



IBM WebSphere Application Server V8

z/OS customization



WebSphere software

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This presentation describes updates to the customization process for Version 8 of IBM WebSphere Application Server for z/OS.

Table of contents

- z/OS configuration image changes
- z/PMT updates
- Troubleshooting

First, a brief discussion of the updates to the directory structure of the WebSphere Application Server for z/OS configuration images is provided. Updates to the Profile Management Tool for z/OS will then be covered. Finally, a short introduction to troubleshooting customization problems is provided.

z/OS configuration image changes

This section covers changes to the z/OS configuration image.

Version 7.0 configuration image

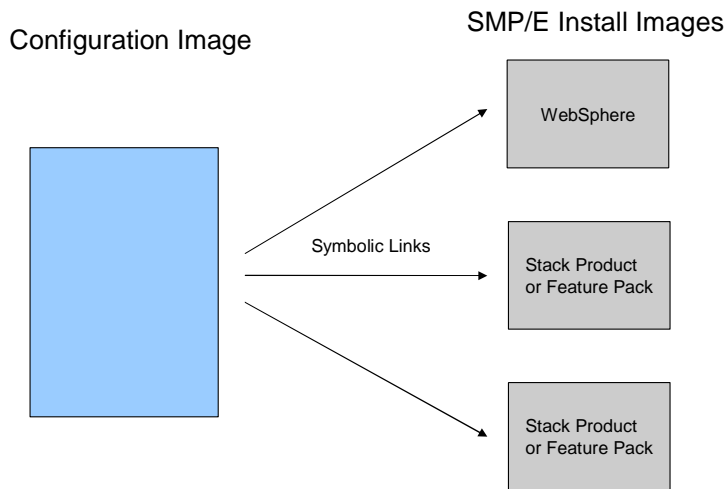
- Products installed by SMP/E reside in independent install images
- A single configuration image is linked to multiple product install images
- The configuration image directory structure mirrors the associated install image directory structure
- Symbolic links are generated in the configuration image for each file in the installation image

Example:

```
<configRoot>                                <installRoot>
  plugins                                     plugins
  com.ibm.cds_.jar                           ----->    com.ibm.cds_.jar
  com.ibm.events.client.jar                   ----->    com.ibm.events.client.jar
  ...                                         ...
  org.eclipse.update.core_.jar               ----->    org.eclipse.update.core_.jar
```

Before looking at the configuration image for Version 8.0, you will review the Version 7.0 configuration image. Here each product is installed by SMP/E into a separate install image. This requires a given configuration image to have symbolic links to multiple install images. As shown in the example, each file within a given directory in the configuration image is represented by a symbolic link to the associated file in the corresponding install image.

Version 7.0 configuration image example



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This slide shows a sample Version 7.0 configuration image. As you can see, the configuration image contains symbolic links to multiple install images. A given directory in the configuration image can very well contain symbolic links to files in more than one of the installation images. This requires that the symbolic links be defined for each individual file within the configuration image.

Version 8.0 configuration image

- Products installed by the IBM Installation Manager reside in the same install image
- A single configuration image is linked to a single install image
- The configuration image directory structure is much simpler than the installation image directory structure
- Symbolic links are generated in the configuration image for most of the directories that reside in the root install directory

Example:

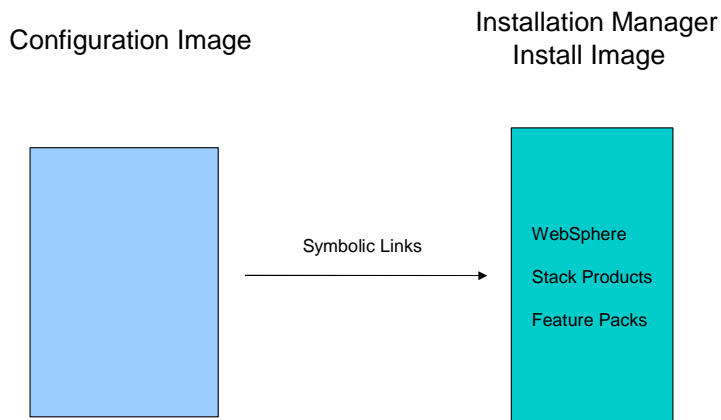
```
<configRoot>                                <installRoot>
  plugins -----> plugins
                                     com.ibm.cds_.jar
                                     com.ibm.events.client.jar
                                     ...
                                     org.eclipse.update.core_.jar
```

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The IBM Installation Manager is used to install WebSphere Application Server for z/OS Version 8.0 and Version 8.0 stack products and feature packs. Unlike SMP/E, the IBM Installation Manager places all of these products into the same install image. WebSphere Application Server for z/OS can now define the configuration image symbolic links at the directory level because all of the files contained within a given directory reside in the same install image.

Version 8.0 configuration image example



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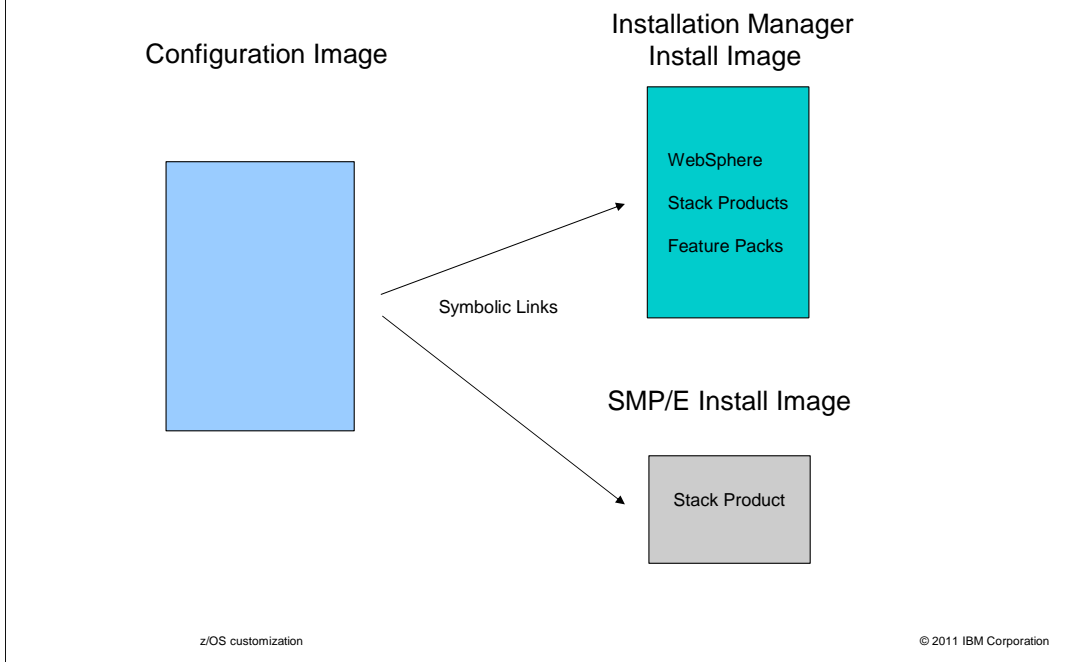
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This slide shows a sample Version 8.0 configuration image. As you can see, the configuration image contains symbolic links to a single install image. This single install image contains WebSphere Application Server and any installed stack products and feature packs. As you previously observed, a given directory in the configuration image will only contain symbolic links to files in the same install image. This allows WebSphere Application Server for z/OS to define a single symbolic link for a given directory in the configuration image rather than defining separate symbolic links for each file contained within the respective directory tree.

Stack products and feature packs that are installed by the IBM Installation Manager into the same install image as the WebSphere Application Server do not provide symbolic link scripts. Due to the new symbolic link structure in the configuration image very few new symbolic links are needed when a stack product or feature pack is added to the installation image. These symbolic links are generated automatically by the profile augmentation customization jobs that are generated by the z/PMT.

A specific example of this configuration is when the WebSphere Compute Grid Version 8.0 is installed on top of WebSphere Application Server Version 8.0. Both products are installed by the IBM Installation Manager and are placed within the same install image.

Version 8.0 hybrid configuration image example

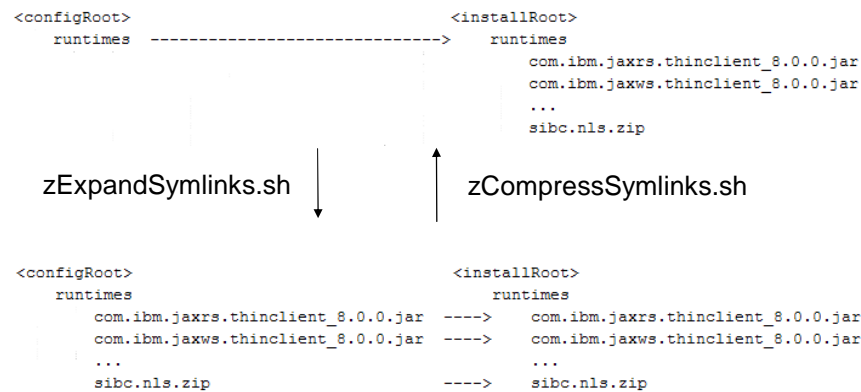


In time, all of the WebSphere stack products are installed by the IBM Installation Manager and are placed in the same install image. However, for WebSphere Application Server Version 8.0, there is a temporary situation in which Version 7.0 stack products are installed on top of WebSphere Application Server Version 8.0. In this case WebSphere Application Server Version 8.0, along with any other Version 8.0 stack products and feature packs, is installed in one install image by the IBM Installation Manager. However, each Version 7.0 stack product is installed in its own install image by SMP/E.

This results in a hybrid configuration image in which most of the symbolic links point to the WebSphere Application Server install image but some of the symbolic links point to each of the Version 7.0 stack product install images. This raises the question as to how to define symbolic links to the files within an SMP/E install image, given that the symbolic links are now defined at the directory level. Remember that in Version 8 the configuration image points to directories rather than individual files. You will see this in greater detail later but for now you should know that the augmentation job created by the z/PMT for the Version 7 product will "expand" the needed directories. This allows the symbolic link script for the Version 7 stack product to define the necessary symbolic links within the configuration image.

A specific example of this configuration is when the WebSphere Virtual Enterprise Version 7.0 is installed on top of WebSphere Application Server Version 8.0. WebSphere Application Server Version 8.0 will be installed in one install image by the IBM Installation Manager and WebSphere Virtual Enterprise Version 7.0 will be installed in another install image by SMP/E.

zExpandSymlinks.sh and zCompressSymlinks.sh



- zExpandSymlinks.sh “expands” a single directory symbolic link into a directory tree of file symbolic links
- zCompressSymlinks.sh “compresses” a directory tree of file symbolic links into a single directory symbolic link

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This slide covers two new customization scripts, zExpandSymlinks.sh and zCompressSymlinks.sh. Both of these scripts reside in the <installRoot>/bin directory. While in normal operations you will not need to invoke these scripts directly it is good to understand how they work. This slide only covers the basics for these scripts. The prologs for each of these scripts contain detailed information on the respective script.

At the top of the slide you can see a configuration image in its initial state where <configRoot>/runtimes is a symbolic link to the <installRoot>/runtimes directory. If you want to place a temporary patch in the <configRoot>/runtimes directory, you can invoke the zExpandSymlinks.sh script to replace the <configRoot>/runtimes symbolic link in the configuration image with a directory tree of file-level symbolic links (as shown in the second file layout on this slide). You can then copy the patch file into this directory tree. At some point you will most likely no longer need the patch in the <configRoot>/runtimes directory. You can then invoke the zCompressSymlinks.sh script to return the configuration image to its original state.

In this example you saw how to “expand” and “compress” the <configRoot>/runtimes symbolic link structure. This same technique can be used on all the other symbolic links in the root configuration directory that point to directories in the installation image (with the exception of the java and java64 directories). Additionally, this technique can be used on the messages and schemas symbolic links within the properties directory.

The user ID that is active when these scripts are invoked must have the authority to change file permissions and ownerships with the chmod and chown commands.

Version 8.0 configuration image recommendation

- Use logical (rather than physical) path names for the “cd” and “pwd” shell commands by adding this statement to shell profiles:
 - “set -o logical”
- Logical path names prevent accidentally switching the working directory from the configuration image to the installation image
 - cd <configRoot>/plugins ---> <installRoot>/plugins (default)
 - cd <configRoot>/plugins ---> <configRoot>/plugins (set -o logical)

Symbolic link:

```

<configRoot>                               <installRoot>
  plugins ----->                          plugins
                                           com.ibm.cds_.jar
                                           com.ibm.events.client.jar
                                           ...
                                           org.eclipse.update.core_.jar
  
```

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When navigating a Version 8.0 configuration image you need to be careful when changing the working directory. In this example, if you use the “change directory” command to change the working directory to the <configRoot>/plugins directory, the <installRoot>/plugins directory will become the working directory. This switch from the configuration image to the installation image is caused by the <configRoot>/plugins symbolic link within the configuration image. The default behavior of the “change directory” command is to change the working directory to the target of the symbolic link.

This problem can be avoided by adding the “set -o logical” command to your shell profile. This will cause logical path names (instead of physical path names) to be used by the “change directory” and “print working directory” commands. This means that when you issue the “change directory” command the working directory will become <configRoot>/plugins. This directory is referred to as a logical directory because no such directory actually exists. However, these logical directories are very useful when invoking shell scripts that require the working directory to point to the configuration image directory in which the script resides.

Section

z/PMT updates

This section covers the updates that have been made to the z/PMT for version 8.0.



z/PMT Version 8.0 highlights (1 of 2)

- z/PMT Version 8.0 supports WebSphere Application Server for z/OS Version 6.1, 7.0 and 8.0 customizations
- The 64-bit SDK is always selected when defining Version 8.0 application servers
- The sample applications cannot be deployed during Version 8.0 profile creation
- The customization metadata has been moved from the customization locations to the Eclipse workspace

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The next two slides cover the main changes to the z/PMT for Version 8.0. The Version 8.0 z/PMT can be used to customize WebSphere Application Server for z/OS Versions 6.1, 7.0 and 8.0.

When used to customize WebSphere Application Server for z/OS Version 8.0, the updated z/PMT will always define 64-bit application servers and will no longer provide the option to install samples during profile creation.

The customization metadata has been moved from the customization locations to the metadata area within the Eclipse workspaces. This makes the size of the customization locations much smaller. It also improves the z/PMT performance when defining customization locations on shared network drives (because the metadata is now located on a local drive within the Eclipse workspace rather than on the network drive).



z/PMT Version 8.0 highlights (2 of 2)

- z/PMT Version 8.0 supports uploading the customization jobs using FTP over SSL
- Version 8.0 cell definitions allow different host names to be specified for the deployment manager and the application server node
- z/PMT support for Version 8.0 augmentation jobs has been updated to support the new install and configuration images

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You can use the new version of the z/PMT to upload the customization jobs to a target z/OS system using FTP over SSL. The secure FTP and basic FTP upload options are still supported.

The new version of the z/PMT will allow you to define different host names for the deployment manager and application server when defining a Version 8.0 cell environment.

Finally, the z/PMT support for augmenting WebSphere Application Server for z/OS Version 8.0 has been updated to support the new install and configuration images. You will take a closer look at this on the next slide.

Augmentation job updates

- Stack products that are installed by the IBM Installation Manager reside in the same install image as the WebSphere Application Server
 - A symbolic link script is not needed for the stack product
- Stack products that are installed by SMP/E reside in a different install image from WebSphere Application Server
 - A symbolic link script is needed for the stack product
 - zExpandSymlinks.sh must be invoked to “expand” the symbolic links for the directories that are populated by the stack product
- z/PMT generates appropriate augmentation jobs for both types of stack products

The z/PMT generates two types of augmentation jobs for WebSphere Application Server for z/OS Version 8.0.

As you saw in previous slides, stack products and feature packs that are installed by the IBM Installation Manager reside in the same install image as the WebSphere Application Server. These products do not provide a symbolic link script because they reside in the same install image. The augmentation job that is generated by the z/PMT invokes a customization script that will make the necessary updates to the configuration image and then augment the profile.

Stack products that are installed by SMP/E reside in a different install image from the WebSphere Application Server. These products provide a symbolic link script and identify the directories in the configuration image that are populated by the symbolic link script. The augmentation job that is generated by the z/PMT will “expand” the designated directory trees in the configuration image (by invoking the zExpandSymlinks.sh script), then invoke the symbolic link script, and finally augment the profile.

Troubleshooting

This section covers troubleshooting and problem determination techniques.

Troubleshooting overview

- The log files contained in the <configRoot>/logs/manageprofiles directory are used to debug profile creation/augmentation errors
- In the event that the log files do not identify the cause of the error, IBM service might request that you try one of these procedures to help isolate the problem:
 - For profile creation launch errors, add the “-debug” argument in the zCreateProfile.sh invocation associated with the profile creation job
 - When profile creation hangs, try invoking zCreateProfile.sh from a shell rather than a batch job
 - If the profile creation error occurs after moving to a new service level that contains an SDK service update try temporarily updating the <configRoot>/java and <configRoot>/java64 symbolic links to point to the SDKs contained in the previous service level
- Most z/PMT issues are related to generating a customization job or the associated instructions incorrectly
 - The customization job in error can typically be edited as a temporary bypass

The log files contained in the <configRoot>/logs/manageprofiles directory are the primary source of diagnostic information for profile creation and augmentation errors.

If the log files do not identify the cause of the profile creation or augmentation error, then there are some procedures that IBM service personnel might ask you to perform to help isolate the error.

When an error occurs launching profile creation, you can add the "-debug" argument to the zCreateProfile.sh invocation (which is contained within the "DATA" partitioned data set member for the profile creation job) to obtain additional trace information. Likewise, when an error occurs launching profile augmentation, you can add the "-debug" argument to the zAugmentProfile.sh invocation to obtain additional trace information. In both cases, the additional trace information will get written to the job log.

When profile creation "hangs", you can try invoking the zCreateProfile.sh from a shell rather than within a batch job.

If a profile creation or augmentation error occurs shortly after applying service that contains updates to the SDK, try running the profile creation or augmentation using the previous SDKs to isolate the cause of the error. You can do this by temporarily updating the java and java64 symbolic links in the configuration image to point to the SDKs contained in the previous service level.

Most z/PMT issues are related to generating a customization job or the associated instructions incorrectly. Typically you can edit the customization job in error as a temporary bypass to the problem.

Section

End

This concludes the presentation.



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