

IBM WebSphere Application Server for z/OS V5.0.2



Getting Started

Note

Before using this information, be sure to read the general information under “Notices” on page 147.

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Contents

How to send your comments v

**Chapter 1. Installing and Customizing
WebSphere Application Server 1**

**Chapter 2. Preparing for WebSphere
Application Server for z/OS installation
and customization 3**

Overview of WebSphere Application Server for z/OS
configuration 3
Steps for creating your implementation plan. 4
WebSphere Application Server for z/OS base cell 7
WebSphere Application Server for z/OS network
deployment cell 8
WebSphere Application Server for z/OS
terminology and system configuration breakdown. 9
The WebSphere Application Server for z/OS
HTTP internal transport 12
Preparing the base z/OS environment 13
Determining your skill needs 14
Determining WebSphere Application Server for
z/OS system requirements 15
Updating your TCP/IP network 18
Setting up workload management (WLM) 20
Recommendations for resource recovery services 22
Guidelines for Java Database Connectivity 24
Guidelines for DB2 settings for WebSphere
concurrency control management 24
Recommendations for using memory. 24
Planning for problem diagnosis. 25

**Chapter 3. Installing WebSphere
Application Server for z/OS 35**

Installing the code through SMP/E 35

**Chapter 4. Customizing WebSphere
Application Server for z/OS 37**

Using the Customization Dialog 37
Simplifying your installation. 40
Installing a practice run-time 43
Steps for starting the Customization Dialog. 45
Steps for loading customization variables 47
Steps for loading security domain variables 47
Steps for allocating the target data sets 48
Steps for defining variables 49
Steps for saving the customization variables 89
Steps for saving the security domain variables. 90
Steps for generating customization jobs 91
Steps for viewing and following the generated
customization instructions 92
z/OS port assignments 98
Cold-starting RRS 98
Handling workload management and server failures 99

**Chapter 5. Performing WebSphere
Application Server for z/OS**

post-installation tasks 101

Installing service to WebSphere Application Server
for z/OS 101
Applying or restoring off a service level 102
Automatic restart management 105
Activating automatic restart management 106
Changing automatic restart management
policies 107
Displaying the status of ARM-registered address
spaces 107
Tips for installing the embedded messaging feature 108
Using the installation verification test 109
Running the Installation Verification Test with a
job 109
Running the Installation Verification Test from a
command line 109
Installing new releases and maintenance levels of
WebSphere Application Server for z/OS 110
Using a version-specific HFS structure to
upgrade WebSphere Application Server for
z/OS 111
Using an alternate HFS structure to upgrade
WebSphere Application Server for z/OS 113

Chapter 6. Migrating and coexisting 117

Migration and coexistence overview 117
Coexistence support 118
Migrating from V4.0.1 to V5 120
Setting up Version 4.0.x and Version 5
coexistence 123
Utilizing WebSphere administrative capabilities
to support migration from V4.0.1 to V5. 126
Migrating from V3.5 Standard Edition (SE) to V5 129
Migrating your existing was.conf file settings 133
Class loader options 134
Code page changes 135
Specification level summary of SE V3.5, V4.0,
V4.0.1, and V5 WebSphere Application Server 136
Prerequisites needed for WebSphere Application
Server for z/OS V3.5SE, V4.0.1, and V5 137
Coexistence port definitions 139
Migrating XML applications 140

**Chapter 7. Installation and
Customization: Resources for
learning. 141**

Chapter 8. Samples Gallery 145

Notices 147

How to send your comments

Your feedback is important in helping to provide the most accurate and highest quality information.

- To send comments on articles in the WebSphere Application Server Information Center, follow these steps:
 1. Display the article in your Web browser and scroll to the end of the article.
 2. Click on the **Feedback** link at the bottom of the article, and a separate window containing an e-mail form appears.
 3. Fill out the e-mail form as instructed, and click on **Submit feedback** .
- To send comments on PDF books, you can e-mail your comments to: **wasdoc@us.ibm.com** or fax them to 919-254-0206.

Be sure to include the document name and number, the WebSphere Application Server version you are using, and, if applicable, the specific page, table, or figure number on which you are commenting.

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Chapter 1. Installing and Customizing WebSphere Application Server

This topic introduces the context of installing and customizing IBM WebSphere Application Server for z/OS V5, including the tasks you need to perform before and after.

To create a complete, customized WebSphere Application Server for z/OS installation, you need to prepare the operating system and subsystems, configure native products (for example, WLM, RACF and TCP/IP), physically load the product code through SMP/E, run the Customization Dialog, follow the customized instructions and run the jobs (including the Installation Verification Test) from the Dialog, and bring up your server.

Note: See Installing a practice run-time for steps you can follow to set up a practice version of WebSphere Application Server for z/OS if you want to just get the feel for it or see the basics.

Perform the following tasks to create a running version of the product on your machine.

1. Prepare for WebSphere Application Server for z/OS installation and customization. You must prepare z/OS subsystems and do other tasks, such as determine important information about WebSphere Application Server for z/OS and z/OS subsystems, before you start installation and customization.
2. Install WebSphere Application Server for z/OS. You must first load the WebSphere Application Server for z/OS code onto your system, using SMP/E install, before you make it usable through customization.
3. Customize WebSphere Application Server for z/OS. Once you have the WebSphere Application Server for z/OS code installed on your system, you are ready to make it your own by customizing it.
4. Perform WebSphere Application Server for z/OS post-installation tasks. Once you have WebSphere Application Server for z/OS customized and running smoothly on your system, there are many post-installation tests and modifications you can perform.

Chapter 2. Preparing for WebSphere Application Server for z/OS installation and customization

You must prepare z/OS subsystems and do other tasks in this section before you start installation and customization. Additionally, you must determine important information about WebSphere Application Server for z/OS and z/OS subsystems before you start customization. Follow these steps to do so.

1. Review the WebSphere Application Server for z/OS configuration. This will give you a basic understanding of what is involved with the product.
2. Ensure the base environment is prepared to support a WebSphere Application Server for z/OS code install. The base z/OS environment and all of the subsystems associated with z/OS must be able to support your WebSphere Application Server installation. You need to install prerequisite products and configure z/OS subsystems, such as resource recovery services (RRS) and workload management. In particular, be sure you have followed instructions and tips for the following:
 - System requirements. See Determining WebSphere Application Server for z/OS system requirements.
 - TCP/IP. See background information and tips in Updating your TCP/IP network.
 - Security Server (RACF). See "Planning to secure your environment" in the WebSphere Application Server InfoCenter.
 - Workload manager (WLM). See Setting up workload management (WLM).
 - Resource Recovery Services. See Recommendations for resource recovery services.
3. If you do not already have one, set up a RACF user ID and authorize it to have read/write access to the WebSphere Application Server for z/OS files (BBO.* data sets and HFS files). Here you will see product data set names without high-level qualifiers, unless a full data set name is required for clarity, in which case BBO is used as the qualifier.
4. Review Migrating and coexisting if you plan to migrate another version of WebSphere for z/OS.

This task describes exactly what is migrated during the automatic migration. It also describes how to perform a manual migration using the migration tools.

You are done when you have successfully finished these preparations.

Overview of WebSphere Application Server for z/OS configuration

WebSphere Application Server for z/OS V5, hereafter referred to as WebSphere for z/OS, builds upon the function of WebSphere Application Server V4.0.1 for z/OS and OS/390 and WebSphere Application Server Advanced Edition.

This section covers planning, installing, and customizing tasks for WebSphere for z/OS.

Planning for, installing, and customizing WebSphere Application Server for z/OS includes those tasks you must perform prior to installing business applications, such as planning your system configuration and installing the WebSphere Application Server for z/OS run-time environment. This chapter:

- Gives a general overview of the tasks you must do to initially install and customize WebSphere Application Server for z/OS.
- Provides pictures and descriptions of your run-time environment after the initial installation and customization of the base and network deployment cells. The initial base installation and customization is performed on a monoplex or a single system in a sysplex.
- Provides a checklist of items you should consider for your initial installation of WebSphere Application Server for z/OS, your application development and client systems, and advanced system configurations.

To install the run-time environment initially, you must perform tasks in two general areas:

1. The base z/OS system. You must prepare various z/OS elements, products, and your network prior to setting up WebSphere Application Server for z/OS. For instance, you must perform such tasks as updating your TCP/IP network, setting up security controls, and defining workload management (WLM) workloads.
2. The WebSphere Application Server for z/OS run-time environment itself. This includes loading the code, changing parmlib members, creating environment files, and running configuration jobs.

If you already have a prior version of WebSphere Application Server for z/OS installed and customized, you can configure WebSphere Application Server for z/OS V5 to coexist with it. For more information, see the migration information.

After installation and customization, you can install application development environments for your application developers and client environments for your business applications. For more information about this, see the assembling applications information in the z/OS view of the WebSphere Application Server InfoCenter, which you can access via the WebSphere Application Server for z/OS library Web site.

When you have stabilized WebSphere Application Server for z/OS on the first system, you can enable WebSphere Application Server for z/OS in a sysplex. You may also implement other advanced system configurations, such as multi-node cells or connecting your business applications to an IMS or CICS database.

Steps for creating your implementation plan

To get started, plan to build all WebSphere Application Server for z/OS run-time servers on one system, then replicate them on other systems as you expand into a cell. This procedure guides you through initial planning and implementation of WebSphere Application Server for z/OS on a monoplex. Then it guides you through setting up your application development and client environments. Finally, the procedure guides you through planning for optional advanced system configurations.

Before you begin: We assume you have a z/OS system on which you will implement WebSphere Application Server for z/OS.

Perform the following steps to implement your plan, checking off each item as you complete it:

1. Plan WebSphere Application Server for z/OS on a monoplex or a single system in a multi-system sysplex.

Check off	Item	For more information, see . . .
	Determine the skills you need.	Determining your skill needs
	Determine WebSphere Application Server for z/OS system requirements.	Determining WebSphere application server for z/OS system requirements
	Understand and plan for customization changes you will need to do for your TCP/IP network.	Updating your TCP/IP network
	Understand security options and prepare for securing your system.	"Planning to secure your environment" in the WebSphere Application Server InfoCenter
	Set up workload management environments for WebSphere Application Server for z/OS run-time servers.	Setting up workload management (WLM)
	Customize resource recovery services for use by WebSphere Application Server for z/OS.	Recommendations for resource recovery services
	Plan for your performance and monitoring systems.	"Monitoring performance" in the WebSphere Application Server InfoCenter
	Follow recommendations for memory utilization.	Recommendations for using memory
	Plan and define your problem diagnosis procedures.	Planning for problem diagnosis
	Consider automatic restart management before you install WebSphere Application Server for z/OS.	Automatic restart management (ARM)

2. Install and customize WebSphere Application Server for z/OS.

Check off	Item	For more information, see . . .
	Install and customize a running WebSphere Application Server for z/OS V5 base configuration.	Installing the code through SMP/E and Using the Customization Dialog

3. Perform various post-installation tasks.

Check off	Item	For more information, see . . .
	Plan and define your system backup procedures.	"Guidelines for backup of the WebSphere Application Server for z/OS system" in the WebSphere Application Server InfoCenter
	Plan and define your software service procedures.	Installing service to WebSphere Application Server for z/OS

Check off	Item	For more information, see . . .
	Implement automation controls and set up automatic restart management for WebSphere application server for z/OS, if desired.	Automatic restart management

4. Plan for your application development and client environments.

Check off	Item	For more information, see . . .
	Review WebSphere Application Server for z/OS requirements for application development and client environments.	Related InfoCenter articles

5. (Optional) Plan and implement advanced system configurations.

Check off	Item	For more information, see . . .
	Implement the Integrated JMS Provider, using WebSphere MQSeries.	"Installing WebSphere MQ as the JMS provider" in the WebSphere Application Server InfoCenter
	Configure a WebSphere Application Server for z/OS network deployment cell.	Using the Customization Dialog
	Expand the WebSphere Application Server for z/OS network deployment cell to include additional systems in the same sysplex.	"Setting up WebSphere Application Server for z/OS on multiple systems in a sysplex" in the WebSphere Application Server InfoCenter
	Implement additional application servers in the cell.	Using the Customization Dialog
	Plan to have multiple TCP/IP stacks, use connection optimization, use an IBM Network Dispatcher, or use bind-specific support.	"Multiple TCP/IP stacks", "Connection optimization", "IBM Network Dispatcher", and "Bind-specific support in WebSphere Application Server for z/OS" in the WebSphere Application Server InfoCenter
	Implement advanced security controls such as SSL and Kerberos.	"Implementing security considerations during installation" in the WebSphere Application Server InfoCenter
	Set up RACF protection for DB2, if desired.	"Setting up RACF protection for DB2" in the WebSphere Application Server InfoCenter
	Tune system performance.	"Tuning the z/OS operating system" in the WebSphere Application Server InfoCenter
	Access DB2 resources (if applicable)	Related InfoCenter articles
	Access IMS resources: 1. Use the IMS Connector for Java. 2. Use the IMS JDBC Connector.	Related InfoCenter articles

Check off	Item	For more information, see . . .
	Access CICS resources with the CICS Transaction Gateway ECI connector.	"CICS automation and recovery scenarios" in the WebSphere Application Server InfoCenter
	Plan for testing and production systems.	"Testing and production phases" in the WebSphere Application Server InfoCenter

6. Plan and implement release and maintenance upgrades.

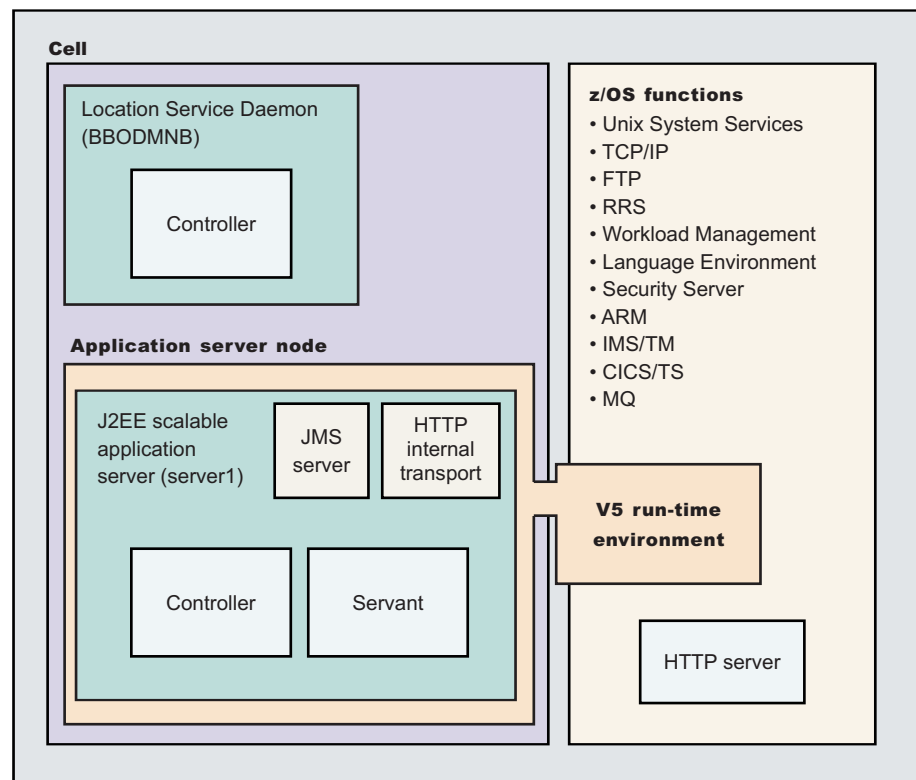
Check off	Item	For more information, see . . .
	Review code upgrade methods.	Installing new releases and maintenance levels of WebSphere Application Server for z/OS

You are done when you have checked all the applicable items.

WebSphere Application Server for z/OS base cell

A typical WebSphere Application Server for z/OS base run-time includes a cell with a location service daemon (BBODMNB) and one node which includes an Application Server (server1) with a controller and any number of servants.

z/OS system: WebSphere for z/OS base run-time configuration



The run-time servers use other z/OS functions, such as z/OS UNIX and TCP/IP. Part of installing WebSphere Application Server for z/OS includes configuring these functions for use by the run-time.

J2EE servers contain at least one Web container and one EJB container. The Web container manages Web applications (servlets and JavaServer Pages), while the EJB container manages enterprise beans.

The HTTP internal transport, which is part of the J2EE application server, is a functional component that acts as an HTTP protocol catcher for Web applications. The HTTP internal transport is depicted in the server1 J2EE Application Server.

The JMS server, which is also part of the J2EE application server, hosts the WebSphere Application Server for z/OS JMS function. The JMS server is depicted in the server1 J2EE application server.

WebSphere Application Server for z/OS network deployment cell

Once you have your WebSphere Application Server for z/OS base cell up and running, there are many reasons why you should continue on and configure a network deployment cell. The network deployment cell provides a more robust operating environment.

A network deployment cell has the unique ability to:

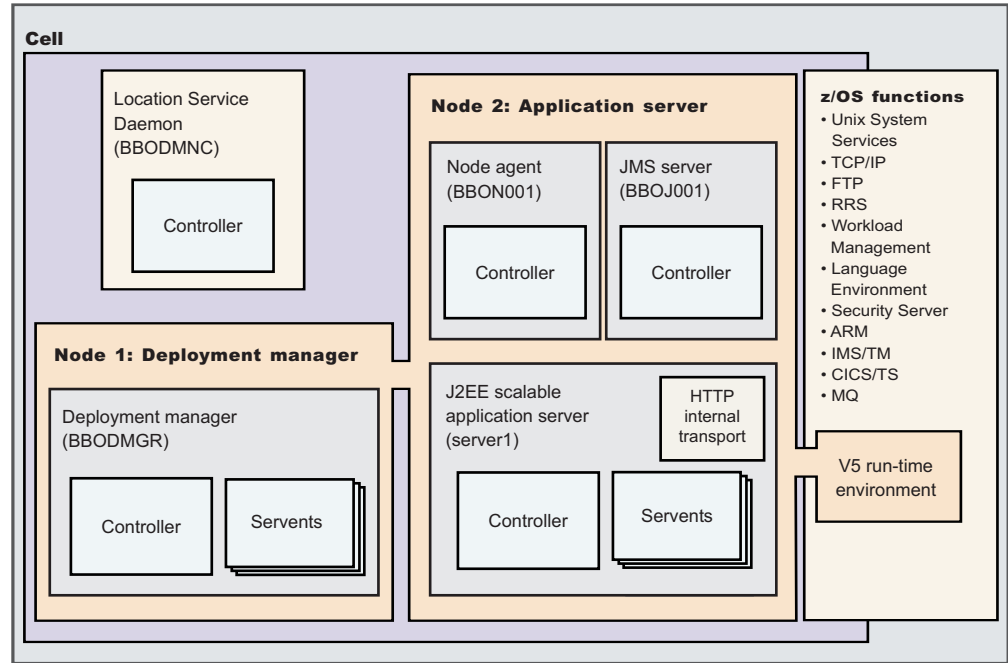
- Span multiple systems in a sysplex
- Fully utilize clustering
- Start and stop servers from the administrative console

Reference the following table for specifics on the differences between a WebSphere Application Server for z/OS base cell and a network deployment cell.

	Base cell	Network deployment cell
Configuration:	Set up each base server node through the ISPF Customization Dialog. Set up additional servers within the node also through the ISPF Customization Dialog.	Set up each deployment manager node through the ISPF Customization Dialog. Add base server nodes to the deployment manager cell through the ISPF Customization Dialog.
Address spaces:	Min: 3 (location service daemon, controller, servant)	Min: 6 (location service daemon, Application Server controller, application server servant, Deployment Manager controller, Deployment Manager servant, node agent)
	Max: Limited only by resources.	Max: Limited only by resources.
Administrative isolation:	Each base server node is a separate administrative domain.	All nodes in the cell are in the same administrative domain.
Operational isolation:	You may start and stop servers independently. Each server has an independent, unshared JNDI namespace.	You may start and stop servers independently. The JNDI namespace is shared among all servers in the cell.

	Base cell	Network deployment cell
Application servers allowed to have multiple servants?	Only if the Administration application is not present	Yes
Clustering available?	No	Yes

z/OS system: WebSphere for z/OS Network Deployment run-time configuration

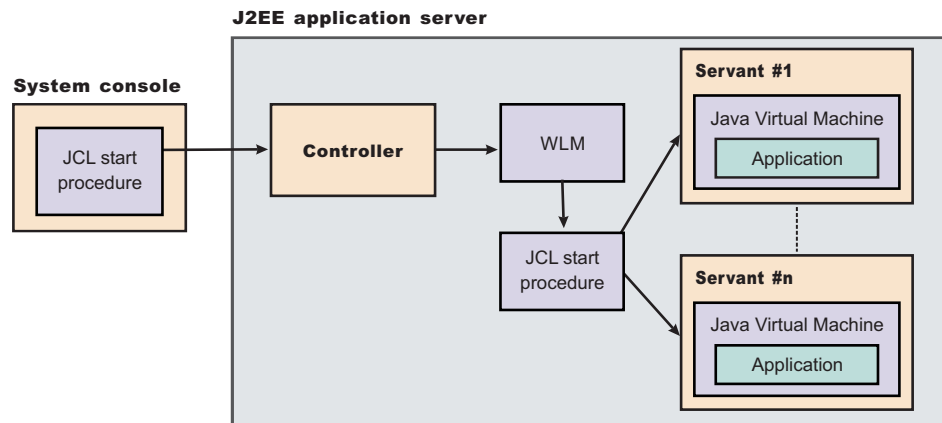


The picture above depicts a typical WebSphere Application Server for z/OS network deployment run-time includes a location service daemon (BBODMNC and two nodes (both housed in a cell, which can span systems)-one for the Deployment Manager and one for the application server. The Deployment Manager node includes a Deployment Manager (BBODMGR) with a controller and any number of servants. The Application Server node includes a node agent (BBON001), a JMS server (BBOJ001), and an application server (server1) with a controller and any number of servants.

WebSphere Application Server for z/OS terminology and system configuration breakdown

In WebSphere Application Server for z/OS, the functional component on which applications run is called a *server*. Servers comprise address spaces that actually

run code.



Within each server are two kinds of address spaces: controllers and servants. A *controller* runs system authorized programs and manages tasks, such as communication, for the server. Each server has one controller that you start with a JCL start procedure when you enter the appropriate start command on the MVS console.

A *servant* is the address space in which the JVM resides. It runs unauthorized programs such as business applications. Depending on the workload, a server has one or more servants running at a time. When work builds up, WLM dynamically starts additional servants to meet the demand.

Note: The location service daemon, node agent and JMS Server are specialized servers and have no servants.

Here is a quick breakdown of the different server types on your system:

Unmanaged (base) application server

The application server set up during base configuration that hosts your J2EE applications.

Managed (network deployment) application server

The application server set up during network deployment configuration that hosts your J2EE applications.

Location service daemon

A server which is the initial point of contact for client requests in either configuration.

JMS server

Hosts the WebSphere Application Server for z/OS JMS function, which controls the MQ broker and queue manager in either configuration.

Deployment Manager

A specialized application server that hosts the Administrative Console application (it hosts only administrative applications) and provides cell-level administrative function in a network deployment configuration. The Administrative Console application administers servers (grouped into nodes) on many different systems. The Deployment Manager is the sole occupant of its own node structure which doesn't need a node agent because there are no application servers in the node, and a cell may have only one Deployment Manager.

Note: The version of the Administrative Console application that runs in the Deployment Manager is designed to manage multi-node environments, whereas the version in the base application server is for single node environments only.

Node agent

Provides node-level administrative function in a network deployment configuration.

Note: Every element of the configuration (servers, clusters, nodes and cells) has both a long and short name:

- The "Server name" is the server long name used in the HFS path and the principal name by which the server is known to WebSphere Application Server for z/OS. It is used to identify the server through the Administrative Console and scripting. It is a mixed case name and greater than 8 characters in length.
- The "Server short name" is the platform-specific native alias and the principal name by which the server is known to z/OS. It is used to identify the server to underlying z/OS facilities, such as the Security Server, JES, WLM and ARM. For example, the server short name is used as the MVS JOBNAME.
- The "Cluster short name" is used as the WLM application environment name.

A *cluster* is a *logical grouping* of like-configured servers. Clusters exist to promote scalability and availability; workload balancing occurs across the servers in a cluster. Clusters allow you to partition workloads into separate servers while still referring to them as a single unit. Clustering is typically applied to a multi-node cell, where each node is configured on a separate system and the cluster has a member (server) on each node. Client requests are distributed among the cluster members based on workload manager decisions.

A node contains servers which may be part of a cluster. The cluster may span nodes as long as all involved nodes are in the same cell.

Here is a quick breakdown of clusters, nodes and cells:

cluster

A logical collection of like-configured servers. A cluster can span nodes and systems within the same cell.

node

A logical collection of managed servers on a particular system in the cell. A node can contain servers that are part of clusters that span other nodes, but the node itself is confined to a single system and a single cell. You may configure multiple nodes on the same system--either in the same cell or in different cells. Nodes exist mainly for the purposes of administration, and each application server node managed by a Deployment Manager must have a node agent.

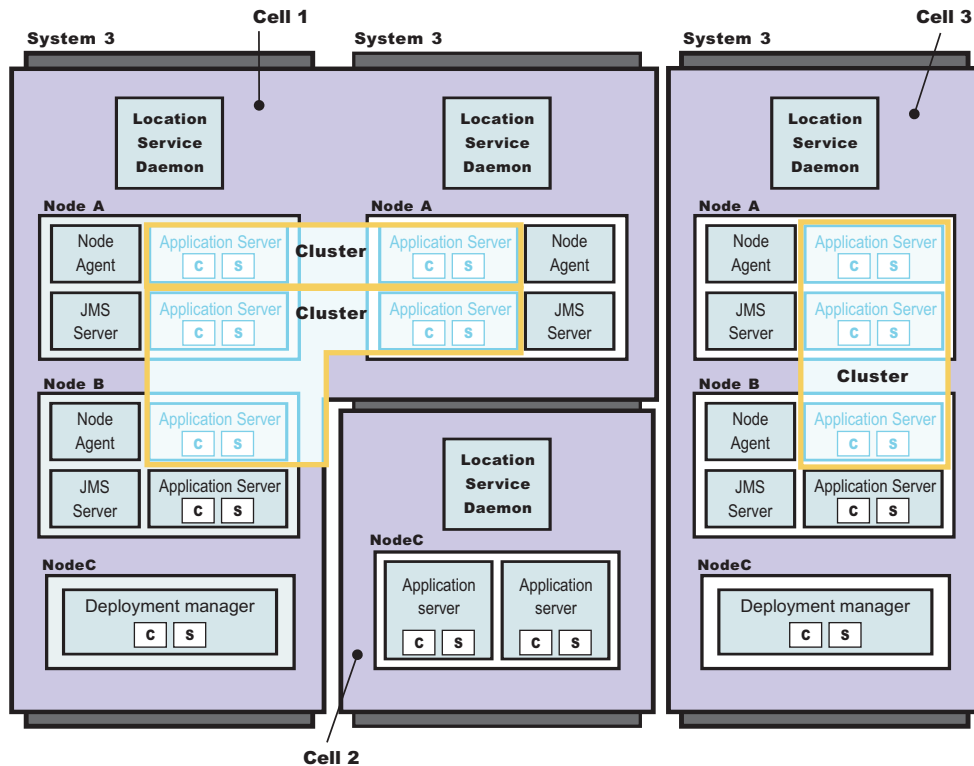
cell

A logical collection of nodes and the boundary of the administrative domain. The nodes that comprise a cell must be configured on systems in the same sysplex. You may configure multiple cells in the same sysplex. Different cells may have nodes on the same systems, though a given node can be a member of only one cell. The cell is the largest unit of organization.

To help you understand the interaction between servers, clusters, nodes and cells, here is a diagram depicting various configurations you can set up in your network

deployment sysplex:

WebSphere for z/OS: Possible configurations in a sysplex



Cells 1 and 3 in the illustration depict Network Deployment configuration cells. Cell 2 is a base configuration cell.

The WebSphere Application Server for z/OS HTTP internal transport

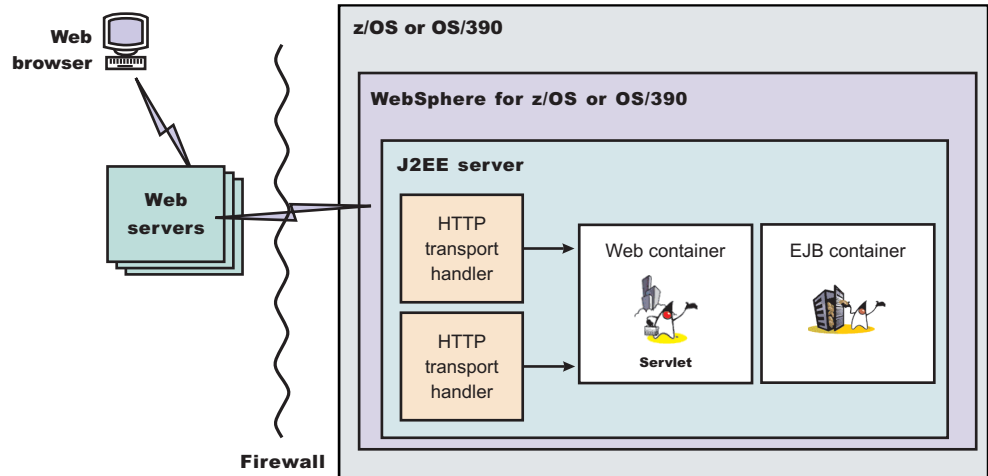
Web components, which are known as Web applications, may consist of any combination of the following parts:

- One or more Java servlets
- Any other Java classes that act as utility classes in support of the servlets
- Static files such as HTML pages and GIF or JPEG images
- JavaServer Pages (JSPs) that format dynamic output

To enable Web applications for use, your Web-serving environment requires an HTTP transport (to receive HTTP requests from a network of browsers using the HTTP access protocol) and an execution environment (to interpret the inbound request and run the appropriate servlet, based on the contents of the inbound request). The WebSphere Application Server for z/OS J2EE server includes a choice of two HTTP transports and execution environments:

1. The HTTP internal transport and/or HTTPS internal transport in combination with the Web container in the J2EE server, or
2. The IBM HTTP server for z/OS in combination with the WebSphere HTTP Plug-in for z/OS shipped with the WebSphere Application Server for z/OS product, and/or Web container in the J2EE server.

Recommendation: Because the application server is not designed to directly host static content (for example, HTML pages), the recommended configuration places a Web server with a plug-in in front of the application server.



Web applications running in the Web container have direct access to resources on z/OS or OS/390, or can access them through Enterprise beans running in any WebSphere Application Server for z/OS J2EE server. Web applications use the RMI/IIOP protocol to access Enterprise beans running in J2EE servers on the same or different z/OS or OS/390 images.

For more information about deploying Web applications, see the assembling applications information in the z/OS view of the WebSphere Application Server InfoCenter, which you can access via the WebSphere Application Server for z/OS library Web site.

Preparing the base z/OS environment

You must ensure you have an adequate skill level to support the base z/OS environment.

Some z/OS function customization steps you need to do for WebSphere for z/OS can be done before you install and customize WebSphere Application Server for z/OS itself. We have put those tasks into this chapter, allowing you to segment your work.

1. Determine your WebSphere Application Server for z/OS system requirements.
2. Update your TCP/IP network, as needed.
3. Ensure you understand and set up the relevant security considerations.
4. Set up workload management (WLM).

Once you complete these steps, you need only to verify completeness:

- With the *WebSphere Application Server V5: Program Directory* that all prerequisites have been met. Also verify with the PSP bucket to ensure the latest adjustments have been met.
- With your z/OS system programmers, DB2 (or other DB administrators), and other technical staff to ensure your environment is ready

Determining your skill needs

In assembling your project team, you should consider the skills you need to implement WebSphere Application Server for z/OS. We have put together the recommended skillset necessary to support the following configurations:

- Basic configurations
- Advanced configurations
- Production environments

Documentation to support the z/OS skills described in this article can be found at this Web site: [z/OS Internet Library](#)

Note: Along with the skills listed below and depending on the needs of the applications you deploy, you may also need skills to configure the resource managers your applications require. Such skills are CICS, DB2 (if applicable), IMS, and MQ.

For basic configurations:

Below are the recommended skills necessary to support a basic configuration:

- z/OS UNIX System Services and the hierarchical file system (HFS) - to set up a functional HFS and UNIX environment
- eNetwork Communications Server (TCP/IP) or equivalent - to configure connectivity for WebSphere Application Server for z/OS clients and servers
- Resource recovery services (RRS) - to implement resource recovery services and support two-phase commit transactions
- Security Server (RACF), or the security product you use - to authenticate WebSphere Application Server for z/OS clients and servers, and authorize access to resources
- Workload management (WLM)
- SMP/E and JCL
- System logger - to set up logstreams for RRS and the WebSphere Application Server for z/OS error log
- Java

For advanced configurations:

When dealing with advanced configurations, you need all the same skills as for basic configurations, plus the following:

- Parallel sysplex - to implement multi-system configurations
- CICS
- IMS
- MQ

For production environments:

As you move your system toward a production environment, you need to have the following system skills available:

- Automatic restart management (ARM)
- System Automation, if you have it installed, or whichever automation you prefer to use
- Sysplex, if you plan to use WebSphere Application Server for z/OS in a cell that spans systems
- Secure Sockets Layer (SSL) or Kerberos, if you plan to have security in a distributed network
- Advanced environment SSL if you enable security

- RMF or other performance measurement systems
- Webserver, if you plan to support HTTP clients

Determining WebSphere Application Server for z/OS system requirements

The following sections describe system requirements for WebSphere Application Server for z/OS.

Hardware requirements

The hardware requirements for this product are any hardware that supports OS/390 Version 2 Release 10 or any version of z/OS. However, there are significant performance advantages for those applications doing floating point arithmetic if the machine has binary floating point hardware, such as S/390 Parallel Enterprise Server-Generation 5 and later systems.

The LPAR in which the WebSphere Application Server for z/OS run-time and initial application servers run requires a minimum of 512 MB of real storage. You may need to increase the real storage size depending on the size and number of application servers you deploy. In addition, you may want to increase your JES spool space if you use WebSphere Application Server for z/OS tracing options to the SYSPRINT DD dataset.

You should plan on an extra 3390-3 volume for the distribution and configuration HFS datasets, two additional 3390-3 volumes for the WebSphere product code, and two further 3390-3 volumes if you will use the Integrated JMS Provider.

Recommendation: We recommend you increase your paging subsystem by one 3390-3 volume if your storage is constrained.

Software requirements

You must install, enable, and configure the following z/OS or OS/390 elements, features, and components. Consult the Program Directory and PSP bucket for the required corrective service.

All of the z/OS sources referenced are available at this Web site:

<http://www.ibm.com/servers/eserver/zseries/zos/bkserv/>

- OS/390 Version 2 Release 10 or z/OS configured as a sysplex (at minimum, you need a monoplex). For details, see *z/OS MVS Setting Up a Sysplex*.

If you want to utilize the dynamic application environment functionality of WebSphere application server for z/OS V5, you must run at least z/OS Version 1.2.

- z/OS UNIX System Services (z/OS UNIX) with a hierarchical file system (HFS). For details, see *z/OS UNIX System Services Planning*.

Note: When setting up the UNIX Systems Services environment, ensure you specify enough threads, files, and processes in your BPXPRMxx member of parmlib. Here is a sample of recommended values:

```
MAXTHREADS:10000
MAXTHREADTASKS:5000
MAXFILEPROC:10000
MAXSOCKETS in the AF_INET domain:12000
```

- WebSphere Application Server for z/OS V5 makes additional use of the /tmp directory and the filesystem that supports it. You may need to increase the size

of the filesystem before you attempt to configure WebSphere Application Server for z/OS. One of the symptoms of an undersized /tmp filesystem is failure to copy the .ear file for the Administrative Console application in the BBOWIAPP job.

Determine the size of the filesystem by entering the ISHELL command at the root "/" level in ISPF and using the line command U on the line for /tmp. This will display a box with information on the filesystem. Multiply the "Block Size" field by the "Total Blocks" field to see the total space in the file system in bytes. Multiply the "Block Size" field by the "Available Blocks" field to see the available space in bytes.

Note: The Administrative Console application .ear file is over 10 Megabytes, so if there isn't at least that much available space, action must be taken to increase the amount of space.

To increase the size of your /tmp directory filesystem, perform one of the following, depending on your filesystem type:

- If the filesystem is an HFS (which is non-temporary), then you must unmount the filesystem, delete it, reallocate it with a larger amount of space, and then remount it.
- If the filesystem is a TFS (a temporary filesystem which is essentially a memory-resident filesystem), the filesystem must be unmounted and then remounted with more space. See *UNIX Systems Services Planning manual*, GA22-7800, for more information on TFS specification.

Example: Here is an example mount command:

```
MOUNT FILESYSTEM('/TMP') TYPE(TFS) MOUNTPOINT('/tmp') PARM('-s 20')
```

where 20 represents the desired amount of space in megabytes. If you do not specify a space value, the undesirable small default value of 1 megabyte will be assumed.

- eNetwork Communications Server (TCP/IP) or equivalent. In this manual, we refer to eNetwork Communications Server, but you may substitute an equivalent product. For details, see *z/OS Communications Server: IP Migration*.
- Workload management (WLM) set up in goal mode. For details, see *z/OS MVS Planning: Workload Management*.

If you are not running z/OS V1.2 or above with the WLM-DAE support PTF (APAR OW54622), you must complete some additional steps for WLM.

- Resource recovery services (RRS). For details, see *z/OS MVS Programming: Resource Recovery*.
- A security product such as SecureWay Security Server (RACF). In this manual we refer to Security Server in examples, but you may substitute an equivalent security product. For details, see *z/OS Security Server RACF Migration*.
- IBM Developer Kit for OS/390 Java 2 Technology Edition Version 1.1, an element of WebSphere Application Server for z/OS, but also available separately. The SDK level supported by this product is 1.3.1.

Later releases of the IBM Developer Kit for OS/390 Java 2 Technology Edition are not supported.

Regarding optional functions, consult the following table:

Table 1. Software requirements for optional functions

If you plan to use . . .	Then you need . . .	Notes . . .
Kerberos security	OS/390 SecureWay Security Server Network Authentication and Privacy Service for OS/390	For OS/390 V2R10 and z/OS, this support is part of SecureWay Security Server.
Cryptography	Cryptographic Services System SSL, a component of Cryptographic Services Base, an element of z/OS.	For details, see <i>z/OS System Secure Sockets Layer Programming</i> .
EJB roles to secure Web components or enterprise beans	z/OS V1R2 Security Server (RACF) or equivalent	For releases of z/OS earlier than z/OS V1R2, install the appropriate APAR for this support.
Java Message Service (JMS)	<ul style="list-style-type: none"> • Integrated JMS provider • Either of the following: <ul style="list-style-type: none"> – MQ stack from WebSphere Application Server for z/OS V5 – Full function MQ using MQ 5.3.1 	MQSI, a pub sub product that supports z/OS, does not support new function like MDBs.
WebSphere Application Server for z/OS IMS Connect V8 support	IMS/TM 6.1.0	
WebSphere Application Server for z/OS CICS Transaction Gateway 5.0.1 support	CICS/TS 1.3	
DB2	DB2 V7.1	DB2 is no longer a prerequisite for WebSphere for z/OS, though some functions may still require it. Check your individual configuration.
DB2 SQLJ in J2EE application components	DB2 V7.1 PTF UQ59527	DB2 is no longer a prerequisite for WebSphere for z/OS, though some functions may still require it. Check your individual configuration.
Logging	z/OS system logger	For details, see <i>z/OS MVS Setting Up a Sysplex</i> .
Connectors	<p>WebSphere Application Server for z/OS V5 supports any resource adapter that is designed to use the 1.0 level of the J2EE Connector Architecture (JCA). Install the listed IBM connectors if you want to access your IMS or CICS legacy data.</p> <p>For the CICS Transaction Gateway ECI connector:</p> <ul style="list-style-type: none"> • CICS Transaction Gateway V5.0.1 • CICS Transaction Server V1.3 • WebSphere Studio Application Developer IE V5.0 	

Table 1. Software requirements for optional functions (continued)

If you plan to use . . .	Then you need . . .	Notes . . .
	For the IMS Connector for Java: <ul style="list-style-type: none"> • IMS Connect for z/OS V2.1 • IMS V8 • WebSphere Studio Application Developer IE V5.0.1 	
	For the IMS JDBC Connector: <ul style="list-style-type: none"> • IMS V8 	

Updating your TCP/IP network

WebSphere Application Server for z/OS follows the CORBA standard, Internet Inter-ORB Protocol (IIOP), for communications. Accordingly, you must consider changes to your TCP/IP network and modify the TCP/IP configuration.

This section provides background information about changes you will need to make to your Domain Name Server (DNS) and TCP/IP. The actual steps to perform are in the customized instructions of the Customization Dialog.

Tips on TCP/IP and WebSphere Application Server for z/OS

Consider the following for your TCP/IP network on z/OS.

- You can get started with a simple Domain Name Service (DNS) name server and a single z/OS image, but you should design your initial configuration with growth in mind. You may, for instance, intend to expand your business applications beyond the monoplex to a full sysplex configuration for performance reasons or to prevent a single point of failure. Several considerations come to bear here.

Several DNS implementations and network router implementations allow the use of a generic location service daemon IP name while dynamically routing network traffic to like-configured servers. If you intend to expand your system beyond a monoplex, it might be worthwhile to use one of these implementations from the start. Non-round-robin DNS name servers limit your ability to expand without retrofitting a name server that allows dynamic network traffic routing.

Recommendation: The IBM-recommended implementation if you are running in a sysplex is to set up your TCP/IP network with Sysplex Distributor. This makes use of dynamic virtual IP addresses (DVIPAs), which increase availability and aid in workload balancing.

Beyond Sysplex Distributor, you have your choice of the following DNS and router implementations on or off z/OS:

- Non-round-robin DNS name servers.
- Round robin DNS name servers.
- Network routers, such as the IBM Network Dispatcher.
- Select the location service daemon IP name. For your base application server, choose the host name of the server under which you are running. For your deployment manager, choose a generic IP name that can resolve to any or all of the systems where location service daemons run.

You must define the location service daemon host IP name during installation and customization. Use the location service daemon IP name you chose.

Note: The Administrative Console has a location service daemon configuration page on which you set location service daemon variables.

- Select the port for the location service daemon server. If you change the location service daemon port number, you can access existing objects after you recycle all your servers. You cannot, however, access the following:
 - Any object handles your application stored to disk
 - Any object references your application stored in the persistent contexts of the name space.

If you install WebSphere Application Server for z/OS V5 on a system that already contains WebSphere Application Server V4.0.1 for z/OS and OS/390, double-check your current location service daemon port value (default for WebSphere Application Server V4.0.1 for z/OS and OS/390 is 5555).

- Set location service daemon port numbers and IP addresses. These are initially set in the Customization Dialog, but you can subsequently change them in the Administrative Console. Access the location service daemon configuration page through the Administrative Console navigation bar (on the left side of screen) under System Administration. If you need to use the Internet Inter-ORB Protocol (IIOP) through a firewall, ensure that your firewall supports IIOP.

When recovering a server somewhere other than its configured system, ensure that the same port is not already in use on the system on which it is recovering. If it is, configure the server with a unique port to avoid a conflict.

If comparing WebSphere Application Server for z/OS V5 and WebSphere Application Server V5 for other platforms, realize that only WebSphere Application Server for z/OS V5 has an ORB SSL port.

HTTP and HTTPS ports are found in individual servers under the Web container transports, which are in the Administrative Console as 'additional properties' on the Web container configuration page (which is off the server configuration page).

Watch for HTTP transport port conflicts if you previously installed WebSphere Application Server V4.0.1 for z/OS and OS/390.

Ensure you set up the following port assignments (along with those in the z/OS port assignments chart) on servers that require them in the Administrative Console:

- ORB port
- ORB SSL port
- Web container transport port
- Web container transport SSL port

See the administrative console and the InfoCenter for more information on the WebSphere variables and how to set their values.

You define ports differently depending on whether they are for the first server or subsequent servers. The first server you create is defined, along with its ports, through the Customization Dialog. You have the ability to explicitly specify the ports as you define the server. Subsequent servers and their ports are defined through the Administrative Console. This means that you define the server first and the ports are automatically assigned. Then, once defined, you can inspect and change the port definitions through the Administrative Console.

- Some ports, such as the ORB SSL port and the server startup status port, are obtained dynamically.
- Other TCP/IP-related activities include setting up NFS, WebServer and Kerberos, which are all optional.
- If you use the DNS on z/OS, you may wish to change the refresh timer interval (-t value) associated with the named location service daemon. The -t value specifies the time (nn, in seconds) between refreshes of cell names and addresses and of the weights associated with those names and addresses. The default is

sixty seconds. Reducing the -t value will shorten the lapse time required to register the location service daemon IP name with the DNS, but will also increase DNS processing overhead. In our testing, we used an interval of 10 seconds.

If you use the z/OS DNS, you have to set a location service daemon variable. Do this by setting WebSphere Variable at cell level:

```
daemon_wlmable=1
```

Note: You can perform this for only one cell in a sysplex at a time.

For details, see *z/OS Communications Server: IP Configuration Reference*.

Setting up workload management (WLM)

WebSphere Application Server for z/OS uses the workload management (WLM) function in z/OS to manage workloads. This section helps you get started and is sufficient to get a functioning WebSphere Application Server for z/OS system.

WebSphere Application Server for z/OS requires that z/OS run workload management in goal mode. If your system runs in compatibility mode, you must implement goal mode. For details on workload management, see *z/OS MVS Planning: Workload Management*, which is available on the z/OS Internet Library Web site.

In addition to setting up workload management in goal mode, you need to define workload management policies for WebSphere Application Server for z/OS servers and your business application servers. This section discusses specifics for the run-time servers. For details on workload management and business applications, see the assembling applications information in the z/OS view of the WebSphere Application Server InfoCenter, which you can access via the WebSphere Application Server for z/OS library Web site.

To get started, you do not need to define special classification rules and work qualifiers, but you might want to do this for your production system.

Note: After you apply service level W500104 (PTF UQ79825), you might want to set up a rule to combat performance problems related to post-install. See *Workload management (WLM) tuning tips for z/OS* for more information.

Each J2EE application server must have a WLM application environment so it can start servant regions. The application environment name is specified as the "cluster transition name" in the Customization Dialog.

WebSphere for z/OS servers (with the exception of the location service daemon and node agent) have a controller and one or more servants. The regions are started by the respective start procedures.

Tip: If you are running z/OS V1.2 or above with the WLM-DAE support PTF (APAR OW54622), you do not need to continue.

You have to start the controllers for the WebSphere Application Server for z/OS servers yourself. This in turn starts the location service daemon. Workload manager dynamically starts the servants as work requests arrive. Thus, you must

create WLM application environments that name servant start procedures to start. For example, specify BBO5ASR as the start procedure name that workload management starts for the server.

Each new server that you create for a business application also must be defined to workload management. For more information, see the assembling applications information in the z/OS view of the WebSphere Application Server InfoCenter, which you can access via the WebSphere Application Server for z/OS library Web site.

Use the ISPF application IWMARIN0 to define WLM application environments.

Tip: If you are running z/OS V1.2 or above with the WLM-DAE support PTF (APAR OW54622), you can skip this step.

During the customization process, you will be instructed to create a WLM application environment. This section shows how to use the WLM ISPF Dialog to accomplish this.

You must have access to the IWMARIN0 application and be able to update the workload management policies to complete this process.

Use the ISPF application IWMARIN0 to define WLM application environments according to Default server values for WebSphere Application Server for z/OS V5.

Using IWMARIN0 (example of steps for defining an application environment)

Workload management must be running in goal mode, and you must have access to a WLM definition, either saved in a WLM definition data set, or active in the WLM couple data set. The user of IWMARIN0 must have update access to the RACF FACILITY class profile MVSADMIN.WLM.POLICY. Perform the following steps to create the BBOC001 application environment.

1. Open the main panel by issuing IWMARIN0. Either load a WLM goal mode definition from a WLM definition dataset, or extract a working goal mode definition from the WLM couple dataset. Then choose option 9:

```
File Utilities Notes Options Help -----
Functionality LEVEL003      Definition Menu          WLM Appl LEVEL004
Command ==> _____
Definition data set . . : CB.MYCB.WLM
Definition name . . . . .CB390 (Required)
Description . . . . . WLMSetup for WebSphere Application Server for z/OS
Select one of the following options. . . . . 9__ 1. Policies
                                                2. Workloads
                                                3. Resource Groups
                                                4. Service Classes
                                                5. Classification Groups
                                                6. Classification Rules
                                                7. Report Classes
                                                8. Service Coefficients/Options
                                                9. Application Environments
                                                10. Scheduling Environments
```

2. Fill in the field on the next panel as shown:

```
Application-Environment Notes Options Help -----
Create an Application Environment
Command ==> _____
Application Environment . . . BBOC001_____
Required Description . . . . .WebSphere Application Server for z/OS IVT server__
Subsystem Type . . . . .CB__
Required Procedure Name . . . . .BBO5ASR
```

```
Start Parameters . . . . .JOBNAME=&IWMSSNM.S,ENV=CELL1.&SYSNAME..
                                &IWMSSNM_____
```

Limit on starting server address spaces for a subsystem instance:

- 2 1. No limit
2. Single address space per system
3. Single address space per sysplex

```
-----|
| Selection List empty. Define an application environment. (IWMAM600) |
|-----|
```

When filling out the previous panel, follow these guidelines:

- The Application Environment name is either the ClusterTransitionName (if the server is not clustered) or the cluster short name (if the server is clustered).
 - The recommended JOBNAME value is &IWMSSNM.S. So, for example, if the server short name is BBOS001, then set JOBNAME=BBOS001S.
 - ENV=... must be of form *cell_short_name.node_short_name.server_short_name*
 - In a base server, the location service daemon default is that both *cell_short_name* and *node_short_name* are the same as *system_name*.
 - In a network deployment server, the location service daemon default is that both *cell_short_name* and *node_short_name* are the same as *sysplex_name*. As you add base server nodes to the deployment manager server's cell, you have to update the ENV= parameter of each in the WLM application environment definition. The reason for this change is because a base server node assumes the cell name of the deployment manager server once the base server node is added to the deployment manager server's cell.
 - Change CELL1 to your *cell_short_name* and &SYSNAME to your *node_short_name* as needed. Otherwise, the defaults will be assumed.
 - The value of the &IWMSSNM variable (defined by WLM) is the server short name.
3. Save the application environment. The following panel appears:

```
Application-Environment Notes Options Help
-----
          Application Environment Selection List Row 1 to 12 of 12
Command ==> _____
Action Codes: 1=Create, 2=Copy, 3=Modify, 4=Browse, 5=Print, 6=Delete,
              /=Menu Bar
Action  Application Environment  Name          Description
-----  -
_      BBOC001                    WebSphere Application Server for z/OS IVT server
***** Bottom of data *****
```

4. From the Utilities menu, select Install definition.
5. From the Utilities menu, select Activate service policy.
6. From the File menu, select exit.

You are done when BBOC001 has an application environment.

Recommendations for resource recovery services

WebSphere Application Server for z/OS requires the use of the RRS Attach Facility (RRSAF) of DB2, which in turn requires that resource recovery services (RRS) be set up. If you do not have RRS set up, the Customization Dialog helps you do this. See Using the Customization Dialog.

When setting up RRS, consider the following:

1. You may have already configured RRS for z/OS to exploit WLM-managed DB2 Stored Procedures address spaces. However, if DB2 is the only RRS-compliant resource manager participating in transactional commits, optimizations will cause the system to bypass RRS usage of the system logger. This means that, while your installation may have configured RRS, your log streams might have just minimal activity. WebSphere Application Server for z/OS is an RRS-compliant resource manager and will participate in transactional commits with DB2. Thus, WebSphere for z/OS will require RRS to start writing data to its system logger log streams. You might need to adjust the size of your log streams.
 - WebSphere Application Server for z/OS has no significant impact on the RM.DATA log.
 - Depending on the transaction policies of both the client and container, you may not see any activity in the MAIN.UR log. This lack of activity is not a problem.
 - Depending on the transactional policy defined for your containers, you may see much more activity in your DELAYED.UR log stream than in the MAIN.UR log stream.

All RRS transaction logging for WebSphere Application Server for z/OS will occur solely in the DELAYED.UR log stream. Such logging may change in future releases of WebSphere Application Server for z/OS, so you may still want to configure your MAIN.UR log stream so that it can handle a production workload, in case you deploy a new container or the WebSphere Application Server for z/OS infrastructure changes.

 - WebSphere Application Server for z/OS has no significant impact on the RESTART log.
 - There is no reason to change your policy about the ARCHIVE log. Though optional, we suggest you use the ARCHIVE log. It has a small negative effect on performance. Set the retention period for the log as you would normally.
2. The Object Transaction Service in WebSphere Application Server for z/OS cannot detect when it has been restarted in a different logging group, which affects transaction recovery. We recommend you use automatic restart management (ARM) to control restart locations.
3. For structure sizes, we recommend the following for initial setup values. Through experience, you may need to adjust these:

Table 2. Recommended size of log streams

Log stream	Initial size	Size
RM.DATA	1 MB	1 MB
MAIN.UR	5 MB	50 MB
DELAYED.UR	5 MB	50 MB
RESTART	1 MB	5 MB
ARCHIVE	5 MB	50 MB

Check the MAXBUFSIZE on your log streams. If the size is too small, you may encounter DB2 failures.

Details about resource recovery are in *z/OS MVS Programming: Resource Recovery*. Details about the RRS Attach Facility are in *DB2 for OS/390 Application Programming and SQL Guide*.

Guidelines for Java Database Connectivity

Java Database Connectivity (JDBC) provides an interface for Java application programs to access relational data in a database by using dynamic SQL. DB2 supports this application programming interface. For complete information about JDBC and DB2, see *DB2 for OS/390 Application Programming Guide and Reference for Java*. This topic covers guidelines related to WebSphere for z/OS's use of JDBC.

- You may use JDBC (dynamic SQL) in your server applications.
- Record the location of the run-time properties file, `db2sqljjdbc.properties`. You will use the location during the WebSphere Application Server for z/OS customization process. If you customize this file, you may want to keep the customized version in a separate directory such as `/etc` and record its location.
- All J2EE servers and the node must be granted EXECUTE authority on the DSNJDBC plan. If your installation allows public access to the DSNJDBC plan, all you need to do is issue:

```
GRANT EXECUTE ON PLAN DSNJDBC TO PUBLIC
```

If your installation does not allow public access to the DSNJDBC plan, then you must grant EXECUTE authority to all J2EE servers and the node. If you use DB2 secondary authorization IDs, then you can grant the authority to the groups to which the server IDs belong.

- You must use the RRSF attachment interface (not CAF).

For more information about setting up JDBC and the implications for application programs, see *DB2 for OS/390 Application Programming Guide and Reference for Java*.

Guidelines for DB2 settings for WebSphere concurrency control management

If your installation uses typical DB2 defaults for U-lock management and lock size, certain WebSphere applications that use container-managed Enterprise beans (CMP beans) may encounter deadlocks. The likelihood of encountering deadlocks is entirely dependent on the design and execution pattern of the application. The potential for deadlocks increases with the number and frequency of applications driving concurrent transactions that update the same areas of the DB2 database. If, given your installation's application workload, the potential for deadlocks is high, consider using the following DB2 settings:

- RRULOCK(YES)
- LOCKSIZE(ROW)

For additional details, see the information about settings for the internal resource lock manager (IRLM) in *DB2 Installation Guide*.

Alternative: Your applications may qualify for the optimistic approach to concurrency control management. To determine whether your applications can use optimistic concurrency control, see the topic about controlling concurrent access to persistent data in the assembling applications information in the z/OS view of the WebSphere Application Server InfoCenter, which you can access via the WebSphere Application Server for z/OS library Web site.

Recommendations for using memory

WebSphere Application Server for z/OS differs from previous application servers in its use of memory. WebSphere Application Server for z/OS's implementation takes advantage of z/OS's efficient memory management, but, like many of today's newer application servers and languages, it is a large consumer of memory.

You may experience some changes from your existing memory usage patterns. This section outlines changes you might need to make. Follow these recommendations:

- For real storage requirements, see related concepts in the InfoCenter..
- In your production cell, we recommend you dynamically load certain WebSphere product load modules into the link pack area (LPA) because the size of the load modules is large, and many address spaces need to refer to those load modules. The load modules for the run-time comprise about 40 MB in size.

Note: WebSphere Application Server for z/OS V5 allows for multiple cells to run on the same system at the same time. Since only one level of WebSphere for z/OS code can reside in LPA, any WebSphere Application Server for z/OS address spaces using a different WebSphere Application Server for z/OS code level must load the code (SBBOLPA, SBBLOAD and SBBOLD2) from STEPLIB. This is set in the WebSphere Application Server for z/OS Customization Dialog. However, the BBORTSS5 module must always run from LPA or the link list. This module is specific to WebSphere Application Server for z/OS V5.

Because you are using dynamic LPA, you may run out of ECSA after an IPL if you do not increase CSA at IPL time. Add 40 MB to ECSA in support of WebSphere Application Server for z/OS. You should monitor ECSA after dynamically loading the run-time into LPA. Remember to increase the size of your CSA page data set accordingly.

Note: Do not dynamically load the run-time in the LPA in your development cell. Load the DLLs out of private memory instead of using ECSA.

- If you choose to place the load modules in steplib or in the link list, you must allow for the additional 40 MB as part of each address space's region. A typical WebSphere Application Server for z/OS base configuration runs 3 address spaces, and a typical WebSphere Application Server for z/OS network deployment configuration runs 8 address spaces. Each of these reference most of the 40 MB of load modules.
- In addition to placing the load modules in the link pack area, give each address space a region size of at least 512 MB.
- Check to see whether your installation limits region sizes through the IEFUSI exit, JES exits, or TSO segment defaults. All of the WebSphere for z/OS JCL procedures are shipped with a default REGION=0M, which means you should give them as large a region as possible. If you choose to run from the link pack area, you will need a minimum of 128 MB for the dynamic area. If you choose to run from the link list you will need a minimum of 168 MB (40 MB for load modules and 128 MB for the dynamic area).

If your IEFUSI exit routine limits the maximum region to a size smaller than what you need (128 MB minimum when you run from the link pack area or 168 MB minimum when you run from the link list), you will get an abend. To fix the problem, either change the IEFUSI exit routine to allow a larger default region, or change the JCL REGION= parameter to the size needed.

Your installation may limit (control) the specification of REGION=, usually through the JES2 EXIT06 exit or the JES3 IATUX03 exit. If so, relax this restriction for the WebSphere for z/OS JCL procedures.

Finally, check your TSO segment default region size and make sure it is at least 128 MB.

Planning for problem diagnosis

This section describes:

- WebSphere Application Server for z/OS's use of Component Trace

- The WebSphere Application Server for z/OS error log stream
- Dump data sets

Overview of problem diagnosis

WebSphere Application Server for z/OS uses component trace (CTRACE) to capture and display trace data in trace data sets. WebSphere Application Server for z/OS identifies itself to CTRACE with a dynamic component name determined by the short cell name. CTRACE allows you to:

- Merge multiple traces through the browse tool, including other components such as TCP/IP and z/OS UNIX.
- Write trace data to a data set rather than sysprint, keeping spool space free.
- Better manage system resources by allowing trace data to wrap or not wrap.
- Use CTRACE to funnel trace data from multiple address spaces to one data set, or have CTRACE send the trace data from each address space to separate data sets.
- Start and stop tracing without stopping and restarting WebSphere Application Server for z/OS address spaces.
- Use one or more data sets for capturing trace data, thus allowing you to manage I/O more effectively.

WebSphere Application Server for z/OS also has an error log stream that records error information when WebSphere Application Server for z/OS detects an unexpected condition or failure within its own code, such as:

- Assertion failures
- Unrecoverable error conditions
- Vital resource failures, such as memory
- Operating system exceptions
- Programming defects in WebSphere Application Server for z/OS code

Use the error log stream in conjunction with other facilities available to capture error or status information, such as an activity log, trace data, system logrec, and job log.

The WebSphere Application Server for z/OS error log stream is a system logger application. Because the error log stream uses the system logger, you can:

- Have error information written to a coupling facility log stream, which provides sysplex-wide error logging, or to a DASD-only log stream, which provides single system-only error logging.

Note: There is a significant performance penalty when using DASD-only error logging.

- Set up either a common log stream for all of WebSphere Application Server for z/OS or individual log streams servers. Local z/OS or OS/390 client ORBs can also log data in log streams. Because the system logger APIs are unauthorized, any application can use them. You should control access to the log streams through a security product such as RACF.

WebSphere Application Server for z/OS provides a REXX EXEC (BBORBLOG) that allows you to browse the error log stream. By default, the EXEC formats the error records to fit a 3270 display.

This manual describes the error log stream and how to set it up. Information about using the error log stream to diagnose problems is in the Troubleshooting section of the WebSphere Application Server InfoCenter. General information and guidance about the system logger is in *z/OS MVS Setting Up a Sysplex*.

Table 3. Finding WebSphere Application Server for z/OS Error Log Stream Information

What is your goal?	You should read:
Learn about the system logger and understand its requirements	<i>z/OS MVS Setting Up a Sysplex</i>
Learn about the WebSphere Application Server for z/OS error log stream	This section
Size the coupling facility structure space needed for the WebSphere Application Server for z/OS error log stream	<i>z/OS MVS Setting Up a Sysplex</i>
Define the WebSphere Application Server for z/OS error log stream	Using the Customization Dialog
View the WebSphere Application Server for z/OS error log stream	The Troubleshooting section of the WebSphere Application Server InfoCenter
Learn about how Java applications can log messages and trace data in the error log stream	The Applications section of the WebSphere Application Server InfoCenter

For details about problem diagnosis, see the Troubleshooting section of the WebSphere Application Server InfoCenter.

Planning for Component Trace

To use CTRACE, you:

- Specify trace options for identifying trace data sets and connecting WebSphere for z/OS address spaces to the data sets in parmlib members.
- Update WebSphere Application Server for z/OS WebSphere variables to allow for initial trace parameters.
- Use IPCS-CTRACE to view the trace data because you cannot read the trace data in an ordinary editor.

Recommendation for dumps

Plan as you would normally for system dumps. Due to the size of WebSphere Application Server for z/OS address spaces, you may need to re-size your system dump data sets and use dynamic dump data sets.

Updating the CFRM policy

As stated in the BBOSSINS instructions generated by the ISPF Customization Dialog, you must "Update the CFRM Policy ... prior to using log streams that have been indicated as CF-resident." These log streams include the WebSphere for z/OS error log and RRS logs. Here is a step-by-step process for updating the CFRM policy.

1. Find the active policy by issuing the command `D XCF,POL`. You will get output similar to this partial example:

```
-D XCF,POL
IXC364I 10.57.49 DISPLAY XCF 061
TYPE: ARM
POLICY NOT STARTED
TYPE: CFRM
POLNAME: POLCF1N1
STARTED: 03/14/2003 11:32:22
LAST UPDATED: 03/14/2003 11:31:52
. . .
```

Note: Do not make any changes to the active policy--you will create a new one later.

2. List the existing CFRM policies with the following utility:

```
//STEP1 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSIN DD * DATA TYPE(CFRM) REPORT(YES)
/*
```

3. Modify the SYSPRINT from the previous job, which currently lists all the policies and has embedded page headings, so you can use it to define a new policy in the next job. Follow these steps to gain a usable SYSPRINT:
 - a. Extract the definitions for the ACTIVE policy only.
 - b. Delete the heading lines.
 - c. Add the new structure definition using the BBOVCFRM member of the target CNTL data set as a model.
 - d. Copy the new structure definition into a FB-LRECL(80) data set that you will use as SYSIN for the following job.
4. Create or update the new policy. Use a utility such as the following:

```
//STEP20 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSIN DD *
DATA TYPE(CFRM) REPORT(YES)
DEFINE POLICY NAME(NEWPOLC) REPLACE(YES)
CF NAME(CF1LPAR) DUMPSPACE(5000) PARTITION(0E) CPCID(00)
TYPE(009672) MFG(IBM) PLANT(02) SEQUENCE(000000051205)
CF NAME(CF2LPAR) DUMPSPACE(5000) PARTITION(0F) CPCID(00)
TYPE(009672) MFG(IBM) PLANT(02) SEQUENCE(000000051205)
STRUCTURE NAME(CTS130_DFHLOG) SIZE(24000) INITSIZE(12000)
REBUILDPERCENT(15) PREFLIST(CF1LPAR, CF2LPAR)
. . .
<== Insert your new structure here
```

Where "NEWPOLC" is the name of the new policy.

5. Switch CFRM to the new policy. Use a command such as the following:

```
SETXCF START,POLICY,TYPE=CFRM,POLNAME=NEWPOLC
```

Post-installation notes on the error log

After installation is complete, use the Administrative Console to change the log stream name or create new log stream names for servers or servants.

Note:

- A server's error log stream setting overrides the general WebSphere for z/OS setting, and a servant setting overrides a server setting. Thus, you can set up general error logging, but direct error logging for servers or servants to specific log streams.
- If you create a new log stream name through the Administrative Console, you must configure a new log stream on z/OS and, if using the coupling facility, define a corresponding new coupling facility log stream.
- If you changed an existing log stream, or created a new one, you probably need to restart WebSphere Application Server for z/OS. When the name of a log stream is changed through the Administrative Console, in most cases a restart of WebSphere for z/OS is required before the change becomes effective. The only case when the change takes effect automatically is when the log stream name is changed for a server along with other changes that cause the server to be restarted.

If you want WebSphere Application Server for z/OS messages that occur during execution of a z/OS client to be recorded in an error log stream, code the `client_ras_logstreamname` WebSphere variable in its environment file, then initialize the client. For more information about `client_ras_logstreamname` and the related variable `ras_log_logstreamName`, see the WebSphere variables in the Administrative Console or the InfoCenter.

Our RACF samples `BBOWBRAC` and `BBODBRAC` give `UPDATE` authority to the run-time control and servant user IDs for the log stream you created (they require that you supply a log stream name). After installation and customization, if you want to grant access to the log stream:

- For each server identity that writes to the log stream (or client identity, if you allow clients to write to the error log stream), assign `UPDATE` access to the log stream.
- For each user who browses the error log stream, assign `READ` access.

Follow the sample RACF commands in `BBOWBRAC` or `BBODBRAC`.

Ensuring problem avoidance

To implement WebSphere Application Server for z/OS, you must implement the necessary features, subsystems, and resources required for the run-time environment. This section provides checklists for tasks you should verify before running your WebSphere Application Server for z/OS system in order to prevent the most common errors encountered during the installation.

Before you begin: Perform the following steps to ensure problem avoidance, checking off each item as you complete it:

1. Plan to prepare your z/OS environment:

Table 4.

Check off	Item
	Check that all the maintenance suggested in the PSP bucket <code>WASAS500</code> subset <code>WAS500</code> has been applied.
	Make certain your address space is large enough. Some WebSphere Application Server for z/OS servers must be able to get a 1GB virtual region to run any workload. Make sure that your installation exits (<code>IEFUSI</code>) do not limit the virtual region size. We recommend that you specify <code>REGION=0M</code> so as not to limit their size.
	Add another local page data set, two if your system does any paging of the WebSphere for z/OS server address spaces.

2. Plan to prepare your DB2 subsystem (if you will use DB2):

Table 5.

Check off	Item
	Increase the <code>MAX USERS (CTHREAD)</code> and <code>MAX BATCH CONNECT (IDBACK)</code> in your DB2 environment settings. Use the sample job in <code>DSN710.SDSNSAMP(DSNTEJ6Z)</code> to display the "ZPARMS" settings of the running system. (An alternative is to use the DB2 Control Center to display these parameters.)

Table 5. (continued)

Check off	Item
	Define at least 200 buffers to the DB2 BP32K buffer pool. Use this command to display the current bufferpool allocations: <code>-dis bpool(active)detail</code> . Verify JDBC 2.0 functionality. The JDBC IVT sample01 JAVA application does not exercise JDBC 2.0 drivers nor the RRS attach facility. A modified version that tests these functions can be found in the DB2 Conundrum whitepaper on Techdocs at http://www.ibm.com/support/techdocs/atmastr.nsf/PubAllNum/WP100217 (This will also verify that the DSNJDBC plan is bound correctly and that it matches the .ser file.)
	Verify the level of DB2 code running on your system with the DSNTEJ6U sample job or run the DSNUTILB utility with the DIAGNOSE DISPLAY MEPL command. The module names, dates, and PTF number on the right of the report are in EBCDIC.
	Make sure that any updates to the DB2 ERLY code are installed, and that you have IPLed your system to activate them.
	Check the JDBC service installed on your system. Use the following java program to display the service level: <pre>export LIBPATH=/usr/lpp/db2/db2710/lib:\$LIBPATH> java -cp /usr/lpp/db2/db2710/classes/db2j2classes.zip COM.ibm.db2os390.sqlj.util.DB2DriverInfo</pre> <p>The typical output message looks like this: DB2 for OS/390 SQLJ/JDBC Driver build version is:DB2 7.1 PQ54756</p>

3. Plan to verify your USS/HFS configuration:

Table 6.

Check off	Item
	Specify enough threads, files, and processes in your BPXPRMxx member of parmlib. Here is a starting list if you don't have it set up yet: <ul style="list-style-type: none"> • MAXTHREADS:10000 • MAXTHREADTASKS:5000 • MAXFILEPROC:10000 • MAXSOCKETS in the AF_INET domain:12000
	If you have an exit that checks for valid accounting codes, you may need to specify an accounting value for spawned address spaces. Use the <code>_BPX_ACCT_DATA=</code> variable in the was.env file.
	Ensure that the userid associated with running the installation jobs that run the BPXBATCH shell scripts has an OMVS segment that directs <code>PROGRAM('/bin/sh')</code> to use the z/OS shell rather than the tcsh (C) shell (at <code>'/bin/tcsh'</code>). These particular shell scripts won't run from the tcsh shell.

4. Plan your SMP/E tasks:

Table 7.

Check off	Item
	You can install WebSphere Application Server for z/OS into an SMP/E environment (SMP/E 3.1 or later) separate from the one you use for z/OS. This includes target and distribution zones, as well as HFS data sets. We recommend you use a separate environment, but you should enable the cross-zone checking so that any prerequisite service requirement can be checked between the WebSphere Application Server for z/OS and z/OS SMP/E zones.
	Verify that the DDDEF for the LTS data set describes a PDSE format data set. This will avoid LINK-EDIT errors during the SMP/E processing.
	We strongly recommend that you carefully read <i>WebSphere Application Server for z/OS V5.0: Program Directory</i> . This is a very large product and you have to make sure that there is sufficient space in all target and temporary data sets for receive and apply processing.

5. Plan your ISPF Dialog consideration:

Table 8.

Check off	Item
	Do not use ISPF Dialog in Split Screen mode. It may happen that you don't see everything on one screen. Keep in mind that there might be parameter values outside of the visible portion of your screen and that this may cause some of the WebSphere for z/OS installation options to be set to default values, which may not be what you want.
	Turn off PFSHOW on the ISPF Dialog screen. As with the split screen problem, there might be parameter values outside the visible portion of your screen, which may cause some of the WebSphere Application Server for z/OS installation options to be set to default values, which may not be what you want.
	You need to use a screen size of at least 32 lines to be able to invoke ISPF Dialog.
	You might want to consider starting with new CNTL and DATA data sets as output of the "Generate the Jobs Stream" function. During this task, you get a large number of confirmation messages for every successful generated job. It is very easy to overlook an error message during this process. Unfortunately this sometimes causes the job generation process to stop without recreating all JCL. When you run the jobs you may run "old" JCL and this will result in unpredictable problems.

6. Plan to verify your WLM environment:

Table 9.

Check off	Item
	Verify that WLM is running in goal mode with the D WLM,SYSTEMS command.

7. Plan to check your TCP/IP configuration:

Table 10.

Check off	Item
	<p>Telnet into UNIX Systems Services and issue these commands to verify that you can find your host name by IP address or IP host-name:</p> <ul style="list-style-type: none"> • Get the local host name: hostname <ul style="list-style-type: none"> - You will get a response such as: sc49.itso.ibm.com - Use the output from the hostname command for the following nslookup command. • Get host address by name: nslookup sc49.itso.ibm.com <ul style="list-style-type: none"> - You will get a response such as this: <pre>Server:sc49.itso.ibm.com Address:9.12.6.15 Name:sc49.itso.ibm.com Addresses:9.12.6.15</pre> <ul style="list-style-type: none"> - Use the dotted IP address from this display for the following command. • Get host name by address: nslookup 9.12.6.15 <ul style="list-style-type: none"> - You will get a response such as in the previous nslookup display. <p>There is also a small java program, InetInfo.java, which you can run to verify the same TCP/IP configuration. See techdocs for the program at http://www.ibm.com/support/techdocs/atmastr.nsf/PubAllNum/TD100609.</p> <p>Example: This example shows you how to run the InetInfo java code.</p> <pre>JAVA4 @SC42:/u/java4>export PATH=/usr/lpp/java/IBM/J1.3/bin JAVA4 @SC42:/u/java4>java InetInfo get Local Host IP Address:9.12.6.27 get Host Name By Address using 9.12.6.27 Host Name:wtsc42oe.itso.ibm.com get Host Address By Name using wtsc42oe.itso.ibm.com Host Address:9.12.6.27</pre>
	Issue the hometest command from TSO. It should show the correct TCP Host name, corresponding IP address(es), and HOME IP addresses. If it doesn't produce the correct results, then TCP/IP is not configured correctly.
	If the fully-qualified TCP/IP HostName is greater than 24 characters, then a DNS will be required. Otherwise, the /etc/hosts file can provide the naming lookup.
	Verify that the DNS name you are using is definitive (authoritative) in your installation.

8. Plan to verify that security is in place:

Table 11.

Check off	Item
	Check that the location service daemon has access to parmlib concatenation to retrieve CTRACE settings in the CTIBBOxx member.
	Verify that all WebSphere Application Server for z/OS servers must have READ access to any datasets or files in their JCL procedures.

Table 11. (continued)

Check off	Item
	Verify that your installation has the RACF list-of-groups turned on. (SETROPTS LIST will show you if turned on or off.) Without this list of groups turned on, an ID cannot belong to more than one group and ASSR1 associates with only WSSR1 instead of both WSSR1 and WSCFG1. Use the command SETROPTS GRPLIST to turn on the list of groups.
	Define the profile BPX.SAFFASTPATH in the FACILITY class to enable SAF fastpath support.
	If you do not load SBBLOAD into LPA, you must add it to the program control list in the RACF PROGRAM class. (With z/OS V1.2, you can use the FACILITY class profile BPX.DAEMON.HFSCTL class. This will cause only HFS files to be checked for program control.)
	Verify that the /usr/lpp/java/IBM/J1.3/lib HFS file permission bits are set up correctly to allow the read capability to other (644) and that /usr/lpp/java/IBM/J1.3/bin and /usr/lpp/java/IBM/J1.3/bin/classic with the execute permission bit on (755) and APF authorized.
	Verify that the authorization bits for the WebSphere Application Server for z/OS HFS (default name is /usr/lpp/zWebSphere/V5R0M0) file are correctly set up for the WebSphere Application Server for z/OS configuration group.

9. Plan your installation phases:

Table 12.

Check off	Item
	After any maintenance has been applied, verify that the code loaded in LPALIB or LNKLST is in sync with the code in the HFS. Check the location service daemon joblog to verify that the correct maintenance level is in use.

You are done when you have checked all the applicable items.

Chapter 3. Installing WebSphere Application Server for z/OS

The term "installing," in regard to WebSphere Application Server for z/OS, refers to only the SMP/E process of loading the code onto the system. This article discusses that installation. To get the product actually up and running, you need to go on and "customize" it. Customization is discussed in Customizing WebSphere Application Server for z/OS.

Installing the code through SMP/E

To install the code through SMP/E, follow one of two documents depending on what you use:

- If you use CBPDO, follow the *WebSphere Application Server for z/OS V5.0: Program Directory*.
- If you use ServerPac, follow *ServerPac: Installing Your Order*.

You can find further information on the eSupport Web site at http://www.ibm.com/software/webservers/appserv/zos_os390/support.html, or check the PSP buckets or contact the IBM Software Support Center.

- You can change the high-level qualifier of the installed data sets (not recommended) or the middle-level qualifier.
- If you are installing from a driving system, make sure the maintenance level of the target system meets requirements for WebSphere Application Server for z/OS.
- Make sure the product code HFSEs are mounted at `/usr/lpp/java` and `/usr/lpp/zWebSphere/V5R0M0`, or at similar mount points of your choice.

Chapter 4. Customizing WebSphere Application Server for z/OS

Customization is the process during which you make your installed WebSphere Application Server for z/OS code actually work for you. This article takes you through the customization process.

1. Run the WebSphere Application Server for z/OS Customization Dialog. The Customization Dialog is an ISPF Dialog that eliminates the need to hand-tailor sample jobs supplied with the product. Through a series of panels, you choose options and define variables. Using your values, the Dialog tailors the WebSphere Application Server for z/OS customization jobs but does not execute them. Rather, the Dialog provides a custom set of instructions for you to follow and the associated tailored jobs that are ready to complete the product customization. The Customization Dialog supports these goals:
 - Configuring the security domain.
 - Configuring the base application server node.
 - Configuring the integral JMS provider.
 - Configuring the deployment manager node
 - Federating a base application server node.
 - Configuring the Web services gateway.
 - Configuring the v5.0.2 License Agreement Refresher

Note: See z/OS port assignments for a handy chart of default server values for WebSphere Application Server for z/OS V5.

2. Handle workload management and server failures.

When you finish the entire customization process, you have WebSphere Application Server for z/OS V5 running on your system.

Using the Customization Dialog

The Customization Dialog is intended for the system programmer or administrator responsible for installing and customizing WebSphere Application Server for z/OS. It allows you to perform the following options:

1. Configure security domain
This will produce security domain variables that you will then use in other options.
2. Configure base application server node
This will give you a working base system with a single-cluster application server and a location service daemon.
3. Configure integral JMS provider
This optional step will set up JMS on your system.
4. Configure Deployment Manager node
This will enable the network deployment function of WebSphere Application Server for z/OS, creating the Deployment Manager and node agent.
5. Federate Base Application Server node
This optional step will add another Deployment Manager node to your WebSphere Application Server for z/OS configuration.
6. Configure Web services gateway

This optional step will set up a Web services gateway on your system.

7. Configure v5.0.2 License Agreement Refresher.

This step, which applies only if you want to warm-start from a previous WebSphere Application Server for z/OS v5.x release to v5.0.2, allows you to generate a job that indicates your consent with the new v5.0.2 license agreement. You must run this option for each configured WebSphere Application Server for z/OS home directory.

In order to use the Dialog, you must know or be able to find the system characteristics for the system on which WebSphere Application Server for z/OS will run.

The Dialog covers a portion of WebSphere Application Server for z/OS customization. Specifically, it creates tailored jobs to:

- Copy the generated jobs into your system libraries.
- Create the run-time HFS structure and the initial environment file.
- Set up WebSphere Application Server for z/OS security controls (RACF).
- Define the WebSphere Application Server for z/OS run-time configuration.
- Run the Installation Verification Test (IVT).

The Dialog also produces a set of instructions for you to follow in order to effectively run these tailored jobs.

Prior to attempting to install and manage a Network Deployment configuration, it is strongly recommended that you first attempt a base application server configuration. Later, when you want some experience with the ND configuration, carry out those experiments separate from the base application. Setting up the runtime consists of a sequence of manual activities, jobstreams, and REXX execs. Installing the runtime takes a little practice, an understanding of the WebSphere Application Server for z/OS system structure, some systems programming skills and attention to detail.

The V5 customization process is similar to that in V4, but without the DB2, LDAP, or bootstrap steps. It is recommended that you install a "practice" configuration before you install the first one to be used for initial testing. There are always decisions made in the Customization Dialog that you want to change once you see how they affect the runtime configuration.

Be aware of other versions of WebSphere Application Server for z/OS that you have running on your system, as the Customization Dialog does not detect them for you. Keep this in mind when going through the Dialog and, if you are running other versions of WebSphere Application Server for z/OS, watch out for such problems as potential location service daemon port collisions or LPA issues. See the InfoCenter migration information for more information.

This section lays out the steps you should follow to configure your system using the Customization Dialog. See the links at the bottom of this article for the corresponding instructions and help for each.

1. Fill in the Customization Dialog worksheets. Worksheets are provided for each task in the Dialog to help you determine what values you should enter in the "Define Variables" stage of customization. You need to consult with other systems programmers, specialists or administrators to determine some of the values, so it's a good idea to get it done beforehand. See the worksheets in Define variables for Security Domain Configuration - Worksheets and definitions, Define Variables to configure base application server node -

Worksheets, Define Variables to configure Integral JMS Provider - Worksheets, Define Variables to configure Deployment Manager node - Worksheets, Define variables for Federate Base application server node - Worksheets and definitions, Define variables for Web services gateway - Worksheets and definitions, and Define variables for configure v5.0.2 License Agreement Refresher - Worksheets and definitions, as well as the corresponding definitions.

Note: You have several tools on your system that you can use to determine or verify this information. Those tools include MVS & TSO commands, ISPF, SDSF, and other tools such as MXI, which you can get from <http://www.secltd.co.uk>.

2. Start the Customization Dialog. Get the Dialog up and running so you can begin your customization. See Steps for starting the Customization Dialog for instructions.
3. Determine which task you wish to complete. After pressing "Enter" to get past the introduction screen(s), you'll see the main Dialog panel which lists the tasks you can complete. Select the corresponding number for your desired task to start.

Note: The remainder of the steps assume you've already chosen a task.

4. Load customization variable information saved from previous configurations, if available. If you previously configured WebSphere Application Server for z/OS and saved the variables, you can load them and use them as a base and for defining your current configuration. See Steps for loading customization variables for instructions.
5. Load security domain customization variable information saved from "Configure security domain" task or previous configurations, if available. In the tasks that require security domain variables, first run the "Configure security domain" task and then load the saved variables using this option in the other tasks. See Steps for loading security domain customization variables for instructions.
6. Allocate a new or existing target data set. Designate a target data set to store your configuration information. See Steps for allocating the target data sets for instructions.
7. Define all variables for your particular customization. Using the worksheets that you completed, fill in a value for each variable. See Steps for defining variables for instructions.

Note: Ensure the accuracy of the variables and customized settings that you enter at this stage. Specification (spelling) errors and omissions are very difficult to diagnose and correct later on.

8. Save your customization variable information to a data set. This option saves both your variables and target library settings in case you want or need to use them again. Then they are available if you want to reconfigure or use the same values for another configuration or environment. This is also an important precautionary step in the case when you run into an error during the generate step--instead of having to reenter all the information, you just reload everything from the data set. See Steps for saving the customization variables for instructions.
9. Save security domain customization variable information (in only the "Configure security domain" task) This option saves both your security domain variables and target library settings for use in the other options. See Steps for saving the security domain variables for instructions.

10. Generate the customized jobs. This step creates the installation job streams you will run when stepping through the generated instructions. See Steps for generating customization jobs for instructions.

Note: At this point, you may want to save the variables to a data set again to catch any generation values you may have specified.

11. (If applicable) Correct any errors flagged by the Dialog and regenerate the customized jobs. As the jobs and data members are created (or replaced), watch for errors. If there is an ENQ on the PDS, the Dialog will stop generating the tailored jobs for that data set and you will not have a complete set of generated jobs and data.
12. Review the saved variables in the data set to which you saved them. Sort the file on the columns that contain the variable values (typically columns 12-20) using the ISPF SORT command, then scan it for the following:

Typos in the data set high-level qualifiers

If there is a typo in one, it may stand out because the file will list it separately from the others.

Typos in server names and UserIDs

If you use a column-specific naming convention, these will also stand out if there is a typo.

Unique UIDs & GIDs

It is important that these are all unique because the Dialog does not check for UIDs and GIDs that are already assigned in the RACF database.

13. View, print and follow the generated instructions. These instructions step you through the process of running the jobs created by the Customization Dialog. This is the manual portion of actual customization. See Steps for viewing and following the generated customization instructions for instructions.

Once these steps are completed, you should have the desired server up and running smoothly. You can now go on to configure subsequent servers. Follow the steps in this section again for whichever task you wish to perform, using the variables you saved from the first configuration as a basis for tailoring the variables for the others. (For example, you can use the same parameters and target CNTL, DATA, and SAVECFG datasets.)

Simplifying your installation

This article presents some tips for simplifying your installation. Refer back to this when you are running through the Customization Dialog, especially when setting up your first or practice run-time.

Naming servers, cells, and nodes for manageability

It is important to plan your system by visualizing the results desired before even installing the product. This is a part of good planning and leads to good management and effective use of your system. This effective kind of long term thinking is important down to the very details of the system, especially naming. Upon initial configuration of the first base application server, you will be asked to provide long names and short names for the servers, nodes, and cells. It is imperative that simple names are selected that can be easily tracked through the installation process.

In general these are the nomenclature "rules" with examples given to indicate best practices for naming:

- Short names are generally 8 or fewer alphanumeric and National (@, # \$) characters, cannot have a numeric first character, are capitalized, and are used for MVS constructs. An exception to this rule is server short names, which are limited to 7 characters because an "S" becomes appended to it to indicate the controller region started task jobname.

Short name examples:

- Server short name: **V5SRV1**
- Node short name: **V5NODEA**
- Cell short name: **V5CELL**

- Long names are mixed case and can be as long as 60 characters, though shorter names are recommended to help ward off unmanageably long path names in the configuration HFS.

Long name examples:

- Server long name: **v5srv1**
- Node long name: **v5nodea**
- Cell long name: **v5cell**

Notice in the examples the same names are used for long name and short name for server, node, and cell. This is an easy way to remember the nomenclature appointed in your environment, while differentiating the long names by using mixed or lower case. When selecting server, cell, or node names, always avoid special non-alphanumeric characters because they are used as HFS directory names and are parsed in XML files that may have problems with special characters such as blanks, slashes, dashes, tildes, question marks, or underscores.

Simplifying proclib

WebSphere Application Server for z/OS V5 allows all the servers and location service daemons in a cell to be started with just three procs. This is radically different than in earlier releases of the application server, such as V4 where new procedures in proclib needed to be created for new servers. To utilize the same three procs without issue or complexity it is recommended that simple names, with understood meaning, be given, such as **V5ACR**, **V5ASR**, and **V5DMN**.

Simplifying WLM definitions

In the ISPF Customization Dialog, you are asked to specify a **Cluster Transition Name**. This **Cluster Transition Name** becomes the Workload Manager (WLM) Application Environment name, as well as the **server_generic_short_name**. Dynamic application environments are now supported, making it unnecessary to go into the WLM panels to define new application environments for each server. When selecting names in the Customization Dialog, it is suggested that simplification apply whenever possible to avoid overly confusing nomenclature later on. A simple example might be naming all the **Cluster Transition Names**(Application Environments) by appending **V5CL**, or some other such naming structure at the beginning of the name. This will simplify the RACF definitions for the CBIND and SERVER class profiles.

Simplifying RACF definitions

For an initial test configuration, it is unnecessary to set up complicated sets of RACF userids and profiles. It is easier to assign a single userid, such as **V5USR**, and a single groupid, such as **V5GRP**, for each user in a cell. Additionally, once you run the BBOCBRAJ job that produces the RACF definitions, the profiles can be

tailored so they can be used for other servers without further RACF definitions. Here are some simple example RACF profiles for all servers with a short name beginning with **V5SRV** and application environments starting with **V5CL**:

- **CBIND** Class profiles
 - Access to generic servers:
 - **CB.BIND.<appl.env_name>** or, as an example **CB.BIND.V5CL***
 - Access to objects in servers:
 - **CB.<appl.env_name>** or, as an example **CB.V5CL***
- **SERVER** Class profiles: servant regions to access control regions
 - Static Application Environments
 - *See example for dynamic application environments*
 - Dynamic Application Environments
 - **CB.<server_name>.<appl.env_name>.<cell_name>** or, as an example **CB*.V5CL*.***
- **STARTED** Class profiles
 - Assign user and group IDs to controller region STCs (V5ACRn profile)
 - **<proc_name>.<job_name>**
 - Assign user and group ID to servant region STC jobnames (V5SR profile)
 - **<job_name>.<job_name>**
- **LOGSTRM** Class profiles
 - Protect access to error log
 - **log.stream.name**

Organize your port usage

In order to understand the levels of communication going on with your application server, it is important to be familiar with port assignments by default. See the article on z/OS port assignments for reference.

Use the ISPF Customization Dialog Effectively

While the ISPF Customization Dialog coordinates the specification of customized variables, it is not a remedy for careful planning and understanding of the z/OS environment. Here are some suggestions:

- It is imperative to develop a good naming convention for server JCL procedures, userids, WLM application environments and other profiles.
- Chose unique UIDs and GIDs for the new userids defined in the Dialog. You may use the ISHELL User List and sort on UIDs using the File pull-down to get a list of all UIDs assigned in your system.
- Validate the customized variables with your communication specialist, and security administrator.
- The very first time you use the ISPF Dialog, you should go through the whole process of generating the job streams, using the IBM default values.
- Take advantage of the help screens (via PFKey 1). They contain a lot of useful information.
- Use the same ISPF application name -- APPL(xxxx), or load the saved variables when you move from option to option (e.g., from "Configure base Application Server node" to "Configure Deployment Manager node".)

- Examine the members in the target .CNTL and .DATA partitioned datasets and the .SAVECFG dataset where you saved them. Also examine the *.SDCFG dataset where you saved your security domain variables.
- Understand how your customized variables affect the generated jobs and data files by browsing each one using the customized instructions in the BBOSSINS member of the .CNTL dataset as a guide.

Note: A common mistake users make is to change any of the values on the Customization Dialog after generating the jobs and data and then attempting to make manual corrections to the target CNTL or DATA members. Don't attempt to do this, instead regenerate all the jobs and data. In the long run it will take far less time and energy.

Installing a practice run-time

Customizing a WebSphere Application Server for z/OS base application server the first time around can be a frustrating experience. Most users find that they don't have everything specified correctly in the Dialog, or may not understand the effects of the variable specifications before they start submitting the jobs. Because of this, we recommend that you install a practice run-time on a test system where you can easily back it out. This helps you understand the structure of the WebSphere Application Server for z/OS run-time when you dismantle it and start over. (The whole process takes less than an hour once you get the practice.)

The intention of this article is to help you learn the ropes with the Customization Dialog. Please use it in conjunction with the other articles in the section about the Dialog.

Some things to note:

- This is altogether a "reading, spelling, and typing" exercise, and a "follow the directions" drill. Most problems occur from making an innocent typing mistake, or from not following all the steps as specified in the instructions. So be careful when entering information--ensure you type everything in correctly. Note the suggestions along each step of the way--they can be very helpful especially your first time around.
 - Pay attention to the "User ID requirements" in the generated instructions. This is a frequent cause for jobs not running successfully.
 - Verify each job or step as you run it and check it off on your customized instructions so you don't skip any steps.
 - Look carefully at the job's output (not just the return code) to make sure everything is installed correctly. You should see no error messages in the job's output except where specifically noted in the instructions.
1. Run through the Dialog and follow all the steps for configuring a security domain up until you view the generated instructions.
 2. Follow the generated security domain instructions, which executes BBOSBRAJ and BBOSBRAK.
 3. Issue the RACF commands necessary to define the users, groups, profiles, and SSL digital certificates that are effective for all WebSphere Application Server for z/OS runtime servers.
 4. Save your security domain definition.
 5. Run through the Dialog and follow all the steps for configuring a base application server up until you view the generated instructions.

6. Perform the manual configuration updates in the generated base application server instructions. These steps affect parts of your system that are usually tightly controlled. They produce changes that your systems programmer responsible for this z/OS system should review.

Note: You could have used "canned" jobstreams to update WLM, SYS1.PARMLIB, and the TCP/IP configuration, but, for good reason, most installations would not allow this.

7. Create your logstreams and datasets. The first four jobs (BBOMSGC - BBOWCTR) are straightforward system programming tasks.
8. Update your server-specific security definitions. The next two jobs (BBOCBRAJ and BBOCBRAK) generate and then issue the RACF commands necessary to define the users, groups, profiles, and permissions for the WebSphere for z/OS runtime servers. The recommended approach is to run the jobs that generate the commands and simplify the profile names.

Submit the BBOCBRAK job, or take it and BBOCBRAJ to your security administrator for approval. Then let your security administrator issue those commands or submit the supplied jobstreams. If your installation has different profiles structures, you may have to modify the RACF commands generated by these execs to suit your particular needs.

Note: Your installation must have "list of groups" turned on for these to work, because the servers must be connected to the WebSphere Application Server for z/OS administrator group.

After you get the runtime up and successfully run the IVT, you may want to replace the built-in administrators defined for WebSphere Application Server for z/OS, or at least change their passwords. If you want to prevent the userids assigned to started tasks from being used to sign on or submit jobs, you can make the userid protected by adding the keywords NOPASSWORD and NOOIDCARD to the user's RACF profile.

If you have some other security product such as Top Secret or ACF2 instead of RACF, then you must put the RACF commands into the appropriate syntax.

Note: Ask your customer's security administrator to contact the vendor (CA) for the latest maintenance and guidance on WebSphere Application Server for z/OS customization.

9. Create and populate the configuration HFS. The next three jobs (BBOWCHFS - BBOMCFGU) and BBOWCPY2 run BPXBATCH shell scripts to define, customize, and load data into the configuration HFS and manipulate the ownership and permission attributes. For this reason these jobs must be submitted with job ownership of a user with a UID=0 (despite what the instructions say):

- Submit by a user with a UID=0,
- Submit by a user with surrogate access to a userid with UID=0, or
- Specify the user id and password of a userid with UID=0 on the JOB card.

Review the output of these jobs so you can see where the configuration files were built and how the directories are structured. Also note that ownership is reassigned to the WebSphere administrator and permission bits are set so you must be connected to that group to even read them.

Once you finish running through the instructions with these simplified instructions, you will have a practice run-time set up! Now you can uninstall it and reinstall WebSphere Application Server for z/OS for real.

Some common mistakes to watch out for:

- Pay close attention to the "User ID requirements" in the generated instructions. This often is the cause for jobs not running successfully.
- Navigating the configuration HFS with a UID of 0 can alter files or their ownership and permission attributes, thus making them inaccessible to the WebSphere Application Server for z/OS runtime servers and administrators. It is better to use the WebSphere Application Server for z/OS administrator's userid.
- If you decide to change any of the customized variables after you have submitted any of these jobs, don't be tempted to make manual modifications to the generated jobstreams or data. Back off the installation and start over by regenerating all the jobstreams and start over from the BBOMCFG job.

Steps for starting the Customization Dialog

You must have the product code installed and have access to the product data sets.

Rules: Regarding your display:

- Your logon display must support 3270 emulation and be set to a minimum of 32 rows by 80 columns (32 x 80) in order for the ISPF Customization Dialog to run.
- If you have a 32-row display and use the ISPF split screen function, deselect "Always show split line" on the ISPF Settings panel and split the screen at the extreme top or bottom of the display. This prevents the split screen line from displaying and lines in the Customization Dialog from being obscured. Other uses of split screen will obscure lines in the Customization Dialog.
- If you have a 32-row display, you cannot display the PF key settings. Displaying the PF key settings will obscure lines at the bottom of the Dialog panels. Issue
PFSHOW OFF

You should complete the worksheets in this section.

Perform the following steps to run the Customization Dialog:

1. From the ISPF command line, enter the following:*ex 'hlq.sbboclib(bbowstrt)'*
'options where:

hlq High-level qualifier for the SBBOCLIB data set.

options

Command options. Enclose any and all options in a single set of quotes.

appl(value)

Specifies the ISPF application name. This option creates unique ISPF profiles, usually stored in the "userid.ISPF.ISPFPROF" dataset, that are useful when you want to keep saved variables separate from those in other target environments. The default value is

BB05

lang(value)

Specifies the national language. Values can be either ENUS (English) or JAPN (Japanese). The default is ENUS.

Example:

ex 'bbo.sbboclib(bbowstrt)'

Result: You see the splash screen:

```
----- WebSphere for z/OS Customization -----  
Option ===>
```

WebSphere Application Server for z/OS Version 5.0

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Status = H28W500

Version = 5.0.2.022

Press ENTER to continue.

Note: To load the Dialog in Japanese, you would type something like ex
'bbo.sbboclib(bbowstrt)' 'lang(japn)'.

2. Press Enter. **Result:** You see the "THIRD PARTY LICENSE TERMS AND CONDITIONS, NOTICES AND INFORMATION" panel, which is too large to reprint here.
3. Type "END" as instructed, then "Y" to finish the license section.

Result: You see the following panel:

```
----- WebSphere for z/OS Customization -----  
Option ===>                               Appl: BB05
```

Use this dialog to customize WebSphere for z/OS for the first time or add Deployment Manager functionality to an existing base application server. Specify an option and press ENTER.

- 1 Configure security domain. If you want to configure a security domain, use this option.
- 2 Configure base application server node. If you want to configure a stand-alone base application server, use this option. You must complete "Configure security domain" before starting this option.
- 3 Configure integral JMS provider. If you want to configure for an integral JMS provider, use this option. You must complete "Configure base application server node" before starting this option.
- 4 Configure Deployment Manager node. If you want to configure for a Deployment Manager, use this option. You must complete "Configure base application server node" before starting this option.
- 5 Federate base application server node. If you want to federate the base application server node, use this option. You must complete "Configure Deployment Manager node" before starting this option.
- 6 Configure Web services gateway. If you want to configure for Web services gateway, use this option. You must complete "Configure base application server node" before starting this option.
- 7 Configure v5.0.2 License Agreement Refresher. If you want to configure from W501nnn to W502nnn service fix levels, use this option.

You have finished starting the Customization Dialog and can now choose the option for the path you would like to follow.

Steps for loading customization variables

You must start the Customization Dialog and select your desired task option.

This section tells you how to complete the "Load customization variables" option that is in all of the main tasks you can perform.

When you first run the Customization Dialog, the Dialog loads initial default customization variables. If you have previously run the Dialog and saved your variables, you can follow these instructions to reload those saved variables.

1. On the main Dialog panel, type the appropriate number or letter in the *Option* field to select "Load customization variables".
2. Press Enter. **Result:** You see the Load Customization Variables panel.:

```
----- WebSphere for z/OS Customization -----  
Option ==>
```

Load Customization Variables

Specify the name of a data set containing the customization variables.
IBM-supplied defaults are in
Press Enter to continue.

Data set name:

If this data set is not cataloged, specify the volume.

Volume:

3. Follow the options in order and enter information from the Load customization variables worksheet (be sure to enclose your data set name in single quotes), then press Enter.

You are done when you successfully load the variables.

Load customization variables - Worksheet

Print out this worksheet for each option in the Customization Dialog and use it to record your values as you customize WebSphere Application Server for z/OS.

Table 13. Load customization variables

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Dsname	(null)	

Specify the data set from which you will prime the variables.

Rules:

- The data set must be a sequential data set. Do not specify a member name.
- Place quotes around the data set name.

Steps for loading security domain variables

You must start the Customization Dialog and select your desired task option.

This section tells you how to complete the "Load security domain variables" option that is in some of the main tasks you can perform.

When you first run the Customization Dialog, you need to run through the task that configures your security domain. You then use the resulting variables in the other tasks. If you have previously run the Dialog and saved your security domain variables, you can follow these instructions to reload those saved variables.

1. On the main Dialog panel of affected tasks, type the appropriate number in the *Option* field to select "Load security domain variables".
2. Press Enter. **Result:** You see the Load Security Domain Variables panel:

```
----- WebSphere for z/OS Customization -----
Option ==>
```

Load Security Domain Variables

Specify the name of a data set containing the security domain variables.
IBM-supplied defaults are in ''
Press Enter to continue.

Data set name:

If this data set is not cataloged, specify the volume.

Volume:

3. Follow the options in order and enter information from the Load security domain variables worksheet (be sure to enclose your data set name in single quotes), then press Enter.

You are done when you successfully load the security domain variables.

Load security domain variables - Worksheet

Print out this worksheet for each option in the Customization Dialog and use it to record your values as you customize WebSphere Application Server for z/OS.

Table 14. Load security domain variables

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Data set name	(null)	

Specify the data set from which you will prime the variables.

Rules:

- The data set must be a sequential data set. Do not specify a member name.
- Place quotes around the data set name.

Steps for allocating the target data sets

You must start the Customization Dialog and select your desired task option.

This section tells you how to complete the "Allocate target data sets" option that is in all of the main tasks you can perform. Complete this step if you didn't specify a HLQ (high-level qualifier for the WebSphere for z/OS installation data sets) when you first start the Customization Dialog or if you want to change it.

1. On the main Dialog panel, type the appropriate number in the *Option* field to select "Allocate target data sets".
2. Press Enter. **Result:** You see:

```
----- WebSphere for z/OS Customization -----
Option ==>
```

Allocate Target Data Sets

Specify a high level qualifier (HLQ) and press ENTER to allocate the data sets to contain the generated WebSphere jobs and instructions. You can specify multiple qualifiers, up to 39 characters.

```
High Level Qualifier:                .CNTL
                                      .DATA
```

The Dialog will display data set allocation panels. You can make changes to the default allocations, however you should not change the DCB characteristics of the data sets.

.CNTL - a PDS with fixed block 80-byte records to contain WebSphere customization jobs.

.DATA - a PDS with variable length data to contain other data produced by the Customization Dialog.

- Follow the options in order and enter information from the Allocate Target Data Sets worksheet, then press **Enter**.

You are done when the data set allocation succeeds.

Allocate Target Data Sets - Worksheet

Print out this worksheet for each option in the Customization Dialog and use it to record your values as you customize WebSphere Application Server for z/OS.

Table 15. Allocate Target Data Sets

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
High Level Qualifier	(null)	

This panel asks you to specify the high-level qualifiers (HLQs) for the target data sets. Target data sets are those into which the Customization Dialog places the customized jobs and other data. The data sets are:

hlq.CNTL

A partitioned data set of fixed block, 80-byte records, that contains WebSphere Application Server for z/OS customization jobs.

hlq.DATA

A partitioned data set of variable length records that contains other data produced by the Customization Dialog.

Steps for defining variables

You must start the Customization Dialog and select your desired task option.

This section describes how to complete the "Define variables" option that is in all of the main tasks you can perform.

- On the main Dialog panel, type the appropriate number in the *Option* field to select "Define variables".
- Press **Enter**.

Result: You see:

Define Variables to configure base application server node

Specify a number and press ENTER to define the WebSphere variables.
You should review all of the variables in each of the sections, even
if you are using all of the IBM-supplied defaults.
Once you complete all sections, press PF3 to return to the main menu.

Completed?

- 1 - System Locations (directories, HLQs, etc)
- 2 - System Environment Customization
- 3 - Server Customization
- 4 - View Security Domain Configuration Panels

This example is from the "Configure base application server node" option, but the steps are relatively the same no matter which option you choose.

3. Follow the options in order and enter information from the define variables worksheets:

You are done when you finish all the "Define Variables to configure..." panels and a "Y" shows up in the Completed? column next to each option. You may then move ahead and save the variable definitions.

Define variables for Security Domain Configuration - Worksheets and definitions

This article presents worksheets and definitions that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog.

For more information about security, see related sections in the InfoCenter.

Define variables for Security Domain Configuration (1 of 2)

Table 16. Define variables for Security Domain Configuration (1 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Use Security Domain Identifier in RACF Definitions	N	
Security Domain Identifier	(null)	
Sysplex name	MCLXCF01	
Generate default RACF realm name	N	
Default RACF realm name	MCLXCF01	
WebSphere Configuration Group Information		
Group	WSCFG1	
GID	2500	
WebSphere Administrator Information		
User ID	WSADMIN	
UID	2403	
Password	WSADMIN	

Table 16. Define variables for Security Domain Configuration (1 of 2) (continued)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Unauthenticated User Definitions for Base Servers		
User ID	WSGUEST	
UID	2402	
Group	WSCLGP	
GID	2502	
WebSphere Asynchronous Administration Task		
User ID	WSADMSH	
UID	2504	

A security domain definition in z/OS provides WebSphere Application Server for z/OS with a set of cell-wide z/OS Security Server (RACF) security definitions. In this circumstance, an unfederated base application server is, for security purposes, considered a cell. A security domain definition includes the following:

- Common definitions for administrative users and groups
- X509 Digital Certificate Authorities (to ensure SSL communication)
- SAF groups to which servers belong
- Authorization profiles.

Note: Creating multiple security domains may isolate WebSphere Application Server for z/OS cells within a sysplex.

This panel asks you to supply some RACF groups and user IDs that are common throughout WebSphere Application Server for z/OS. The Dialog creates the RACF commands to define these new user IDs and groups for your security system. It also creates and saves a set of variables that you must load and use in subsequent Dialog options.

Note: If you anticipate the use of multiple security domains in your WebSphere Application Server for z/OS configuration, we recommend that you create a naming scheme for saved security domain definition data.

In some of the following, specifying "Y" (yes) tells the Dialog to define the profile or enable an option. Specifying "N" (no) tells the Dialog to not define the profile or enable the option.

Use Security Domain Identifier in RACF Definitions

Specify "Y" if you want to use a security domain identifier in your RACF definitions, which will cause the Customization Dialog jobs to include the security domain identifier in any CBIND, APPL, PASSTKT, or EJBROLE profiles generated by WebSphere Application Server for z/OS. The WebSphere Application Server for z/OS runtime also uses this information to indicate the profiles that require checking.

If you specify "Y", ensure you also specify a security domain identifier. Selecting "N" will ignore any security domain identifier value specified.

Security Domain Identifier

If you are using a security domain identifier, specify its name here. It is

generally a good idea to make the value the same as the short name of the WebSphere Application Server for z/OS cell that uses it.

Rule: The security domain identifier name must contain 8 or fewer characters.

Note: This value is also stored as a custom property in the Global Security definition in the administrative console.

Sysplex name

The sysplex name for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Tip: If you are not sure what the system name (&&SYSNAME) and sysplex name (&&SYSPLEX) are, display them using the console command D SYMBOLS on the target z/OS system.

Generate default RACF realm name

Specify "Y" if you want to generate a default RACF realm name, which is a sysplex-wide SAF setting used to identify a particular RACF (or compliant) database. The CSIV2 protocol uses this value to identify the security realm for Local OS authentication.

Note:

- Only one value is in effect at any one time, so set this up only once per sysplex.
- The CSIV2 Local OS registry uses the location service daemon IP name as the security realm name if there is no value in RACF.

Default RACF realm name

If you are generating a default RACF realm name, specify its name here.

WebSphere Configuration Group Information

Rules: In this and the following sections, ensure you follow these rules:

- User IDs and groups must be unique names (1 to 8 characters).
- UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.
- Do not assign a UID of 0 (superuser) to any of these users.
- GIDs should be unique numbers between 1 and 2,147,483,647.

Group

The default group name for the WebSphere Application Server for z/OS administrator and base server. This group allows you to more easily control who can and can not make configuration changes to your servers.

Rule: These two users must have the same default group.

Note: If you are building base Application Server nodes that you might later federate into a Deployment Manager cell, make sure they all have the same group value.

GID The group identifier for the WebSphere Application Server for z/OS configuration group.

WebSphere Administrator Information

User ID

The user ID you use to log onto telnet to perform administrative actions against your server.

UID The user identifier for the WebSphere Application Server for z/OS user ID.

Password

The password for the WebSphere Application Server for z/OS user ID.

Unauthenticated User Definitions for Base Servers

User ID

If you allow unauthenticated client requests, this is the default user ID under which those requests run.

UID The user identifier for the unauthenticated user.

Group

The group for unauthenticated users.

GID The group identifier for unauthenticated users.

WebSphere Asynchronous Administration Task

User ID

Specifies the user ID under which the administration asynchronous operations procedure executes.

UID The user identifier for the WebSphere asynchronous administration task user ID.

Define variables for Security Domain Configuration (2 of 2)

Table 17. Define variables for Security Domain Configuration (2 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere Common Groups and User IDs		
Servant group for base servers	WSSR1	
Servant GID for base servers	2501	
SSL Customization		
WebSphere Certificate Authority Keylabel	WebSphereCA	
Generate Certificate Authority (CA) certificate	Y	
Expiration date for CA Authority	2010/12/31	
Default RACF Keyring Name	WASKeyring	
Enable SSL on Location Service Daemon	N	
Additional z/OS Security Customization Options		
Use SAF EJBROLE profiles to enforce J2EE roles	Y	
Enable Passtickets for z/SAS authentication	N	
Passticket KEYMASK value	(null)	
Enable SAF authentication using LTPA or ICSF login tokens	Y	
Use APPL Profile to restrict access to WebSphere	N	

In some of the following, specifying "Y" (yes) tells the Dialog to define the profile or enable an option. Specifying "N" (no) tells the Dialog to not define the profile or enable the option.

WebSphere Common Groups and User IDs

Servant group for base servers

Specifies an additional group name to which the base server's user ID connects. This is used to control access to resources that are external to the application server (for example, DB2).

Servant GID for base servers

A group identifier that the Dialog uses for the WebSphere Application Server for z/OS base server's servant group.

SSL Customization

WebSphere Certificate Authority Keylabel

Name of the keylabel that identifies the WebSphere Application Server for z/OS certificate authority (CA) that is generated when you run the RACF jobs.

Generate Certificate Authority (CA) certificate

Select "Y" to generate a new CA certificate. Select "N" to have an existing CA certificate generate server certificates.

Expiration date for CA Authority

The expiration date used for any X509 Certificate Authority certificates, as well as the expiration date for the personal certificates generated for WebSphere Application Server for z/OS servers. You must specify this even if you selected "N" for "Generate Certificate Authority (CA) certificate."

Default RACF Keyring Name

The default name given to the RACF keyring. The keyring names created for repertoires are all the same within a cell.

Enable SSL on Location Service Daemon

Select "Y" if you wish to support secure communications using Inter-ORB Request Protocol (IIOP) to the location service daemon using SSL. If you specify "Y", a RACF keyring will generate for the location service daemon to use.

Additional z/OS Security Customization Options

Use SAF EJBROLE profiles to enforce J2EE roles

Select "Y" to indicate the use of SAF EJBROLE profiles, rather than WebSphere Application Server for z/OS bindings created during application deployment, for authorization of J2EE and WebSphere Application Server for z/OS administrator roles. The value specified here is relevant when:

- WebSphere Application Server for z/OS security is enabled
- Local OS is the active registry.

When SAF EJBROLE profiles are used, it is the WebSphere administrator's responsibility to ensure that SAF EJBROLE profiles are defined, and a system administrator's responsibility to complete user-to-role mapping. The Customization Dialog generates sample EJBROLE profiles to restrict access to WebSphere Application Server for z/OS administration and naming services.

If you specify a security domain identifier, SAF EJBROLE profiles must prepend the security domain identifier to the profile name. For example, if your application role is defined as Teller and your security domain

identifier is defined as CELL1, then WebSphere Application Server for z/OS checks if the caller has read access to the EJBROLE profile called "CELL1.Teller". If you don't use a security domain identifier is used, the access check is performed on the EJBROLE "Teller" profile.

Enable Passtickets for z/SAS authentication

Specify "Y" to enable PassTickets for z/SAS authentication, in which case KEYMASK is required.

PassTicket KEYMASK value

Specify any string of 16 hexadecimal characters as a secret KEYMASK for PassTickets.

Enable SAF authentication using LTPA or ICSF login tokens

Specify "Y" to enable the WebSphere Application Server for z/OS servant to authenticate users to the SAF registry without providing a password or SAF-specific authenticator. This is required when:

- WebSphere Application Server for z/OS security is enabled
- Local OS is the active registry

and either:

- ICSF or LTPA is the authentication mechanism **OR**
- A Trust Association Interceptor is in use.

Use APPL Profile to restrict access to WebSphere

If you activated the APPL class in your installation, specify "Y" to create a profile APPL class to represent WebSphere Application Server for z/OS for this security domain.

If you specified a security domain identifier, it is used as the APPL profile name. Otherwise, a profile name of "CBS390" is created. The Dialog gives universal access to this profile as well as permitting the WebSphere unauthenticated group for the security domain to this profile. If your installation does not require use of the APPL class, specify "N".

Define Variables to configure base application server node - Worksheets

This article presents worksheets that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog. See the related definitions article for definitions of each of the terms.

Note: Any instance of "(cannot change)" in the "Your value" column indicates that you can't change that value in that particular panel. Either the value is static throughout the Dialog, or you need to go back to a previous task to make the change.

1 System locations (directories, HLQs, etc)

System Locations (1 of 2)

This panel asks you for information about your base operating system and HFS-resident components.

Table 18. System Locations (1 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
System name	(System on which the Customization Dialog is running)	

Table 18. System Locations (1 of 2) (continued)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Sysplex name	(Sysplex on which the customization Dialog is running)	
PROCLIB	SYS1.PROCLIB	
PARMLIB	SYS1.PARMLIB	
SYSEXEC	(blank)	
SCEERUN	CEE.SCEERUN	In link list or LPA?
SBBLOAD	BBO.SBBLOAD	In link list or LPA?
SBBOLD2	BBO.SBBOLD2	In link list or LPA?
SBBOMIG	BBO.SBBOMIG	In link list or LPA?
SBBOLPA	BBO.SBBOLPA	In link list or LPA?
SBBOEXEC	BBO.SBBOEXEC	
SBBOMSG	BBO.SBBOMSG	

System Locations (2 of 2)

Table 19. System Locations (2 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Locations of HFS resident components		
WebSphere SMP/E home directory	/usr/lpp/zWebSphere/V5R0M0	
WebSphere JMS Client Java Feature SMP/E home directory	/usr/lpp/mqm/V5R3M1	
java home directory	/usr/lpp/java/IBM/J1.3	

2 System Environment Customization

System Environment Customization (1 of 3)

Table 20. System Environment Customization (1 of 3)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere HFS information		
Mount point	/WebSphere/V5R0M0	
Name	OMVS.WAS.CONFIG.HFS	
Volume, or '*' for SMS	*	
Primary allocation in cylinders	250	
Secondary allocation in cylinders	100	

System Environment Customization (2 of 3)

Table 21. System Environment Customization (2 of 3)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere error log stream information		
Name	WAS.ERROR.LOG	
Data class	STANDARD	
Storage class	(null)	
HLQ for data sets	LOGGER	
Is logstream CF resident (Y N)	Y	
If yes, specify structure name	WAS_STRUCT	
If no, specify:		
logstream size	3000	
staging size	3000	
RRS log stream information		
Group name	(Cell on which the Customization Dialog is running)	
Data class	STANDARD	
Storage class	(null)	
HLQ for data sets	LOGGER	
Is logstream CF resident (Y N)	Y	
Create RRS PROC (Y N)	Y	

System Environment Customization (3 of 3)

Table 22. System Environment Customization (3 of 3)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
CTRACE Writer Definitions		
Procedure name	BBOWTR	
User ID	STCRACF	
Group	SYS1	
Trace Data Set Information		
Name	SYS1. <i>systemname</i> . WAS390.CTRACE	
Volume, or “*” for SMS	*	
Primary space in cylinders	10	
Secondary space in cylinders	0	
Trace Parmlib member suffix	50	

3 Server Customization

Server Customization (1 of 4)

Table 23. Server Customization (1 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Application Server definitions		
WAS home directory	/WebSphere/V5R0M0/AppServer	
Cell name (short)	<i>sysplex</i>	
Cell name (long)	<i>sysplex</i>	
Node name (short)	<i>system</i>	
Node name (long)	<i>system</i>	
Server name (short)	BBOS001	
Server name (long)	server1	
Cluster transition name	BBOC001	
Admin asynch operations procedure name	BBOW5SH	

Server Customization (2 of 4)

Table 24. Server Customization (2 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Application Server definitions		
Controller information		
Jobname	BBOS001	(cannot change)
Procedure name	BBO5ACR	
User ID	ASCR1	
UID	2431	
Servant information		
Jobname	BBOS001S	(cannot change)
Procedure name	BBO5ASR	
User ID	ASSR1	
UID	2432	

Server Customization (3 of 4)

Table 25. Server Customization (3 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Application Server definitions		
Node host name	(null)	
SOAP JMX Connector port	8880	
DRS Client Address port	7873	
ORB Listener host name	*	
ORB port	2809	
ORB SSL port	0	
HTTP transport host name	*	
HTTP port	9080	
HTTP SSL port	9443	

Server Customization (4 of 4)

Table 26. Server Customization (4 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
location service daemon definitions		
Daemon Home Directory	/WebSphere/V5R0M0/Daemon	(cannot change)

Table 26. Server Customization (4 of 4) (continued)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Daemon job name	BBODMNB	
Procedure name	BBO5DMN	
User ID	WSDMNCR1	
UID	2411	
IP name	(null)	
Port	5655	
SSL Port	5656	
Register Daemon with WLM DNS	N	

4 View Security Domain Configuration Panels

This panel displays values you previously set in the "Configure security domain" option--you can not change any of the values here. If you do wish to make changes, you must go back to the main dialog panel and run through the "Configure security domain" option again.

Define Variables to configure base application server node - Definitions: This article lists definitions for the terms you will come across in the WebSphere Application Server for z/OS Customization Dialog.

1 System locations (directories, HLQs, etc)

System Locations (1 of 2)

System name

The system name for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Sysplex name

The sysplex name for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Tip: If you are not sure what the system name (&SYSNAME) and sysplex name (&SYSPLEX) are, use the console command D SYMBOLS on the target z/OS system to display them.

For the following, specify the fully-qualified data set names without quotes.

PROCLIB

An existing procedure library where the WebSphere Application Server for z/OS cataloged procedures are to be added.

PARMLIB

An existing parameter library for system definitions to support WebSphere for z/OS. This data set must be in the parmlib concatenation for the target z/OS system.

SYSEXEC

A variable-block (RECFM=VB, LRECL=255) data set into which the customization process places REXX EXECs to be called from TSO, such as the WebSphere for z/OS error log browser, BBORBLOG. You must allocate

this data set and concatenate it as part of the SYSEXEC DD allocation in your installation-wide TSO logon PROC or allocation exec.

If your existing SYSEXEC DD data set concatenation consists of fixed-blocked (RECFM=FB) data sets, you must make a copy of the hlq.DATA data set (produced by the Customization Dialog) after the customization process is complete, and place the copy in the SYSEXEC concatenation.

If you do not specify a data set name, the customization process does not place any REXX EXECs in any data set.

Specify the following Language Environment and WebSphere for z/OS data sets and whether they are ("Y") or are not ("N") in the link list or the link pack area (LPA). "N" indicates the generated JCL will contain STEPLIB statements for these data sets. Refer to your SMP/E installation for the location of these data sets listed by their DD Name.

SCEERUN

Your existing Language Environment run-time load module library.

SBBLOAD

WebSphere Application Server for z/OS load module library that you installed through SMP/E. It has members that should go into the link list or LPA.

SBBOLD2

WebSphere Application Server for z/OS load module library that you installed through SMP/E. It has members that should go into the link list. **DO NOT** place them in LPA.

SBBOMIG

WebSphere Application Server for z/OS IPCS data set that you installed through SMP/E. It is not used during normal operations, but for dump formatting in IPCS only. **DO NOT** place them in LPA.

SBBOLPA

WebSphere Application Server for z/OS data set that you installed through SMP/E.

Specify the following WebSphere Application Server for z/OS libraries so they can be accessed by the customized job streams the Dialog produces. These data sets must be cataloged.

SBBOEXEC

WebSphere Application Server for z/OS variable length file distribution PDS you installed through SMP/E.

SBBOMSG

SBBOMSG WebSphere Application Server for z/OS message skeletons for language translation you installed through SMP/E.

System Locations (2 of 2)

Locations of HFS resident components:

WebSphere SMP/E home directory

The name of the directory where WebSphere Application Server for z/OS files reside after SMP/E installation.

WebSphere JMS Client Java Feature SMP/E home directory

The name of the directory where the WebSphere JMS Client Java Feature files reside after SMP/E installation.

java home directory

The name of the directory where the Java SDK files reside after SMP/E installation.

2 System Environment Customization

System Environment Customization (1 of 3)

WebSphere configuration HFS Information

Mount point

Read/write HFS directory mount point where application data and environment files are written. The customization process creates this mount point, if it didn't already exist.

Name Hierarchical File System data set mounted at the above mount point.

Volume, or '*' for SMS

Specify either the DASD volume serial number containing the above data set or "*" to let SMS select a volume. Using "*" requires that SMS automatic class selection (ACS) routines be in place to select the volume. If you do not have SMS set up to handle data set allocation automatically, list the volume explicitly.

Primary allocation in cylinders

Initial size allocation in cylinders for the above data set.

Recommendation: The minimum suggested size is 250 cylinders (3390).

Secondary allocation in cylinders

Size of each secondary extent in cylinders.

Recommendation: The minimum suggested size is 100 cylinders.

System Environment Customization (2 of 3)

WebSphere Error Logstream Information

Note: Having the error log in the logstream is optional. By default, the error log is written to JES SYSOUT.

Name Name of your WebSphere error log stream that is created.

Rules:

- The name must be 26 characters or fewer.
- Do NOT put quotes around it.

Data class

An existing DFSMS data class for the log stream data set allocation. Applicable only if you use SMS.

Storage class

An existing DFSMS storage class for allocation of the DASD staging data set for this log stream. Applicable only if you use SMS.

HLQ for data sets

The high-level qualifier for your log stream data set name and staging data set name that is created.

Is logstream CF resident (Y|N)

If you want the log stream to be created on a coupling facility, specify "Y". If on DASD, specify "N".

If yes, specify structure name

If using the coupling facility, specify the coupling facility structure to be used for the log stream.

Rule: The name can be 1 to 16 characters, including alphanumeric characters, national characters, and an underscore, where the first character is uppercase alphabetic.

If no, specify: logstream size

Specifies the size, in 4K blocks, of the log stream DASD data sets for the log stream being defined.

If no, specify: staging size

Specifies the size, in 4K blocks, of the DASD staging data set for the log stream being defined.

RRS Logstream Information

If you do not have the RRS log streams set up, the Customization Dialog will create the jobs you can use to set up the log streams.

Group name

Specify the XCF group name.

Recommendation: Use your cell name.

Data class

Specify an existing DFSMS Data Class for the log stream data set allocation. Applicable only if you use SMS.

Storage class

An existing DFSMS storage class for allocation of the DASD staging data set for this log stream. Applicable only if you use SMS.

HLQ for data sets

The high-level qualifier for your log stream data set name and staging data set name.

Is logstream CF resident (Y|N)

If the log stream is to be created on a coupling facility, specify " Y". If on DASD, specify " N".

Create RRS PROC (Y|N)

If you answer " Y", the Dialog copies the ATRRRS cataloged procedure into SYS1.PROCLIB so that RRS can be started.

If you already have RRS set up, specify " N".

System Environment Customization (3 of 3)

WebSphere for z/OS uses component trace (CTRACE) to capture and to display trace data in trace data sets. WebSphere Application Server for z/OS identifies itself to CTRACE with the "cell short name."

CTRACE Writer Definitions

Procedure name

This is the CTRACE external writer start procedure to be created. It is identified in the WebSphere Application Server for z/OS CTRACE member (CTIBBOxx) in PARMLIB.

Rule: The name can be 1 to 7 characters.

User ID

RACF user ID to be created and associated with the CTRACE external writer start procedure.

Group RACF group name to be created and associated with this user.

Trace Data Set information

Name Specify a fully-qualified data set name, such as WAS390.CTRACE1, for the data set to be created. The default includes the system name of the system on which the Customization Dialog is running.

Rule: Do not use quotes.

Volume, or "*" for SMS

Specify either the DASD volume serial number containing the above data set or " *" to let DFSMSHsm select a volume. Using "*" requires SMS. Using "*" requires that SMS automatic class selection (ACS) routines be in

place to select the volume. If you do not have SMS set up to handle data set allocation automatically, list the volume explicitly.

Primary space in cylinders

The primary space for the trace data set.

Secondary space in cylinders

The secondary space for the trace data set.

Trace Parmlib member suffix

3 Server Customization

Server Customization (1 of 4)

application server definitions

WAS home directory

Directory in which the application server resides.

Note: You can alter only the portion after `"/WebSphere/V5R0M0."`

Cell name (short)

Parameter passed to the server's start procedures that specifies the location of the cell's configuration files and identifies the cell to certain WebSphere Application Server for z/OS-exploited z/OS facilities (for example, SAF).

Rule: Name must be 8 or fewer characters and all uppercase.

Cell name (long)

Primary external identification of this WebSphere Application Server for z/OS cell. This name identifies the cell as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Note: If you intend to ever add this base server node to a deployment manager cell, ensure that the base server cell name is different than the deployment manager cell name.

Rule: Name must be 50 or fewer characters and can be of mixed case.

Node name (short)

Parameter passed to the server's start procedures that specifies the location of the node's configuration files and identifies the node to certain WebSphere Application Server for z/OS-exploited z/OS facilities (for example, SAF).

Rules:

- Name must be 8 or fewer characters and all uppercase.
- Name must be unique within the cell.

Node name (long)

Primary external identification of this WebSphere Application Server for z/OS node. This name identifies the node as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Note: If you intend to ever add this base server node to a deployment manager cell, ensure that all the nodes in the deployment manager cell are unique.

Rules:

- Name must be 50 or fewer characters and can be of mixed case.

- Name must be unique within the cell. The application server must be defined on its own node; no other server may exist on the same node as the Application Server.

Server name (short)

Name of the application server server. This is the server's jobname, as specified in the MVS START command JOBNAME parameter. This value is also passed as a parameter to the server's start procedures to specify the location of the server's configuration files and identify the server to certain WebSphere for z/OS- exploited z/OS facilities (for example, SAF).

Note: The server short name is used as the server JOBNAME.

Rule: Name must be 7 or fewer characters and all uppercase.

Server name (long)

Name of the application server server and the primary external identification of this WebSphere Application Server for z/OS server. This name identifies the server as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Rule: Name must be 50 or fewer characters and can be of mixed case.

Cluster transition name

WLM APPLENV (WLM application environment) name for this server.

Note: If this server is converted into a clustered server, this name becomes the cluster short name. The cluster short name is the WLM APPLENV name for all servers that are part of the same cluster.

Rule: Name must be 8 or fewer characters and all uppercase.

Admin asynch operations procedure name

Specifies the JCL procedure name of a started task that is launched via the START command by node agents and/or application servers to perform certain asynchronous administrative operations (such as node synchronization) and add and remove a node.

Server Customization (2 of 4)

Application Server definitions

Controller information

Jobname

The jobname, specified in the MVS START command JOBNAME parameter, associated with the application server controller.

Procedure name

Name of member in your procedure library to start the application server controller.

Rule: Name must be 7 or fewer characters.

User ID

The user ID associated with the application server controller.

Note: If you are using a non-IBM security system, the user ID may have to match the procedure name. Please refer to your security system's documentation.

UID The user identifier associated with this user ID.

Rule: UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.

Servant information

Jobname

The jobname specified in the IWSSNM parameter of the WLM Application Environment for the server.

Procedure name

Name of member in your procedure library to start the application server servant.

Rule: Name must be 7 or fewer characters.

User ID

The user ID associated with the application server servant.

Note: If you are using a non-IBM security system, the user ID may have to match the procedure name. Please refer to your security system's documentation.

UID The user identifier associated with this user ID.

Rule: UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.

Server Customization (3 of 4)

Application Server definitions

Node host name

IP name or address of the system on which the server is configured. This value is used by other WebSphere Application Server for z/OS functions to connect to this server.

Note: The node host name must always resolve to an IP stack on the system where the application server runs. The node host name cannot be a DVIPA or a DNS name that, in any other way, causes the direction of requests to more than one system.

SOAP JMX Connector port

Port number for the JMX HTTP connection to this server based on the SOAP protocol. JMX is used for remote administrative functions, such as invoking scripts through wsadmin.sh.

Rule: Value cannot be 0.

DRS Client Address port

Port address for access to the server's data replication service. This is important for configurations that define replication groups.

Rule: Value cannot be 0.

ORB Listener host name

IP address on which the server's ORB listens for incoming IIOP requests. The default is "*", which instructs the ORB to listen on all available IP addresses.

ORB port

Port for IIOP requests which acts as the bootstrap port for this server and also as the port through which the ORB accepts IIOP requests. Port value cannot be 0.

ORB SSL port

Port for secure IIOP requests. The default is "0", which allows the system to choose this port.

HTTP transport host name

IP address on which the server's Web container should listen for incoming HTTP requests. The default is "*", which instructs the Web container to listen on all available IP addresses.

Note: The "transport host name" becomes the "hostname" in the virtualhosts.xml file, which makes setting a specific IP address here less than ideal because, if you do so, you are restricting yourself to that IP address until you go into the Administrative Console and add another virtual host.

HTTP port

Port for HTTP requests. Port value cannot be 0.

HTTP SSL port

Port for secure HTTP requests. Port value cannot be 0.

Server Customization (4 of 4)**Location Service Daemon definitions**

The location service daemon is the initial point of client contact in WebSphere Application Server for z/OS. The server contains the CORBA-based location service agent, which places sessions in a cell. All RMI/IIOP IORs (for example, for EJBs) establish connections to the location service daemon first, then forward them to the target application server.

Daemon Home Directory

Directory in which the location service daemon resides.

Daemon Job Name

Specifies the jobname of the location service daemon, specified in the JOBNAME parameter of the MVS start command used to start the location service daemon.

Caution: When configuring a second cell, ensure you change the daemon job name from the default or value you used for the first cell.

Note: A server automatically starts the location service daemon if it is not already running.

Procedure name

Name of the member in your procedure library to start the location service daemon.

Rule: Name must be 7 or fewer characters.

User ID

The user ID associated with the location service daemon.

UID

Rule: UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.

IP Name

The fully-qualified IP name, registered with the Domain Name Service (DNS), that the location service daemon uses. The default is your node host name.

Port The port number on which the location service daemon listens.

SSL Port

The port number on which the location service daemon listens for SSL connections.

Register Daemon with WLM DNS

Note: Select the IP name and port number for the location service daemon carefully. You can choose any name you want, but, once chosen, it is difficult to change, even in the middle of customization.

The WebSphere Application Server for z/OS run-time requires four base cell servers: application server, Deployment Manager, node agent, location service daemon. The panels corresponding to the following tables set up the names, network configuration, start procedures, and user IDs for a base server.

Recommendation: Use the IBM default names the first time you install WebSphere Application Server for z/OS to make the installation instructions easier to follow.

For identification, each controller and servant start procedure must have a user ID and will be defined in the STARTED class.

4 View Security Domain Configuration Panels

This panel displays values you previously set in the "Configure security domain" option--you can not change any of the values here. If you do wish to make changes, you must go back to the main dialog panel and run through the "Configure security domain" option again.

Define Variables to configure Integral JMS Provider - Worksheets

This article presents worksheets that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog. See the related definitions article for definitions of each of the terms.

Note: Any instance of "(cannot change)" in the "Your value" column indicates that you can't change that value in that particular panel. Either the value is static throughout the Dialog, or you need to go back to a previous task to make the change.

1 System locations (directories, HLQs, etc)

System Locations (1 of 2)

This panel asks you for information about your base operating system, HFS-resident components, and MQ subsystem.

Table 27. System Locations (1 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
System name	(System on which the Customization Dialog is running)	
Sysplex name	(Sysplex on which the customization Dialog is running)	
Jes3 (Y/N)	N	
Full Names of Data Sets		
MACLIB	SYS1.MACLIB	
PROCLIB	SYS1.PROCLIB	

Table 27. System Locations (1 of 2) (continued)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
PARMLIB	SYS1.PARMLIB	
SCSQAUTH	CSQ531.SCSQAUTH	
		In link list or LPA?
SCSQANLx	CSQ531.SCSQANLE	
		In link list or LPA?
SCSQLINK	CSQ531.SCSQLINK	
		In link list or LPA?
SCSQMVR1	CSQ531.SCSQMVR1	
		In link list or LPA?
SCEERUN	CEE.SCEERUN	
		In link list or LPA?
USER LOAD	CSQ531.CSQZPARAM	
		In link list or LPA?
SCSQLOAD	CSQ531.SCSQLOAD	
SCSQMACS	CSQ531.SCSQMACS	
SCSQPROC	CSQ531.SCSQPROC	
SCSQSNLx	CSQ531.SCSQSNLE	

System Locations (2 of 2)

Table 28. System Locations (2 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
High Level Qualifier of IJP Operational Datasets		
CSQHLQ	CSQ531	
Integral Provider Output Volumes		
BSDS Vol1	(blank)	
BSDS Vol2	(blank)	
LogCopy 1 Vol1	(blank)	
LogCopy 1 Vol2	(blank)	
LogCopy 2 Vol1	(blank)	
LogCopy 2 Vol2	(blank)	
Integral Provider Page Volumes		
PageSet Vol0	(blank)	
PageSet Vol1	(blank)	

Table 28. System Locations (2 of 2) (continued)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
PageSet Vol2	(blank)	
PageSet Vol3	(blank)	
PageSet Vol4	(blank)	
PageSet Vol5	(blank)	
PageSet Vol6	(blank)	
PageSet Vol7	(blank)	
PageSet Vol8	(blank)	

2 Server Customization

These panels allow you to define values for your Integral JMS Provider. The values you initially set for your base application server and location service daemon are displayed for reference purposes only. If you wish to change them, you need to go back and reconfigure your base application server.

Recommendation: Use the IBM default names the first time you install WebSphere Application Server for z/OS to make the installation instructions easier to follow.

For identification, each controller and servant start procedure must have a user ID and will be defined in the STARTED class.

Server Customization (1 of 2)

Table 29. Server Customization (1 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere HFS Information		
Mount point	/WebSphere/V5R0M0	(cannot change)
Application Server definitions		
WAS home directory	/WebSphere/V5R0M0/AppServer	(cannot change)
Cell name (short)	<i>sysplex</i>	(cannot change)
Cell name (long)	<i>sysplex</i>	(cannot change)
Node name (short)	<i>system</i>	(cannot change)
Node name (long)	<i>system</i>	(cannot change)
Server name (short)	BBOS001	(cannot change)
Server name (long)	server1	(cannot change)
Integral JMS definitions		
JMS Server name (short)	WMQX	
Command Prefix	+	

Server Customization (2 of 2)

Table 30. Server Customization (2 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Integral JMS Server Parameters		
Archive retention (days)	9999	
Stat Interval Time (secs)	30	
JMS Server Queued Address port	5558	
JMS Server Direct Address port	5559	
JMS Server Security port	5557	

3 Security Customization

This panel allows you to specify authentication and authorization options for your run-time resources.

Security Customization (1 of 1)

Table 31. Security Customization (1 of 1)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Queue Manager Security		
Default User ID for Commands	(blank)	
Resource Auditing (Y/N)	Y	

Define Variables to configure Integral JMS Provider - Definitions: This article lists definitions for the terms you will come across in the WebSphere Application Server for z/OS Customization Dialog.

1 System locations (directories, HLQs, etc)

System Locations (1 of 2)

System name

The system name, designated in your base cell customization, for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Sysplex name

The sysplex name, designated in your base cell customization, for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Tip: If you are not sure what the system name (&SYSNAME) and sysplex name (&SYSPLEX) are, use the console command D SYMBOLS on the target z/OS system to display them.

Jes3 (Y/N)

Indicate "Y" if you are using JES 3 or "N" if you are using JES 2.

Full Names of Data Sets

For the following, specify the fully-qualified data set names without quotes.

MACLIB

PROCLIB

An existing procedure library where the WebSphere Application Server for z/OS cataloged procedures are added.

PARMLIB

An existing parameter library for system definitions to support WebSphere for z/OS. This data set must be in the parmlib concatenation for the target z/OS system.

Specify the following Language Environment and WebSphere for z/OS data sets and whether they are ("Y") or are not ("N") in the link list or the link pack area (LPA). "N" indicates the generated JCL will contain STEPLIB statements for these data sets. Refer to your SMP/E installation for the location of these data sets listed by their DD Name.

SCSQAUTH

The main repository for all MQSeries product load modules. It also contains the default parameter modules CSQZPARM and CSQXPARM. Ensure this library is APF-authorized.

Note: It is recommended that you place this library in LNKLIST rather than the LPA because you can update LNKLIST after maintenance by issuing the z/OS command REFRESH LLA. If you do decide to place it in the LPA, you need to manually copy any changed modules into the LPA whenever you apply maintenance.

SCSQANLx

Contains the load modules for various versions of MQSeries. The different versions, designated by letters in place of the "x", are U.S. English: mixed case ("E"), U.S. English: uppercase ("U"), Simplified Chinese ("C"), and Japanese ("K").

Note: It is recommended that you place this library in LNKLIST rather than the LPA because you can update LNKLIST after maintenance by issuing the z/OS command REFRESH LLA. If you do decide to place it in the LPA, you need to manually copy any changed modules into the LPA whenever you apply maintenance.

SCSQLINK

The early code library. Contains the load modules that must reside in the link list because they are loaded at system initial program load (IPL). Ensure this library is APF-authorized and in the link list.

Note: It is recommended that you place this library in the LPA.

SCSQMVR1

Contains the load modules for distributed queuing when using LU 6.2 or TCP/IP with either the OpenEdition sockets or IUCV interface. Ensure this library is APF-authorized.

Note: It is recommended that you place this library in LNKLIST rather than the LPA because you can update LNKLIST after maintenance by issuing the z/OS command REFRESH LLA. If you do decide to place it in the LPA, you need to manually copy any changed modules into the LPA whenever you apply maintenance.

SCEERUN

The LE run-time library. Access is required. If it is not in your link list, concatenate it in the STEPLIB DD statement. You need to stop and restart your queue manager to do this.

USER LOAD

System parameter module that controls the logging, archiving, tracing, and connection environments that MQSeries uses in its operation. You need to create this linkedit target data set from scratch, using another data set as a template.

SCSQLOAD

The load library. Contains load modules for non-APF code, user exits, utilities, samples, installation verification programs, and adapter stubs. The library does not need APF-authorization nor must it reside in the link list.

SCSQMACS

Contains Assembler macros including sample macros, product macros, and system parameter macros.

SCSQPROC

Contains sample JCL and default system initialization data sets.

SCSQSNLx

Contains the load modules for various versions of the MQSeries modules that are required for special purpose function (for example, the early code). The different versions, designated by letters in place of the "x", are U.S. English: mixed case ("E"), U.S. English: uppercase ("U"), Simplified Chinese ("C"), and Japanese ("K").

Note: It is recommended that you place this library in the LPA.

System Locations (2 of 2)

Each MQSeries subsystem in WebSphere Application Server for z/OS contains two bootstrap data sets (BSDSs), two sets of log data sets, and nine page data sets. Along with the volume 0 page data set, which is fixed and untailorable, there are eight other page data sets that you can organize to suit your needs.

Note: You must define all the BSDS, LogCopy, and PageSet volumes, but you can choose to make the values different or all the same. You might specify the same value for all the volumes if, for example, you run only a test system, but the system performs better if they are spread out.

High Level Qualifier of IJP Operational Data sets:**CSQHLQ**

The high level qualifier that you create for your IJP operational data sets.

Integral Provider Output Volumes**BSDS Vol1**

The bootstrap data set volume 1.

BSDS Vol2

The bootstrap data set volume 2.

LogCopy 1 Vol1

Volume 1 of copy 1 of the log data set.

LogCopy 1 Vol2

Volume 2 of copy 1 of the log data set.

LogCopy 2 Vol1

Volume 1 of copy 2 of the log data set.

LogCopy 2 Vol2

Volume 2 of copy 2 of the log data set.

Integral Provider Page Volumes

PageSet Vol0

The volume 0 page data set, which is fixed and untailorable.

PageSet Vol1 - PageSet Vol8

Eight volumes of page data sets. You must define them all, but you can choose to make the values different or all the same.

2 Server Customization

Server Customization (1 of 2)

WebSphere HFS Information

Mount point

Read/write HFS directory mount point where application data and environment files are written. The customization process creates this mount point, if it did not already exist.

application server definitions

WAS home directory

Directory in which the application server resides.

Note: You can alter only the portion after `"/WebSphere/V5R0M0."`

Cell name (short)

Parameter passed to the server's start procedures that specifies the location of the cell's configuration files and identifies the cell to certain WebSphere Application Server for z/OS-exploited z/OS facilities (for example, SAF).

Cell name (long)

Primary external identification of this WebSphere Application Server for z/OS cell. This name identifies the cell as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Node name (short)

Parameter passed to the server's start procedures that specifies the location of the node's configuration files and identifies the node to certain WebSphere Application Server for z/OS-exploited z/OS facilities (for example, SAF).

Node name (long)

Primary external identification of this WebSphere Application Server for z/OS node. This name identifies the node as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Server name (short)

Name of the application server server. This is the server's jobname, as specified in the MVS START command JOBNAME parameter. This value is also passed as a parameter to the server's start procedures to specify the location of the server's configuration files and identify the server to certain WebSphere for z/OS- exploited z/OS facilities (for example, SAF).

Server name (long)

Name of the application server server and the primary external identification of this WebSphere Application Server for z/OS server. This name identifies the server as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Integral JMS definitions

JMS Server name (short)

MQSeries subsystem base server name. This value defines the Integral JMS Queue Manager as a z/OS subsystem and forms the name of the Integral JMS Broker.

Rule: The JMS Server name must contain only 4 characters.

Command Prefix

Character string value that WebSphere System Manager uses, in conjunction with the JMS Server short name, to form system commands that direct both the operation and administration of the Integral JMS Queue Manager.

Server Customization (2 of 2)

Integral JMS Server Parameters

Archive retention (days)

Specifies the retention period, in days, set when you create the archive log data set. The default is 9999.

Rule: The parameter must be in the range 0 through 9999.

Stat Interval Time (secs)

The interval, in seconds, between listener restart attempts. The default is 60.

JMS Server Queued Address port

JMS Server Direct Address port

JMS Server Security port

3 Security Customization

For more information about security, see related sections in the InfoCenter.

Security Customization (1 of 1)

Queue Manager Security

Default User ID for Commands

Specifies the default user ID used for command security checks. Ensure this user ID is defined to the ESM.

Rule: The name must be between 1 and 8 alphanumeric characters and start with a letter.

In the following, specifying "Y" (yes) tells the Dialog to define the profile or enable an option in RACF. Specifying "N" (no) tells the Dialog to not define the profile or enable the option.

Resource Auditing (Y/N)

If you want to enable the creation of an audit trail, specify "Y". Otherwise, specify "N". Creating an audit trail may impact performance.

Define Variables to configure Deployment Manager node - Worksheets

This article presents worksheets that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog. See the related definitions article for definitions of each of the terms.

Note: Any instance of "(cannot change)" in the "Your value" column indicates that you can't change that value in that particular panel. Either the value is static throughout the Dialog, or you need to go back to a previous task to make the change.

1 System locations (directories, HLQs, etc)

This panel asks you for information about your base operating system and HFS-resident components.

System Locations (1 of 2)

Table 32. System Locations (1 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
System name	(System on which the Customization Dialog is running)	
Sysplex name	(Sysplex on which the customization Dialog is running)	
Full Names of Data Sets		
PROCLIB	SYS1.PROCLIB	
PARMLIB	SYS1.PARMLIB	
SYSEXEC	(blank)	
SCEERUN	CEE.SCEERUN	
		In link list or LPA?
SBBLOAD	BBO.SBBLOAD	
		In link list or LPA?
SBBOLD2	BBO.SBBOLD2	
		In link list or LPA?
SBBOMIG	BBO.SBBOMIG	
		In link list or LPA?
SBBOLPA	BBO.SBBOLPA	
		In link list or LPA?
SBBOEXEC	BBO.SBBOEXEC	
SBBOMSG	BBO.SBBOMSG	

System Locations (2 of 2)

Table 33. System Locations (2 of 2)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Locations of HFS resident components		

Table 33. System Locations (2 of 2) (continued)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere SMP/E home directory	/usr/lpp/zWebSphere/V5R0M0	
WebSphere JMS Client Java Feature SMP/E home directory	/usr/lpp/mqm/V5R3M1	
java home directory	/usr/lpp/java/IBM/J1.3	

2 System Environment Customization

System Environment Customization (1 of 1)

Table 34. System Environment Customization (1 of 1)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere HFS information		
Mount point	/WebSphere/V5R0M0	
Name	OMVS.WAS.CONFIG.HFS	
Volume, or '*' for SMS	*	
Primary allocation in cylinders	250	
Secondary allocation in cylinders	100	

3 Server Customization

Server Customization (1 of 4)

Table 35. Server Customization (1 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Deployment Manager definitions		
WAS home directory	/WebSphere/V5R0M0/DeploymentManager	
Cell name (short)	<i>sysplex</i>	
Cell name (long)	<i>sysplex</i>	
Node name (short)	<i>system</i>	
Node name (long)	<i>system</i>	
Server name (short)	BBODMGR	
Server name (long)	dmgr	(cannot change)
Cluster transition name	BBODMGR	

Server Customization (2 of 4)

Table 36. Server Customization (2 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Deployment Manager definitions		
Controller information		
Jobname	BBODMGR	(cannot change)
Procedure name	BBO5DCR	
User ID	DMCR1	
UID	2421	
Servant information		
Jobname	BBODMGRS	(cannot change)
Procedure name	BBO5DSR	
User ID	DMSR1	
UID	2422	

Server Customization (3 of 4)

Table 37. Server Customization (3 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Deployment Manager definitions		
Node host name	(null)	
SOAP JMX Connector port	8879	
CELL DISCOVERY ADDRESS port	7277	
DRS Client Address port	7989	
ORB Listener host name	*	
ORB port	9809	
ORB SSL port	0	
HTTP transport host name	*	
HTTP port	9090	
HTTP SSL port	9043	

Server Customization (4 of 4)

Table 38. Server Customization (4 of 4)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Location Service Daemon definitions		
Daemon Home Directory	/WebSphere/V5R0M0/Daemon	(cannot change)
Daemon job name	BBODMNC	
Procedure name	BBO5DMN	
User ID	WSDMNCR1	
UID	2411	
IP name	(null)	
Port	5755	
SSL Port	5756	
Register Daemon with WLM DNS	N	

4 View Security Domain Configuration Panels

This panel displays values you previously set in the "Configure security domain" option--you can not change any of the values here. If you do wish to make changes, you must go back to the main dialog panel and run through the "Configure security domain" option again.

Define Variables to configure Deployment Manager node - Definitions: This article lists definitions for the terms you will come across in the WebSphere Application Server for z/OS Customization Dialog.

1 System locations (directories, HLQs, etc)

System Locations (1 of 2)

System name

The system name for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Sysplex name

The sysplex name for the target z/OS system on which WebSphere Application Server for z/OS is installed.

Tip: If you are not sure what the system name (&SYSNAME) and sysplex name (&SYSPLEX) are, use the console command D SYMBOLS on the target z/OS system to display them.

Full Names of Data Sets

For the following, specify the fully-qualified data set names without quotes.

PROCLIB

An existing procedure library where the WebSphere Application Server for z/OS cataloged procedures are to be added.

PARMLIB

An existing parameter library for system definitions to support WebSphere for z/OS. This data set must be in the parmlib concatenation for the target z/OS system.

SYSEXEC

A variable-block (RECFM=VB, LRECL=255) data set into which the customization process places REXX EXECs to be called from TSO, such as the WebSphere for z/OS error log browser, BBORBLOG. You must allocate this data set and concatenate it as part of the SYSEXEC DD allocation in your installation-wide TSO logon PROC or allocation exec.

If your existing SYSEXEC DD data set concatenation consists of fixed-blocked (RECFM=FB) data sets, you must make a copy of the hlq.DATA data set (produced by the Customization Dialog) after the customization process is complete, and place the copy in the SYSEXEC concatenation.

If you do not specify a data set name, the customization process does not place any REXX EXECs in any data set.

Specify the following Language Environment and WebSphere for z/OS data sets and whether they are ("Y") or are not ("N") in the link list or the link pack area (LPA). "N" indicates the generated JCL will contain STEPLIB statements for these data sets. Refer to your SMP/E installation for the location of these data sets listed by their DD Name.

SCEERUN

Your existing Language Environment run-time load module library.

SBBLOAD

WebSphere Application Server for z/OS load module library that you installed through SMP/E. It has members that should go into the link list or LPA.

SBBOLD2

WebSphere Application Server for z/OS load module library that you installed through SMP/E. It has members that should go into the link list. **DO NOT** place them in LPA.

SBBOMIG

WebSphere Application Server for z/OS IPCS data set that you installed through SMP/E. It is not used during normal operations, but for dump formatting in IPCS only. **DO NOT** place them in LPA.

SBBOLPA

WebSphere Application Server for z/OS data set that you installed through SMP/E.

Specify the following WebSphere Application Server for z/OS libraries so they can be accessed by the customized job streams the Dialog produces. These data sets must be cataloged.

SBBOEXEC

WebSphere Application Server for z/OS variable length file distribution PDS you installed through SMP/E.

SBBOMSG

SBBOMSG WebSphere Application Server for z/OS message skeletons for language translation you installed through SMP/E.

System Locations (2 of 2)**Locations of HFS resident components:**

WebSphere SMP/E home directory

The name of the directory where WebSphere Application Server for z/OS files reside after SMP/E installation.

WebSphere JMS Client Java Feature SMP/E home directory

The name of the directory where the WebSphere JMS Client Java Feature files reside after SMP/E installation.

java home directory

The name of the directory where the Java SDK files reside after SMP/E installation.

2 System Environment Customization

System Environment Customization (1 of 1)

WebSphere HFS Information**Mount point**

Read/write HFS directory mount point where application data and environment files are written. The customization process creates this mount point, if it didn't already exist.

Name Hierarchical File System data set mounted at the above mount point.

Volume, or '*' for SMS

Specify either the DASD volume serial number containing the above data set or "*" to let SMS select a volume. Using "*" requires that SMS automatic class selection (ACS) routines be in place to select the volume. If you do not have SMS set up to handle data set allocation automatically, list the volume explicitly.

Primary allocation in cylinders

Initial size allocation in cylinders for the above data set.

Recommendation: The minimum suggested size is 250 cylinders (3390).

Secondary allocation in cylinders

Size of each secondary extent in cylinders.

Recommendation: The minimum suggested size is 100 cylinders.

3 Server Customization

The WebSphere Application Server for z/OS run-time requires four base cell servers: application server, Deployment Manager, node agent, location service daemon. The panels corresponding to the following tables set up the names, network configuration, start procedures, and user IDs for a Deployment Manager server.

Recommendation: Use the IBM default names the first time you install WebSphere Application Server for z/OS to make the installation instructions easier to follow.

For identification, each controller and servant start procedure must have a user ID and will be defined in the STARTED class.

Server Customization (1 of 4)**WAS home directory**

Directory in which the Deployment Manager resides.

Note: You can alter only the portion after "/WebSphere/V5R0M0."

Cell name (short)

Parameter passed to the server's start procedures that specifies the location

of the cell's configuration files and identifies the cell to certain WebSphere Application Server for z/OS-exploited z/OS facilities (for example, SAF).

Rule: Name must be 8 or fewer characters and all uppercase.

Cell name (long)

Primary external identification of this WebSphere Application Server for z/OS cell. This name identifies the cell as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Note: Ensure that the cell name is unique (different from those in other deployment manager or base server configurations).

Rule: Name must be 50 or fewer characters and can be of mixed case.

Node name (short)

Parameter passed to the server's start procedures that specifies the location of the node's configuration files and identifies the node to certain WebSphere Application Server for z/OS-exploited z/OS facilities (for example, SAF).

Rules:

- Name must be 8 or fewer characters and all uppercase.
- Name must be unique within the cell. The Deployment Manager must be defined on its own node; no other server may exist on the same node as the Deployment Manager.

Node name (long)

Primary external identification of this WebSphere Application Server for z/OS node. This name identifies the node as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Note: Ensure that the node name is unique (different from those in other deployment manager or base server configurations).

Rules:

- Name must be 50 or fewer characters and can be of mixed case.
- Name must be unique within the cell. The Deployment Manager must be defined on its own node; no other server may exist on the same node as the Deployment Manager.

Server name (short)

Name of the Deployment Manager server. This is the server's jobname, as specified in the MVS START command JOBNAME parameter. This value is also passed as a parameter to the server's start procedures to specify the location of the server's configuration files and identify the server to certain WebSphere for z/OS- exploited z/OS facilities (for example, SAF).

Rule: Name must be 7 or fewer characters and all uppercase.

Server name (long)

Name of the Deployment Manager server and the primary external identification of this WebSphere Application Server for z/OS server. This name identifies the server as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Rule: Name must be 50 or fewer characters and can be of mixed case.

Cluster transition name

WLM APPLENV name for this server.

Note: The Deployment Manager is not clusterable, so this value never actually becomes the cluster short name of this server's cluster. However, like an application server, the Deployment Manager still needs an APPLENV, so the cluster transition name is used for this purpose.

Rule: Name must be 8 or fewer characters and all uppercase.

Server Customization (2 of 4)**Controller information****Jobname**

The jobname, specified in the MVS START command JOBNAME parameter, associated with the Deployment Manager controller.

Procedure name

Name of member in your procedure library to start the Deployment Manager controller.

Rule: Name must be 7 or fewer characters.

User ID

The user ID associated with the Deployment Manager controller.

Note: If you are using a non-IBM security system, the user ID may have to match the procedure name. Please refer to your security system's documentation.

UID The user identifier associated with this user ID.

Rule: UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.

Servant information**Jobname**

The jobname specified in the IWSSNM parameter of the WLM Application Environment for the server.

Procedure name

Name of member in your procedure library to start the Deployment Manager servant.

Rule: Name must be 7 or fewer characters.

User ID

The user ID associated with the application server servant.

Note: If you are using a non-IBM security system, the user ID may have to match the procedure name. Please refer to your security system's documentation.

UID The user identifier associated with this user ID.

Rule: UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.

Server Customization (3 of 4)**Deployment Manager definitions**

Node host name

IP name or address of the system on which the server is configured. This value is used by other WebSphere Application Server for z/OS functions to connect to this server.

Note: The node host name must always resolve to an IP stack on the system where the application server runs. The node host name cannot be a DVIPA or a DNS name that, in any other way, causes the direction of requests to more than one system.

SOAP JMX Connector port

Port number for the JMX HTTP connection to this server based on the SOAP protocol. JMX is used for remote administrative functions, such as invoking scripts through wsadmin.sh.

Rule: Value cannot be 0.

CELL DISCOVERY ADDRESS port

Port number used by node agents to connect to this Deployment Manager server.

DRS Client Address port

Port address for access to the server's data replication service. This is important for configurations that define replication groups.

Rule: Value cannot be 0.

ORB Listener host name

IP address on which the server's ORB listens for incoming IIOP requests. The default is "*", which instructs the ORB to listen on all available IP addresses.

ORB port

Port for IIOP requests which acts as the bootstrap port for this server and also as the port through which the ORB accepts IIOP requests. Port value cannot be 0.

ORB SSL port

Port for secure IIOP requests. The default is "0", which allows the system to choose this port.

HTTP transport host name

IP address on which the server's Web container should listen for incoming HTTP requests. The default is "*", which instructs the Web container to listen on all available IP addresses.

Note: The "transport host name" becomes the "hostname" in the virtualhosts.xml file, which makes setting a specific IP address here less than ideal because, if you do so, you are restricting yourself to that IP address until you go into the Administrative Console and add another virtual host.

HTTP port

Port for HTTP requests. Port value cannot be 0.

HTTP SSL port

Port for secure HTTP requests. Port value cannot be 0.

Server Customization (4 of 4)**Location Service Daemon definitions**

The location service daemon is the initial point of client contact in WebSphere Application Server for z/OS. The server contains the CORBA-based location

service agent, which places sessions in a cell. All RMI/IIOP IORs (for example, for EJBs) establish connections to the location service daemon first, then forward them to the target application server.

Daemon Home Directory

Directory in which the location service daemon resides.

Daemon Job Name

Specifies the jobname of the location service daemon, specified in the JOBNAME parameter of the MVS start command used to start the location service daemon.

Caution: When configuring a second cell, ensure you change the daemon job name from the default or value you used for the first cell.

Note: A server automatically starts the location service daemon if it is not already running.

Procedure name

Name of the member in your procedure library to start the location service daemon.

Rule: Name must be 7 or fewer characters.

User ID

The user ID associated with the location service daemon.

UID The user identifier associated with this user ID.

Rule: UIDs must be unique numbers, between 1 and 2,147,483,647, within the system.

IP Name

The fully-qualified IP name, registered with the Domain Name Service (DNS), that the location service daemon uses.

Adhere to the following regarding your location service daemon IP name:

- It must be unique in the sysplex.
- It must not have the same value as any one system's node host name.
- It should be a name that can be used in conjunction with a routing service that distributes requests among nodes in the cell (i.e. systems in the sysplex).
- It should be a virtual IP address (VIPA) if you are operating in a sysplex.

Note: IBM recommends you use z/OS Sysplex Distributor and dynamic virtual IP addresses. See related sections in the InfoCenter for more information.

Port The port number on which the location service daemon listens.

SSL Port

The port number on which the location service daemon listens for SSL connections.

Register Daemon with WLM DNS

If you use the WLM DNS (connection optimization), you must select "Y" to register your location service daemon with it. Otherwise, select "N."

Note: Select the IP name and port number for the location service daemon carefully. You can choose any name you want, but, once chosen, it is difficult to change, even in the middle of customization.

4 View Security Domain Configuration Panels

This panel displays values you previously set in the "Configure security domain" option--you can not change any of the values here. If you do wish to make

changes, you must go back to the main dialog panel and run through the "Configure security domain" option again.

Define variables for Federate Base application server node - Worksheets and definitions

This article presents worksheets and definitions that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog.

Note: Any instance of "(cannot change)" in the "Your value" column indicates that you can't change that value in that particular panel. Either the value is static throughout the Dialog, or you need to go back to a previous task to make the change.

Define variables for Federate Base Application Server Node (1 of 1)

Table 39. Define variables for Federate Base Application Server Node (1 of 1)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WAS home directory	/WebSphere/V5R0M0/AppServer	(cannot change)
Deployment Manager access		
Node host name	(null)	
JMX Soap port	8879	
Deployment Manager Security is Enabled	N	
User ID	WSADMIN	(cannot change)
Include Apps	Y	
Base server ORB port	9810	
Node Agent definitions		
Server name (short)		
Server name (long)		(cannot change)
SOAP JMX Connector port	8878	
DRS Client Address port	7888	
Node Discovery port	7272	
Node Multicast Discovery port	5000	
ORB Listener host name	*	
ORB port	2809	
ORB SSL port	0	

WAS home directory

Directory in which the application server resides.

Note: You can alter only the portion after "/WebSphere/V5R0M0."

Deployment Manager access

Node host name

IP name or address of the system on which the server is configured. This value is used by other WebSphere Application Server for z/OS functions to connect to this server.

Note: The node host name must always resolve to an IP stack on the system where the application server runs. The node host name cannot be a DVIPA or a DNS name that, in any other way, causes the direction of requests to more than one system.

JMX Soap port**Deployment Manager Security is Enabled****User ID**

The user ID you use to log onto telnet to perform administrative actions against your server.

Include Apps**Base server ORB port****Node Agent definitions****Server name (short)**

Name of the application server server. This is the server's jobname, as specified in the MVS START command JOBNAME parameter. This value is also passed as a parameter to the server's start procedures to specify the location of the server's configuration files and identify the server to certain WebSphere for z/OS- exploited z/OS facilities (for example, SAF).

Note: The server short name is used as the server JOBNAME.

Rule: Name must be 7 or fewer characters and all uppercase.

Server name (long)

Name of the application server and the primary external identification of this WebSphere Application Server for z/OS server. This name identifies the server as displayed through the Administrative Console and also appears as part of the directory path under the WebSphere Application Server for z/OS home's configuration directory.

Rule: Name must be 50 or fewer characters and can be of mixed case.

SOAP JMX Connector port

Port number for the JMX HTTP connection to this server based on the SOAP protocol. JMX is used for remote administrative functions, such as invoking scripts through wsadmin.sh.

Rule: Value cannot be 0.

DRS Client Address port

Port address for access to the server's data replication service. This is important for configurations that define replication groups.

Rule: Value cannot be 0.

Node Discovery port**Node Multicast Discovery port****ORB Listener host name**

IP address on which the server's ORB listens for incoming IIOP requests. The default is "*", which instructs the ORB to listen on all available IP addresses.

ORB port

Port for IIOP requests which acts as the bootstrap port for this server and also as the port through which the ORB accepts IIOP requests. Port value cannot be 0.

ORB SSL port

Port for secure IIOP requests. The default is "0", which allows the system to choose this port.

Define variables for Web services gateway - Worksheets and definitions

This article presents worksheets and definitions that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog.

Note: Any instance of "(cannot change)" in the "Your value" column indicates that you can't change that value in that particular panel. Either the value is static throughout the Dialog, or you need to go back to a previous task to make the change.

Define variables for Web services gateway (1 of 1)

Table 40. Define variables for Web services gateway (1 of 1)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WebSphere SMP/E home directory	/usr/lpp/zWebSphere/V5R0M0	
WAS home directory	/WebSphere/V5R0M0/AppServer	
Owner and Group information		
Owner	WSADMIN	(cannot change)
Group	WSCFG1	(cannot change)
SBBOEXEC	BBO.SBBOEXEC	

WebSphere SMP/E home directory

The name of the directory where WebSphere Application Server for z/OS files reside after SMP/E installation.

WAS home directory

Directory in which the application server resides.

Owner and Group information

Owner

Group

SBBOEXEC

WebSphere Application Server for z/OS variable length file distribution PDS you installed through SMP/E.

Define variables for configure v5.0.2 License Agreement Refresher - Worksheets and definitions

This article presents worksheets and definitions that will assist you when completing the WebSphere Application Server for z/OS Customization Dialog.

Note: Any instance of "(cannot change)" in the "Your value" column indicates that you can't change that value in that particular panel. Either the value is static throughout the Dialog, or you need to go back to a previous task to make the change.

Define variables for configure v5.0.2 License Agreement Refresher (1 of 1)

Table 41. Define variables for configure v5.0.2 License Agreement Refresher (1 of 1)

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
WAS home directory	/WebSphere/V5R0M0/ AppServer	
Owner and Group information		
Owner	WSADMIN	(cannot change)
Group	WSCFG1	(cannot change)
SBBOEXEC	BBO.SBBOEXEC	

WAS home directory

Directory in which the application server resides.

Owner and Group information

Owner

Group

SBBOEXEC

WebSphere Application Server for z/OS variable length file distribution PDS you installed through SMP/E.

Steps for saving the customization variables

You must have completed the definition of the variables, which is outlined in the article Steps for defining variables.

This section tells you how to complete the "Save customization variables" option that is in all of the main tasks you can perform.

1. On the main Dialog panel, type the appropriate number or letter in the *Option* field to select "Save customization variables".
2. Press Enter. **Result:** You see the Save Customization Variables panel.:

```
----- WebSphere for z/OS Customization -----
Option ==>
```

Save Customization Variables

Specify the name of a sequential data set to contain the customization variables. If the data set does not exist, the Dialog displays the Allocate New Data Set panel, through which you can allocate a data set. Press Enter to continue.

Data set name:

3. Follow the options in order and enter information from the Save customization variables worksheet (be sure to enclose your data set name in single quotes), then press Enter.

You are done when you successfully save the variables.

Save customization variables - Worksheet

Print out this worksheet for each option in the Customization Dialog and use it to record your values as you customize WebSphere Application Server for z/OS.

Table 42. Save customization variables

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Data set name	(null)	

Specify the name of the data set into which you want to save the customization variables.

Rules:

- The data set must be a sequential data set. Do not specify a member name.
- Place quotes around the data set name.

Steps for saving the security domain variables

You must have completed the definition of the security domain variables in the Configure Security Domain task.

This section tells you how to complete the "Save security domain variables" option that is in the Configure Security Domain task.

1. On the main Dialog panel, type the appropriate number in the *Option* field to select "Save security domain variables".
2. Press Enter. **Result:** You see the Save security domain variables panel:

```
----- WebSphere for z/OS Customization -----
Option ==>
```

Save Security Domain Variables

Specify the name of a sequential data set to contain the Security Domain variables. If the data set does not exist, the Dialog displays the Allocate New Data Set panel, through which you can allocate a data set. Press Enter to continue.

Data set name:

3. Follow the options in order and enter information from the Save security domain variables worksheet (be sure to enclose your data set name in single quotes), then press Enter.

You are done when you successfully save the variables.

Save security domain variables - Worksheet

Print out this worksheet for each option in the Customization Dialog and use it to record your values as you customize WebSphere Application Server for z/OS.

Table 43. Save security domain variables

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Data set name	(null)	

Specify the name of the data set into which you want to save the security domain variables.

Rules:

- The data set must be a sequential data set. Do not specify a member name.

- Place quotes around the data set name.

Steps for generating customization jobs

You must complete the process of Defining variables, which is outlined in Steps for defining variables.

This article describes how to complete the "Generate customization jobs" option that is in all of the main tasks you can perform.

Recommendation: When you have finished entering all your customization data, before you generate the customization jobs, use the "Save customization variables" option to save your customization variables for future reference.

1. On the main Dialog panel, type the appropriate number in the *Option* field to select "Generate customization jobs".
2. Press Enter.

Result: If all variables are defined correctly, you see the Specify Job Cards panel:

```
----- WebSphere for z/OS Customization -----
Option ==>
```

Generate Customization Jobs

This portion of the Customization Dialog generates the jobs you must run after you complete this Dialog process. You must complete the customization process before you generate the jobs with this step. If you have not done this, please return to that step.

Jobs and data files will get generated into data sets:

```
'hlq.CNTL'
'hlq.DATA'
```

If you wish to generate using other data sets, then END from this panel and select option 1 (Allocate target data sets).

All the jobs that will be tailored for you will need a jobcard. Please enter a valid jobcard for your installation below. The file tailoring process will update the jobname for you in all the generated jobs, so you need not be concerned with that portion of the job cards below. If continuations are needed, replace the comment cards with continuations as needed.

Specify the job cards. Press ENTER to continue.

```
//jobname JOB (ACCTNO,ROOM),'userid',CLASS=A,REGION=0M
//*
//*
//*
```

Note: Pay particular attention to the displayed target data sets.

3. Fill in the job card information using the Generate customization jobs worksheet, then press **Enter**.

You are done when all the jobs are generated. You may then move ahead to viewing the generated jobs.

Generate customization jobs - Worksheet

Print out this worksheet for each option in the Customization Dialog and use it to record your values as you customize WebSphere Application Server for z/OS.

Table 44. Generate customization jobs

Item	Value in the Dialog after you load IBM defaults	Your value (Fill in the blanks)
Job card information	//jobname JOB (ACCTNO,ROOM),userid,CLASS=A,REGION=0M //* //* //*	

Specify the job card according to your installation requirements. For each job, the Dialog generates a job name and the "JOB" keyword to match the member name of the PDS, but you specify the rest.

Note: If you need to run these jobs on a particular system in the sysplex (for example, JES2 MAS or JES3 complex), you should specify the necessary Scheduling Environment (SCHENV), JES2 JOBPARM, or JES3 `//*MAIN` statement at this time.

Example of a job card entry:

```
//jobname JOB 1234,USER1,NOTIFY=????,MSGCLASS=0,REGION=0M
//*          USER=SYSADM1,PASSWORD=SYSADM1
/*JOBPARM  SYSAFF=SYSB
```

Note: This example is useful for jobs that require a userid other than that of the logged-on TSO user (typically a userid with UID=0). In that case, you can just put a comma at the end of the first line, put in the correct userid on the second line, then un-comment that second line.

Steps for viewing and following the generated customization instructions

You must complete the generation of the customization jobs.

This section tells you how to complete the "View instructions" option that is in all of the main tasks you can perform. Once you view the steps and verify your information, you can then follow the steps.

Note: It is very helpful to also print the instructions for reference and to use as a checklist for all the installation and customization steps you need to follow.

There are four phases you go through when following the generated instructions:

1. Perform manual system updates:
 - WLM
 - SCHEDxx
 - APF
 - SMF
 - BPXPRMxx
 - LPA
 - Link list.
2. Run system-related jobs:
 - Logstream
 - RRS
 - CTRACE
 - RACF profiles and resources.

3. Run your server's HFS-related jobs:
 - Create and mount the HFS file system.
 - Populate the HFS with directories and XML.
 - Create the was.env files for the location service daemon and servers.
 - Batch install the Administration application.
 - Clean up the HFS structure.
4. Start your servers:
 - Start CTRACE.
 - Start your controller. (The controller automatically starts the location service daemon, and WLM starts the servants.)
1. On the main Dialog panel, type the appropriate number in the *Option* field to select "View instructions".
2. Press Enter. You will then see the generated instructions file.
3. View the instructions.
4. Check the instructions for any typographical errors you may have introduced when entering your variables or other information. If necessary, modify your variables using the Dialog, regenerate the instructions, and re-review the results.

Note: Do **not** attempt to fix a typo or make a change by modifying the generated output. Many of the variables are used in multiple members of the target data sets, so, if you don't change them all, you will run into very difficult-to-diagnose problems.

5. Print the instructions according to your local print procedures.

You are done when you view or print the instructions. You can now go on to follow them, using the worksheet for your task as a guide.

Following the customized Security Domain Configuration instructions

The major stages of the security domain configuration process are:

Table 45. Following the customized security domain configuration instructions

Stage	Description
1	Make a variety of configuration changes to your z/OS system configuration. The customized instructions provide details and pointers to relevant documentation.
2	Builds the RACF commands for the WebSphere Application Server for z/OS security domain with job BBOSBRAJ.
3	Invoke RACF commands that instantiate the security rules set up in the previous job with job BBOSBRAK.

Following the customized application server node instructions

The major stages of the application server node customization process are:

Table 46. Following the customized Application Server node instructions

Stage	Description
1	Make a variety of configuration changes to your z/OS system configuration (PARMLIB, TCP/IP, workload management, and so forth). The customized instructions provide details and pointers to relevant documentation.

Table 46. Following the customized Application Server node instructions (continued)

Stage	Description
2	If you require message translation, set up MMS to translate messages for WebSphere for z/OS with job BBOMSGC. Note: If you are not using NLS (National Language Support), you can skip this job.
3	Define log streams used by WebSphere Application Server for z/OS and RRS through jobs BBOERRLG and BBORRSLs. You do not need to run BBORRSLs if RRS is already running on your target MVS system.
4	Allocate the CTRACE data set through job BBOWCTR.
5	Create a customized set of RACF commands for initial WebSphere Application Server for z/OS security setup through job BBOCBRAJ. The RACF commands are saved in member BBOWBRAK of the <i>hlq</i> . DATA data set. Job BBOWBRAK executes these RACF commands. Later, you can use the RACF commands saved in BBOWBRAK to help in defining security for additional servers or users.
6	Check the authorization level of all your user IDs and modify them where necessary.
7	Allocate and mount the WebSphere Application Server for z/OS run-time HFS through job BBOWCHFS. If your root HFS is mounted read-only, you may need to create one or more directories manually. See the instructions for details. Job BBOMCFG creates subdirectories in the WebSphere Application Server for z/OS run-time HFS and job BBOMCFGU, which is optional, configures the run-time HFS to include the directory for UDDIReg.
8	Copy customized PARMLIB and PROCLIB members into their proper locations using job BBOWCPY1.
9	Copy customized HFS files into their proper locations using job BBOWCPY2.
10	Create the was.env file for the location service daemon and the application servers through job BBOWC2N.
11	Install the Administrative Console and the IVT application through job BBOWIAPP.
12	(Optional) Copy digital certificates from RACF to the keystores in the hfs with job BBOCR2FA.
13	Complete the HFS initialization with job BBOMCFG2.
14	Activate Resource Recovery Services (RRS), if it is not already active, with the MVS command START ATRRRS, SUB=MSTR.
15	Start the CTRACE writer used by WebSphere Application Server for z/OS with the MVS command TRACE CT, WTRSTART= BBOWTR.

Table 46. Following the customized Application Server node instructions (continued)

Stage	Description
16	Start the application server with the following MVS command (all on one line): <code>S <controller_procname,JOBNAME=server_shortname, ENV=<cell_shortname.node_shortname.server_shortname</code> This process causes information to be stored in the HFS. Once the process is complete, you have a working WebSphere Application Server for z/OS run-time that you will use to run the Installation Verification Test (using job BBOWIVT) and your own applications.
17	For reference purposes only, configure samples with jobs BBODEFR, BBOINST, and BBOUNIN. Ensure you reset all sample ears to their original state and delete the samples when you are finished with them.
18	Use the BBOWBRAC sample exec to help define security controls for clusters. It defines all the user IDs and groups that are necessary and sufficient for installing WebSphere Application Server for z/OS, among other things.

Following the customized integral JMS provider instructions

The major stages of the integral JMS provider customization process are:

Table 47. Following the customized integral JMS provider instructions

Stage	Description
1	Make a variety of configuration changes to your z/OS system configuration. The customized instructions provide details and pointers to relevant documentation.
2	Set the authorization bits for involved MQ files.
3	Establish security identity for the MQ started tasks.
4	Creates dual bootstrap data sets for usage by the Integral JMS Provider WebSphere MQ Queue Manager with job BBOJBSDS.
5	Create page data sets for usage by the Integral JMS Provider WebSphere MQ Queue Manager with job BBOJPAGR.
6	Assemble your parameters with jobs BBOJXPRR and BBOJZPRR. BBOJXPRR assembles the X parameters for usage by the Integral JMS Provider WebSphere MQ Channel Initiator, and BBOJZPRR assembles the Z parameters for usage by the Integral JMS Provider WebSphere MQ Queue Manager.
7	Copy the tailored start procedures and parameters to the run-time libraries with jobs BBOWCPYJ and BBOWCPYZ.
8	Stop the application server with the MVS command <code>STOP server_shortname</code> .
9	Run job BBOWCPJ2 to write z/OS UNIX resident files into the HFS for use by the application server.
10	Initialize the Integral JMS Provider run-time environment in the HFS for the application server with job BBOWJWC.

Table 47. Following the customized integral JMS provider instructions (continued)

Stage	Description
11	<p>Start the application server with the following MVS command (all on one line):</p> <pre>S <controller_procname,JOBNAME=server_shortname, ENV=<cell_shortname.node_shortname.server_shortname</pre> <p>This process causes information to be stored in the HFS. Once the process is complete, you have a working WebSphere Application Server for z/OS run-time that you will use to run the Installation Verification Test (using job BBOWIVT) and your own applications.</p>
12	<p>For reference purposes only, configure samples with jobs BBODEFRM, BBOINSTM, and BBOUNINM. Ensure you reset all sample ears to their original state and delete the samples when you are finished with them.</p>

Following the customized Deployment Manager node instructions

The major stages of the Deployment Manager node customization process are:

Table 48. Following the customized Deployment Manager node instructions

Stage	Description
1	<p>Make a variety of configuration changes to your z/OS system configuration (PARMLIB, TCP/IP, workload management, and so forth). The customized instructions provide details and pointers to relevant documentation.</p>
2	<p>Create a customized set of RACF commands for initial WebSphere Application Server for z/OS security setup through job BBODBRAJ. The RACF commands are saved in member BBODBRAK of the <i>hlq</i>.DATA data set. Job BBODBRAK executes these RACF commands. Later, you can use the RACF commands saved in BBODBRAK to help in defining security for additional servers or users.</p>
3	<p>Allocate and mount the WebSphere Application Server for z/OS run-time HFS through job BBODCHFS. If your root HFS is mounted read-only, you may need to create one or more directories manually. See the instructions for details. Job BBODCFG creates subdirectories in the WebSphere Application Server for z/OS run-time HFS.</p>
4	<p>Configure the run-time HFS to include the directory for UDDIReg with the job BBOMCFGU, if desired.</p>
5	<p>Copy customized PROCLIB members into their proper locations using job BBODCPY1.</p>
6	<p>Copy customized HFS files into their proper locations using job BBODCPY2.</p>
7	<p>Create the was.env file for the location service daemon and the application servers through job BBODC2N.</p>
8	<p>Install the Administrative Console and the filetransfer application through job BBODIAPP.</p>
9	<p>Complete the HFS initialization with job BBODCFG2.</p>

Table 48. Following the customized Deployment Manager node instructions (continued)

Stage	Description
10	Activate Resource Recovery Services (RRS), if it is not already active, with the MVS command START ATRRRS, SUB=MSTR.
11	Start the Deployment Manager (and, hence, the location service daemon) with the MVS command START BB05DCR, JOBNAME=BBODMGR. This process stores information in the HFS. Once the process is complete, you have a working WebSphere Application Server for z/OS network deployment run-time that you will use to run your own applications.
12	Use the BBODBRAC sample exec to help define security controls. It defines all the user IDs and groups that are necessary and sufficient for installing WebSphere for z/OS, among other things.

Following the customized Federate Base application server node instructions

The major stages of the base application server node federation process are:

Table 49. Following the customized Federate Base application server node instructions

Stage	Description
1	Make a variety of configuration changes to your z/OS system configuration. The customized instructions provide details and pointers to relevant documentation.
2	Add the application server(s) associated with the base application server node to the deployment manager's cell with job BBOWADDN.
3	Update the application server's WLM application environment.
4	(Optional) Start the node agent server with the MVS command START <i>controller_procname</i> , JOBNAME= <i>server_shortname</i> , ENV= <i>cell_shortname.node_shortname.server_</i>
5	Start the JMS server with the MVS command START <i>controller_procname</i> , JOBNAME= <i>server_shortname</i> , ENV= <i>cell_shortname.node_shortname.server_</i>
6	(Optional) Start the application server with the following MVS command (all on one line): S < <i>controller_procname</i> , JOBNAME= <i>server_shortname</i> , ENV=< <i>cell_shortname.node_shortname.server_shortname</i>

Following the customized Web services gateway instructions

The major stages of the Web services gateway process are:

Table 50. Following the customized Web services gateway instructions

Stage	Description
1	Run job BBOMCFGW to configure the runtime HFS to include the directory for "webservices."
2	Install the "development kit" onto your workstation.

Following the customized v5.0.2 License Agreement Refresher instructions

The major stages of the v5.0.2 License Agreement Refresher process are:

Table 51. Following the customized v5.0.2 License Agreement Refresher instructions

Stage	Description
1	Run job BBOWLDOC to update the product to indicate that you've read the License Agreement.

z/OS port assignments

Purpose

The following table lists the default server values for WebSphere Application Server for z/OS V5.

z/OS port assignments

The following table lists the z/OS port assignments.

Port	Base location service daemon	Base Application Server	ND location service daemon	ND Application Server	Node Agent	JMS Server	Deploy. Manager
HTTP		9080		9080			9090
HTTP/S		9443		9443			9043
Bootstrap		2809		9810	2809	2810	9809
ORB	5655	2809	5755	9810	2809	2810	9809
ORB SSL	5656	0	5756	0	0	0	0
SOAP/JMX		8880		8880	8878	8876	8879
DRS		7873		7873	7888		7989
JMS Queued		5558				5558	
JMS Direct		5559				5559	
Node Discovery					7272		
Node Multi-cast Discovery					5000		
Cell Discovery							7277

Cold-starting RRS

Perform the following steps to cold-start RRS.

1. Shut down WebSphere Application Server for z/OS (if running) and DB2 (if in use).
2. Shut down RRS using the SETRRS CANCEL command.
3. Delete and redefine the RRS resource manager data logstream (RM.DATA) using the same attributes you used to create it.

Note: See member ATRCOLD in SYS1.SAMPLIB for a sample jobstream.

4. Start RRS using the S ATRRRS, SUB=MSTR command.

You know you are done when the job completes successfully.

Handling workload management and server failures

During operations, if your application fails repeatedly, causing the application servants to terminate, workload management may terminate the application environment for the application. WebSphere Application Server for z/OS issues the following message if it tries to use a failed application environment:

```
BB000075E Unable to schedule work. WLM application environment applenv has stopped.
```

You must fix the problem with your application, then restart the application environment with the RESUME option on the VARY WLM command.

Perform these steps to check and start the workload management application environment.

Note: The dynamic application environment commands apply only if you are running z/OS V1.2 or above with the WLM-DAE support PTF (APAR OW54622). See the assembling applications information in the InfoCenter for more information.

1. Display the application environment. To do so, issue

```
d wlm,applenv=*
```

for static application environments or

```
d wlm,dynappl=*
```

for dynamic application environments.

2. Start the application environment. To do so, issue

```
v wlm,applenv=environment_name,resume
```

for static application environments (where **environment_name** is the application environment name) or

```
v wlm,dynappl=applenv,resume
```

for dynamic application environments.

You know you are done when a re-display of the application environment shows it is available.

Chapter 5. Performing WebSphere Application Server for z/OS post-installation tasks

Once you have WebSphere Application Server for z/OS running smoothly on your system, there are many things you can do to test and modify the product to suit your needs even further. This article introduces the various post-installation tasks available to you.

1. Install service to WebSphere Application Server for z/OS.

This task helps you apply maintenance to WebSphere Application Server for z/OS.

2. Detect and recover from failures using z/OS Automatic Restart Management (ARM).
3. Install the embedded messaging feature for use as the integral JMS provider.
4. Run the installation verification test (IVT). Although the IVT is a step you must perform when customizing the product with the Customization Dialog, you can also run it any time you choose using other methods.
5. Install a new release of WebSphere Application Server for z/OS.

This task helps you maintain the availability of sysplex systems when installing a new release or maintenance level of WebSphere Application Server for z/OS.

Installing service to WebSphere Application Server for z/OS

Maintaining the base z/OS environment in addition to the WebSphere Application Server can require an in-depth knowledge of applying service and the product service stream. This is especially important in a high yield production environment where availability is of the utmost importance. Therefore planning service and knowing how to best apply service are essential skills.

Contact the IBM Software Support Center for information about preventive service planning (PSP) upgrades for WebSphere Application Server for z/OS. For more information about PSP upgrades, see *WebSphere Application Server for z/OS V5.0: Program Directory*. Although the *Program Directory* contains a list of required program temporary fixes (PTFs), the most current information is available from the IBM Software Support Center.

Make copies of the product data sets and HFS structure, and apply maintenance to the copies when applying service to WebSphere Application Server for z/OS. Use the following procedure to put the maintenance into production.

1. Stop the Application Servers and the WebSphere Application Server for z/OS location service daemon.
2. Stop CTRACE.
3. Switch to the newly-serviced WebSphere Application Server for z/OS product data sets. You can do this by:
 - a. Rename the new data sets to replace the old ones.
 - b. Recatalog product data sets, if the names are identical, or change WebSphere Application Server for z/OS cataloged procedures to refer explicitly to the new data sets. If you are using new data set names, you need to also handle program controls, so update the program control list.

Verify that the MVS link list and APF list refer to the newly-serviced data sets.

4. If the WebSphere Application Server for z/OS run-time is loaded into the link pack area, delete the old modules and load the new ones, or IPL the system to load the new modules into the LPA.
5. Verify that the newly-serviced HFS data sets are correctly mounted.
6. Perform any other migration actions as instructed in PTF or APAR cover letters.
7. Start the location service daemon and application servers.
8. Complete any necessary post-install tasks.

You can maintain service to clients when upgrading the host cluster of WebSphere Application Server for z/OS.

Applying or restoring off a service level

Following the delivery of WebSphere Application Server for z/OS service level W500104, there are additional actions that you need to perform when using SMP/E to apply a new service level or restore off a service level. These new WebSphere Application Server for z/OS add-ons, which you perform on the WebSphere run-time home directory created in the HFS by the Customization Dialog, were put into place to reduce some of the post-install service actions you previously had to perform by hand. It also makes possible tasks you couldn't perform before, such as updating customized files (such as `setupCmdLine.sh` or `server.xml`, which contain unique content for each node) that exist in each WebSphere run-time home directory, or expecting new files to appear in the WebSphere run-time home directory after you add them to the SMP/E home directory.

Note: After you apply service level W500104 (PTF UQ79825), you might want to set up a rule to combat performance problems related to post-install. See Workload management (WLM) tuning tips for z/OS for more information.

Post-install tasks for after applying a new service level

This topic describes post-install tasks you complete after applying a new service level.

The new post-install functionality includes actions you perform the first time the server is restarted after you install service with SMP/E. It includes a new step, which automatically launches the `applyPTF.sh` shell script, in the server `proc`. `applyPTF.sh`, which is located in your `bin` directory (`$WAS_HOME/bin`, where `$WAS_HOME` is the absolute path of the WebSphere run-time home directory), makes sure that any pending post-install actions are properly applied before starting the server.

You don't have to perform any new manual steps when using SMP/E to apply service unless there is something in your configuration that prevents the `applyPTF.sh` shell script from running properly or if you are applying a particular service release that requires manual intervention.

Since post-install processing executes under the controller `proc`, it executes with the identity assigned to that particular `proc`. While that identity has sufficient authority to perform MOST HFS file actions required on the WebSphere run-time home directory, you cannot assume it to have the appropriate authority for your `applyPTF.sh` shell script. Therefore, you cannot perform any post-install action that requires special authority by "inline" apply processing. You must manually

perform any such apply processing in "batch" mode, running applyPTF.sh or the appropriate jobs from a user that has the needed authority to apply a particular action.

Note:

- When you launch the shell script from the server proc, it automatically runs in "inline" mode and can only apply service that qualifies as "inline."
- If batch service is delivered, you'll find the needed user authority noted in the service level documentation.

To start the post installer, you can run applyPTF.sh OR you can submit specific jobs depending on the intended node. So, perform ONE of the tasks below.

1. Run applyPTF.sh in batch mode by issuing "run applyPTF.sh" in the bin directory of each existing node OR
2. Submit BBOWAPLB for a base application server node, or BBOWAPLD for a Deployment Manager node.

The post installer component enforces that certain actions are performed successfully and preconditions are met before applying service. Otherwise, warnings or error messages result. If you launched the applyPTF.sh script from the server proc, the output is appended to the file `$WAS_HOME/properties/service/logs/ applyPTF.out`. If you ran applyPTF.sh manually from the shell, the output goes right to stdout (on the shell from where the applyPTF.sh script was run) and WTO messages are issued. In the latter case, no output is appended to the applyPTF.log log file.

Whenever actions are performed on the WebSphere run-time home directory, a log file is kept. (This does not apply if you ran applyPTF.sh manually from the shell, as indicated above.) When warnings or errors occur, the absolute path to the log file is displayed so that you can examine the details of the problem. The following is a list of common errors that might occur when the post installer (applyPTF.sh) applies service. The errors will most likely appear in the form of error codes on the console on which applyPTF.sh was issued.

The post installer ran and determined that the SMP/E home directory was SMP/E rolled back in service to an earlier version than that at which the WebSphere run-time home directory is running.

This occurs if the SMP/E restore off was performed without first running the backoutPTF.sh shell script. The server will not start if it detects this condition, and post-install action halts without applying service.

The post installer issued a warning message while installing service.

Warnings are still a success, but you should still look at the log file. A console message is issued for each warning hit during apply processing, but the server will still start.

Note: These warning messages appear only the first time you run the post installer as it does not retry to apply service for defects that issue warnings. It is important to check the log file in all cases because this could indicate that a certain function is disabled.

The post installer incurred an error and stopped processing.

When this happens, make sure you review the log and correct the error. The server will not start until it is able to successfully complete the post-install action on which it is failing.

You tried to start the server, but the post installer came in and found "batch" service pending.

The post installer checks batch service before starting anything. It issues such a message and exits without doing any of the pending service if it finds any.

Note: If the post installer detects this condition, it won't allow the server to start.

Post-install tasks for after restoring off a service level

This topic describes post-install tasks you complete after restoring off of a new service level.

When restoring off service, you need to "back off" any post-install actions applied during that service. Follow these steps to run the "backoutPTF.sh" shell script, which is located in your bin directory (\$WAS_HOME/bin, where \$WAS_HOME is the absolute path of the WebSphere run-time home directory) and will take care of this for you.

The following is a list of common errors that might occur when you use backoutPTF.sh to back out of service. The output goes right to stdout (on the shell from where the applyPTF.sh script was run).

A valid, currently installed PTF or APAR name must be specified (case sensitive).

If a PTF or APAR isn't specified, then the "usage" of the command is printed along with a listing of the currently installed and pending service units.

Level check failed message.

This indicates that the WebSphere run-time home directory is at a higher service level than the SMP/E home directory, which can happen if you SMP/E restore off a PTF or APAR level without first running the backoutPTF.sh script. You will see a message like this: "Error: The WebSphere run-time home directory is at a higher service level than the SMP/E home directory. You must use SMP/E to return to level <service level that was just SMP/E restored off> and use the backoutPTF.sh to return to level <current service level>."

Service pending warning

This means you are running the backoutPTF.sh script but still have service pending. This error could happen if:

- You installed a new service level with SMP/E but haven't started the server or explicitly run applyPTF.sh yet.
- You installed a new service level with SMP/E but the post-install of the new level failed. So, you decided to roll back service, creating new pending service in the process.
- You ran the backoutPTF.sh script more than once without SMP/E backing off a PTF level.

1. Bring down those servers in the node for which you are doing backoff processing.
2. Launch the backoutPTF.sh script, specifying the committed service level to which you intend SMP/E to revert ("restore off").

Example: This is an example of the command used to run the backoutPTF.sh shell script, run from the shell by a user with the proper authority. It prepares the WebSphere run-time home directory to run at service level "W500104."

```
backoutPTF.sh W500104
```

Note:

- The shell script uses service levels of the form "Wvrmxyy" (PTF), "AQxxxxx" (++APAR), or UQxxxx (SMP/E service).
 - The shell script is case sensitive.
3. After using the backoutPTF.sh shell script, follow the normal SMP/E procedures for restoring off a service level.

You know you are done when you are successfully back on the desired service level.

Automatic restart management

If you have an application that is critical for your business, you need facilities to manage failures. z/OS provides rich automation interfaces, such as automatic restart management, that you can use to detect and recover from failures. Automatic restart management handles the restarting of servers when failures occur.

WebSphere Application Server for z/OS uses the z/OS Automatic Restart Management (ARM) to recover application servers. Each application server running on a z/OS system (including servers you create for your business applications) are automatically registered with an ARM group. Each registration uses a special element type called SYSCB, which ARM treats as restart level 3, assuring that RRS restarts before any application server.

Tips:

- If you have automatic restart management (ARM) enabled on your system, you may wish to disable ARM for the WebSphere Application Server for z/OS address spaces before you install and customize WebSphere Application Server for z/OS. During customization, job errors may cause unnecessary restarts of the WebSphere Application Server for z/OS address spaces. After installation and customization, consider enabling ARM.
- If you are ARM-enabled and you cancel or stop a server, it will restart in place using the armrestart command.
- It is a good idea to set up an ARM policy for your Deployment Manager and node agents.
- If you start the location service daemon on a system that already has one, it will terminate.
- Every other server will come up on a dynamic port unless the configuration has a fixed port. Therefore, the fixed ports must be unique in a sysplex.
- If you issue STOP, CANCEL, or MODIFY commands against server instances, be aware of how automatic restart management behaves regarding WebSphere Application Server for z/OS server instances:

Table 52. Behavior of automatic restart management regarding WebSphere Application Server for z/OS server instances

If you issue . . .	Automatic restart management will . . .
STOP <i>address_space</i>	not restart the address space
CANCEL <i>address_space</i>	not restart the address space
CANCEL <i>address_space</i> , ARMRESTART	restart the address space
MODIFY <i>address_space</i> , CANCEL	not restart the address space

Table 52. Behavior of automatic restart management regarding WebSphere Application Server for z/OS server instances (continued)

If you issue . . .	Automatic restart management will . . .
MODIFY <i>address_space</i> , CANCEL,ARMRESTART	restart the address space

Activating automatic restart management

You must have access to the couple data set format utility, IXCL1DSU, in SYS1.MIGLIB. If you plan to modify the automatic restart management policy, you must have access to the administrative data utility, IXCMIAPU, also in SYS1.MIGLIB, and have UPDATE authorization to the RACF FACILITY class MVSADMIN.XCF.ARM. To start a policy, you must have READ authorization to the RACF FACILITY class MVSADMIN.XCF.ARM.

Though servers automatically register with automatic restart management, you must activate the arm component itself, which means you must:

1. Allocate an ARM couple data set
2. Start the automatic restart management policy

If automatic restart management is not active, WebSphere Application Server for z/OS issues an error message to the hardcopy log.

You are not required to change the automatic restart management policy. However, you will have to modify this policy if you want to create custom restart groups. For instance, it is not required or recommended that you start the node agent or deployment manager servers on another system. These servers will never have any transactional recovery to perform. Therefore, they should only be set up for restart-in-place. For complete information about how to modify the policies, see *z/OS MVS Setting Up a Sysplex, SA22-7625*.

The following procedure is intended to give you enough information to get automatic restart management running. Defining automatic restart management policies would require the z/OS manual mentioned above.

1. If you have not already formatted a couple data set for policies, do so now. For details, see *z/OS MVS Setting Up a Sysplex*
2. Submit the job to format the ARM couple data set.
3. Optional: Modify the automatic restart management policy. To get started, you do not need to modify the policy. If you do want to modify the automatic restart management policy, go to *z/OS MVS Setting Up a Sysplex*, and follow the instructions in that manual.
4. Issue the following operator commands to start the automatic restart management policy:

```
SETXCF COUPLE,TYPE=ARM,PCOUPLE=(dsname,vvvvvv)
SETXCF START,POLICY,TYPE=ARM
```

where

dsname

Is the data set name for the couple data set.

vvvvvv

Is the volume serial of the volume on which the couple data set resides.

You are done when the SETXCF commands complete successfully.

Changing automatic restart management policies

Because server instances register with the default restart group, when a system failure occurs, automatic restart management attempts to restart the entire default group on another system in the sysplex. If you want to create a restart group other than this default group, you must follow the following rules and restrictions that apply for z/OS automatic restart management policies. For more information about how to actually change these policies, see, *z/OS MVS Setting Up a Sysplex*, SA22-7625.

- To change the policy, you need to know the existing element names for the server instances and how to name new elements for additional instances. The element names for these server instances are formed by concatenating the cell short name and the servers specific short name.

For example, if you have a cell named PLEX1 and server named BBOS001, the ARM element name would be PLEX1BBOS001.

Since wildcard characters can be used in the ARM policy, it is possible to exclude an entire group of servers by using a common naming scheme within your cell.

For example, the following section of the ARM policy will prevent any node agents from starting, assuming each node agent in your cell has a name that adheres to the form BBONxxx:

```
RESTART_GROUP(WEBSPHERE)
ELEMENT(PLEX1BBON*)
RESTART_ATTEMPTS(0,150)
RESTART_TIMEOUT(600)
READY_TIMEOUT(1200)
TERMTYPE(ALLTERM)
RESTART_METHOD(BOTH,PERSIST)
```

This ARM policy will also prevent the node agent from restarting in-place. This specification can be modified by changing the RESTART_METHOD and TERMTYPE parameters. See *z/OS MVS Setting Up a Sysplex*, SA22-7625 for more information.

- If you create a restart group, keep the following in the same restart group and set the restart order for the elements as indicated:
 1. RRS
 2. DB2 with IRLM, IMS, CICS, and other transaction or resource managers, if used by your application servers in the restart group
 3. Your server instances.

IBM recommends that you should either set up the Daemon and node agent for restart-in-place or remove them from your ARM policy. Since WebSphere application server must be running on all systems that might be used to perform recovery, the application servers will use the Daemon and node agent that are already running on the alternate system. If the Daemon attempts to restart on the alternate system, it will fail. If the node agent restarts on the alternate system, it will have no recovery work to do.

Displaying the status of ARM-registered address spaces

Perform the following steps to use ARM to display the status of ARM registered address spaces (including the address spaces of server instances) in the WebSphere Application Server for z/OS environment:

1. Initialize all servers.
2. Display all registered address spaces (including the address spaces of server instances). Issue the following command:

```
d xcf,armstatus,detail
```

Tips for installing the embedded messaging feature

When installing IBM WebSphere Application Server for z/OS, you can install the embedded messaging feature for use as the Java message service (JMS) provider, which is also frequently called the integral JMS provider. The integral JMS provider is installed using the Customization Dialog.

Installing the embedded messaging server feature if WebSphere MQ Version 5.3 is already installed

You have a choice if you already have WebSphere MQ Version 5.3 installed:

- You can install only the embedded messaging client feature on a machine that already has WebSphere MQ Version 5.3.

To use WebSphere MQ Version 5.3 as the JMS provider, install the IBM WebSphere Application Server product with only the embedded messaging client feature. Installing and using the WebSphere Application Server embedded messaging client feature is recommended with either the server feature or the full WebSphere MQ Version 5.3 product.

WebSphere Application Server messaging applications can use the WebSphere MQ Version 5.3 product as the JMS provider. Using the client feature, however, requires that you install the WebSphere MQ Version 5.3 Java messaging feature.

- You can install the embedded messaging server and client features on a machine that already has WebSphere MQ Version 5.3.

To install the embedded messaging server feature when WebSphere MQ Version 5.3 is already installed, upgrade WebSphere MQ Version 5.3:

- Apply the CSD01 update to the original WebSphere MQ Version 5.3 release, or move to the WebSphere MQ Version 5.3 refresh release (which includes CSD01).
- Install the WebSphere MQ Version 5.3 features, server and Java messaging, which the WebSphere Application Server embedded messaging server feature requires.

If you install WebSphere MQ Version 5.3 without the required features, the installation of either IBM WebSphere Application Server embedded messaging feature is unsuccessful because of prerequisite check errors. The IBM WebSphere Business Integration Server Foundation package includes installation images of the WebSphere MQ Version 5.3 product and the WebSphere MQ Event Broker product, with restricted licensing. You can use the products to install the required WebSphere MQ Version 5.3 features or to install the refresh release of WebSphere MQ Version 5.3 for use with IBM WebSphere Business Integration Server Foundation.

Avoiding a coexistence problem between embedded messaging, IBM WebSphere Studio Application Developer Integration Edition, and IBM WebSphere Application Server

The IBM WebSphere Studio Application Developer Integration Edition and IBM WebSphere Application Server both include an option to install embedded messaging. The embedded messaging option in these two products is incompatible.

To avoid this problem, do not install embedded messaging for both products on the same machine.

For current information available from IBM Support on known problems and their resolution, see this customized IBM Support page.

IBM Support has documents that can save you time gathering information needed to resolve this problem. Before opening a PMR, see this customized IBM Support page.

Using the installation verification test

You initially run the installation verification test (IVT), which verifies that WebSphere application server is configured correctly for your system, during ISPF customization of each of your systems. If you want to run the IVT at a time other than during initial customization, however, there are two methods from which you can choose.

Note: These options are available only if the user is running a base application server configuration.

Select either method to invoke the IVT:

- Use the BBOWIVT job
- Run `ivt.sh` from a command line

Running the Installation Verification Test with a job

The application server must be running.

Follow these steps to run the Installation Verification Test using the BBOWIVT job.

1. Verify that the application server is running.

Note: The IVT will end unsuccessfully if the server is not running.

2. Confirm that the `ivtApp` application is installed and started.
3. Submit the job BBOWIVT.

After initialization, the IVT runs its series of verification tests and reports pass or fail status for each in the messages generated by the BBOWIVT job. Once it finishes, check the results in the `install_root/logs/ivt.log` file.

Running the Installation Verification Test from a command line

The application server must be running.

Follow these steps to run the Installation Verification Test from a command line.

1. Verify that the application server is running.

Note: The IVT will end unsuccessfully if the application server is not running.

2. Confirm that the `ivtApp` application is installed and started.
3. From a command line, navigate to the `/WebSphere/V5R0M0/AppServer/bin` directory.
4. Issue the following command:

```
ivt.sh [-p port_number] [-host host_name]
```

where

- `-p port_number` is an optional argument that specifies your port number. If you do not specify a port number, the program will use the default port number value of 9080.
- `-host host_name` is an optional argument that specifies your host name. If you do not specify a host name, the program will use the host name value that is set in your TCP/IP hosts file.

Example:

```
/WebSphere/V5R0M0/AppServer/bin> ivt.sh -p 9090 -host myhost
```

The IVT will run, producing a series of verification tests and reporting pass or fail status in the messages generated by the BBOWIVT job. It will also log results to the `install_root\logs\ivt.log` file.

Note: After command line initialization, the IVT runs its series of verification tests and reports pass or fail status for each. Once it finishes, check the results in the `install_root/logs/ivt.log` file.

Installing new releases and maintenance levels of WebSphere Application Server for z/OS

This task uses IBM functions and methods to migrate WebSphere Application Server for z/OS in a sysplex from one functional level to the next, with as little disruption as possible. This task does not apply to WebSphere Application Server for z/OS running in a monoplex, or on a single system in a sysplex. Installing a new code level in a monoplex requires you to shut down WebSphere Application Server for z/OS. You have no choice but to disrupt service to clients of the monoplex system. You can also ignore this topic if disrupting service to clients is not a problem when running WebSphere Application Server for z/OS in a sysplex.

IBM functions and methods for migrating WebSphere Application Server for z/OS include the following:

- Documenting types of migration methods.
- Providing a function to offload WebSphere Application Server for z/OS configuration data for reloading later into a new or existing configuration.
- Managing WebSphere Application Server variables in a central system-management database, so that there is no confusion about where to go for authoritative configuration data.
- Supporting differing functional levels of WebSphere Application Server for z/OS within the same network or within the same z/OS sysplex while you perform an orderly migration of the WebSphere Application Server for z/OS run time from one functional level to another. The assumption is that this migration happens over a relatively short period of time, perhaps a few weeks.

You can install new functional levels of WebSphere Application Server for z/OS without disrupting service to your clients, provided you have the proper HFS structure in a sysplex and you use what is defined here as a *rolling upgrade*. The rolling upgrade method upgrades the host cluster of WebSphere Application Server for z/OS by upgrading clustered host instances one at a time. This lets you keep available service to clients while you do the upgrade. Availability of service continues because only one system is removed from the host cluster at any time, while other clustered host instances remain running.

You have the option of using either of two methods for performing the rolling upgrade. The optional methods differ in the HFS structure they use. One method uses a version-specific HFS structure. The other uses an alternate HFS structure. Read through the procedure for using each method to determine which is better for you. The main determinant is whether to use a shared HFS.

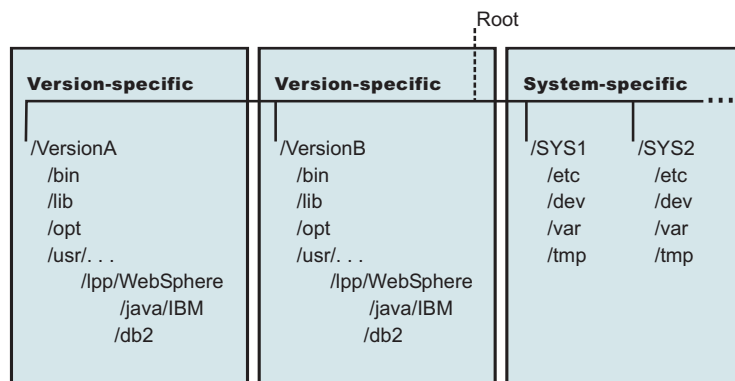
1. Optional: Use a version-specific HFS structure to upgrade WebSphere Application Server for z/OS.
2. Optional: Use an alternate HFS structure to upgrade WebSphere Application Server for z/OS.

You can maintain service to clients when upgrading the host cluster of WebSphere Application Server for z/OS.

Using a version-specific HFS structure to upgrade WebSphere Application Server for z/OS

This task describes one of the two methods for performing a *rolling upgrade* of WebSphere Application Server for z/OS in a sysplex that is introduced by installing new releases and maintenance levels of WebSphere Application Server for z/OS. This task describes using a version-specific HFS structure to upgrade WebSphere Application Server for z/OS.

Using a version-specific HFS structure in a rolling upgrade means that two different versions of WebSphere Application Server for z/OS run in the sysplex at the same time, each with a separate HFS structure. A conventional sysplex environment has but one HFS structure that all WebSphere Application Server for z/OS systems share. To run a second, different version of WebSphere Application Server for z/OS at the same time requires a second HFS structure that is specifically for the second version as shown in the following illustration:



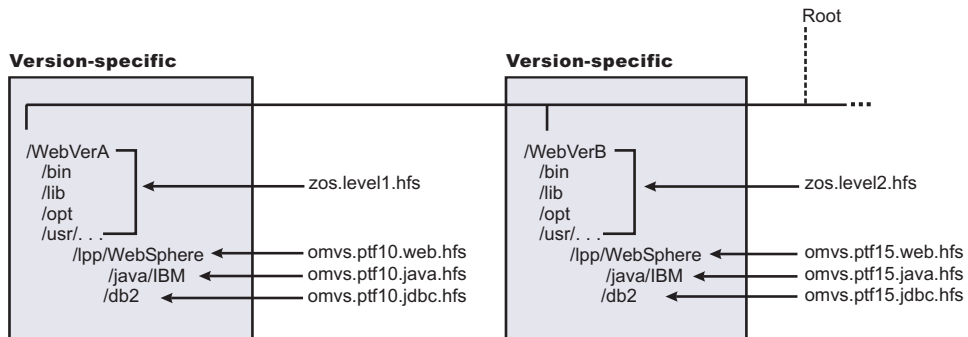
Each version-specific HFS structure requires its own /usr directory (containing a version-specific level of WebSphere Application Server for z/OS and Java) and /db2 directory (containing a version-specific level of JDBC) because of code-level interdependencies between products.

With the dual HFS structure in place, you can mount one code-level version of WebSphere Application Server for z/OS, run the host cluster from that mount point, and upgrade a second mount point where you mounted the other version of WebSphere Application Server for z/OS.

Example: Assume you mount a version-specific HFS for one service level (PTF 10) at /VersionA and another version-specific HFS for another service level (PTF 15) at /VersionB:

```
mount omvs.ptf10.was.hfs at /VersionA/usr/lpp/WebSphere
mount omvs.ptf10.java.hfs at /VersionA/usr/lpp/java/IBM
mount omvs.ptf15.was.hfs at /VersionB/usr/lpp/WebSphere
mount omvs.ptf15.java.hfs at /VersionB/usr/lpp/java/IBM
mount omvs.ptf15.jdbc.hfs at /VersionB/usr/lpp/db2
```

The HFS structure appears in the following illustration:



You can use a symbolic link to determine which code version any system in the sysplex addresses:

```
/usr --> $VERSION/usr
```

You use the **SETOMVS** command to control how \$VERSION resolves. In this example, set the initial value of \$VERSION for each system in the sysplex to VersionA. All systems that use the symbolic link to refer to the /usr directory resolve to /VersionA/usr.

For any system in the sysplex to use the HFS structure associated with PTF15, change the value of \$VERSION on that system (and only on that system) to VersionB. Accordingly, any references on that system to /usr resolve to /VersionB/usr through the symbolic link.

Use the following procedure to switch the code level for a clustered host instance:

1. Install the new code, copy it to a new data set, and mount the data set at the VersionB mount point.
2. Shut down all application servers and WebSphere Application Server for z/OS on that clustered host instance
3. Use the **SETOMVS** command to change \$VERSION to VersionB
4. Using SET PROG, load the LPA modules from data sets associated with the new level
5. Change the start procedures to address the new code level load libraries
6. Restart WebSphere Application Server for z/OS and the Application Servers.
7. Repeat the prior steps of this process for each clustered host instance, one at a time, to upgrade the code level of WebSphere Application Server for z/OS throughout the sysplex without disrupting service to your clients.

Each code level of WebSphere Application Server for z/OS is designed to tolerate an older code level. Differing levels of WebSphere Application Server for z/OS can coexist compatibly within the sysplex during the upgrade process.

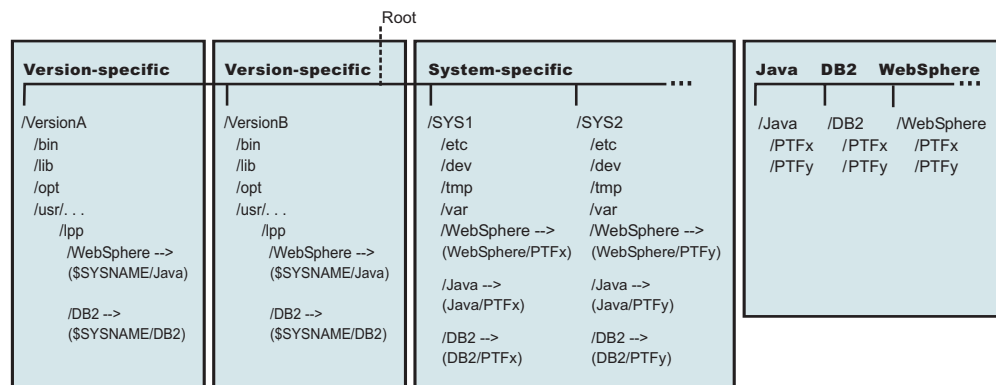
In cases when a new level of WebSphere Application Server for z/OS introduces new functions, all members of the host cluster run in compatibility mode during the upgrade process. When all clustered host instances are at the new code level, restart each instance, one by one, to enable the new function.

Read about using an alternate HFS structure to upgrade WebSphere Application Server for z/OS.

Using an alternate HFS structure to upgrade WebSphere Application Server for z/OS

This task is the second of the two methods for performing a *rolling upgrade* of WebSphere Application Server for z/OS in a sysplex that is introduced by installing new releases and maintenance levels of WebSphere Application Server for z/OS. Using a version-specific HFS structure to upgrade WebSphere Application Server for z/OS describes the first method. This task describes using an alternate HFS structure to upgrade WebSphere Application Server for z/OS.

The alternate HFS structure accomplishes the same objective as the version-specific HFS structure, but does not mount a product HFS directly off the version-specific subdirectories (referred to by the \$VERSION symbolic link). Rather, version-specific subdirectories refer to system-specific subdirectories using symbolic links with the \$SYSNAME symbol. In turn, system-specific subdirectories refer to program product subdirectories through symbolic links. The alternate HFS structure is depicted in the following illustration:



The alternate HFS structure has the following characteristics:

- **Version-specific subdirectories that allow systems in the sysplex to refer to differing versions of system code.**

The WebSphere Application Server for z/OS, Java, and DB2 for OS/390 (JDBC) subdirectories do not contain product code but instead, contain symbolic links to system-specific subdirectories through the use of the \$SYSNAME symbol. As far as WebSphere Application Server for z/OS is concerned, you need not change these symbolic links. However, you should plan for creating version-specific structures for future system upgrades.

- **System-specific subdirectories that contain symbolic links to WebSphere Application Server for z/OS, Java, and DB2 for OS/390 (JDBC) subdirectories in the sysplex root.**

The symbolic links point to specific code levels (for example, WebSphere/PTFx). To change the code level that a system uses, you change these symbolic links.

- **Individual subdirectories for WebSphere Application Server for z/OS, Java, and DB2 for OS/390 (JDBC) components.**

Each of these subdirectories can have one or more subdirectories for a specific code level.

- **Shared subdirectories, such as the WebSphere390 subdirectory.**

With the alternate HFS structure in place, you can mount one or more code levels of WebSphere Application Server for z/OS, Java, or DB2 for OS/390 (JDBC) under their individual component subdirectories. Each system-specific subdirectory uses symbolic links to component code levels and can refer to new code levels by changing those symbolic links.

There are certain advantages to the alternate HFS structure:

- You can stage product upgrades and service in a sysplex environment with minimal impact to availability. You can stage product upgrades or service without applying the upgrade or service to all products at the same time.
- You can upgrade one product without duplicating another version-specific (\$VERSION) structure by placing the level of control at the system-specific subdirectories and linking to those subdirectories through the \$SYSNAME symbol. However, it is beneficial to plan for a second version-specific structure so you are prepared for future system upgrades.
- You can help performance by using version-specific subdirectories that are read-only. Changes are in the system-specific (\$SYSNAME) subdirectory, which is read/write.
- You can save storage space because you need not duplicate version-specific HFS structures for program product upgrades.

Example: Assume you have an individual component directory for WebSphere Application Server for z/OS (/WebSphere), Java (/Java), and DB2 for OS/390 (JDBC) (/DB2). Assume that each directory contains two subdirectories, one for PTFx (/PTFx) and one for PTfy (PTfy). Also assume that the code for each component update is in its own HFS data set, such as OMVS.PTFX.WEB.HFS, OMVS.PTFX.JAVA.HFS, and OMVS.PTFX.JDBC.HFS, for example. The mount commands are:

```
MOUNT FILESYSTEM('OMVS.PTFX.WEB.HFS') MOUNTPOINT('/WebSphere/PTFx') TYPE(HFS) MODE(RDWR)
MOUNT FILESYSTEM('OMVS.PTFX.JAVA.HFS') MOUNTPOINT('/Java/PTFx') TYPE(HFS) MODE(RDWR)
MOUNT FILESYSTEM('OMVS.PTFX.JDBC.HFS') MOUNTPOINT('/DB2/PTFx') TYPE(HFS) MODE(RDWR)

MOUNT FILESYSTEM('OMVS.PTFY.WEB.HFS') MOUNTPOINT('/WebSphere/PTfy') TYPE(HFS) MODE(RDWR)
MOUNT FILESYSTEM('OMVS.PTFY.JAVA.HFS') MOUNTPOINT('/Java/PTfy') TYPE(HFS) MODE(RDWR)
MOUNT FILESYSTEM('OMVS.PTFY.JDBC.HFS') MOUNTPOINT('/DB2/PTfy') TYPE(HFS) MODE(RDWR)
```

System SYS1 refers to the PTFx levels of code through these symbolic links:

```
/WebSphere --> /WebSphere/PTFx
/Java       --> /Java/PTFx
/DB2       --> /DB2/PTFx
```

If you want system SYS1 in the sysplex to use the HFS structure associated with PTfy, change the symbolic links for /WebSphere, /Java, and /DB2:

```
/WebSphere --> /WebSphere/PTfy
/Java       --> /Java/PTfy
/DB2       --> /DB2/PTfy
```


Use the following procedure to switch the code level for the WebSphere Application Server for z/OS for the clustered host instance on SYS1.

1. Install the new code for WebSphere Application Server for z/OS, Java, and DB2 for OS/390 (JDBC), copy each component to its own data set, and mount the data under its component subdirectory. WebSphere Application Server for z/OS, Java, and DB2 for OS/390 (JDBC) code levels are usually interdependent, so keep the level of each component coordinated with the others.
2. Shut down all Application Servers and the WebSphere Application Server for z/OS clustered host instance on SYS1.
3. Change the symbolic links for the system-specific subdirectories for SYS1.
4. Load new run-time modules into LPA and update the link list. You can do this dynamically, but IBM recommends you re-IPL the system.
5. Change the start procedures to address the new code level load libraries.
6. Restart WebSphere Application Server for z/OS and the Application Servers.

By repeating this process for each clustered host instance, one at a time, you can upgrade the code level of WebSphere Application Server for z/OS throughout the sysplex without disrupting service to your clients.

Chapter 6. Migrating and coexisting

This topic describes migrating, which is copying the configuration from a previous release of a WebSphere Application Server product into a new release. This topic also describes coexisting, which is running a new release of a WebSphere Application Server product on the same machine at the same time as you run an earlier release.

Determine whether you have an existing version of WebSphere Application Server installed on the machine where you plan to install your Version 5.0.x product.

If you have a previous version, you must plan whether to migrate the configuration and applications of the previous version to the new version. Migration does not uninstall the previous version. The earlier release is still functional. If you run the earlier release at the same time as the WebSphere Application Server for z/OS V5 installation, the two versions are *coexisting*. The migration articles describe migration from WebSphere Application Server for z/OS V3.5SE and WebSphere Application Server for z/OS V4.0.1 levels and coexisting with these prior levels. Unless otherwise noted, information pertaining to V3.5SE migration is valid for customers moving from the V4.0.1 Alternate Configuration Option. See “Migration and coexistence overview” for more information.

You can coexist with, or migrate the applications and configuration from a previous version of WebSphere Application Server.

Migration from V4.0.1 to V5 does not require extensive tuning. Migration from V3.5SE to V5 does require you to examine the migrating applications. After planning for migration and coexistence, continue the installation.

For more information on coexistence among releases, see “Migration and coexistence overview.”

To migrate from V3.5SE to V5, see “Migrating from V3.5 Standard Edition (SE) to V5” on page 129.

To migrate from V4.0.1 to V5, see “Migrating from V4.0.1 to V5” on page 120.

Migration and coexistence overview

5.0.2 + WebSphere Application Server provides support for migrating V4.0.1 applications to V5. This utility is available as V4.0.1 service (W401502) against 390fy [Direct Deployment Tool] and provides a new -v5mp option.

The migration tool performs a fairly routine migration from V4 to V5. For example, Java 2 Platform, Enterprise Edition (J2EE) 1.2 EAR files in V4 work in V5 of WebSphere Application Server, which also supports the J2EE 1.3 specification. Similarly, it is not necessary to redeploy EJB 1.1 JAR files when moving them from V4 to V5, which also supports EJB 2.0 JAR files. V5 server configurations must be defined manually. If you have V4.0.1 installed, see **5.0.2 +** “Migrating from V4.0.1 to V5” on page 120 for more information.

The migration from V3.5 to V5 involves significant changes in application structures, development, and deployment. This migration is a manual effort.

If you have V3.5SE installed, see *Migrating from V3.5SE to V5* for more information.

The remaining migration articles assume that V5 is being installed in an environment where it must coexist with prior levels of WebSphere Application Server. Consider the following items while planning to enable coexistence:

- Update prerequisites to the levels required by V5. Prior levels of WebSphere Application Server for z/OS will continue to run at the higher prerequisite levels. For more information, see “Prerequisites needed for WebSphere Application Server for z/OS V3.5SE, V4.0.1, and V5” on page 137.
- Set up V5 to eliminate potential LPA conflicts with a prior V4.0.1 install. V5 and V4.0.1 both require the placement of some code into LPA (SBBOLPA). In addition it is recommended that additional product code (SBBOLOAD) be placed into LPA for performance reasons. Because of naming conflicts, V5 and V4.0.1 product code can not be in LPA at the same time. To support coexistence:
 - Place the V5 SBBOLPA dataset in the STEPLIB of the V5 daemon
 - Add either a V4.0.1 or V5 STEPLIB for SBBOLOAD.

In V5, put BBORTSS5 into LPA so ctrace will work. This does not cause any coexistence issues since the dll name is different than the V4.0.1 version.

- Utilize WLM DAE when configuring V5 to allow both the use of a specific server name by V5 and by a server on V4.0.1.
- Review the ports that have been defined to ensure that the V5 installation does not conflict. In particular, when installing to coexist with V4.01, note that the default daemon port definition for both V5.0 and V4.0.1 is the same. For more information, see *Coexistence port definitions*. See *z/OS port assignments* for more information on ports.

Consider these other issues in a migration or coexistence scenario:

- Conflicting context roots when attempting to share the same Web server.
A procedure for configuring a Web server for sharing between WebSphere Application Server versions is described in the InfoCenter for the base WebSphere Application Server product.
- Installing WebSphere Application Server multiple times on the same z/OS image or sysplex.

Coexistence support

Coexistence, as it applies to WebSphere Application Server products, is the ability of multiple installations of WebSphere Application Server to run on the same z/OS image or sysplexmachine at the same time. Multiple installations include multiple versions and multiple instances of one version. Coexistence also implies various combinations of Web server interaction.

Version 5 WebSphere Application Server products can coexist with supported, previous versions as described below. The installation wizard looks for these existing installations to determine if it should prompt you for coexistence information:

- IBM WebSphere Application Server Standard Edition and Advanced Edition, Version 3.5.5 and up
- IBM WebSphere Application Server Advanced Server Single Edition and Advanced Edition, Version 4.0.2 and later

- IBM WebSphere Business Integration Server Foundation Edition, Version 4.1 and later
- IBM WebSphere Application Server, Version 5.0.0 and later

V5 WebSphere Application Server products can coexist with supported, previous versions as described below.

- IBM WebSphere Application Server for z/OS Version 3.5SE
- IBM WebSphere Application Server for z/OS V4.0.1

Multiversion coexistence scenarios appear in the following table.

5.0.2 + Supported but without embedded messaging support: This status in the preceding tables describes an incompatibility between the embedded messaging features in different levels of Version 5. Version 5.0.0 and V5.0.1 support the embedded messaging feature at a service level less than CSD04, which is what V5.0.2 and V5.1 support. Because all V5 instances that coexist on a machine must use the same level of embedded messaging, there is a coexistence problem when two V5 instances use different levels of embedded messaging. If you want V5.0.0 to coexist with V5.1, for example, upgrade V5.0.0 to V5.0.2 by applying Fix Pack 2. See *Upgrading V5.0.0 or V5.0.1 to V5.0.2*.

In addition to multiversion coexistence, WebSphere Application Server also lets you install multiple times on one machine (multiple installation instances), or install once and have multiple configurations (multiple configuration instances).

In addition to coexistence with earlier versions of WebSphere Application Server for z/OS, WebSphere Application Server for z/OS also lets you install multiple times on one z/OS image or sysplex (multiple installation instances), or install once and have multiple configurations (multiple configuration instances).

Multiple Version 5 instances on one machine include:

- Multiple base Application Server instances from multiple installations of the Network Deployment product
- Multiple base Application Server configuration instances from a single installation of the Network Deployment product
- Multiple deployment manager instances from multiple installations of the Network Deployment product
- Multiple deployment manager configuration instances from a single installation of the Network Deployment product
- Multiple deployment manager configuration instances from a single installation of the Network Deployment product

Multiple Version 5 instances on one machine include:

- Multiple Application Server instances from multiple installations of the base WebSphere Application Server product
- Multiple Application Server configuration instances from a single installation of the base product
- Multiple Application Server configuration instances from a single installation of the base product
- Multiple deployment manager instances from multiple installations of the Network Deployment product
- Multiple deployment manager configuration instances from a single installation of the Network Deployment product
- Multiple deployment manager configuration instances from a single installation of the Network Deployment product

Migrating from V4.0.1 to V5

Determine whether you have an existing version of WebSphere Application Server installed on the machine where you plan to install your Version 5 product.

To migrate V4.0.1 applications and configurations to Version 5, follow this procedure:

1. Prepare to migrate or update product prerequisites and corequisites to supported versions. If your existing configuration makes use of a non-390 Web server and associated AE plugin, you should review Web server levels required by V5 and update as appropriate. Refer to IBM WebSphere Application Server supported hardware, software, and APIs for current requirements.

Functional dependencies on the 390 infrastructure have changed in V5. See “Prerequisites needed for WebSphere Application Server for z/OS V3.5SE, V4.0.1, and V5” on page 137 comparing V3.5SE, V4.0.1 and V5.0 prerequisites. V4.0.1 must be at service level W401501 to allow coexistence with V5.

2. Review existing V4.0.1 for possible coexistence issues related to port definitions and placement of WebSphere Application Server modules in LPA. See Chapter 6, “Migrating and coexisting,” on page 117 for more information.
3. Install the V5 product. Note that V5 requires the use of SMP/E 3.1. Installation instructions have been provided with your ServerPac or PDO order.
4. Customize V5 utilizing the customization dialog provided with the product and verify success by running the Installation Verification Test. Note that the V5 default */install root* directory on z/OS is *WebSphere/V5R0M0/AppServer*, and it does not conflict with mount points or directory structure of the existing V4.0.1 release.
5. Run the V5 samples. There have been significant changes to Admin, system structure, etc. with the V5 level. For this reason, it is recommended to run the V5 samples. See Chapter 8, “Samples Gallery,” on page 145 for more information.
6. Define V5 servers for applications being migrated.

V5 now requires the use of the HTTP transport, and HTTP listening ports must be selected so as to not conflict with the existing V4.0.1 configuration.

- There is no tooling support for migrating Server configurations because of the massive change in the Administration console support between V4.0.1 and V5. This process will need to be done manually. Use the V4.0.1 administrative console capability to dump existing V4.0.1 settings for review. See “Utilizing WebSphere administrative capabilities to support migration from V4.0.1 to V5” on page 126 for more information.
 - Establish a naming convention that lends itself to changes and extensions when establishing Server configurations.
 - Create V5 copies of policies such as WLM and ARM and modify them for the V5 Server configuration.
7. Install resources into the V5 server. Prerequisites levels needed for WebSphere Application Server for z/OS may have changed from V4.0.1. Review these prerequisites at “Prerequisites needed for WebSphere Application Server for z/OS V3.5SE, V4.0.1, and V5” on page 137.
 8. Move applications to V5 level tooling. Most V4.0.1 applications will continue to run on V5. However, WSAD 4.0 and WSAD IE 4.1.1 generated applications are not formally supported for deployment into V5 runtimes. Formal support necessitates movement of the application to V5 level tooling. In the case of

WSAD 5.0, this tool has the flexibility to generate both J2EE 1.2 and J2EE 1.3 applications allowing convergence to a single tool to support V4.0.1 and V5. In the case of WSAD IE 5.0, there are conflicts in tooling jars with WSAD IE 4.1.1. Customers will need to maintain both tooling levels until they have migrated everything to V5 levels. You can also find information about migrating to the V5 tooling levels in the IBM Redbook, Migrating to WebSphere V5.0: An End-to-End Migration Guide, SG24-6910-00. There is a link to the book in the Resources for Learning topic.

9. Review applications to be migrated to determine if any changes are required. The Class API checker tool can be used to analyze servlets and ejbs to determine if any APIs are unsupported or deprecated. The CACT tool can be found at WebSphere Developer Domain downloadable tools. If required changes are found, it will be necessary to modify them and then install into the V5 servers. If changes are not required, then the migration utility can be utilized. Some of the key things to note that may cause a need for application changes are:
 - The default code page has changed to be consistent with the V5 family. In V5, the JVM is started with a default file encoding of iso-8859-1 (US ASCII). This enables applications that rely on JVM behavior instead of explicit specification of encoding to execute unchanged on a WebSphere Application Server for z/OS V5 system. This should improve portability of applications across platforms.

Even though the Java language allows programmers to explicitly specify the encoding of a file that is to be opened and read by the JVM, many programmers do not take advantage of this capability and rely on the default encoding. If you have applications which access EBCDIC encoded files, you must ensure that they explicitly specify this encoding in the application code, or you must change the encoding of the target file to match this new JVM setting.
 - With the installation of APAR PQ74162, JCA connector applications developed using WSAD IE 4.1.1 to create an atomic JCA connector Web service that communicates to a backend resource manager should still be able to run under V5. However, to do so, one must first redeploy the application to V5. The redeploy can be done during the installation of the application. Although, these applications should run under V5 after redeploying, this should be viewed as a temporary method of operation. Customers should still eventually transition their WSAD IE 4.1.1 JCA connector applications to the WSAD IE 5.0 tooling.
 - There are cases where Web Applications may need to be modified. See Migrating Web application components for more information.
10. Utilize the migration utility that was shipped in W401502 to process V4.0.1 EARs. This utility is being provided as an option on 390fy. In V4.0.1 it was required that EARs be processed through the 390 AAT or 390fy to condition them for deployment into V4.0.1. In V5, this conditioning is not required. This utility will remove the conditioning that was done for existing V4.0.1 EARs that are being migrated to V5. It should be noted that if the application is being sent back through the WSAD 5.0 tooling, that the resulting EAR is ready for installation into V5 and that the use of migration utility is not required. Support for migrating V4.0.1 applications to V5 has been shipped in V4.0.1 service (W401502). This support has been provided as a new -v5mp option for the 390fy tool. See "Utilizing WebSphere administrative capabilities to support migration from V4.0.1 to V5" on page 126 for more information.
11. Address differences between V4.0.1 and V5 by use of the AAT.

- Review the changes in the classloader options in V5 compared to V4.0.1. Determine the new option that is appropriate and utilize the AAT to make the change. See Migrating the class-loader Module Visibility Mode setting for more information.
 - A change was made in the web container behavior that was required by J2EE that involves the setting of content type. If a servlet writer does not set the content type it is no longer defaulted by the web container and it is returned as "null". This can cause some browsers to incorrectly display the resulting tags sent by the web container. This problem can be eliminated by using the AAT to set the autoResponseEncoding IBM extension to true for web modules while migrating enterprise applications.
12. Install the application into the V5 server. For Web applications being migrated from V4.0.1 the following should be noted. In V4.0.1, the classes generated from JSPs are in a package based on the directory structure of the WAR. Any JSP at the top of the context root is in the unnamed package, and JSPs in subdirectories of the root are in packages named after the subdirectories. In V5, the classes generated from JSPs are all in the package **org.apache.jsp**. Therefore, the classfiles are not compatible between versions. When migrating an enterprise application from V4.0.1 to V5, the JSPs need to be recompiled so that the classfiles are regenerated into the correct packages. Use the *-preCompileJSPs* option of wsadmin tool during the installation of the application to force this recompilation.
 13. Migrate clients for the applications that have been migrated to the V5 Server.

Update clients that reference EJBs.

The naming structure has changed in V5. This makes the EJB references that were valid in previous versions no longer work in V5. Existing V4.0.1 clients will need to be changed appropriately. Alternatively, a name binding can be added to map the old name into the new name in V5. If you pick this alternative, you can find some helpful examples in the IBM Redbook, Migrating to WebSphere V5.0: An End-to-End Migration Guide, SG24-6910-00. There is a link to the book in the Resources for Learning topic.

Update data resources for client enterprise applications.

The client container supported by V4.0.1 utilized a WCCM model that is different from the one used by V5. As a result, data resources will need to be converted to run correctly with V5.
 14. Update your Webserver to the V5 prerequisite level and the appropriate plugin. Most V4.0.1 configurations will include a Webserver. This can be a 390 Webserver or any Webserver supported by V4.0.1 AE. If a Webserver configuration is required for V5, then the Webserver to be used must be updated to the V5 prerequisite level and the appropriate V5 plugin must be installed. It should be noted that the V5 plugin can support both V4.0.1 and V5 application servers. With this in mind, several migration configurations are possible:
 - Install the V5 plugin into the existing Webserver (the V4.0.1 plugin and V5 plugin coexist).
 - Create a unique Webserver instance and install the V5 plugin.
 - Replace the V4.0.1 plugin with the V5 plugin and setup to drive both the V4.0.1 and V5 images.

See "Setting up Version 4.0.x and Version 5 coexistence" on page 123 for more information.
 15. Migrate the existing V4.0.1 security configuration for the applications that have been migrated. See Migrating security configurations from WebSphere Application Server Version 4.0.1 for more information.

16. Make the necessary operational changes to support production.
 - Scripting based on SM API is not valid at the V5 level. It must be converted. See Migrating from Systems Management Scripting API (SMAPI) V4 to wsadmin V5 for more information.
 - ARM policies should be updated based on the new topology/infrastructure.

See the Operations and Administration Guide for more information.

17. Post migration activities.
 - Some interfaces have been deprecated at the V5 level. Although they are still supported at V5, they should be eliminated to facilitate migration to later WebSphere Application Server levels. See Migrating security configurations from WebSphere Application Server Version 4.0.1 for some areas that should be changed.
 - Migrate applications to the latest specification levels.

You now understand coexisting with, or migrating the applications and configuration from, a previous version of WebSphere Application Server.

Migration from Version 4.x to Version 5 does not require extensive tuning.

Migration from Version 4.0.1 to Version 5 does not require extensive tuning.

Migration from Version 3.5.x to Version 5 does require you to examine the migrating applications.

Migration from Version 3.5SE to Version 5 does require you to examine the migrating applications.

After planning for migration and coexistence, you are ready to continue the installation.

Setting up Version 4.0.x and Version 5 coexistence

You must migrate prerequisite and corequisite programs to the levels required by WebSphere Application Server, Version 5. You must also identify ports in use in Version 4.0.x before you begin the Version 5 installation, to avoid possible conflicts during coexistence. The first two steps in this task describe these activities.

You must migrate prerequisite and corequisite programs to the levels required by WebSphere Application Server, Version 5. You must also identify ports in use in Version 4.0.1 before you begin the Version 5 installation, to avoid possible conflicts during coexistence.

You can install WebSphere Application Server Version 4.0.1, with Service level W401502, and Version 5 on the same node.

You can install WebSphere Application Server Version 4.0.x and Version 5 on the same node. When the Version 5 installation wizard detects the Version 4.0.x installation, it displays the migration and coexistence panel, where you can select either option, both options, or neither option. If you select coexistence, the installation wizard displays the coexistence panel to ensure you install Version 5 without port conflicts.

Silent installation also supports configuring for coexistence silently. You can specify non-conflicting port assignments in the options response file.

By default, there are port conflicts between Version 4.0.1 and Version 5 that you must resolve. See *Migrating from V4.0.1 to V5* for more information. The next step is to setup the Webserver to support V4.0.1 and V5 coexistence.

By default, there are port conflicts between Version 4.0.x and Version 5 that you must resolve. Also, if you migrate more than two Version 4.0.x nodes to Version 5, there are port conflicts that you must resolve, as described in the *Setting up Version 5 coexistence* topic.

1. Migrate prerequisite and corequisite programs to the levels required by WebSphere Application Server, Version 5.

Refer to the IBM WebSphere Application Server supported hardware, software, and APIs site for current requirements.

2. Resolve port conflicts.

Refer to the Port number settings in WebSphere Application Server versions topic to see a list of default port numbers, and where they are defined.

Inspect the configuration of the previous version:

- **For WebSphere Application Server Advanced Single Server Edition, Version 4.0.x:** Inspect the `server-cfg.xml` file to get port values for the configuration.
- **For WebSphere Application Server Advanced Edition, Version 4.0.x:** Inspect the `admin.config` file to get port values for the configuration. When the administrative server is running, use this command:

```
xmlConfig -export config.xml -nodeName theNodeName
```

Review the `config.xml` file to look for `<node action="update" name="nodename">` to find the appropriate node and port number assignments in the file. The installation wizard displays a default set of coexistence port numbers as suggested Version 5 port numbers. Change the values to ports that are not in use. The installation wizard uses whatever values you approve.

Change conflicting HTTP transport ports manually, if necessary.

3. Associate a Web server with each WebSphere Application Server.
 - Use a separate Web server for each WebSphere Application Server.
 - a. Create a Web server instance using the Web server documentation.
 - b. Select the appropriate Web Server plug-in feature during WebSphere Application Server installation, and identify the Web server configuration file location. (For example, identify the location of the `httpd.conf` file for IBM HTTP Server.)
 - c. Install the appropriate Web Server plug-in feature, and identify the Web server configuration file location. (For example, identify the location of the `httpd.conf` file for IBM HTTP Server.)
 - Use the same Web server for both WebSphere Application Server versions.

To use the same Web server for both Application Server versions, you must first upgrade the Web server to the common level supported by both versions of the application server.

Follow this procedure to use the same Web server for both WebSphere Application Server versions.

 - a. Select the appropriate Web Server plug-in feature during WebSphere Application Server installation, and identify the Web server configuration file location. (For example, identify the location of the `httpd.conf` file for the IBM HTTP Server that is associated with Version 4.0.x.)

- b. Install the appropriate Web Server plug-in feature, and identify the Web server configuration file location. (For example, identify the location of the `httpd.conf` file for the IBM HTTP Server that is associated with Version 4.0.1.)
 - c. Edit the Web server configuration file to remove entries for Version 4.0.x, as described in the *Migrating plug-ins, one machine at a time* (`tins_websmig2`) topic in the base Application Server InfoCenter.
The WebSphere Application Server, Version 5 plug-in acts as the routing agent to route requests to both versions.
 - d. Edit the Web server configuration file to remove entries for Version 4.0.1, as described in the *Migrating plug-ins, one machine at a time* (`tins_websmig2`) topic in the base Application Server InfoCenter. The WebSphere Application Server, Version 5 plug-in acts as the routing agent to route requests to both versions.
 - e. Generate the plug-in configuration files for both versions of the Application Server.
 - f. Edit the Version 4.0.x `plugin-cfg.xml` file and the Version 5 `plugin-cfg.xml` file, to merge their entries into a combined file of all Web context roots.
Web context roots must be unique across Application Server versions. If there is a common context root across versions, requests are served by the plug-in instance that was last loaded.
If you have both Version 4.0.x Samples and Version 5 Samples in the file, you can access only the Version 5 Samples after merging the configuration files because there is one context root for Samples.
Whenever you modify the `plugin-cfg.xml` file for either version, you must manually merge the files again, to make a master file.
This is described in the *Preparing to install and configure a Web server* (`tins_webserver`) topic in the base Application Server InfoCenter.
Whenever you modify the `plugin-cfg.xml` file for either version, you must manually merge the files again, to make a master file.
 - g. Edit the Version 4.0.1 `plugin-cfg.xml` file and the Version 5 `plugin-cfg.xml` file, to merge their entries into a combined file of all Web context roots. Web context roots must be unique across Application Server versions. If there is a common context root across versions, requests are served by the plug-in instance that was last loaded.
If you have both Version 4.0.1 Samples and Version 5 Samples in the file, you can access only the Version 5 Samples after merging the configuration files because there is one context root for Samples.
This is described in the *Preparing to install and configure a Web server* (`tins_webserver`) topic in the base Application Server InfoCenter.
Whenever you modify the `plugin-cfg.xml` file for either version, you must manually merge the files again, to make a master file.
This is described in the *Preparing to install and configure a Web server* (`tins_webserver`) topic in the base Application Server InfoCenter.
Whenever you modify the `plugin-cfg.xml` file for either version, you must manually merge the files again, to make a master file.
 - h. Replace the original `plugin-cfg.xml` file of the Version 5 installation with the master file.
4. Fix any problems with environmental variables on Windows platforms. For example, installing WebSphere Application Server, Version 5 updates the system variable `PATH`, potentially affecting tools with the same name across

installations. To run tools with conflicting names, alter the PATH environment variable in a command window and place the directory for the former installation before the directory for the latter installation. For example, PATH=E:\WebSphere\AppServer\40\bin;%PATH%. Then, invoke the tools from the bin directory.

Return to Migrating from, or coexisting with a previous version to continue.

Utilizing WebSphere administrative capabilities to support migration from V4.0.1 to V5

There are a few steps in utilizing WebSphere Application Server V5 for z/OS administrative capabilities to support migration from V4.0.1 to V5:

1. Migrating your server
2. Migrating your applications
3. Migrating your server
4. Mapping of V4.0.1 environment variables to V5 WebSphere console settings

Migrating your server from WebSphere Application Server for z/OS V4.0.1 to V5

Migrating your server from WebSphere Application Server for z/OS V4.0.1 to V5 is a manual process. The export server capability of the V4.0.1 administrative console allows the dumping of V4.0.1 server settings to an XML file for review prior to manually configuring the V5 server.

1. Use the "Export server" task within the administrative console to specify <export_dir> as the Output directory within your HFS. You can take an ACTIVE conversation (one currently being used), and find the J2EE Server (for example, the Server name J2SERV1) that you want to EXPORT.

Then, you can specify <export_dir> (for example, in the Output directory) for output and export the J2EE server by clicking on OK.

Note: The directory "/export_dir/J2SERV1" **MUST** already exist in order for this export to succeed.

- "/export_dir/J2SERV1" should contain the *.xml file for each J2EE Resource that is used within the J2EE server that has been exported.
- "/export_dir/J2SERV1" should contain the server.xml file that contains the configuration settings of the exported J2EE server.
- "/export_dir/J2SERV1" should contain the <UUID> .ear file for each application that has been installed into the J2EE server being exported.

You can look into server.xml to find out exactly which <UUID> .ear file maps to which application name.

2. Use <export_dir>/<server_name>/server.xml and transfer (or dump) the configuration.
3. Configure the V5 setup.
 - a. Change the current configuration settings using the administrative console.

Note: You should review the settings when you did a dump of the server.

- b. Save your SM configuration by one of two ways:
 - 1) Use the following administrative console command to commit the SM configuration:

```
wsadmin> $AdminConfig save
```

- 2) Press the "Save" link in the administrative console to save your SM configuration into the master configuration.

Here's an example of where it may be saved:

```
/WebSphere/V5R0M0/AppServer/config/cells/SY1/...*.xml
```

Migrating your applications from WebSphere Application Server for z/OS V4.0.1 to V5

Utilize the migration utility that was shipped in W401502 to process V4.0.1 EARs. This utility is being provided as an option on 390fy. In V4.0.1 it was required that EARs be processed through the 390 AAT or 390fy to condition them for deployment into V4.0.1. In V5, this conditioning is not required. This utility will remove the conditioning that was done for existing V4.0.1 EARs that are being migrated to V5. It should be noted that if the application is being sent back through the WSAD 5.0 tooling, that the resulting EAR is ready for installation into V5 and that the use of migration utility is not required. Support for migrating V4.0.1 applications to V5 has been shipped in V4.0.1 service (W401502). This support has been provided as a new `-v5mp` option for the 390fy tool.

The following are the steps needed to migrate your V4.0.1 application to V5:

1. Use the "Export server" task to specify `<export_dir>` within your HFS. See "Migrating your server from WebSphere Application Server for z/OS V4.0.1 to V5" on page 126 for more information on how to do this.
2. Change the `<UUID>` .ear name format to the regular name.

Note: This step is optional.

3. Run the `390fy -v5mp <export_dir> /<server_name>` option to migrate all applications that are exported into the `<export_dir> /<server_name>` directory. Each of the exported ear files will be in `<UUID>` format unless they have been changed in optional step 2 above.

Your J2EE server (for example, J2SERV1) might contain the following installed applications:

- J2APPL1
- BVTEC
- PolicyIVP

When you export the J2EE server (J2SERV1 in this example) into the `<export_dir>/<server_dir>` (for example, `"/export_dir/J2SERV1"`) directory, the directory will look like the following:

```
/export_dir/J2SERV1/> ls -l
<UUID_for_J2SERV1>.ear
<UUID_for_BVTEC>.ear
<UUID_for_PolicyIVP>.ear
<UUID_for_some_DataSource1>.xml
<UUID_for_some_DataSource2>.xml
server.xml
```

When you run the 390fy command in this directory it will generate a new `*_v5mp.ear` for each EAR file processed by the 390fy `v5mp` option.

Note: The last parameter of the "390fy" command for the "-v5mp" option is a directory. In this case, it is the directory of the <export_dir>/<server_name> where the *.ear has been exported. For example:

```
/export_dir/J2SERV1/> /usr/lpp/WebSphere/bin/390fy -v5mp .
```

where "." is the target directory where the *.ear files can be found, or

```
/export_dir/J2SERV1/> /usr/lpp/WebSphere/bin/390fy -v5mp /export_dir/J2SERV1/
```

where "/export_dir/J2SERV1/" is the target directory where the *.ear files can be found.

The following demonstrates the 390fy v5mp option for this example:

```
/export_dir/J2SERV1/> /usr/lpp/WebSphere/bin/390fy -v5mp .
/export_dir/J2SERV1/> ls -l
<UUID_for_J2SERV1>.ear
<UUID_for_BVTEC>.ear
<UUID_for_PolicyIVP>.ear
<UUID_for_J2SERV1>_v5mp.ear
<UUID_for_BVTEC>_v5mp.ear
<UUID_for_PolicyIVP>_v5mp.ear
<UUID_for_some_DataSource1>.xml
<UUID_for_some_DataSource2>.xml
server.xml
```

The UUID for each application can be looked up in the server.xml file to find the original application name.

Mapping of V4.0.1 environment variables to V5 WebSphere console settings

The following table lists only V5 WebSphere variables related to diagnosis, along with their equivalent V4.0.1 environment variables. This information is provided only as an aid to IBM service personnel.

Warning: Do not use this information to manually modify the contents of a *was.env* file. The *was.env* file is managed by WebSphere, and its content is rewritten with each change made to the WebSphere configuration. Therefore, any hand-editing will be overwritten.

Table 53. V4.0.1 environment variables and their equivalent V5 WebSphere variables

V4.0.1 environment variables	Equivalent V5 WebSphere variables
BBOC_HTTP_INPUT_TIMEOUT	protocol_http_timeout_input
BBOC_HTTP_OUTPUT_TIMEOUT	protocol_http_timeout_output
BBOC_HTTP_PERSISTENT_SESSION_TIMEOUT	protocol_http_timeout_persistentSession
BBOC_HTTP_SSL_OUTPUT_TIMEOUT	protocol_https_timeout_output
CLIENT_TIMEOUT	protocol_iiop_local_timeout
IIOP_SERVER_SESSION_KEEPALIVE	protocol_iiop_server_session_keepalive
OTS_DEFAULT_TIMEOUT	transaction_defaultTimeout
	control_region_wlm_dispatch_timeout
OTS_MAXIMUM_TIMEOUT	transaction_maximumTimeout

Table 53. V4.0.1 environment variables and their equivalent V5 WebSphere variables (continued)

V4.0.1 environment variables	Equivalent V5 WebSphere variables
RECOVERY_TIMEOUT	transaction_recoveryTimeout
SSLIIOP_SERVER_SESSION_KEEPALIVE	protocol_iiop_server_session_keepalive_ssl

Migrating from V3.5 Standard Edition (SE) to V5

Determine whether you have WebSphere Application Server for OS/390 V3.5 Standard Edition installed on the system where you plan to install your Version 5 product.

To migrate V3.5 Standard Edition (hereafter referred to as V3.5SE) applications and configurations to Version 5, follow this procedure:

1. Prepare to migrate or update product prerequisites and corequisites to supported versions. Significant functional dependencies on the 390 infrastructure have been added to V5 over those that had been required for V3.5SE. See “Prerequisites needed for WebSphere Application Server for z/OS V3.5SE, V4.0.1, and V5” on page 137 comparing V3.5SE, V4.0.1 and V5 prerequisites. Review the PSP bucket for the latest PTF information. There is no dependency on a particular V3.5SE service level to allow coexistence with V5.

Unlike V3.5SE, V5 for z/OS allows distributed platform Web servers for distributed platforms to communicate with the WebSphere Application Server for z/OS product. Refer to IBM WebSphere Application Server supported hardware, software, and APIs for supported distributed platform Web servers.

2. Install the V5 product.

Note: V5 requires the use of SMP/E 3.1. Installation instructions have been provided with your ServerPac or PDO order.

3. Customize V5 utilizing the customization dialog provided with the product and verify success by running the Installation Verification Test. The customization dialog will prompt you for various TCP/IP ports that the V5 Application Server should listen on for requests. You should insure that you configure the new application server not to make use of the same ports as an existing server on that same image.

Note: V 5 does not conflict with the mount points or directory structure of the existing V3.5SE release.

4. Run the V5 samples. There have been significant changes to Admin, system structure, etc. with the V5 level. For this reason, it is recommended to run the V5 samples. See Chapter 8, “Samples Gallery,” on page 145 for more information.
5. Define V5 servers for applications being migrated.

There is no tooling support for migrating Server configurations because of the massive differences in application packaging/deployment, server structure/architecture, application administration compared to V3.5SE. This process will need to be done manually. Some key differences that should be noted:

- The servlet engine provided by V3.5SE has been replaced by a full J2EE 1.3 WebContainer provided by V5.

- The WAS.CONF file has been eliminated. All configuration that was previously done through the WAS.CONF is now done through the J2EE tooling (WSAD, Application Assembly Tool, and the V5 administrative console). See “Migrating your existing was.conf file settings” on page 133 for more information.
 - The configuration is no longer restricted to running as a GWAPI out of the IBM HTTP Server for z/OS and OS/390. V5 has included HTTP Transport function as part of its server structure. A default internal transport is provided, but a specific HTTP transport can also be configured using the V5 administrative console. HTTP listening ports must be selected so as to not conflict with existing V3.5SE configuration. Because of the HTTP Transport function, customers now have three configuration options:
 - a. Allow direct HTTP access to the J2EE server via the HTTP transport
 - b. Utilize IBM HTTP Server V5.3 for z/OS and OS/390 with the WebSphere HTTP Plug-in for z/OS to front end the HTTP transport. This option requires new ServerInit, Service, and ServerTerm directives to be added to the HTTP server httpd.conf file. See “The WebSphere Application Server for z/OS HTTP internal transport” on page 12 for more information.
 - c. Utilize any V5 supported distributed platform Web server, along with the appropriate WebSphere plug-in for Web servers, to front end the HTTP transport.
 - When establishing Server configuration, care should be taken to establish a naming convention that lends itself to changes and extensions.
 - Create WLM and ARM policies for the Servers as part of the server configuration.
6. Install resources into the V5 server.

Note: Prerequisites levels needed for WebSphere Application Server for z/OS may have changed from V3.5SE. Review these prerequisites at “Prerequisites needed for WebSphere Application Server for z/OS V3.5SE, V4.0.1, and V5” on page 137.

7. Create new DB2 tables if your application uses HTTP Session State Persistence. The format of the DB2 tables needed to support HTTP Session State persistence has changed in V5. Consequently HTTP sessions can not be shared between V3.5SE and V5. If your application uses HTTP Session State Persistence using DB2, you must create new tables. See Creating a DB2 table for session persistence for more information.
8. Review the existing security configuration for Web applications. The authentication and authorization policy for URLs within J2EE Web applications is able to be fully described by the web.xml deployment descriptor that is contained in the Web application archive (.war) file that is deployed into the WebSphere Application Server for z/OS V5 J2EE Server. The enforcement of the rules at runtime is carried out by the Web container in the V5 J2EE Server in conjunction with the configured user registry, such as SAF or LDAP. Implementing a security policy for the installation consists of the deployer granting permission for users and groups to be in various ROLES that are described in the deployment descriptor of the application. At runtime, the Web container will authenticate the user using the means in the deployment descriptor and will subsequently insure that either the authenticated user (or a group in which he is a member) has been granted access to the necessary J2EE Roles by the deployer. For more information on J2EE Security, please see Migrating security configurations from WebSphere Application Server Version 4.0.1.

The V3.5SE server executes as a GWAPI plug-in within the address space of an IBM HTTP Server for z/OS. Security policy for URLs (including those that get serviced by the WASv3.5SE plugin) that are served from the Web server are configured using the security directives in the httpd.conf file of that Web server. At runtime, the Web server is able to authenticate the user to the configured security server such as RACF or LDAP and determine if the user or a group that the user is a member of has been granted access to the specified URL before allowing access.

In order to migrate Web applications and their security policy from V3.5SE to V5 and execute that server independent of the existing Web server, you need to insure that the deployment descriptor for the Web applications that are being migrated contains security constraints that match what currently exists within the httpd.conf. It is recommended to make use of the deployment descriptors within the Web application as a means for describing the security policy of the application.

V3.5SE does provide extended capability to supplement the Web server authorization processing by performing SAF checks against resources profiles that are defined in the SOMDOBJs facility class. If your existing V3.5SE servers use this capability, you will need to insure that you understand the policy and configure the equivalent within the deployment descriptor.

9. Move applications to V5 level tooling. WSAD 4.0 and WSAD IE 4.1.1 generated applications are not supported for deployment into V5 runtimes. This necessitates movement of the application to V5 level tooling. You can also find information about migrating to the V5 tooling levels in the IBM Redbook, *Migrating to WebSphere V5: An End-to-End Migration Guide*, SG24-6910-00. There is a link to the book in the Resources for Learning topic.
10. Review applications to be migrated to determine if any changes are required. See *Migrating Web application components* for more information. Some of the areas to review are:
 - **Update application to supported specification level.** V3.5SE provided a compatibility option allowing the use of Servlet 2.1/JSP 1.0 levels. Servlets/JSPs must be brought up to at least the minimal level that is supported by J2EE 1.3 (Servlet 2.2/JSP 1.1). The MigrateWC tool has been provided to assist in conversion of JSPs and Servlets coded at specification levels of previous WebSphere versions. The MigrateWC tool can be found on the WebSphere Developer Domain downloadable tools Web site at <http://www.ibm.com/software/>.
 - **Repackage application as a J2EE application.** V3.5SE did not require J2EE packaging. In V5, Web applications must be packaged as WAR/EAR files for deployment into a V5 webcontainer. J2EE packaging includes the declaration of application properties through deployment descriptors that are contained in a separate xml file. WSAD/WSAD IE tooling provides this packaging capability.
 - **Review classloader options.** V3.5SE provided a single class loader and it was highly recommended that a web application only reference entities contained within the web application. Review the changes in the classloader options in V5 compared to V3.5SE and change as appropriate. See "Class loader options" on page 134 for more information.
 - **Review servlet for change related to content type setting.** A change was made in the web container behavior (required by J2EE) that involves the setting of content type. If a servlet writer does not set the content type it is no longer defaulted by the web container and it is returned as "null". This can cause some browsers to incorrectly display the resulting tags sent by

the web container. This problem can be eliminated by either modifying the servlet to set the content type, or by setting the `autoResponseEncoding` IBM extension to `true` for web modules.

- **Indicate external resources.** Web applications that use JDBC must include a deployment descriptor indicating that JDBC is an external resource that needs to be accessed.
 - **Modify JNDI calls.** The `com.ibm.ejs.ns.jndi.CNInitialContext` Factory class can not be used for a V5 Web application to obtain an initial context factory for gaining access to the JNDI name space. Change the application to obtain JNDI access through the J2EE defined mechanism.
 - **Remove any usage of Connection Manager APIs.** These APIs were deprecated in V3.5SE and are not supported in V5.
 - **Review application resource authentication for possible changes.**
 - Existing application components that specify a user ID and password on the `getConnection` method must be reassembled with a resource authentication property of *Application* to maintain the current behavior of the application. Otherwise, the J2EE server ignores the user ID passed on the method.
 - Application code dependent on the ACEE being placed on the thread of execution will need to change. An example of this is the CTG best practice recommendation to not provide a password/ID on the `getConnection` call for applications running in V3.5SE. This type of application must be changed.
 - **Convert to J2EE Connector Architecture.** Customers should recode, reassemble, and reinstall existing applications to work with WebSphere for z/OS-supported connectors that are designed to implement the J2EE Connector Architecture.
 - **Make code page related changes.** The JVM default code page has changed from EBCDIC to ASCII to be consistent with the WebSphere Application Server V5 family. Application changes may be required. See “Code page changes” on page 135 for more information.
11. Install the application into the V5 server using the V5 administrative console.
 12. Choose your Web server. Existing V3.5SE configurations include a V3.5 SE plug-in running as a GWAPI out of the IBM HTTP Server for z/OS and OS/390. V5 does not require the use of the IBM HTTP Server for z/OS and OS/390. You can choose to either:
 - Use a distributed platform Web server, in which a V5 WebSphere plug-in for Web servers has been installed, or
 - Run without a Web server fronting the HTTP transport provided as part of the V5 J2EE server

Either of these alternatives can coexist with the existing V3.5SE configuration. Alternatively, you may choose to continue to use an IBM HTTP Server for z/OS and OS/390, in which the V5 WebSphere HTTP Plug-in for z/OS has been installed. In this case, the IBM HTTP Server for z/OS and OS/390 you are using must be at a V5.3 level.

With this in mind, several migration configurations are possible:

- Install the V5 WebSphere HTTP Plug-in for z/OS into the existing IBM HTTP Server V5.3 for z/OS and OS/390 (V3.5SE plug-in and V5 WebSphere HTTP Plug-in for z/OS can coexist).
 - Install the V5 WebSphere HTTP Plug-in for z/OS into a separate IBM HTTP Server V5.3 for z/OS and OS/390.
13. Make necessary operational changes to support production.
 - V5 provides scripting capability that can be used for automation.

- ARM policies should be updated based on the new topology/infrastructure. See WebSphere Application Server for z/OS V5 Operations and Administration for more information.

You now understand coexisting with, or migrating the applications and configuration from, a previous version of WebSphere Application Server.

Migration from Version 4.x to Version 5 does not require extensive tuning.

Migration from Version 3.5.x to Version 5 does require you to examine the migrating applications.

After planning for migration and coexistence, you are ready to continue the installation.

Migrating your existing was.conf file settings

The following table describes how to migrate your was.conf configuration file settings to your WebSphere Application Server V5 environment.

was.conf file setting	How to set in V5
appserver.compliance.mode	Not applicable.
appserver.version	Not applicable.
appserver.usesystemclasspath	Defined using administrative console J2EE server settings.
appserver.libpath	Defined using administrative console shared library settings.
appserver.classpath	Defined using administrative console runtime and application settings.
appserver.name	Defined using administrative console when application server is created.
appserver.jvmpropertiesfile	Not applicable. JVM properties are defined using the administrative console.
appserver.loglevel	Defined using administrative console trace and error control settings.
appserver.logdirectory	Not applicable. The name of the log directory is pre-defined.
appserver.jspbasehrefadd	Defined at the application level.
appserver.workingdirectory	Not applicable.
appserver.permississions	Not applicable.
appserver.nodetach	Not applicable.
appserver.java.system.property	Not applicable.
appserver.java.extraparm	Not applicable.
appserver.configviewer	Not applicable.
appserver.initializeonwebappfailure	Not applicable.
session.enable	Not applicable.
session.invalidationtime	Defined using administrative console session management settings.

session.tableoverflowenable	Defined using administrative console session management settings.
session.tablesize	Not applicable.
session.dbenable	Defined using administrative console session management settings.
session.dbjdbcpoolname	Defined using administrative console data source settings.
session.dbtablename	Defined using administrative console Web container custom properties settings.
session.urlrewriting.enable	Defined using administrative console session tracking settings.
session.cookies.enable	Defined using administrative console session tracking settings.
session.protocolswitching.enable	Defined using administrative console session tracking settings.
session.cookie.name	Defined using administrative console session management cookie settings.
session.cookie.comment	Not applicable.
session.cookie.maxage	Defined using administrative console session management cookie settings.
session.cookie.path	Defined using administrative console session management cookie settings.
session.cookie.secure	Not applicable.
session.cookie.domain	Defined using administrative console session management cookie settings.
Connection pool properties	Not applicable.
Virtual host properties	Defined using administrative console virtual host settings.
Application definition (webapp properties)	Defined during the application assembly process.
Application deployment (deployedwebapp properties)	Defined using administrative console application install settings.
Java Virtual Machine (JVM) definition	Defined using administrative console Java Virtual Machine settings.
objectleveltrace.enabled	Not applicable.
objectleveltrace.host	Not applicable.
objectleveltrace.port	Not applicable.
inline.comment	Not applicable.

Class loader options

WebSphere Application Server V3.5 Standard Edition for z/OS and OS/390 maintains an Application Server class loader that is global to the JVM. In addition each Web application has its own class loader.

The Application Server class loader serves as the parent to all of the Web application class loaders. The default search mode used when locating a class to load is "Parent First". In Parent First mode, the servlet engine first attempts to

locate the specified class in the parent class loader or load it from one of the libraries or directories supported by that class loader. In the case where a Web application is being loaded, the servlet engine will first search the application level class loader for the target class. If not found, the servlet engine will then proceed to locate the class in the Web application specific class loader or from one of the libraries or directories specified in the `deployedwebapp.web_app_name` classpath directive for that Web application.

The application server classpath is used to specify classes that are used by multiple Web applications such as utility functions. The Web application contains the artifacts that are to be referenced by a single Web application. Web Applications do not have access to artifacts that are packaged with another Web application.

In V3.5, any text based files (properties or resource bundles) that are loaded from an open directory by the Application Level class loader are required to be encoded in EBCDIC. This anomaly no longer exists in V5. All property files and resource bundles are required to be encoded as US ASCII with no exception.

The technique for specifying a class loader policy is more robust in V5. Migrating the class loader Module Visibility Mode describes how to specify these policies in V5.

Code page changes

WebSphere Application Server for z/OS V5 is much closer to the other WebSphere Application Server platforms in how it treats code page issues. This improvement should allow greater portability of applications from other platforms or from the development environment. Encoding changes should no longer be required as part of deployment.

If you are migrating from WebSphere Application Server Standard Edition V3.5, you should be aware of the following potential migration issues:

1. V3.5 supports JSP .91, 1.0, and 1.1 specification levels. JSPs that were configured as .91 or 1.0 levels required the JSP source files to be stored in EBCDIC encoding. JSP specification level 1.1 clarifies the requirements for content of JSPs. Minimally they must be stored in ISO-8859-1 (US ASCII) encoding or a proper derivative. To successfully migrate your level .91, and 1.0 JSPs to V5.0, you must convert the source files to ASCII encoding.
2. V3.5 requires property files and resources bundles that were loaded from an open directory by the application server class loader to be encoded as EBCDIC. In V5, any resource bundles or property files that are used by your application that had previously been converted to EBCDIC encoding must be changed to ASCII before deployment.

Note: Properties or resource bundles that were contained in .jar files or that were loaded from a Web application class loader were not required to be in EBCDIC. Therefore they should already be in ASCII format.

3. V3.5 does not override the default native file encoding of the JVM. This implies that the default file encoding used by the JVM in V35 is assumed to be CP1047 - EBCDIC.

Even though the Java language allows programmers to explicitly specify the encoding of a file that is to be opened and read by the JVM, many programmers do not take advantage of this capability and rely on the default encoding. V5 should improve portability of applications by starting the JVM with a default file encoding of ISO-8859-1 (US ASCII). This implies that

applications that rely on JVM behavior instead of explicit specification of encoding will be able to execute unchanged on a WebSphere Application Server for z/OS V5 system. If you have applications which access EBCDIC encoded files, you must ensure that they explicitly specify this encoding in the application code, or you must change the encoding of the target file to match this new JVM setting.

Note: If you have applications which access EBCDIC encoded files, you need to insure that they are explicitly specifying this encoding in the application code or change the encoding of the target file to match the new JVM setting.

Specification level summary of SE V3.5, V4.0, V4.0.1, and V5 WebSphere Application Server

This article shows the various releases of the WebSphere for z/OS family and the specification and functional differences between them.

Table 54. Specification and functional differences between WebSphere for z/OS releases

Specifications	WebSphere V3.5SE	WebSphere V4.0	WebSphere V4.0.1	WebSphere V5
Java related	<ul style="list-style-type: none"> • Requires SDK 1.3 • Supports specification levels: <ul style="list-style-type: none"> – Servlet 2.1/2.2 – JSP .091/1.0/1.1 – JDBC 1.2 	<ul style="list-style-type: none"> • Requires SDK 1.3 • Supports J2EE 1.2 levels: <ul style="list-style-type: none"> – Servlet 2.2 – JSP 1.1 – JDBC 2.0 – EJB 1.1 – JNDI 1.2 – JTA 1.0 – RMI/IIOP 1.0 	<ul style="list-style-type: none"> • Requires SDK 1.3 • Supports J2EE 1.2 levels: <ul style="list-style-type: none"> – Servlet 2.2 – JSP 1.1 – JDBC 2.0 – EJB 1.1 – JNDI 1.2 – JTA 1.0 – RMI/IIOP 1.0 – JMS 1.1 – JavaMail 1.1 – JAP 1.0 – Client container 	<ul style="list-style-type: none"> • Requires SDK 1.3 • Supports J2EE 1.3 levels: <ul style="list-style-type: none"> – Servlet 2.3 – JSP 1.2 – JDBC 2.0 – EJB 2.0 – part of J2SE 1.3 – JTA 1.0 – part of J2SE 1.3 – JMS 1.1 – JavaMail 1.2 – JAP 1.0 – Client container – Java Authentication and Authorization Service (JAAS) 1.0 – Java API for XML Parsing (JAXP) 1.1 – J2EE Connector Architecture 1.0

Table 54. Specification and functional differences between WebSphere for z/OS releases (continued)

Web Services	N/A	N/A	<p>Introduces Web Services equivalent to those provided by:</p> <ul style="list-style-type: none"> • WebSphere AE V4.0 <ul style="list-style-type: none"> – HTTP to Stateless Session beans • Requires SDK 1.3 PTF • Supports specification levels: <ul style="list-style-type: none"> – SOAP 1.1 – Apache SOAP V2.2 	<ul style="list-style-type: none"> • UDDI V2 • SOAP 2.3 • 5.0.2 + jaxrpc 1.0 GA • 5.0.2 + jsr109 V1.0 GA
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- **WebSphere V3.5SE** adds support for Servlet/JSP specification levels required by the J2EE 1.2 specifications, allowing customers to take advantage of the latest levels and to start early migration of applications in preparation for movement to J2EE 1.2 servers.
- **WebSphere V4.0** introduces a J2EE server that provides support for enterprise applications consisting of Web applications and enterprise java beans (EJBs). Support for Servlets, JSPs, and EJBs is compliant to the J2EE 1.2 architecture and provides all the benefits of this architecture. Tooling supports the J2EE 1.2 required packaging scheme. The J2EE server, unlike prior JAVA runtimes provided by WAS SE, provides container managed services for items such as transactions and security, simplifying the application programmers job. In addition the J2EE server utilizes the z/OS infrastructure to provide QOS expected on the 390 platform.
- **WebSphere V4.0.1** finishes delivery of all functional items required for certification. This includes delivery of JMS, JAVAMail, and client container support. In addition, WebSphere 4.0.1 provides the initial delivery of Web Services.
- **WebSphere V5** provides support for next generation technologies- J2EE 1.3 compatible with support for key Web services. V5 is Network Deployment compliant and continues to build towards WebSphere family consistency in architecture, administrative console, and programming APIs.

Prerequisites needed for WebSphere Application Server for z/OS V3.5SE, V4.0.1, and V5

The following table describes the prerequisites needed for WebSphere Application Server for z/OS V3.5SE and V4.0.1 Alternate Configuration Option, V4.01, and V5.

Table 55. Prerequisites needed for WebSphere Application Server for z/OS V3.5SE and V4.0.1 Alternate Configuration Option, V4.01, and V5.

Pre-Reqs	V3.5 and V4.0.1 Alternate Configuration Option	V4.0.1	V5.0
OS/390 or z/OS	R8 and above	R8 and above	R10 and above z/OS1.2 is required for the Dynamic application environment

Table 55. Prerequisites needed for WebSphere Application Server for z/OS V3.5SE and V4.0.1 Alternate Configuration Option, V4.01, and V5. (continued)

HTTP Server	IBM HTTP Server for OS/390 ONLY	Options: <ul style="list-style-type: none"> • Direct browser to HTTP transport • IBM HTTP Server for OS/390 with no HTTP transport • IBM HTTP Server for OS/390 with HTTP transport • Any HTTP server that supports AEplugin 4.0.2 and above. 	Must use HTTP transport Options for connecting to HTTP transport: <ul style="list-style-type: none"> • Direct Browser • IBM HTTP Server for OS/390 (R10) • Any HTTP Server supported by V5.0 family plugins
Sysplex	Not required	Required	Required
OS/390 Communications server (TCP/IP)	Required	Required	Required
OS/390 Unix System Services and Hierarchical file system (HFS)	Required	Required Shared HFS is required for a multiple image sysplex	Required Shared HFS is supported, but is no longer required for a multiple image sysplex
SecureWay Security Server (RACF) or Equivalent	Required	Required	Required
System Logger	Not required	Required	Required
LightWeight Directory Access Protocol (LDAP) Server	Not required	Required	Not required
Workload Manager in Goal mode	Only required for scaleable mode	Required	Required Dynamic AE (programmatic setup of WLM application environment) requires PTF against z/OS 1.2
Resource Recovery Services (RRS)	Not required	Required	Required
FTP server	Not required	Required	Not required
System SSL Security	Required for SSL	Required for SSL	Required for SSL
DB2	V5 or later if JDBC or Session State is used	V7 required for Admin DB	Not required or supported for SM function V7 required for user data (JDBC compliant driver)

Table 55. Prerequisites needed for WebSphere Application Server for z/OS V3.5SE and V4.0.1 Alternate Configuration Option, V4.01, and V5. (continued)

WSMQ	Not required	Not required Optional support for point to point: MQSeries 5.2+PTF; SupportPac MA88 Optional support for pub/sub: MQ SI 2.1	Not required - Integrated JMS provided as part of WAS 5.0 If integrated provider is not required: <ul style="list-style-type: none"> • Can continue to use the same product stack as in WAS 4.0.1 Note: Functions such as XA support and Java client are only available with MQ5.3.1. <ul style="list-style-type: none"> • Can purchase and install full MQ5.3.1 product.
IMS JCA	Not applicable	IMS Connect 1.2+PTFs (requires IMS V7.1) IMS Connect 2.1 (requires IMS V8.1)	IMS Connect 2.1 (requires IMS V8.1)
CICS JCA	Not applicable	CICS Transaction Gateway 4.0.2, 5.0, 5.0.1 (requires CICS TS 1.3)	CICS Transaction Gateway 5.0.1 (requires CICS TS 1.3)

Coexistence port definitions

The following table defines port definitions for WebSphere Application Server for z/OS versions.

See Port number settings in WebSphere Application Server versions for more information on ports.

Table 56. Coexistence port definitions

WebSphere Application Server for z/OS V5	WebSphere Application Server for z/OS V4.0.1	WebSphere Application Server for z/OS V3.5SE
Daemon	Daemon 5555	
5.0.2 + 5655		
5656 (SSL)		
Application server	Application server	Web server
IIOP Dynamically chosen	IIOP Dynamically chosen	
Equal to bootstrap port		
Bootstrap	Application Server did not have a bootstrap port	
2809 if base server		
9810 if part of ND cell		
IIOPS Dynamically chosen	IIOPS Dynamically chosen	
HTTP 9080 (same as distributed)	HTTP No Default (8080 in examples)	HTTP 80
HTTPS 9443 (same as distributed)	HTTPS No Default (8080 in examples)	HTTPS 443

Table 56. Coexistence port definitions (continued)

NodeAgent	SM
Bootstrap 2089 (same as distributed)	Bootstrap 900
IIOP 2089 (separate in distributed)	
IIOPS Dynamically chosen	
LDAP Not Applicable	LDAP 1439
Naming/IR Not Applicable	Naming/IR Dynamically chosen

Migrating XML applications

The following step is needed to migrate Version 3.5SE XML applications to supported XML APIs.

Migrate Version 3.5.x XML applications to supported XML APIs

If your XML applications use XML for Java API, Version 2.0.x or earlier, you must migrate them to API Version 3.1 or the equivalent open-source version. Although there are inherent performance improvements in later versions of the XML for Java API, you can gain additional performance by explicitly using nonvalidating parsers in application environments where you can trust the data.

The most significant change is that the TX-compatible APIs are no longer available. The Document API retains the XML manipulation APIs that were in TXDocument, but you must rewrite the following functionality:

- Creating and loading an XML parser: Use a Java API for XML Processing (JAXP) factory class.
- Writing out the Document Object Model (DOM) tree: Use a serializer. One drawback to the DOM Level 2 implementation in this level of the XML for Java API is that the grammar (DTD or schema) is no longer a node in the DOM tree, so you cannot write it out. As a result, only external grammars are recommended. You can query the system ID of the root element and use it to retrieve the name from the statement. After the tree is written to an XML file, you can read the file as text and insert a statement.

Note: In addition to the XML API changes, it is important to understand that J2EE Version 1.3 mandates the use of JAXP 1.1, DOM Version 2, and SAX Version 2. JAXP Version 1.2, DOM Version 3, and SAX Version 3 are not allowed in products that are compliant with the J2EE Version 1.3 specification. This prohibition exists because the newer versions were *experimental* at the time of the J2EE Version 1.3 specification. Because WebSphere Application Server is compliant with the J2EE Version 1.3 specification, WebSphere Application Server has support for JAXP Version 1.1, DOM Version 2 and SAX Version 2 only.

You must only recompile a Version 4.0.1 XML application to migrate it to the Version 5 level.

Chapter 7. Installation and Customization: Resources for learning

Use the following links to find relevant supplemental information about installation and customization. The information resides on IBM and non-IBM Internet sites, whose sponsors control the technical accuracy of the information.

These links are provided for convenience. Often, the information is not specific to the IBM WebSphere Application Server product, but is useful all or in part for understanding the product. When possible, links are provided to technical papers and Redbooks that supplement the broad coverage of the release documentation with in-depth examinations of particular product areas.

View links to additional information about:

- Planning, business scenarios, and IT architecture
- Programming model and decisions
- Programming instructions and examples
- Programming specifications
- Administration
- Support

Planning, business scenarios, and IT architecture

- IBM WebSphere Application Server supported hardware, software, and APIs

The official site for determining product prerequisites for hardware, software and APIs for all WebSphere Application Server products.

- IBM developerWorks WebSphere

The home of technical information for developers working with WebSphere products. You can download WebSphere software, take a fast path to developerWorks zones, such as VisualAge Java or WebSphere Application Server, learn about WebSphere products through a newcomers page, tutorials, technology previews, training, and Redbooks, get answers to questions about WebSphere products, and join the WebSphere community, where you can keep up with the latest developments and technical papers.

- IBM WebSphere Application Server library and InfoCenters Web site

The IBM WebSphere Application Server Library Web site contains links to all WebSphere Application Server InfoCenters, for all versions. It also lets you access each InfoCenter in your native language.

- IBM WebSphere Application Server home page

The IBM WebSphere Application Server home page contains useful information, including support links and downloads for fixes, APARs, tools, and trials.

- IBM WebSphere software platform home page

The IBM WebSphere software platform home page introduces WebSphere products and describes how companies can easily transform to an e-business, with software that can grow as fast as the business it supports.

- Migrating to WebSphere V5.0: An End-to-End Migration Guide, SG24-6910-00

This IBM Redbook is the definitive migration guide for migrating earlier versions of WebSphere Application Server to Version 5. The Redbook adds a broader scope, including planning for application migration and WebSphere Studio Application Developer tooling and samples. Read this book to formulate an optimal migration strategy.

- The power of Edge of Network technology in IBM WebSphere Application Server Version 5
A description of WebSphere Application Server Edge Components Version 5.
- WebSphere Application Server - Express, V5
A description of WebSphere Application Server Express, Version 5.
- WebSphere Application Server, Version 5
A description of the base product, WebSphere Application Server, Version 5.
- IBM WebSphere Business Integration Server Foundation, Version 5
A description of IBM WebSphere Business Integration Server Foundation, Version 5.
- IBM WebSphere Application Server for z/OS, Version 5
A description of WebSphere Application Server for z/OS, Version 5.
- InfoCenter for WebSphere Application Server Edge components
The InfoCenter for WebSphere Application Server Edge components contains complete documentation for the Caching Proxy and the Load Balancer in these PDF online books, *WebSphere Application Server Concepts, Planning, and Installation for Edge Components*, the *WebSphere Application Server Caching Proxy Administration Guide*, and the *WebSphere Application Server Programming Guide for Edge Components*.
- developerWorks: Patterns for e-business: Redbooks listing
This Web page lists links to pattern resources under these categories:
 - Current patterns Redbooks
 - Superseded patterns Redbooks (valid for back-level product versions)
 - Independent analyst reports
 - Patterns CD order offer
 - Back-level version patterns Web site (zip downloads and old Flash tutorial)
 - Customer references
 - White papers
 - Multimedia presentations and screen cams
 - Webcasts
 - Patterns development kit
 - WebSphere technical exchange presentations
- developerWorks: IBM Patterns for e-business
The IBM developerWorks site is the source for IBM patterns for e-business, a set of tested, reusable intellectual assets that you can use to design and implement your e-business network and architecture!
- Design for Scalability - An Update
This White paper is from the IBM High Volume Web Sites team. The White paper describes component selection and management techniques you can use to make your Web site ready to adapt to increasing traffic. These techniques are the product of IBM experiences while working with customers seeking to improve the performance and availability of some of the largest Web sites in the world.
Abstract: Optimizing for scalability remains a significant challenge for e-businesses as they balance the demands for availability, reliability, security, and high performance. Vendors are responding with infrastructure options and supporting hardware and software platforms that address these requirements. This update identifies current products and emerging trends that are most likely to improve the scalability of your e-business infrastructure.
- IBM WebSphere Application Server V5.0 System Management and Configuration: WebSphere Handbook Series
This IBM Redbook provides the knowledge needed to implement WebSphere Application Server V5.0, Network Deployment runtime environment, to package and deploy Web applications, and to perform ongoing management of the

WebSphere environment. It is one in a series of handbooks, designed to give you in-depth information on the entire range of WebSphere Application Server products.

This book provides an overview of the architecture, topology options, and new features of WebSphere Application Server Version 5 and WebSphere Application Server Network Deployment Version 5. It takes you through the installation steps needed to install each topology. Platform-specific chapters are included for installation on Windows, AIX, and Solaris.

The book then takes you through the process of configuring WebSphere Application Server. It is organized in the same manner as the WebSphere administrative console. It also includes information on packaging and deploying applications. It concludes with information on troubleshooting runtime problems.

- IBM WebSphere V4.0 Advanced Edition Handbook

This Redbook describes base application topologies and product mappings for WebSphere Application Server. Refer to the IBM Redbooks Web site for the latest update.

- The User centered design (UCD) for different project types, part 1

This Web page is the first of two articles posted to IBM developerWorks that describes useful application design activities for different types of projects.

- The User centered design (UCD) for different project types, part 2

This Web page is the latest of two articles that describes design activities that IBM scientists have found most useful in various types of projects. This article defines user interface design elements, including the design prototype, use case model, and design specification document.

Programming model and decisions

- Designing e-business Solutions for Performance

This White paper describes how the design or implementation of an e-business application can affect performance.

- Managing Web Site Performance

This White paper contains tips and techniques for developers building applications that use session persistence. It also helps administrators to tune the WebSphere Application Server product appropriately for these applications.

Programming instructions and examples

- IBM developerWorks

IBM developerWorks contains many excellent resources for developers, including tutorials on Web development-related topics. There is an excellent tutorial on the JDBC API.

- IBM Redbooks

The IBM Redbooks site contains many WebSphere Application Server related documents.

Programming specifications

- J2EE information

For more information about J2EE specifications, visit the Sun site.

- sun.net.inetaddr.ttl property

The following Java 2 SDK, Standard Edition 1.4 Web site describes the private sun.net.inetaddr.ttl property, which works in both Java 2 SDK, Standard Edition 1.3 (WebSphere Application Server V5.0.0, V5.0.1, and V5.0.2) and Java 2 SDK, Standard Edition 1.4.

- java.net.URLConnection class

The *Networking* section of this Java 2 SDK, Standard Edition 1.4 Web site describes a change in the behavior of the `java.net.URLConnection` class.

Administration

- Best Practices Zone on WSDD

The WebSphere Best Practices Zone is a collection of best practices for administering WebSphere Application Server. Over time, the zone is intended to grow to include best practices for using other WebSphere software products, and to cover more topics. Use the feedback mechanism to submit your best practice suggestions.

- The IBM Glossary of Computing Terms

This glossary defines technical terms used in many IBM products. It is not a comprehensive resource of all IBM computing terms. This resource is provided for information purposes only and is updated periodically. IBM takes no responsibility for the accuracy of the information it contains.

Support

- AIX Fix Distribution Service Web site

A Web facility for downloading AIX Version 4 and AIX Version 3 fixes, with a limited search engine designed with the assumption that you know what fix you need. If you do not know what fix you need, there is a pointer at the Web site to the APAR Database Facility. You can also contact your authorized IBM business partner or IBM Support Center.

- Ten Steps to Getting Support for WebSphere Application Server

If you are new to a product, you might have difficulty finding all the information you need. And if you come across a problem, where do you go for help? Whether you are a new user looking for introductory information, or an experienced user looking for a workaround for a specific defect, you can benefit immediately from extensive Web-based support from IBM. It enables you to download fix packs, search on keywords, look up FAQs, Hints and Tips, and so forth. Always use this Web resource before contacting IBM Support directly.

- WebSphere Application Server Support page

Take advantage of the Web-based Support and Service resources from IBM to quickly find answers to your technical questions. You can easily access this extensive Web-based support through the IBM Software Support portal at URL <http://www-3.ibm.com/software/support/> and search by product category, or by product name. For example, if you are experiencing problems specific to WebSphere Application Server, click **WebSphere Application Server** in the product list. The WebSphere Application Server Support page appears.

Chapter 8. Samples Gallery

The Samples Gallery offer a set of samples that demonstrates common Web application tasks. The samples are installed as a by-product of the install process, specifically the Customization Dialog, which generates the batch jobs that ultimately install the samples

The Samples Gallery available with the Application Server offers a set of samples that demonstrate common Web application tasks. When you install the Enterprise product, you can choose to add samples to the gallery that demonstrate enterprise extension features. During a typical install of the base Application Server or Enterprise product, the Samples are installed on your local machine by default; however, if you choose a custom install for either product, the Samples are available as an option. During an Enterprise product install, a sample is available for each of the enterprise extensions that you choose to install. When you install an extension, it is then possible to add its sample to the Samples Gallery.

The Samples Gallery includes the following samples:

- The Plants by WebSphere application, which demonstrates several J2EE functions, using an online store that specializes in plant and garden tool sales.
- Technology Samples, which showcase enterprise beans, servlets, JavaServer Pages technology, message-driven beans, and J2EE application client.
- The Java Pet Store Application, which demonstrates J2EE technology, using an online pet store.
- The message-driven beans Samples demonstrate message-driven beans receiving messages from the Point-to-Point and Publish Subscribe messaging models. It also demonstrates Java Message Service (JMS) inside the client container.

The Samples Gallery includes the following samples:

- Samples that demonstrate new v5.0 enterprise extension features such as Extended Messaging, Dynamic Query Service, ActivitySessions Service, Application Profiling, JTA Extensions, Asynchronous Beans, Scheduler, and Process Choreographer.
- Improved samples for previously-available enterprise extension features such as Business Rules Beans, WorkArea Service, Internationalization Service, and CORBA C++ SDK.
- A collection of Application Server samples, such as the Plants by WebSphere application, Technology samples, the Java Pet Store application, and message-driven beans samples.

Finding the Samples Gallery. Once the Samples are installed on your local machine, they are available to try out. Locate them at <http://localhost:9080/WSsamples/>. The default port is 9080. If you do not find the Samples on your localhost, confirm their installation and the port number for the internal HTTP server. If you selected coexistence during installation, and changed the HTTP Transport from 9080 to another value, use the new value in place of 9080. On Windows platforms, you can also find the Samples by clicking **Start > Programs > IBM WebSphere > Application Server v5.0 > Samples Gallery**. It is possible to change the port number, if necessary, in the properties window for the menu item.

Finding the Samples Gallery. Once the Samples are installed on your local machine, they are available to try out. You can locate them by pointing a browser

at <http://hostname:9080/WSsamples/>. The default port is 9080. However, if you specified a different port assignment you will need to modify your URL. If you have difficulty finding the Samples at the URL given, confirm their installation and the port number for the internal HTTP server.

Client Samples. A separate Samples Gallery is available for the client Samples. To view these Samples, install the WebSphere Application Server client. The Client Samples Gallery demonstrates the following:

- J2EE application client.
- Java thin client.
- Applet client.
- ActiveX to EJB Bridge client.
- CORBA C++ SDK Client.

Client Samples. For WebSphere Application Server for z/OS there is a separate Samples Gallery available for the client Samples. There is a line mode client on z/OS which is used for the calculator client sample and the MDBSamples client. To view the client Samples, install the WebSphere Application Server client. The Client Samples Gallery demonstrates the following:

- J2EE application client.
- Java thin client.
- Applet client.
- ActiveX to EJB Bridge client.
- CORBA C++ SDK Client.

Code Examples. In addition to the Samples in the Samples Gallery, you can find other code examples in the InfoCenter by clicking **Reference > Examples** in the InfoCenter navigation.

Note: The Samples are for demonstration purposes only. The code provided is not intended to run in a secured production environment. The Samples support Java 2 Security, therefore the Samples implement policy-based access control that checks for permissions on protected system resources, such as file I/O. The Samples also support global security.

Before you can run the Process Choreographer Sample, install it according to the instructions in the Samples Gallery. After the installation, you must enable global security.

The Samples are not supported in a multi-server, clustered environment. Many of the Samples use Cloudscape as a persistent data store on the server. Only one instance of Cloudscape is supported per Java virtual machine (JVM). As a result, the second server in the node will fail to start the Sample applications, since an instance of Cloudscape has already been created with the first server in the node.

Additional WebSphere Application Server Samples are available on the IBM WebSphere Developer Domain.

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