Same JMX code, MicroEdition in WAS z/OS 		
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WebSphere JMX Components



- **WebSphere MBeans**
 - JMX ModelMBean (ManagedBean) Interface
 - JSR-077 ManagedObject Interface, Event Notification
 - extended WebSphere properties, operations, notifications
 - all MBeans defined by XML MBeanDescriptor
- **WebSphere JMX Agent**
 - MBeanServer, plus Agent Services (Monitor, Timer, Relation)
 - TMX4J (externally available on AlphaWorks)
- **JMX Connectors and Adapters**
 - XML/HTTP (SOAP) JMX Connector
 - RMI JMX Connector (uses WebSphere ORB)
 - Later ...
 - SNMP Adapter
 - Asynchronous JMS Connector

WebSphere Admin Tools



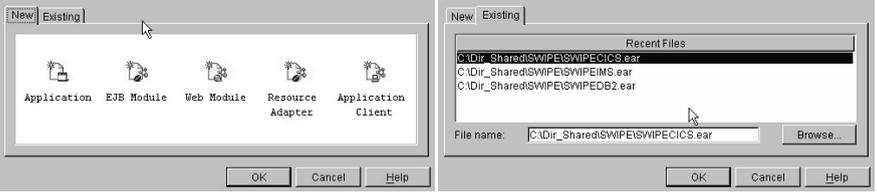
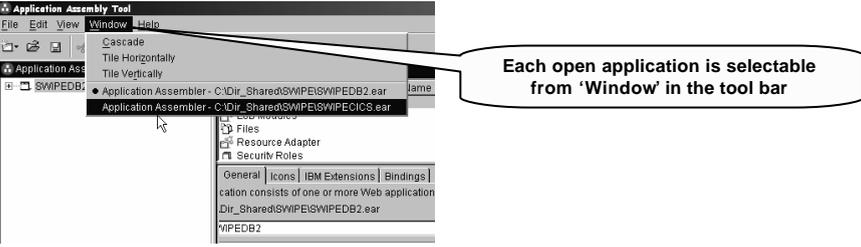
- **Command Line Tools**
 - single node utilities to start server, perform simple functions
 - located in /bin directory
- **Admin Console**
 - Web application - runs in some application server
 - browser is the client environment (connects to app server)
- **Wsdadmin Scripting program**
 - non-graphic admin client
 - 3 modes - interactive, batch, command line
- **Java Admin APIs**
 - allows custom admin programs to be written in Java
 - public classes and methods documented in the product javadoc, InfoCenter

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WebSphere z/OS V5		
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Application Assembly Tool (AAT)		
<ul style="list-style-type: none"> ▪ The AAT in WebSphere z/OS V5 is now like the AAT used on other platforms. ▪ Part of WebSphere Client Development Kit for zOS ▪ Download from /<websphere_install_root>/lib/setup.exe 		
		
<ul style="list-style-type: none"> ▪ Import the application ear file ▪ Each application is in a separate window ▪ View / Edit deployment descriptor ▪ Export modified ear 		
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AAT: Selecting your ear file

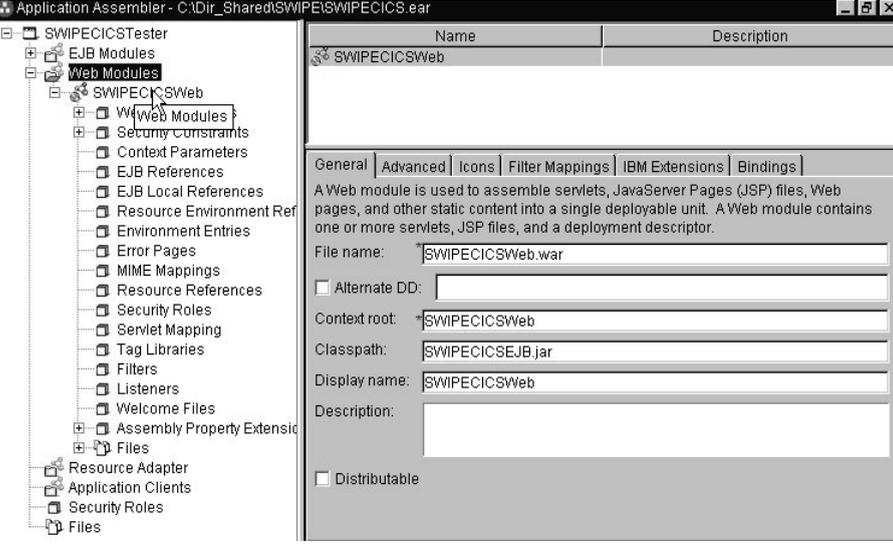




Each open application is selectable from 'Window' in the tool bar

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AAT: Overview

Name	Description
SWIPECICSWeb	

General | Advanced | Icons | Filter Mappings | IBM Extensions | Bindings

A Web module is used to assemble servlets, JavaServer Pages (JSP) files, Web pages, and other static content into a single deployable unit. A Web module contains one or more servlets, JSP files, and a deployment descriptor.

File name: *SWIPECICSWeb.war

Alternate DD:

Context root: *SWIPECICSWeb

Classpath: *SWIPECICSEJB.jar

Display name: *SWIPECICSWeb

Description:

Distributable

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AAT: Welcome Files



Application Assembler - C:\Dir_Shared\SWIPE\SWIPEICIS.ear

Resource Environment F
 Environment Entries
 Error Pages
 MIME Mappings
 Resource References
 Security Roles
 Servlet Mapping
 Tag Libraries
 Filters
 Listeners
Welcome Files
 Assembly Property Ext
 Files
 Resource Adapter
 Application Clients
 Security Roles

Welcome file

index.jsp

General

A Welcome File is an entry-point file (for example, index file) for a group of files. Welcome files are located by matching existing URIs to a group of p

Welcome file: index.jsp

AAT: Resource Reference Binding



Application Assembler - C:\Dir_Shared\SWIPE\SWIPEICIS.ear

SWIPEICISTester
 EJB Modules
 SWIPEICISEJB
 Session Beans
 "SWIPEICISTester"
 Environment Entries
 EJB References
 EJB Local References
 Resource Environment Referer
Resource References
 Security Role References
 Message Extensions
 Beans
 Entity Beans
 Message
 Security
 EJB Relations
 Access Intent
 Files
 Web Modules
 Resource Adapter
 Application Clients
 Security Roles
 Files

Name	Type	Authentication	Description	Sharing Sc
(A) eis/cicslocalapplJCA1	javax.resource.cci...	Application	No JAAS Auth alia...	Shareable
(A) eis/cicslocalapplJCA2	javax.resource.cci...	Application	Wrong password...	Shareable
(A) eis/cicslocalapplJCA3	javax.resource.cci...	Application	Wrong password...	Shareable
(A) eis/cicslocalapplJCA4	javax.resource.cci...	Application	Wrong password...	Shareable
(A) eis/cicslocalcontJCA1	javax.resource.cci...	Container	No JAAS Auth Alia...	Shareable
(A) eis/cicslocalcontJCA2	javax.resource.cci...	Container	Both Component...	Shareable
(A) eis/cicslocalcontJCA3	javax.resource.cci...	Container	Wrong (invalid) us...	Shareable
(A) eis/cicslocalcontJCA4	javax.resource.cci...	Container	Wrong password...	Shareable
(A) eis/cicsremoteapplJCA1	javax.resource.cci...	Application	No JAAS Auth Alia...	Shareable
(A) eis/cicsremoteapplJCA2	javax.resource.cci...	Application	Component and C...	Shareable
(A) eis/cicsremoteapplJCA3	javax.resource.cci...	Application	Wrong (invalid) us...	Shareable
(A) eis/cicsremoteapplJCA4	javax.resource.cci...	Application	Wrong password...	Shareable
(A) eis/cicsremoteapplJCASSL	javax.resource.cci...	Application	No JAAS Alias. Re...	Shareable
(A) eis/cicsremotecontJCA1	javax.resource.cci...	Container	No JAAS Auth Alia...	Shareable
(A) eis/cicsremotecontJCA2	javax.resource.cci...	Container	Wrong password...	Shareable
(A) eis/cicsremotecontJCA3	javax.resource.cci...	Container	Wrong (invalid) us...	Shareable
(A) eis/cicsremotecontJCA4	javax.resource.cci...	Container	Wrong password...	Shareable
(A) eis/cicsremotecontJCASSL	javax.resource.cci...	Container	No JAAS Alias. Re...	Shareable

General | IBM Extensions | Bindings

A resource reference is a logical name used to locate a connection factory object. These objects define connections to external resources such as databases and messaging systems.

Name: eis/cicslocalapplJCA1

Type: javax.resource.cci.ConnectionFactory

Authentication: Application

Sharing Scope: Shareable

Description: No JAAS Auth alias defined
Local mode. Application managed

res-auth

Binding to Connection Factory JNDI name

Resource References

AAT: Security Roles



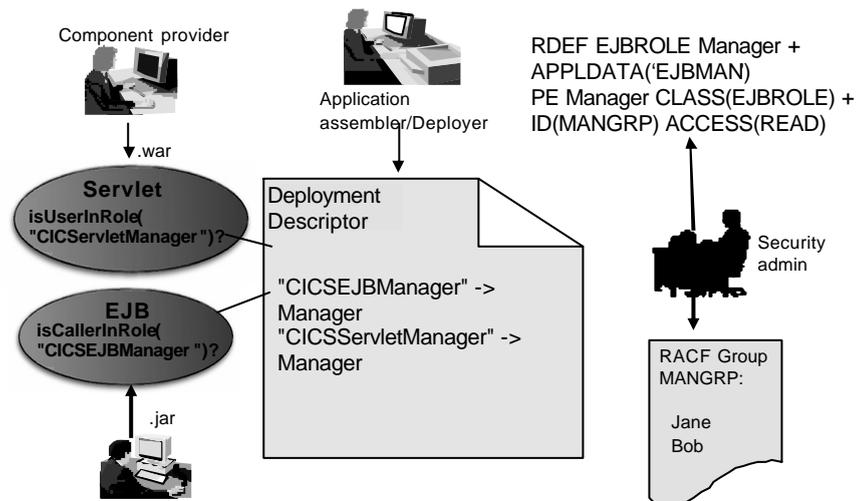
Name	Description
CICSEJBManager	Maps to userid EJBMAN
CICServletManager	Maps to userid SERVMAN

General
A security role describes a group of actions that a principal is permitted to perform.
Name: CICSEJBManager

Security Roles in EJB deployment descriptor

Security Roles in ear deployment descriptor

AAT: Security Role References (1)



AAT: Security Role References (2)



The screenshot shows the 'New Security Role Reference' dialog box in the Application Assembler. The 'Name' field contains 'Manager', the 'Link' field contains 'CICSEJBManager', and the 'Description' field contains 'All 'Manager' types roles link to EJBROLE profile called 'Manager''. The background shows a tree view of the project structure with 'Security Role References' selected under the 'SWIPECICSEJB' module.

Right click and select 'New' to create Role reference

Enter details here

AAT: View XML file



The screenshot shows the 'View XML file' dialog box displaying the contents of the 'META-INF/ejb-jar.xml' file. The XML code includes the following elements:


```

    <?xml version="1.0" encoding="UTF-8"?>
    <!DOCTYPE ejb-jar PUBLIC "-//Sun Microsystems, Inc.//DTD Enterprise JavaBeans 2.0//EN" "http://java.sun.com/dtd/ejb-jar.dtd">
    <ejb-jar id="ejb-jar_ID">
      <display-name>SWIPECICSEJB</display-name>
      <enterprise-beans>
        <session id="SWIPECICSEJB">
          <ejb-name>"SWIPECICSEJB"</ejb-name>
          <home>com.ibm.itso.swipe.cics.ejb.SWIPECICSEJBHome</home>
          <remote>com.ibm.itso.swipe.cics.ejb.SWIPECICSEJBRemote</remote>
          <ejb-class>com.ibm.itso.swipe.cics.ejb.SWIPECICSEJBBean</ejb-class>
          <session-type>Stateless</session-type>
          <transaction-type>Container</transaction-type>
          <security-identity>
            <run-as id="RunAsSpecifiedIdentity_1005892256077">
              <description>Maps to userid EJBMAN</description>
              <role-name>CICSEJBManager</role-name>
            </run-as>
          </security-identity>
          <resource-ref id="ResourceRef_1">
            <description>No JAAS Auth Alias used. (Should use Thread Identity)
            Local mode. Container managed.</description>
            <res-ref-name>eis/cics/localcont/LCA1</res-ref-name>
            <res-type>javax.resource.cci.ConnectionFactory</res-type>
            <res-auth>Container</res-auth>
          </resource-ref>
        </session>
      </enterprise-beans>
    </ejb-jar>
    
```

AAT: Save



- When changes are finished use 'File' – 'Save' to save the changes or click the diskette icon in the tool bar.
- There is no specific 'Export' option as there was in AAT for V4.
- You can now use the WebSphere Administration Console or wsadmin to deploy the application

WebSphere z/OS V5



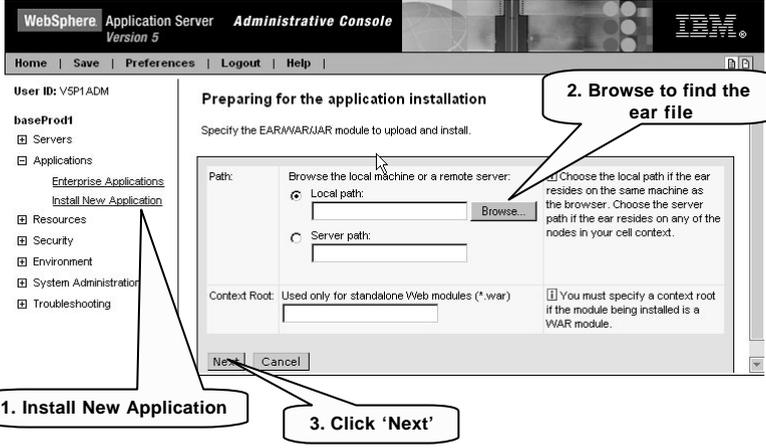
Application Deployment

**Java Management Extensions (JMX)
Application Assembly Tool (AAT)
WebSphere Administrative Console
Deploying application with MDBs
wsadmin / JACL scripts and Ant
Hot deployment and Dynamic Reload
Classloaders**

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Admin Console: Locate the ear file to install





1. Install New Application

2. Browse to find the ear file

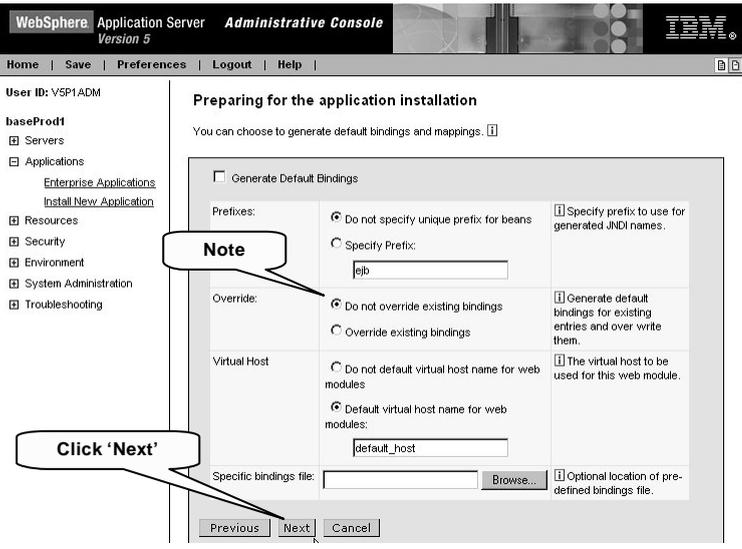
3. Click 'Next'

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Admin Console: Preparing for installation





Note

Click 'Next'

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Admin Console: Step 1: Application Options



WebSphere Application Server Administrative Console
Version 5

Home | Save | Preferences | Logout | Help

User ID: VSP1ADM

baseProd1

- [-] Servers
- [-] Applications
 - Enterprise Applications
 - Install New Application
- [-] Resources
- [-] Security
- [-] Environment
- [-] System Administration
- [-] Troubleshooting

Install New Application

Allows installation of Enterprise Applications and Module

→ **Step 1: Provide options to perform the installation**

Specify the various options available to prepare and install your application.

AppDeployment Options	Enable
Pre-compile JSP	<input type="checkbox"/>
Directory to Install Application	<input type="text"/>
Distribute Application	<input checked="" type="checkbox"/>
Use Binary Configuration	<input type="checkbox"/>
Deploy EJBs	<input type="checkbox"/>
Application Name	<input type="text" value="SMWPECICSTester"/>
Create MBeans for Resources	<input checked="" type="checkbox"/>
Enable class reloading	<input type="checkbox"/>
Reload interval	<input type="text"/>

Next Cancel

Step 2 Provide JNDI Names for Beans

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Admin Console: Step 2: Bean JNDI names



User ID: VSP1ADM

baseProd1

- [-] Servers
- [-] Applications
 - Enterprise Applications
 - Install New Application
- [-] Resources
- [-] Security
- [-] Environment
- [-] System Administration
- [-] Troubleshooting

Install New Application

Allows installation of Enterprise Applications and Module

Step 1 Provide options to perform the installation

→ **Step 2: Provide JNDI Names for Beans**

Each non message driven enterprise bean in your application or module must be bound to a JNDI name.

EJB Module	EJB	URI	JNDI Name
SMWPECICSEJB	"SMWPECICSTester"	SMWPECICSEJB.jar/META-INF/ejb-jar.xml	<input type="text" value="ejb/SMWPECICSTester"/>

Previous Next Cancel

Step 3 Map EJB references to beans
 Step 4 Map resource references to resources
 Step 5 Map virtual hosts for web modules
 Step 6 Map modules to application servers
 Step 7 Map security roles to users/groups
 Step 8 Map RunAs roles to users
 Step 9 Summary

If the deployment descriptor is correct you could jump straight to Step 9

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Admin Console: Step 4: Resource References

Step 3 Map EJB references to beans

→ Step 4: Map resource references to resources

Each resource reference defined in your application must be mapped to a resource.

javax.resource.cci.ConnectionFactory

Specify existing Resource JNDI name: select....

1. Check

2. Select CF JNDI name from list

3. Click 'Apply'

4. Now correct?

<input type="checkbox"/>	Module	EJB	URI	Reference Binding	JNDI Name
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalcontJCA1	eis/cicslocalJCA1
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalcontJCA2	eis/cicslocalJCA2
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalcontJCA3	eis/cicslocalJCA3
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalcontJCA4	eis/cicslocalJCA4
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalapplJCA1	eis/cicslocalJCA1
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalapplJCA2	eis/cicslocalJCA2
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalapplJCA3	eis/cicslocalJCA3
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicslocalapplJCA4	eis/cicslocalJCA4
<input type="checkbox"/>	SWMPECICSEJB	"SWMPECICSTester"	SWMPECICSEJB.jar,META-INF/fejb-jar.xml	eis/cicsremotcontJCA1	eis/cicsremoteJCA1

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Admin Console: Step 8: Map RunAs roles to users

Step 7 Map security roles to users/groups

→ Step 8: Map RunAs roles to users

The Enterprise beans you are installing contain predefined RunAs roles. RunAs roles are used by Enterprise beans that need to run as a particular role to be recognized while interacting with another Enterprise bean.

username:

password:

Remove the RunAsUser user name and password from the selected roles.

<input type="checkbox"/>	Role	User Name
<input type="checkbox"/>	CICSEJBManager	
<input type="checkbox"/>	CICServletManager	

Step 9 Summary

Click on Step 9 to go to Summary

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Admin Console: Step 9: Summary



[Step 8](#) Map RunAs roles to users

Step 9: Summary

Summary of Install Options

Options	Values
Distribute Application	Yes
Use Binary Configuration	No
Cell/Node/Server	Click here
Create MBeans for Resources	Yes
Enable class reloading	No
Deploy EJBs	No
was.policy.data	was.policy file does not exist
Application Name:	SWPEPICSTester
Reload Interval	
Directory to Install Application	
Pre-compile JSP	No
Application Name	SWPEPICSTester

Previous Finish Cancel

Click 'Finish'

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Admin Console: Installation messages



Installing..

If there are EJB's in the application, the EJB Deploy process may take several minutes. Please do not save the configuration until the process is complete.

Check the SystemOut.log on the Deployment Manager or Server where the application is deployed for specific information about the EJB Deploy process as it occurs.

ADMA5005: Application SWPEPICSTester configured in WebSphere repository

ADMA5001: Application binaries saved in /wasv5Config/prodCell1/AppServerNC/wstemp/608656330/workspace/cells/baseProd1/applications/SWPEPICSTester.ear/S

ADMA5011: Cleanup of temp dir for app SWPEPICSTester done.

ADMA5013: Application SWPEPICSTester installed successfully.

Application SWPEPICSTester installed successfully.

If you want to start the application, you must first save changes to the master configuration.

Save to Master Configuration

If you want to work with installed applications, then click Manage Applications.

[Manage Applications](#)

1. Look for this message

2. Click to save master configuration

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Admin Console: Save master configuration



Message(s)

⚠ Changes have been made to your local configuration. Click [Save](#) to apply changes to the master configuration.
 ⓘ The server may need to be restarted for these changes to take effect.

Enterprise Applications >

Save

Save your workspace changes to the master configuration

Save to Master Configuration

Click the Save button to update the master repository with your changes. Click the Discard button to discard your changes and begin work again using the master repository configuration. Click the Cancel button to continue working with your changes.

Total changed documents: 16

View items with changes

Click 'Save'

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Admin Console: Start the application



User ID: V5P1.ADM

baseProd1

- Servers
- Applications
 - [Enterprise Applications](#)
 - [Install New Application](#)
- Resources
- Security
- Environment
- System Administration
- Troubleshooting

Enterprise Applications

A list of installed applications. A single application can be deployed onto multiple servers. ⓘ

Total: 4

Filter

Preferences

<input type="checkbox"/>	Name	Status
<input type="checkbox"/>	lsoBankSEAR	→
<input checked="" type="checkbox"/>	SMPPECICTester	⌘
<input type="checkbox"/>	adminconsole	→
<input type="checkbox"/>	lvtApp	→

1. Check box

2. Hit 'Start'

3. Check this changes to green arrow

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WebSphere z/OS V5



Application Deployment

**Java Management Extensions (JMX)
Application Assembly Tool (AAT)
WebSphere Administrative Console
Deploying applications with MDBs
wsadmin / JACL scripts and Ant
Hot deployment and Dynamic Reload
Classloaders**

Deploying Applications with MDBs



- Use the WebSphere Administrative Console to define the listener ports

Servers – Application Servers - <server name> - Additional Properties
Select : Message Listener Service and set the properties.
Open Custom Properties and review/set properties of listener service

- For each MDB, use the AAT to configure the deployment attributes to match the listener port

Expand EJB module. Click on Message-driven beans.
Open General Deployment tab. Set properties e.g. transaction type
Open Advanced Deployment tab. Set properties e.g. Acknowledge mode
Open Bindings tab. Set properties e.g. MDB listener port.

- Use the WebSphere Administrative Console to install the application
 - This stage is a standard WebSphere Application Server task
 - You are prompted to specify the name of the listener port that the application is to use for late responses. Select the listener port, then click **OK**.

WebSphere z/OS V5



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wsadmin overview



- wsadmin
 - Actually a specialized Java AdminClient application
 - Several possible languages (Tcl, Jython, Javascript) but only JACL on z/OS
 - 3 modes - interactive, command line (-c), script file (-f)
 - 3 objects to represent admin functions - AdminControl, AdminConfig, AdminApp
 - Primarily meant to allow rapid creation of small control programs using existing administration function
 - Considerable documentation in InfoCenter section **(200 pages or more!)**
- AdminClient Java API
 - Represents the remote client side of WAS admin programming interface
 - Used by all internal admin tools shipped with WAS 5.0
 - Based on JMX programming model, with distributed extensions
 - Allows more sophisticated admin program logic, better exception handling, registration for event notification
 - Public javadoc shipped in install image

wsadmin scripting environment



- Refer to the Infocentre or Systems Administration manual GA22-7962
- Properties files define properties relating to a connection between a wsadmin client and a target server
- Three levels of properties files:
 - Level 1. Default properties: from <WAS_HOME>/properties/wsadmin.properties
 - Level 2. In the Java user.home property/wsadmin.properties
 - Level 3. WSADMIN_PROPERTIES environment variable -> wsadmin.properties
 - -p command line option points to a file with a properties
These properties override others from the other sources which are themselves processed in order, each overriding the previous properties encountered. Keep it simple!
- Profiles can be used to customize the scripting environment
 - -profile can point to a properties file (which can point to another profile)

wsadmin tracing



- Trace options can be set in a properties file (default wsadmin.properties)
 - Or -profile point to a properties file
 - com.ibm.ws.scripting.traceString=true switches on trace to . . .
 - com.ibm.ws.scripting.traceFile=/ - If not set, trace / logging goes to the admin console
- Enabling trace from command line invocations :


```
$AdminControl trace
com.ibm.*=all=enabled
```

Installing a new application using wsadmin



- wsadmin can be used to install a new application
- For interactive and command line, use Telnet to execute wsadmin or a batch job, not OMVS because the command line is too short

- Launch wsadmin by running wsadmin.sh file from <WAS_HOME>/bin

- Interactive install
 - <WAS_HOME>/bin/wsadmin.sh
 - wsadmin>\$AdminApp **installInteractive**
/<wasconfig_root>/<cell>/<node>/installableApps/SWIPECICS.ear

- Non-interactive invocation
 - <WAS_HOME>/bin/wsadmin.sh
 - wsadmin>\$AdminApp **install**
/<wasconfig_root>/<cell>/<node>/installableApps/SWIPECICS.ear

Installing a new application using wsadmin



- Use -conntype NONE option, if the server stopped
 - wsadmin.sh -conntype NONE -c \$AdminApp install
/<wasconfig_root>/<cell>/<node>/installableApps/SWIPECICS.ear

- To list all installed applications (you need the server up to do this no local mode)
 - wsadmin>\$AdminApp list

- Invoking help text
 - wsadmin>\$Help help
 - wsadmin>\$AdminApp help
 - wsadmin>\$AdminApp help installInteractive

Batch execution



- The customized CNTL library contains BBOIAPP which execute a batch job that invokes wsadmin to install the adminconsole and ivt applications.

```

/*****/
/* STEP 2 - Install the IVT app. */
/*****/
//INST2 EXEC PGM=IKJEFT01,REGION=0M
//SYSTSPRT DD SYSOUT=*
//SYSTSIN DD *
BPXBATCH SH +
/wasv5Config/prodCell1+
/AppServerNC+
/bin/wsadmin.sh -conntype none +
-c '$AdminApp install +
/wasv5Config/prodCell1+
/AppServerNC+
/installableApps/ivtApp.ear +
{-appname ivtApp -usedefaultbindings +
-server server2 +
-node nodeC +
-cell baseProd1}' +
1>> /tmp/bbowiapp.out +
2>> /tmp/bbowiapp.err
/*

```

Application Update



- From end-user perspective, the update process will be very similar to ins tall
 - It will additionally take the name of the existing app that is to be upgraded
- No continuous availability of the application. The reinstall process:-
 - Stops the current application if it is running
 - Uninstalls the current application
 - Installs the new application j
- Continuous availability requires more planning
 - ND configuration
 - AutoSynch off to prevent automatic install across the cell
 - Use of the distributed plugin for initial balancing and affinities (implied by ND)
 - A way to control distribution of IP messages (dynamic VIPA and Sysplex distributor)

Application Update (continued)



- Using Admin Console
 - The user interface will guide the users through the same install steps for update
 - Applications ->Enterprise Applications. Select the Application and click "Update"

- Using wsadmin

- Use update option in AdminApp
- Example:

```
$AdminApp install  
<wasconfig_root>/<cell>/<node>/installableApps/SWIPECICS.ear  
{ -appname SWIPECICSTester -update -update.ignore.new}
```

- -update option specifies that the application named SWIPECICS is to be redeployed using the supplied EAR file
- -update.ignore.new option specifies that the bindings from the new version are ignored

Ant



- Ant (ANother Tool) is now supported in WebSphere z/OS V5.0.1 (Service level W501000)
- Very popular with developers
- Apache Ant is a Java-based build tool.
 - Similar to Make, but extended by Java classes rather than shell scripts.
 - Instead of shell, XML files are used.
 - These XML files reference a target tree in which various tasks are run.
 - Each task is run by an object that implements a particular Task interface.
- For more detailed information about Ant, refer to the Apache Web site:
<http://jakarta.apache.org/ant/index.html>
- Also see WebSphere distributed Redbook for usage information:
SG24-6993 WebSphere Version 5 Application Development Handbook
There are samples for wsadmin and Ant supplied with this Redbook

Ant



- The tasks included with IBM WebSphere Application Server enable you to:
 - Install and uninstall applications
 - Run EJB deployment and JSP precompilation tools
 - Start and stop servers
 - Run administrative scripts or commands
- By combining these tasks with those provided by Ant, you can create build scripts that compile, package, install, and test your application on IBM WebSphere Application Server.
- WebSphere Ant is supplied in `<WAS_HOME>/lib/ant.jar`
Javadoc for package: `com.ibm.websphere.ant.tasks` is at:

<http://publib7b.boulder.ibm.com/wasinfo1/en/info/aes/javadoc/ae/com/ibm/web-sphere/ant/tasks/package-summary.html>
- Launched using: `<was_install_root>/bin/ws_ant.sh`
- Note that Ant build XML file and properties files must be in ascii.

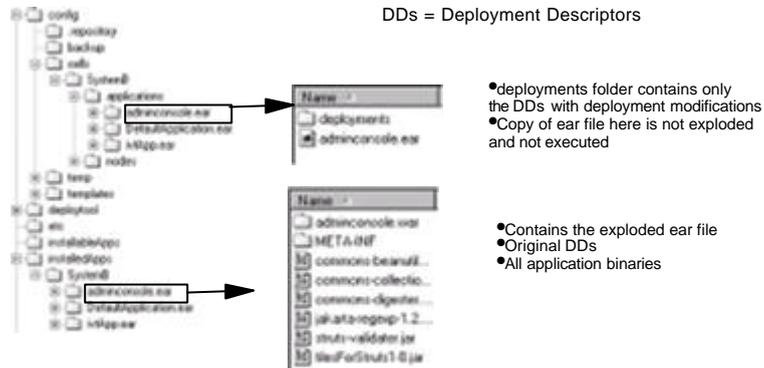
WebSphere z/OS V5



Application Deployment

Where did it go?

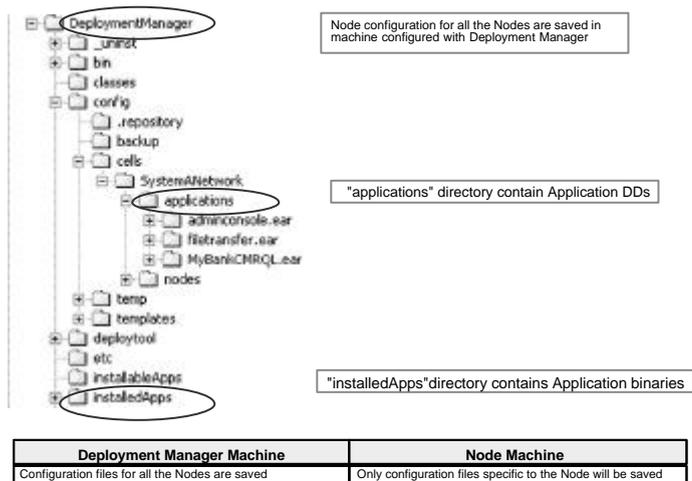
Repository - Base Application Server



- DDs in installedApps dir. are the original DDs in the EAR file (unmodified DDs)
- App Server takes the modified DDs (from config dir.) to start the application
- DDs in config dir. contain all updates provided after installation of the Application ear.

Example: Could have provided a different JNDI name for an EJB or resource

Repository – Network Deployment



WebSphere z/OS V5



Application Deployment

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Hot Deployment and Dynamic Reloading



- Hot deployment
 - The process of adding new components (such as WAR files, EJB Jar files, enterprise Java beans, servlets, and JSP files) to a running server without having to stop the application server process and start it again.
- Dynamic reloading
 - The ability to change an existing component without needing to restart the server in order for the change to take effect. Dynamic reloading involves:
 - Changes to the implementation of a component of an application, such as changing the implementation of a servlet
 - Changes to the settings of the application, such as changing the deployment descriptor for a Web module

Hot Deployment Overview



- Locate your expanded ear file.
If you did not override the location in Step 1 of the installation it will be in:
install_root/installedApps/cell_name/application_name.ear.
- Locate the application metadata files.
- If running ND configuration with multiple nodes disable AutoSynch :
System Administration – Node Agents – File Synchronization Service
Uncheck the option: Automatic Synchronization
- Change or add the following components or modules as needed:
 - Application files
 - WAR files
 - EJB Jar files
 - HTTP plug-in configuration files

Hot Deployment: General rules



- Web Modules can be reloaded independently in WebSphere distributed but not in WebSphere z/OS
- EJB Modules
 - Cannot be stopped/restarted independently in Version 5
 - The entire application has to be restarted
- Best practice: stop/restart the Enterprise Application
 - This will ensure that all the dependencies are also reloaded

Dynamic Reload



- Set as an option on the application or on the deployment descriptor (META-INF/ibm-application-ext.xml)

(Reload Enabled and Reload Interval options)
- Performance penalty so avoid, especially avoid low reload intervals.

WebSphere z/OS V5



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v4 vs. v5 Classloading Policies - Comparison



v4	v5	
4.0 Classloader Policy	v5 Application Classloader Policy	v5 WAR Classloader Policy
SERVER	SINGLE	APPLICATION
COMPATIBILITY	SINGLE	MODULE
APPLICATION	MULTIPLE	APPLICATION
MODULE	N/A	N/A
J2EE Application Mode	MULTIPLE	MODULE

Shared Libraries



- Environment
 - Update Web Server Plugin
 - Virtual Hosts
 - Manage WebSphere Variables
 - Shared Libraries**
- Naming

DEFINE New Shared Libraries

Configuration

General Properties

Name: MySharedCode

Description:

Classpath: C:\MyCode\

Native Library Path:

Can be a Single JAR file or DIRECTORY that contains multiple JAR files

Native Library used by the Application - DLLs, lib*.so, etc.

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<div style="text-align: right;"> Redbooks</div> <div style="text-align: center;"><h1>References</h1></div>		
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<div style="text-align: right;"> Redbooks</div> <div><h2>References</h2></div> <ul style="list-style-type: none">■ WebSphere z/OS V5 InfoCenter: http://www.ibm.com/software/webservers/appserv/zos_os390/library.html and follow link or, http://publib.boulder.ibm.com/infocenter/wasinfo/index.jsp■ WebSphere z/OS PDFs available from the zos_os390/library.html site.■ Redbooks and Redpieces (http://ibm.com/redbooks)<ul style="list-style-type: none">■ SG24-6086 z/OS WebSphere Application Server V5 and J2EE 1.3 Security Handbook■ SG24-7044 Migrating applications from WebSphere for z/OS V4 and V3.5 to V5■ SG24-6993 WebSphere Version 5 Application Development Handbook (useful for information on wsadmin and Ant but written for distributed WebSphere)		