WebSphere® Application Server for z/OS® V7

Installation and configuration

This presentation provides an overview of the Installation and configuration process for WebSphere Application Server for z/OS Version 7.

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Agenda

- System prerequisites

- Products

- Overview of install process

- WebSphere Customization Tools
  - ▸ z/OS profile management tool

- zpmt shell script

2

This presentation covers the prerequisites for WebSphere Application Server for z/OS, the products that ship as part of WebSphere Application Server for z/OS and then an overview of the installation process. This includes looking at the various tools available for customization.

Section

System prerequisites

Installation and configuration

This section will discuss system prerequisites.

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Prerequisites

- Hardware requirements
  - ▸ Any hardware that supports z/OS 1.7 or higher or z/OSe 1.7 or higher

- Software requirements
  - ▸ z/OS 1.7 or higher or z/OSe 1.7 or higher with these features installed, enabled and configured
    - z/OS Communications Server (TCP/IP) or equivalent
    - z/OS UNIX® System Services and the hierarchical file system (HFS)
    - z/OS SecureWay® Security Server (RACF®) or equivalent SAF security management product
    - z/OS System Logger
    - z/OS Workload management
    - z/OS Resource recovery services

4

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WebSphere Application Server V7.0 requires hardware that supports z/OS V1.7 or higher, or z/OSe V1.7 or higher. The software that is required for WebSphere Application Server V7.0 includes a communications server, UNIX System Services in full function mode with the hierarchical file system (HFS) or zSeries File System (zFS), Security Server (RACF) or an equivalent SAF security management product, system logger, workload manager and Resource Recovery services (RRS). SMP/E Version 3.3 is required for installation.

Prerequisites

- APARs OA22093, OA22094 and OA25489 are mandatory service for V7
  - ▶ Provides an enhanced LOADHFS call to load WebSphere modules directly from the HFS
    - Address spaces will fail to start with 40xx abend without the service

- APAR OA22093 (RACF) and APAR OA22094 (SAF)
  - ▶ Required for writable SAF keyring support on z/OS 1.7 or z/OS 1.8

WebSphere Application Server V7.0 requires three z/OS APARs which are listed on the slide. These APARs provide function that allows WebSphere to load needed modules from the HFS rather than load libraries. This simplifies the configuration of WebSphere by not requiring any PDSes to run WebSphere and thus not requiring any STEPLIB statements in the JCL. Without these APARs, the WebSphere address spaces will fail to start with a 40xx abend. If you plan to use the writable SAF keyring support, APARs OA22093 and OA22094 are also required.

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Implementation options (optional)

- Optional based on WebSphere Application Server configuration:
  - ▸ IBM HTTP Server for z/OS or equivalent
  - ▸ Lightweight Directory Access Protocol (LDAP) Server
  - ▸ Tivoli® Access Manager (TAM) V6.0

6

Optional software products that can be used with WebSphere Application Server for z/OS Version 7 are the IBM HTTP Server for z/OS, the Lightweight Directory Access Protocol Server, and Tivoli Access Manager.

Implementation options (optional)

- Optional based on Application Requirements:
  - DB2® Universal Database Server for z/OS, Version 8 or higher
  - Information Management System IMS™ V9 or later; IMS JDBC Connector V9 or later
  - CICS® TS 2.3.0 or later
  - CICS TG V6.0
  - WebSphere MQSeries® 6.0 for z/OS or higher

7

Depending on the applications you plan to run in your application serving environment, optional software products include DB2 for z/OS Version 8 or higher, IMS V9 or later and IMS JDBC Connector V9 or later, CICS Transaction Server 2.3.0 or later and WebSphere MQSeries 6.0 or higher

Section

Products

8

This section covers the products that are part of the WebSphere Application Server for z/OS V7.

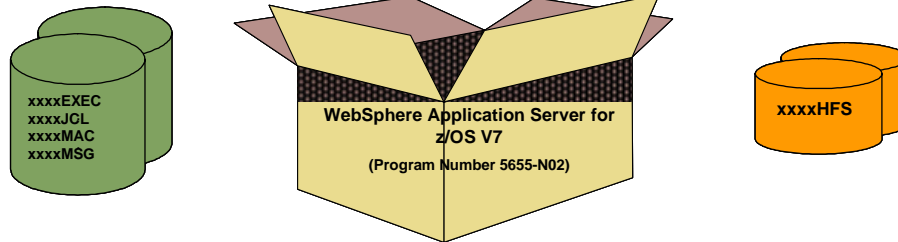# WebSphere Application Server for z/OS V7

- Consists of these FMIDs:
  - ▸ H28W700 - WebSphere Application Server for z/OS V7.0.0
  - ▸ JIWO700 - WebSphere Application Server for z/OS V7.0.0 Optional Materials
  - ▸ JDYZ700 - WebSphere Application Server for z/OS V7.0.0 DMZ Secure Proxy Server
  - ▸ HCYE700 -- ITCAM for IBM WebSphere Application Server V7.0

- Media contents Web site:

  http://www.ibm.com/support/docview.wss?rs=180&uid=swg27013293

WebSphere Application Server for z/OS Version 7 consists of four FMIDs. The first one, H28W700, is the base product that allows you to configure a Java EE application serving environment. JIWO700 is a second FMID that is supplied to hold optional materials, which are components delivered through the service stream into separate directories on a separate file system created by the installation process for JIWO700. The third FMID, JDYZ700, is for WebSphere Application Server for the z/OS Version 7 DMZ Secure Proxy Server. The DMZ Secure Proxy Server will also be installed into its own file system but must be installed into the same SMP/E zones that contain the WebSphere Application Server for the z/OS base product. A later slide will show the structure. The fourth FMID, HCYE700, contains ITCAM for IBM WebSphere Application Server V7. The URL shown at the bottom of the slide is a reference for what is shipped with WebSphere Application Server for z/OS V7. It includes all media content which consists of CD, DVD and tape.

WebSphere Application Server V7.0 packaging

xxxxEXEC
xxxxJCL
xxxxMAC
xxxxMSG

WebSphere Application Server for z/OS V7

(Program Number 5655-N02)

xxxxHFS

Component name	FMID	Compid	PSP Bucket (Upgrade=WASAS700) Subset
WebSphere Application Server for z/OS V7.0.0 (xxxx=SBBO)	H28W700	5655I3500	H28W700
Optional Materials (xxxx=SIWO)	JIWO700	-----	JIWO700
Install Samples	JIWO700	5655I3509	JIWO700
IBM HTTP Server for WebSphere	JIWO700	5655I3510	JIWO700
IBM HTTP Server 64 bit plug-in	JIWO700	5655I3511	JIWO700
WebSphere Application Server for z/OS V7.0.0 DMZ Secure Proxy Server (xxxx=SDYZ)	JDYZ700	5655N0212	JDYZ700

10

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As you saw on the previous slide, WebSphere Application Server for z/OS V7 consists of four FMIDs. The component names of the first three FMIDs that are included are shown here in the table, along with the corresponding compids and information to locate the PSP buckets for the components. Notice that while there are some PDSes shipped as part of the product, such as EXEC and JCL, there is not a PDS for LOAD modules. As noted earlier, the entire product now runs from the HFS.

Section

Overview of installation process

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This section will discuss the installation process.

Installation on z/OS, two step process

- Install the product code
  - ▶ Using SMP/E

- Configure application serving environments by running customized batch jobs created for you:
  - ▶ Using WebSphere customization tools (profile management tool, or PMT)
    - Workstation tool available for Windows® or Linux® Intel® operating systems
    - Available for download (also known issues found here):
      http://www.ibm.com/support/docview.wss?rs=180&uid=swg24020368
  - ▶ Using zpmt.sh command found in:
    `/usr/lpp/zWebSphere/V7R0/bin`

ISPF Dialogs no longer available

12

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WebSphere Application Server for z/OS has a two step installation process. The first thing that must be done is to install the product code. This is done using SMP/E. The second step involves actually configuring your application serving environment. As you will see, this involves customizing jobs that you need to run. Different tools are provided to create the information needed to customize the jobs. One option is to use the profile management Tool, or PMT, which is part of the WebSphere Customization Tools. The WebSphere Customization Tools is a workstation tool that is available for the Windows or Linux Intel operating systems. It is available for download at the URL shown on the slide. The second option allows you to configure completely on z/OS using a shell script, zpmt, found in the product bin directory. The zpmt command does not support the secure proxy install image however. You'll notice that the ISPF customization dialogs are no longer available starting with Version 7 of the product. It is also important to note that there can be some things you need to do to prepare your z/OS target systems to run WebSphere Application Server for z/OS. The information center contains an article, 'Preparing the base operating system', outlining what needs to be done. This presentation assumes that the base operating system has been properly prepared.

SMP/E

- Program directory available here:

  http://www.ibm.com/software/webservers/appserv/was/library/v70/was-zos/books.html

- Requires SDK 1.4 or higher

- UNIX must be in full function mode

- Userid to run some jobs needs authority to mount file systems and modify UNIX system services files

  ▶ Must also have read access to the facility class resources BPX.FILEATTR.PROGCTL, BPX.FILEATTR.APF, and BPX.FILEATTR.SHARELIB

To install the product code, you will use SMP/E. The program directory for the product is found at the URL listed on the slide. Because WebSphere Application Server uses the SDK as part of the SMP/E processing, you must have SDK 1.4 or higher on the system where you plan to do the installation. UNIX must also be configured in full function mode in order to complete the product code installation. To run some of the SMP/E jobs, the user ID used must have the authority to mount file systems and modify UNIX system services files and access to the facility class resources listed.

Configure application serving environment

- WebSphere Application Server
  - Stand-alone application server cell
  - Administrative agent
  - Network deployment cell
  - Managed node in a network deployment cell
  - Federate an application server
  - Job manager

- WebSphere DMZ Secure Proxy Server
  - Administrative agent
  - Secure proxy server

There are different types of environments that you can create for your application serving environment. The simplest environment consists of a stand-alone application server cell. This environment is limited to one node and one application server. The administrative console runs within that one server. The administrative agent environment is provided to allow you to administer multiple stand-alone application server nodes.

A network deployment cell provides the ability to define one or more application server nodes across multiple LPARs with a central administrative interface in a deployment manager node. It provides clustering capabilities for workload balancing and failover, thus allowing for higher availability of your applications. The managed node configuration is used to define an additional node to be federated into a network deployment and likely become part of a cluster. The job manager configuration creates a job manager which is used to submit administrative jobs asynchronously for application servers registered to administrative agents and for deployment managers.

The DMZ Secure Proxy Server for IBM WebSphere Application Server installation allows you to install your proxy server in the demilitarized zone (DMZ). This reduces the security risk that might occur if you choose to install an application server in the DMZ to host a proxy server. The risk is reduced by removing any functionality from the application server that is not required to host the proxy servers, but that can pose a security risk. The secure proxy administrative agent provides a single interface to administer multiple secure proxy servers.

Configure application serving environment

- Plan, plan, plan!!
  - ▶ Spreadsheet helps with naming conventions:
    - http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1331
    - Creates response file to be input in configuration tools
  - ▶ Sample network deployment configuration:
    - http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP100653
    - Good explanation of concepts
  - ▶ Introducing the WebSphere Customization Tools for z/OS
    - http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS3357

There is a lot of information you need to provide in order to customize your application serving environment. Before beginning the process, it is important to decide on naming conventions and resources that are to be used. You need names for the cell, nodes and servers and names for the job names and proc names that are used. You need user IDs and groups with UIDs and GIDs and many TCP ports. This is just a sampling of some of the information needed. The important point to note is that you need to do some planning before beginning the customization. The information center provides customization sheets that can be printed out and filled in but the spreadsheet listed on the slide is an excellent tool that can be used to make the job easier. By starting with a few key variables, this spreadsheet derives all the needed parameters and allows you to easily create a response file that can be used with the customization tools.

If you are new to WebSphere Application Server for z/OS, the sample network deployment configuration is a great place to get a good understanding of how to create a robust, operational network deployment configuration. It takes you through a complete configuration, explaining decisions along the way. While it is based on V6, the same concepts still apply to version 7 and will help you plan your configuration appropriately.

Finally, there is a techdoc that is meant as an introduction to the WebSphere Customization Tools which is new for V7.

Configure application serving environment
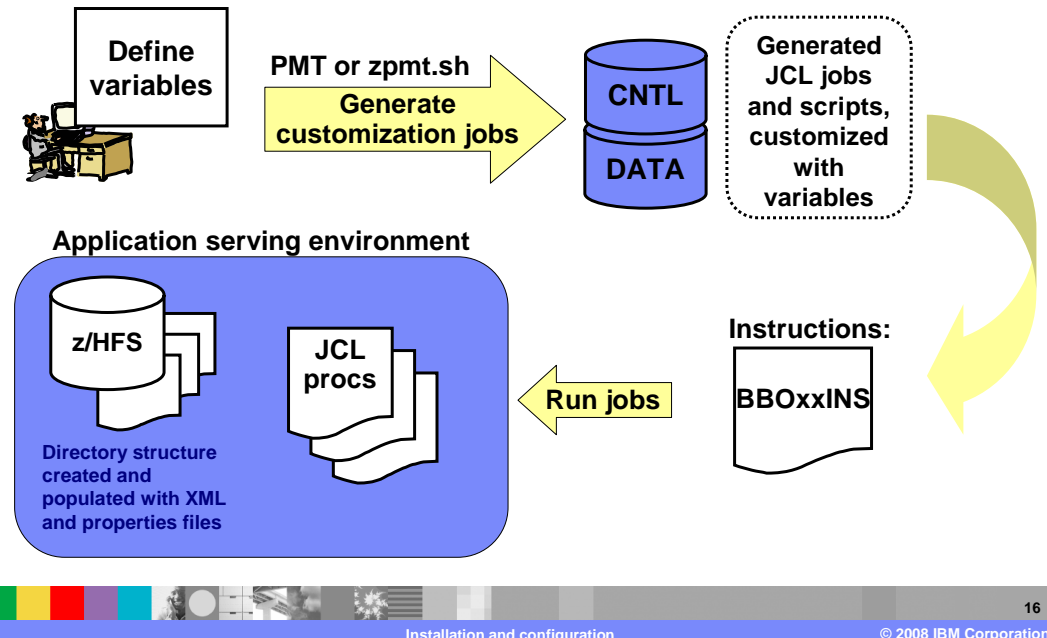
Once you have determined what type of application serving environment you want to create, you will define variables that reflect your naming conventions and other choices you have made. Using either the PMT tool or the zpmt.sh script, you will generate customization jobs and scripts based on those variables. The jobs and scripts will end up in the CNTL and DATA PDSes on the mainframe where they can be run. In the CNTL PDS, you will find a BBOxxINS member, where the xx will depend on what type of environment you are configuring. The instructions to run the jobs are found there. The instructions will tell you what jobs need to be run and in what order, and the user ID that is needed to run the job. Once you have successfully run all the jobs, you will have an application serving environment ready to use. This includes the customization zFS or HFS that has been fully configured to run the environment, including XML and properties files customized to your specifications. JCL procs are also created that allow you to start it.
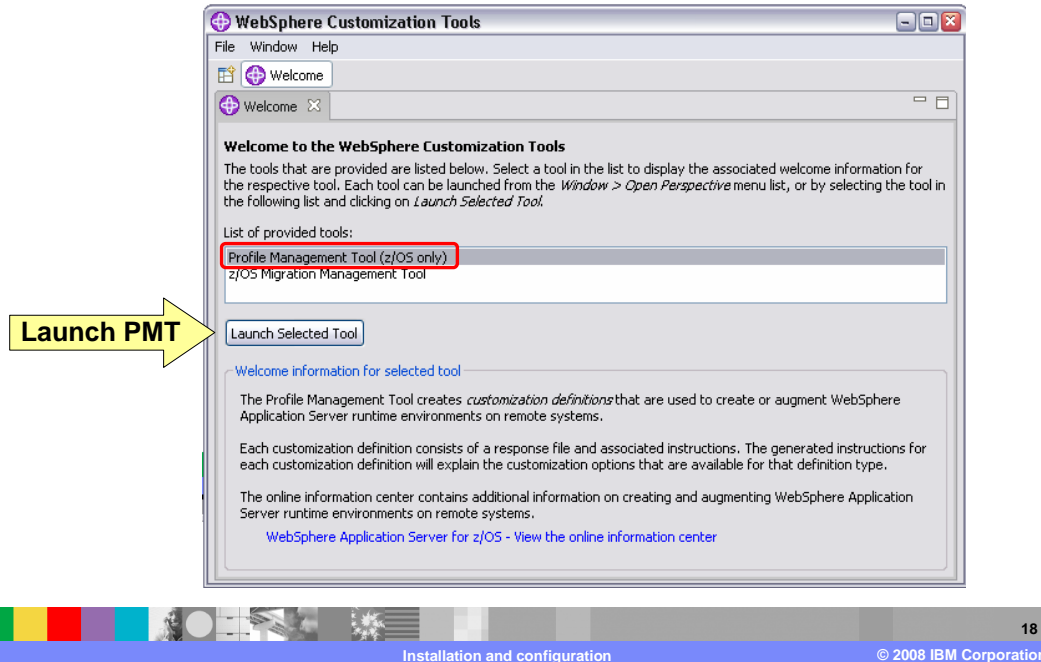
Section

z/OS profile management tool

17

In this next section, you will look briefly at the z/OS profile management tool.
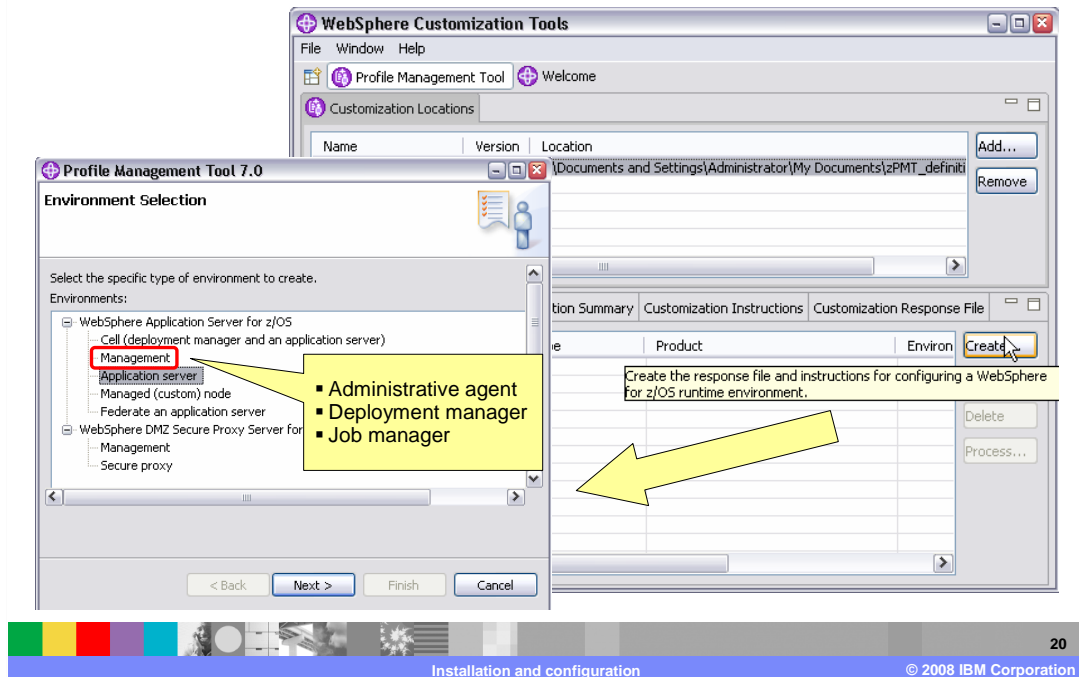
z/OS profile management tool

WebSphere Customization Tools

File   Window   Help

Welcome

Welcome ✕

Welcome to the WebSphere Customization Tools

The tools that are provided are listed below. Select a tool in the list to display the associated welcome information for the respective tool. Each tool can be launched from the *Window > Open Perspective* menu list, or by selecting the tool in the following list and clicking on *Launch Selected Tool*.

List of provided tools:

Profile Management Tool (z/OS only)
z/OS Migration Management Tool

Launch PMT → Launch Selected Tool

Welcome information for selected tool

The Profile Management Tool creates *customization definitions* that are used to create or augment WebSphere Application Server runtime environments on remote systems.

Each customization definition consists of a response file and associated instructions. The generated instructions for each customization definition will explain the customization options that are available for that definition type.

The online information center contains additional information on creating and augmenting WebSphere Application Server runtime environments on remote systems.

WebSphere Application Server for z/OS - View the online information center

18

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Now that you have seen an overview of the installation and configuration process, you will look at the tools available to do the configuration. The first one is the z/OS profile management tool, or the PMT. As mentioned before, the PMT is part of the WebSphere Customization Tools that are available for the Windows or Linux Intel operating systems. The Welcome screen is shown on this slide and you must select the profile management tool and then launch it.

z/OS profile management tool
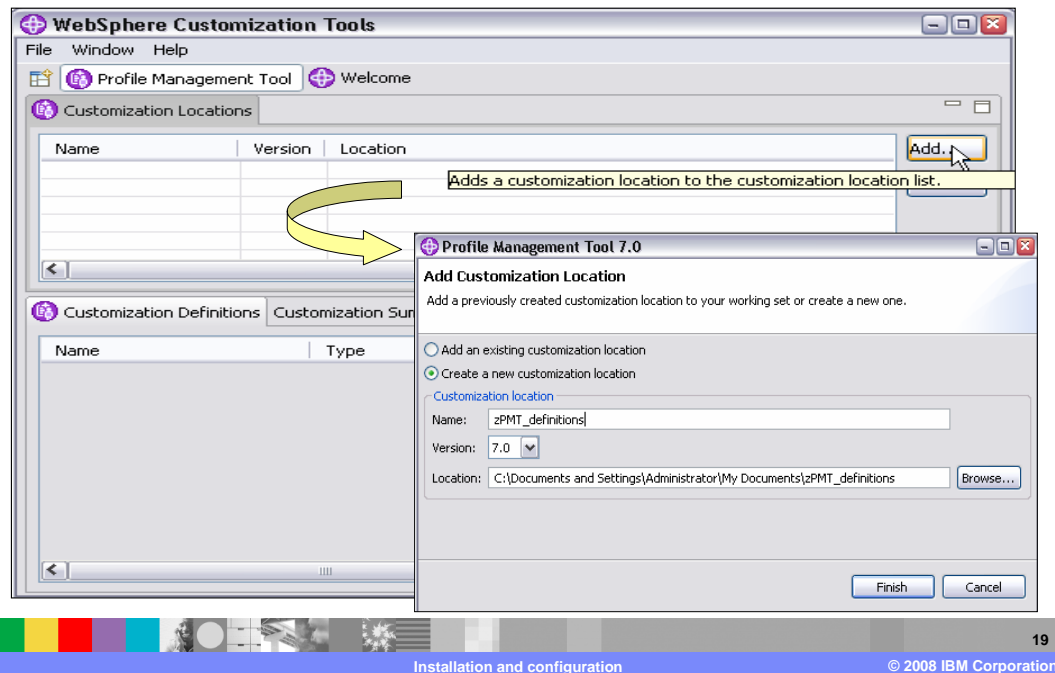
Once the tool has been launched, the first thing you need to do is add a customization location. This is the location where the tool will keep the customization definitions you will define. This is shown in the smaller box on the slide.

z/OS profile management tool

WebSphere Customization Tools

File   Window   Help

Profile Management Tool   Welcome

Customization Locations

Name	Version	Location
		\Documents and Settings\Administrator\My Documents\zPMT_definiti

Add...
Remove

Profile Management Tool 7.0

Environment Selection

Select the specific type of environment to create.

Environments:

- WebSphere Application Server for z/OS
  - Cell (deployment manager and an application server)
  - Management
  - Application server
  - Managed (custom) node
  - Federate an application server
- WebSphere DMZ Secure Proxy Server for
  - Management
  - Secure proxy

- Administrative agent
- Deployment manager
- Job manager

< Back   Next >   Finish   Cancel

...tion Summary   Customization Instructions   Customization Response File

...e	Product	Environ

Create

Create the response file and instructions for configuring a WebSphere for z/OS runtime environment.

Delete

Process...

20

Installation and configuration

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Once you have a customization location defined, you can customize an environment of your choosing. Seen in the smaller box on the left are the various environments you can configure as noted earlier. Note that the management selection includes choices for the administrative agent, the deployment manager, and the job manager. Also note that there is a 'cell' configuration which allows you to configure a deployment manager with an application server node already federated.

z/OS profile management tool

The profile management tool will take you through a series of screens asking for values that will allow it to customize the environment to your specifications. The first of these screens allows you specify a response file that contains the variables needed to pre-fill the values in the rest of the screens. This is where you can put the response file generated from the spreadsheet mentioned earlier.

z/OS profile management tool

Installation and configuration
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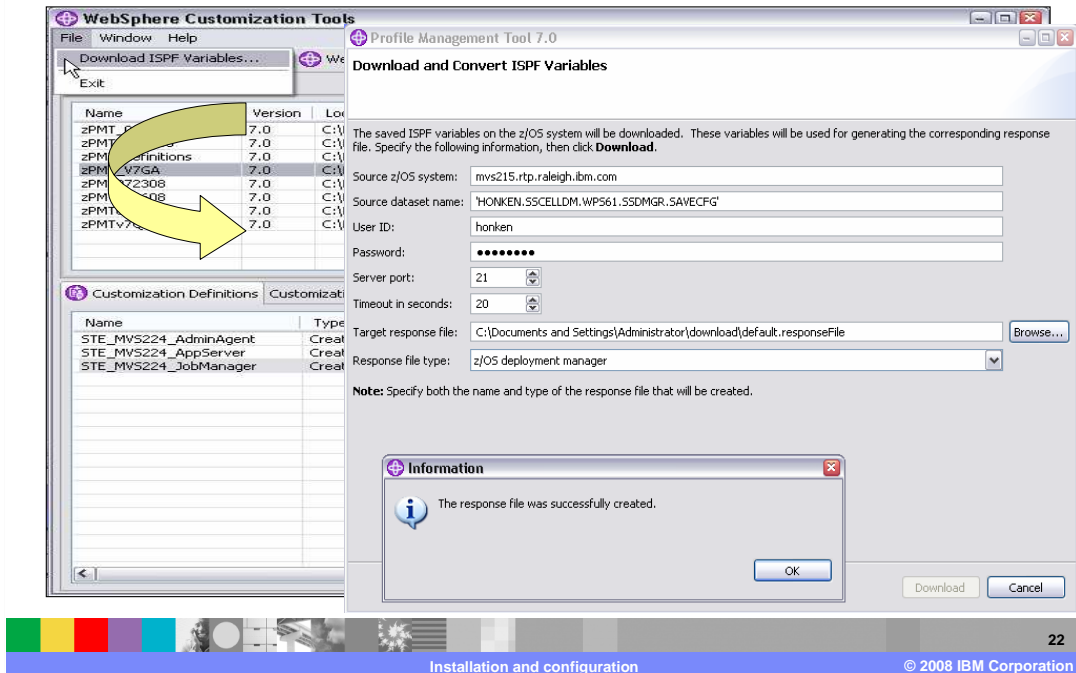
Another option that you might find useful is the 'Download ISPF Variables' under the File menu. This allows you to specify a dataset that was created on a previous release using option "S Save customization variables" in the ISPF Customization Dialog panels. It is a good way to prime the information that is needed in the PMT tool.

z/OS profile management tool

Once all the fields have been filled in and the customization definition created, you have the option of uploading the customization data which will create the CNTL and DATA PDS files up on the host. This is the process option highlighted on the slide.

z/OS profile management tool

Instructions on finishing the customization are found in both the PMT tool and on the host in the BBOxxINS member for the environment you are configuring.

Configuration jobs

Execute RACF commands	BBOxBRAK jobs
Creates home directories for user IDS.	BBOSBRAM
Message Translation (optional)	BBOMSGC
Copies tailored JCL to PROCLIB	BBOxCPY1
Create HFS or zFS	BBOxCFS
Populate HFS	BBOxHFSA
Set up runtime HFS	BBOWWPFx

25

Finally, you need to run the jobs. The configuration has been simplified for Version 7. There are not as many jobs to run as in previous releases. This slide shows the jobs that need to be run with an explanation of what they do. The basic sequence of jobs that need to be run are the same for each of the different environments. The names, as denoted by the lowercase 'x', change slightly in each environment. Note that the BBOWWPFx job is long running and can cause certain error conditions such as an ABEND 522. TIME=NOLIMIT on the JCL job card solves the problem. If you receive the ABEND 522, you may need to delete the 'default' directory in order to continue.

Section

zpmt.sh command

26

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This section will look briefly at the zpmt.sh command alternative.

zpmt.sh command alternative

- Allows configuration to fully happen on the mainframe

- Requires a fully-populated response file
  - Samples found in:

  `/usr/lpp/zWebSphere/V7R0/zOS-config/zpmt/samples`

- Will create the .CNTL and .DATA files needed to run the required jobs

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An alternative to running the z/OS profile management tool on the workstation is the zpmt.sh command. The zpmt.sh command runs on z/OS. There is no GUI interface to allow you to fill in your configuration variables. A response file that has been fully-populated is required. Samples for each of the configuration environments can be found in the directory shown on the slide. You can also use the z/OS PMT workstation tool or the spreadsheet mentioned earlier to create the response file that can then be used for the zpmt.sh command. When run, it will create the CNTL and DATA files needed to run the required jobs.

zpmt.sh command alternative

- Found in the `/usr/lpp/zWebSphere/V7R0/bin` directory
- Parameters:
  - **-responseFile**
    - Specifies the path to your response file (ASCII or EBCDIC)
  - **-profilePath**
    - Fully qualified path name to an existing set of generated jobs (the **zpmt** command first writes the customization jobs to a USS file system). This parameter cannot be used in combination with the -responsefile option.
  - **-workspace**
    - Specifies the Eclipse work space directory
  - **-transfer**
    - Copy generated jobs from a UNIX system services (USS) file system to a pair of partitioned datasets. The **zpmt** command first writes the customization jobs to a USS file system.
  - **-allocate**
    - Attempts to allocate the target datasets

The zpmt.sh command is found in the bin directory of the SMP/E install root. The –responseFile parameter is necessary to customize the resulting jobs and scripts to your installation's specifications. It can be coded in either ASCII or EBCDIC. Note that the sample shipped with the product is in ASCII. The resulting jobs and scripts are generated to the UNIX System Services file system. The –transfer command is necessary to actually move the generated jobs to CNTL and DATA PDS files. The –profilePath command can be used in conjunction with the –transfer command if you need to create the PDS files later. The –workspace parameter needs to specify a directory that you have read-write access to and is used as a work directory for Eclipse. Finally, the –allocate parameter determines whether it will attempt to allocate the CNTL and DATA PDS files first.
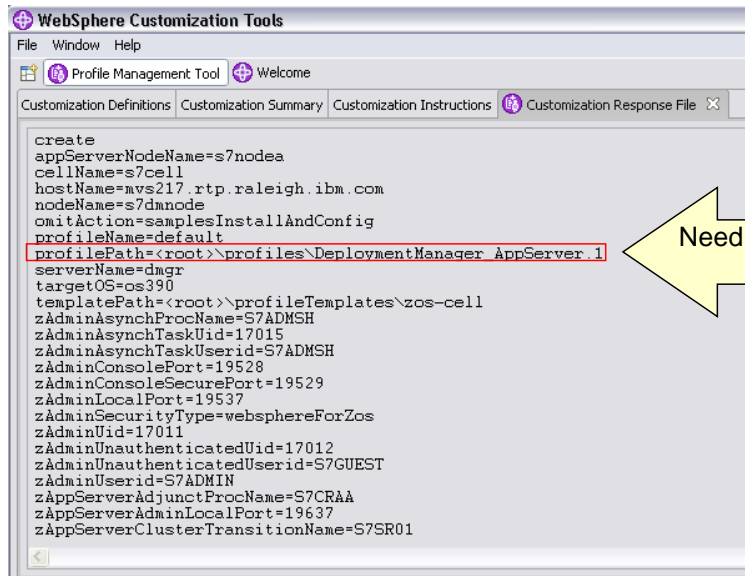
zpmt.sh command alternative example

- ```
  zpmt.sh -workspace /xxx -transfer -
  allocate -responseFile
  /xxx/ZCellcmd.responseFile
  ```
  - ▸ Generate the customization jobs to the location specified by profilePath in the response file
  - ▸ Allocate the target CNTL and DATA datasets, using the high level qualifier specified by targetHLQ in the response file
  - ▸ Transfer the jobs from the file system to the CNTL and DATA datasets

An example of the zpmt.sh command is shown here. Once the CNTL and DATA datasets are created, you can follow the directions found in the BBOxINS member of the CNTL dataset to finish your configuration.

zpmt.sh command alternative response file


```
WebSphere Customization Tools
File  Window  Help
Profile Management Tool   Welcome
Customization Definitions  Customization Summary  Customization Instructions  Customization Response File

create
appServerNodeName=s7nodea
cellName=s7cell
hostName=mvs217.rtp.raleigh.ibm.com
nodeName=s7dmnode
omitAction=samplesInstallAndConfig
profileName=default
profilePath=<root>\profiles\DeploymentManager_AppServer.1
serverName=dmgr
targetOS=os390
templatePath=<root>\profileTemplates\zos-cell
zAdminAsynchProcName=S7ADMSH
zAdminAsynchTaskUid=17015
zAdminAsynchTaskUserid=S7ADMSH
zAdminConsolePort=19528
zAdminConsoleSecurePort=19529
zAdminLocalPort=19537
zAdminSecurityType=websphereForZos
zAdminUid=17011
zAdminUnauthenticatedUid=17012
zAdminUnauthenticatedUserid=S7GUEST
zAdminUserid=S7ADMIN
zAppServerAdjunctProcName=S7CRAA
zAppServerAdminLocalPort=19637
zAppServerClusterTransitionName=S7SR01
```

Need to set profilePath to a valid path

This slide shows the response file as generated by the z/OS PMT workstation tool. This can be uploaded and used to run the zpmt.sh command on z/OS. Note that you need to update the profilePath parameter here to point to a valid directory on your system.

zpmt.sh notes

- ## When run, you are put in the osgi command shell
  - ### Will look like nothing is happening

```
/usr/lpp/zWebSphere/V7R0/bin#>rkspace -responseFile /tmp/zDMgr01.responseFile

osgi>
```

  - ### Will eventually come back with messages

```
osgi> Customization definition successfully written to /tmp/ZDMgr01
Attempting to allocate dataset: BOSS.VICOM.BOSS0173.CNTL
Allocation successful.
Attempting to allocate dataset: BOSS.VICOM.BOSS0173.DATA
Allocation successful.
Copying CNTL files to BOSS.VICOM.BOSS0173.CNTL...
Copy successful.
Copying DATA files to BOSS.VICOM.BOSS0173.DATA...
Copy successful.
```

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Just a few notes about running the zpmt command. When you run it, you are thrown into the osgi command shell. You will see the osgi command prompt for what seems like quite some time and you will think nothing is happening. Be patient though and it will eventually come back with messages indicating either an error occurred or the definition was successfully created.

zpmt.sh notes

- When rerun, delete the profilePath directory
  - ▸ Otherwise, see message indicating the ProfilePath is not valid

```
osgi> The following validation errors were present with the command line arguments:
        profilePath: The profile path is not valid.
```

32

If you need to rerun the zpmt command, be sure to delete the directory you specified on the profilePath parameter. If you do not, you will see a validation error claiming the profilePath is not valid.

Summary

- Prerequisites

- z/OS installation is a two-step process
  - ▸ SMP/E
  - ▸ zPMT tool or zpmt.sh

In this presentation, you looked at the necessary prerequisites needed in order to run WebSphere Application Server for z/OS V7. You then looked at an overview of what is required to install and configure WebSphere Application Server for z/OS V7. You saw that it is a two-step process. Installation involves installing the product code by way of SMP/E and then customizing an environment using the z/OS profile management tool or the zpmt.sh script.

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34

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