z/OS
2.5

Knowledge Center for z/OS Configuration and User Guide

SC27-6805-50

Note

Before using this information and the product it supports, read the information in “Notices” on page 43.

This edition applies to Version 2 Release 5 of z/OS® (5650-ZOS) and to all subsequent releases and modifications until otherwise indicated in new editions.

Last updated: 2021-09-30

Contents

How to send your comments to IBM

We invite you to submit comments about the z/OS product documentation. Your valuable feedback helps to ensure accurate and high-quality information.

Important: If your comment regards a technical question or problem, see instead “If you have a technical problem” on page v.

Submit your feedback by using the appropriate method for your type of comment or question:

Feedback on z/OS function
If your comment or question is about z/OS itself, submit a request through the IBM RFE Community (www.ibm.com/developerworks/rfe/).

Feedback on IBM® Documentation function
If your comment or question is about the IBM Documentation functionality, for example search capabilities or how to arrange the browser view, send a detailed email to IBM Documentation Support at ibmdocs@us.ibm.com.

Feedback on the z/OS product documentation and content
If your comment is about the information that is provided in the z/OS product documentation library, send a detailed email to mhvrcfs@us.ibm.com. We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information.

To help us better process your submission, include the following information:

- Your name, company/university/institution name, and email address
- The following deliverable title and order number: IBM Knowledge Center for z/OS Configuration and User Guide, SC27-6805-40
- The section title of the specific information to which your comment relates
- The text of your comment.

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- Go to the IBM Support Portal (support.ibm.com).
- Contact your IBM service representative.
- Call IBM technical support.

Summary of changes

This information includes terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations for the current edition are indicated by a vertical line to the left of the change.

Note: IBM z/OS policy for the integration of service information into the z/OS product documentation library is documented on the z/OS Internet Library under IBM z/OS Product Documentation Update Policy (www-01.ibm.com/servers/resourcelink/svc00100.nsf/pages/ibm-zos-doc-update-policy?OpenDocument).

What's new in Knowledge Center for z/OS V2R5?

Following are the key enhancements to Knowledge Center for z/OS that are introduced in V2R5 (KC4z 1.2):

- With APAR PH38107 ADD SAMPLE FOR RACF SITE SHARED CERTIFICATE FOR SSL SUPPORT samples are added for SITE certificates and for a shared Key Ring and certificate.

Related concepts

"Using a shared SITE certificate with a RACF Key Ring" on page 14
IBM Knowledge Center for z/OS can be configured to use an SITE certificate connected to the KC4z RACF Key Ring.

"Using a shared user certificate and a shared RACF Key Ring" on page 15
IBM Knowledge Center for z/OS can be configured to use a certificate stored in a RACF Key Ring owned by another user id.

What's new in Knowledge Center for z/OS V2R4?

Following are the key enhancements to Knowledge Center for z/OS that are introduced in V2R4 (KC4z 1.2):

- Softcopy Librarian has been replaced as the method of managing documentation content for KC4z.
- A sample shell script and a sample z/OSMF workflow are provided as models for using the new documentation distribution web site.
- With APAR PH20691 NEW TECHNIQUES FOR PROVISIONING PDFS FOR KC4Z ARE NEEDED, support for the repackaging of z/OS Documentation to separate Japanese Content and add PDF files is introduced.
- With APAR PH24318 HTTPS becomes the default file transfer protocol for receive.sh and the content provisioning workflow script workflow_get jar.sh. If configured, FTP will continue to be used. To change to using HTTPS instead remove the $HOME/.netrc configuration as detailed in "Command Line Interface Option to copy KC4z content" on page 25
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Related tasks

"Command Line Interface Option to copy KC4z content" on page 25
The shell script file `receive.sh` shipped in the samples directory provides a command line interface to transfer and extract the packaged content jar files which IBM distributes.

What's new in Knowledge Center for z/OS V2R3?

Following are the key enhancements to Knowledge Center for z/OS that are introduced in V2R3 (KC4z 1.1):

Updated With APAR PH11363:

- Softcopy Librarian has been replaced as the method of managing documentation content for KC4z.
- A manual method, a sample shell script and a sample z/OSMF workflow are provided as models for using the new documentation distribution web site.

Included with V2R3 General Availability:

- Configuration scripts and defaults have been enhanced to support configuring Knowledge Center for z/OS within a sysplex environment. With this support, a single copy of Knowledge Center product content and properties files may be shared across all systems in a sysplex that exploit shared file system support.
- The latest available version of the KC Customer Installable (KC-CI) WAR file and an updated KC Taxonomy ditamap file have been packaged with this release, to improve search granularity, topic navigation and product stability.
- A new LookAt web application has been added with this release to provide a Knowledge Center-based replacement to the legacy BookManager-based LookAt function for performing message lookup functions. This LookAt function has both an End User (browser interface) component and a RESTful API component.
- With APAR PH20682, NEW TECHNIQUES FOR PROVISIONING PDFS FOR KC4Z ARE NEEDED, support for the repackaging of z/OS Knowledge Center to separate Japanese Content and add PDF files is introduced.

Chapter 1. Overview of Knowledge Center for z/OS

Knowledge Center for z/OS is a web application that provides IBM product publication content to web browser clients from the z/OS server system.

The information in this publication applies to Version 1.2 of Knowledge Center for z/OS (KC4z 1.2) in z/OS V2R4. Information related to Version 1.0 of Knowledge Center for z/OS (KC4z 1.0) in z/OS V2R2 can be found in publication (SC27-6805-00).

Knowledge Center is IBM's strategic platform for delivering technical content. There are two types of Knowledge Center applications:

Knowledge Center - Hosted (KC-hosted)
The outward-facing server of IBM content running on the IBM web site. This Knowledge Center can be found by pointing your web browser to IBM Documentation (www.ibm.com/docs/en).

Knowledge Center - Customer Installable (KC-CI)
A customer installable version of Knowledge Center packaged for product use.

IBM Knowledge Center for z/OS (KC4z) is an SMP/E packaging of KC-CI Version 1.5, with some additional function added. It is a Java™ web application deployed by the WebSphere Liberty base element of z/OS. Knowledge Center for z/OS is a base element of z/OS. All z/OS customers have access to it as part of the base operating system.

Knowledge Center for z/OS provides the ability to display, navigate and search content in a manner similar to Knowledge Center hosted on the IBM web site. You can manually add content to Knowledge Center for z/OS by copying it to your z/OS directories in Unix System Services. A shell script, receive.sh, and a z/OSMF workflow are provided to assist with acquiring and updating z/OS base element content. By adding content, you can make Knowledge Center for z/OS serve product publications for many different IBM and vendor products.

Liberty provides an application server runtime environment for Knowledge Center for z/OS.

Software delivery options for Knowledge Center for z/OS

Knowledge Center for z/OS is available for installation through the ServerPac order delivery process or as a Custom-Built Product Delivery Option (CBPDO) software delivery package. How your installation sets up Knowledge Center for z/OS — the procedures you use and the instructions that you follow—depends in part on the software delivery option that you use.

These differences are explained as follows:

ServerPac users:

- If you select the full system replacement installation type, a default instance of Knowledge Center for z/OS is set up for you. Here, a base Knowledge Center for z/OS configuration is created through a ServerPac post-installation job, using IBM-supplied defaults.
- If you select the software upgrade installation type, you require the planning and configuration information in this document to create a Knowledge Center for z/OS configuration. Your system programmer can use the provided shell scripts to set up Knowledge Center for z/OS on your system, and add content plug-ins to it.

ServerPac provides customization guidance for configuring Knowledge Center for z/OS. See the copy of *ServerPac: Installing Your Order* that is supplied with your order.

CBPDO users:
If you receive Knowledge Center for z/OS in a Custom-Built Product Delivery Option (CBPDO) software delivery package, you require the planning and configuration information in this document. Your installation's system programmer must set up Knowledge Center for z/OS through shell scripts that are provided with the product.

Software prerequisites

Determine on which z/OS operating system image you want to run this product. Knowledge Center for z/OS V2R3 must be run on z/OS Version 2 Release 3.

Ensure that the following product is installed and operational on your system:

IBM 64-bit SDK for z/OS, Java Technology Edition, Version 8 (program number 5655-DGG). For the required PTF's, see *z/OS Program Directory* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary) (GI11-9848-02).
Liberty (the version which is a base element of z/OS). By default, the Knowledge Center for z/OS server started task (HKCSVR1) specifies `/usr/lpp/liberty_zos/current` as the root directory of Liberty's installation tree. Note that there are multiple service levels of Liberty installed under the `/usr/lpp/liberty_zos` directory (for example, `17.0.0.1/` and `17.0.0.2/`) and that `current/` is a symbolic link that points to the latest (i.e. most current) such level.

This set-up must be done before you run the Knowledge Center for z/OS configuration scripts. By default, the Java SDK resides in the directory `/usr/lpp/java/J8.0_64/` on your system. If you installed it in another location, be sure to configure the JAVA_HOME variable in the `server.env` file before running your shell session.

For ServerPac users, use the jobs and documentation supplied with your ServerPac order to create an initial instance of Knowledge Center for z/OS. During the ServerPac process, you will need sections of this document to complete certain actions. Thereafter, you can refer to this document for information about performing various post-configuration actions.

Installations that install Knowledge Center for z/OS from a Custom-Built Product Delivery Option (CBPDO) software delivery package, or from a ServerPac order using the software upgrade method of installation, should plan to manually run the configuration script procedures described in this document. In contrast, installations that install Knowledge Center for z/OS as part of a ServerPac full system replacement will have these scripts run automatically during the ServerPac post-installation process.

The following web browsers are supported by Knowledge Center for z/OS, and are recommended for best results:

- Microsoft Internet Explorer Version 9 or later
- Mozilla Firefox Version 17 or later
- Google Chrome Version 20 or later
- Apple Safari Version 5 or later

What setup is needed for Knowledge Center for z/OS?

Configuring Knowledge Center for z/OS on your system requires certain z/OS resources to be set up, shell scripts to be run, and security set up to be performed for your security management product, such as RACF (or equivalent).

Using Knowledge Center for z/OS requires sufficient authority in z/OS. Specifically, on the z/OS system to be managed, the resources to be accessed on behalf of Knowledge Center for z/OS users (data sets, operator commands, and so on) are secured through the security management product at your installation; for example, Resource Access Control Facility (RACF®). Your installation's security administrator must create the authorizations in your security management product. Knowledge Center for z/OS provides scripts and the information in this document to assist your security administrator.

Receiving service updates for Knowledge Center for z/OS

As with other IBM software products, IBM ships service for Knowledge Center for z/OS in the form of program temporary fixes (PTFs).

When planning for service updates, consider that all Knowledge Center for z/OS functions are provided together as one functional modification identifier (FMID): HKCZ110.

For the most current information on APAR fixes and service updates, review the product Preventive Service Planning (PSP) bucket, as referenced in *z/OS Program Directory* in the z/OS Internet library (www.ibm.com/servers/resourcelink/svc00100.nsf/pages/zosInternetLibrary) (GI11-9848-02). You can also use the IBM Support Portal (support.ibm.com) or the IBM Link (www.ibm.com/ibmlink) web site. For a list of fix category (FIXCAT) values and descriptions, go to IBM Fix Category Values and Descriptions (www.ibm.com/systems/z/os/zos/features/smpe/fix-category.html).

When working with service updates, check the PTF ++HOLD action for specific instructions for deploying the updated code, such as whether you must restart the Knowledge Center for z/OS server to have the updates take effect.

Chapter 2. Configuring Knowledge Center for z/OS

It is strongly recommended that you review all of these steps before performing the configuration.

The configuration process

The shell scripts and configuration files that are provided with Knowledge Center for z/OS are run in the z/OS UNIX System Services environment for proper execution. The scripts and configuration files are installed into default installation directory `/usr/lpp/kc4z/samples`. If the default installation and runtime directories are used, the scripts, configuration files and sample JCL can be used without modification. If either the default installation or runtime directories are customized, you must also modify copies of the scripts, configuration files and sample JCL before running them.

In Knowledge Center for z/OS V2R3, the default installation directory is `/usr/lpp/kc4z`, and the default configuration directory is `/etc/kc4z`. If either of these locations is different on your system, you will need to replace the default value with the customized value in the scripts, configuration files and sample JCL before using them.

The `/global/kc4z/data` directory is the default for KC product content, and associated properties, data repository. If you wish to override this default value, the customized value must be substituted in copies of the scripts and configuration files that refer to `/global/kc4z/data`. Note that in z/OS V2R3, a `/global` directory is always present, either in the sysplex root of a sysplex, or in the root filesystem of a single system not in a sysplex. Refer to "Sharing content within a sysplex" on page 32 for information about how using the `/global` directory enables sharing a single copy of KC product content and properties across multiple systems within a shared sysplex environment.

The `/var/kc4z/runtime` directory is the default for the server runtime files. If you wish to override this default value, the customized value must be substituted in copies of the scripts and configuration files that refer to `/var/kc4z/runtime`.

The `/var/kc4z/logs` directory is the default for both Knowledge Center and Liberty log files, as specified by the *LOG_DIR* and *WLP_OUTPUT_DIR* parameters in `server.env`. To override this default value, copies of both the `server.env` file and the scripts and configuration files that refer to `/var/kc4z/logs` must be modified to substitute the customized value.

The configuration process occurs in several stages, and in the following order:

Creating space for runtime files, data repository, and logs
Performing and verifying initial configuration
Performing additional configuration

This sequence is critical to a successful configuration. Earlier steps create resources, such as directories, that later steps must act upon, such as changing ownership of the directories. This document assumes that you will carry out the steps in the order in which they are presented.

Creating space for runtime, data, and logging

Before continuing with the Knowledge Center for z/OS configuration process, ensure that the following work is done.

Creating mount point directories

Before configuring Knowledge Center for z/OS, you must create mount point directories for the data, runtime and log file systems. You can choose to use the default mount point directories, or you can customize them.

The default mount point directories are `/global/kc4z/data` for content-related data, `/var/kc4z/runtime` for runtime data. and `/var/kc4z/logs` for log data. If choosing to customize these mount point defaults, do so in another copy of `/usr/lpp/kc4z/samples/makemountpoints.cmd` created in

a in a writable directory. Note that the names of the subdirectories that subsequently get created under these mount points should not be changed.

Using a privileged or UID 0 userid, run the `/usr/lpp/kc4z/samples/makemountpoints.cmd` script to create the mount points.

Important: Customizing `makemountpoints.cmd` will necessitate corresponding changes to several of the process steps and associated files used in the configuration process.

Creating and mounting the runtime, data and log filesystems

Using a privileged or UID 0 user ID (required for the mount step in each job), copy, customize and submit the three sample jobs that define, format, and temporarily mount the three zFS linear sequential VSAM cluster filesystems. These sample jobs are installed in *SYS1.SAMPLIB*.

The three JCL sample job files are:

- `HKCRUNFZ`
- `HKCDATGZ`
- `HKCLOGFZ`

Each of these jobs calls the HKCMNTFS REXX exec in the mount step.

Important: If not using the default mount point directories, the PATHPREF= value in the mount step for each of these jobs will also need to be modified with the correct customized directory names.

Attention: Although both HFS and zFS filesystems are supported by Knowledge Center, the sample JCL file is provided only for zFS filesystems.

Adding ipl-time mount commands for the newly created filesystems

Add the mount commands for the three zFS filesystem datasets to the BPXPRMxx member of your system parmlib. Use the HKCMOUGZ sample mount commands included in *SYS1.SAMPLIB* as a model.

Important: If not using the default mount point directories, the value of the **`MOUNTPOINT()`** arguments will need to be modified to specify customized directory names.

Configuring initial setup

The configuration process for the initial default IBM Knowledge Center for z/OS setup involves configuring RACF (or equivalent security management product), creating target subdirectories under the mount points, copying default configuration files to the configuration target subdirectory, verifying installation, and setting up the Knowledge Center server started task.

Configuring RACF

You configure RACF for your IBM Knowledge Center for z/OS system by creating the user id and group id to own the subdirectories and run the Knowledge Center server started task HKCSVR1.

Procedure

1. Run the `/usr/lpp/kc4z/samples/defracf1.cmd` script.

   The script runs the **ADDGROUP** and **ADDUSER RACF** commands for a user id to be assigned to the HKCSVR1 started task.

   If you are using the default configuration settings:

   Run the `defracf1.cmd` script using a user id with RACF SPECIAL authority. The script will establish the following values assigned to the HKCSVR1 started task:

   - User id: `hkcsvr`
   - Group id: `hkcadmin`
   - OMVS home: `/u/hkcsvr`

If you do not want to use the provided defaults:
Before making your desired modifications to the `defracf1.cmd` script, make a backup copy in a writable directory. You can specify a customized user id, group id or OMVS home directory. In addition, if the **AUTOUID** and **AUTOGID** RACF features are not supported, you will need to specify an existing user id using the **UID()** parameter, as well as an existing group id using the **GID()** parameter, instead of the **AUTOUID** and **AUTOGID** defaults specified in `defracf1.cmd`.

2. After running the `defracf1.cmd` script, if the specified OMVS home directory (`/u/hkcsvr` by default) does not already exist, create it (using the **mkdir** command) with 755 permissions, and assign it the specified user id (`hkcsvr`, by default) and group id (`hkcadmin`, by default) using the **chown** and **chgrp** commands, respectively.
3. If the TCPIP profile name has an HLQ other than "SYS1" or "TCPIP", then a **RACF PERMIT ACCESS(READ)** is needed for the hkcsvr user id to the TCPIP profile name.

Creating target subdirectories

You must create target subdirectories under the mount points for the three execution time file systems that you have mounted. You also need to enable the HKCSVR1 started task to use these subdirectories.

If the filesystems are mounted on the default mount points, then you can use a privileged or UID 0 user id to run the `/usr/lpp/kc4z/samples/maketargetdirs.cmd` script to create the following target subdirectories, and enable the HKCSVR1 started task to use them:

- `/etc/kc4z/servers/kc4zServer`
- `/global/kc4z/data/conf`
- `/global/kc4z/data/content`
- `/var/kc4z/runtime`
- `/var/kc4z/runtime/index`
- `/var/kc4z/runtime/diskcache`
- `/var/kc4z/runtime/datacache`
- `/var/kc4z/logs/kc4zServer`

If you have customized the default user id or group id, or if the filesystems are not mounted on the default mount points, make a backup copy of `maketargetdirs.cmd` to a writable directory before modifying the appropriate values with your changes and running the script.

Copying Knowledge Center configuration files

You must copy the default configuration files from the Knowledge Center installation directory to the execution time configuration directory.

If you are using the default installation directory and default execution time configuration directory, you can run the `/usr/lpp/kc4z/samples/copycfg.cmd` script to copy the configuration files to the execution time configuration directory. Using a privileged or UID 0 user id, run the script to copy the following files from the `/usr/lpp/kc4z/samples` source directory to the `/etc/kc4z/servers/kc4zServer` target directory:

- `server.xml`
- `server.env`
- `kc.properties`
- `lookat.properties`
- `bootstrap.properties`
- `jvm.options`
- `jvm.security.override.properties`
- `hkcz.properties`

If not using the default `/etc/kc4z/servers/kc4zServer` directory as your execution time configuration directory, you can specify your customized execution time configuration directory on the command line as demonstrated in this example: `/usr/lpp/kc4z/samples/copycfg.cmd /MYCONFIG/kc4z/servers/kc4zServer`, with no trailing slash.

If not using the default `hkcsvr` user id or `hkcadmin` group id for authorizing the HKCSVR1 started task, make a copy of the `copycfg.cmd` script in a writable directory before making your customized changes. If you will be running your modified copy of `copycfg.cmd` from a directory other than the directory in which it was originally installed, you must also modify the "sourceDir=" setting in `copycfg.cmd` to point to the original installation directory. This is because `copycfg.cmd` otherwise assumes the files it copies reside in the same directory in which the running script resides.

Verifying the installation

After having performed the space creation and initial configuration, you can verify that IBM Knowledge Center for z/OS has been successfully installed and configured, and is ready for Knowledge Center product content deployment.

Before you begin

Restriction: This procedure assumes that you have used the default settings up to this point. If not, the default settings in the configuration files copied in the previous step will first need to be overridden.

Attention: By default, the Java SDK resides in the directory `/usr/lpp/java/J8.0_64/` on your system. If you installed it in another location, be sure to configure the `JAVA_HOME` variable in the `server.env` file before verifying the installation.

Note: There are several references to the `SYS1.PROCLIB` dataset in this publication, however, in practice a different PROCLIB dataset may apply in your case. Specifically, IBM supplies the KC for z/OS cataloged procedure (HKCSVR1) in your order, as follows:

ServerPac orders
For a ServerPac order, IBM supplies the cataloged procedures in SYS1.IBM.PROCLIB. You can rename this data set through the installation dialog if you choose to do so.

CBPDO orders
For a CBPDO order, the procedure is installed in the SMP/E defined PROCLIB. IBM recommends using SYS1.PROCLIB. You can rename this data set and set it up as such in your DDDEF for PROCLIB. During installation, you can optionally catalog the data set, or you can defer doing so.

Procedure

To verify installation and configuration:

1. Start the HKCSVR1 started task that is included in `SYS1.PROCLIB`.
   For example, run the following command on the Command Input line of the SDSF "ST" function:

   ```
   /s hkcsvr1
   ```

   If the installation has succeeded, the resulting Job Log for the started task should include the following message near the beginning of the log:

   ```
   CWWKF0011I: The server kc4zServer is ready to run a smarter planet.
   ```

   In addition, assuming default http port 9080 is used, the resulting `console.log` file in `/var/kc4z/logs/` should include the following message:

   ```
   CWWKT0016I: Web application available (default_host): http://yourHostName:9080/zos/knowledgecenter/
   ```

2. Load the URL from the end of this `CWWKT0016I` message in a web browser.
   The framed display of the IBM Knowledge Center for z/OS welcome page should load in the browser with an entry for the IBM Knowledge Center for z/OS product (i.e. this product content) listed in the table of contents frame, as sample product content. When that product link is clicked, it should

expand, and navigation to topics under that product tree should be possible, if the configuration was successful.

Configuring the Knowledge Center server started task to run with system IPL

HKCSVR1 is the started task that drives Liberty to launch the IBM Knowledge Center for z/OS web application. The installed copy of HKCSVR1 in SYS1.PROCLIB contains a **USERDIR** parameter whose value is the prefix of the default configuration directory (/etc/kc4z), and a **ROOT** parameter whose value is the prefix of the default Liberty location (/usr/lpp/liberty_zos/current).

Remember: The default **ROOT** value in the HKCSVR1 started task is indicative that IBM Knowledge Center for z/OS uses the Liberty that is a base element of z/OS.

If you are not using the default configuration directory or default Liberty location, copy SYS1.PROCLIB(HKCSVR1) to USER.PROCLIB(HKCSVR1), and customize the new copy with the appropriate values.

Add a start directive for HKCSVR1 to the COMMANDxx member of your system parmlib so that the Knowledge Center server starts with each system IPL. For example, add the following line to SYS1.PARMLIB(COMMNDxx):

```
COM='S HKCSVR1'
```

Configuring additional setup and default overrides

You can configure SSL support, connect additional administrators for IBM Knowledge Center for z/OS and override the default settings in the configuration files.

SSL Support and KC4z

IBM Knowledge Center for z/OS is capable of using SSL encryption to protect communication with the browser.

SSL concepts

In this document, the term "SSL" will be used generically to refer to both the original Secure Sockets Layer and its successor, Transport Layer Security, TLS. "SSL will be used synonymously with "SSL\TLS" which is sometimes used to be precise about the history and similarity of the two protocols.

The https web protocol uses SSL to provide secure data transmission.

SSL provides two distinct functions to establish trusted communication. SSL can provide both encrypted data transport and a guarantee of URL owner identity.

Self-signed certificates only support encrypted data transport, they do not guarantee URL owner identity. Browsers will allow encrypted communication without the identity guarantee if the user "adds an exception" to accept a self-signed certificate as trustworthy.

Certificate authorities are third party companies which issue certificates which guarantee URL ownership identity, as well as containing an encryption key. The Certificate Authority (CA) also issues a root certificate and an intermediate certificate for itself. Browsers indicate with an icon or a red background that an https URL with a self-signed certificate is less trustworthy than an https URL with a certificate authority signed certificate.

The browser and the server both need copies of the CA root and intermediate certificates. Browser vendors keep their list of CA certificates current with browser updates. We will need to add the CA root and intermediate certificates to the server as well as our server's URL certificate which the CA will issue to us (for a fee).

The browser manufacturers trust the Certificate Authority, and the Certificate Authority verifies that your URL belongs to you. Thus your ownership of the URL and the trustworthiness of your website can be determined by the browser.

SSL support with KC4z

You can use either the system AT-TLS or the Java SSL library for KC4z.

To use AT-TLS, you configure Communication Server's Policy Agent to include the port associated with KC4z and disable the Java SSL library as described below.

To use the Java SSL library, you either store certificates in a Java Key Store file or connect certificates to a RACF Key Ring.

PTFs UI57513 (z/OS 2.2) and UI57376 (z/OS 2.3) shipped samples to support using certificates with a JKS.

PTF UI61914 for z/OS 2.3 shipped samples to support using certificates with a RACF Key Ring.

APAR PH38107 for z/OS 2.4 and 2.5 will include samples to support sharing certificates with other users of RACF Key Rings.

Sharing Certificates with other applications

Both the system AT-TLS and the Java SSL library support sharing certificates.

With AT-TLS, certificate sharing is implied.

With the Java SSL library, RACF features can be configured to use either a SITE certificate or to share a certificate connected to a Key ring owned by a different user id.

Controlling and disabling http and https port numbers to configure NO SSL or SSL Only

Within bootstrap.properties, the SSL port is configured with the variable: hkc.httpsPort.

You may choose to disable SSL support by setting the value: hkc.httpsPort=-1. With the -1 value, KC4z is configured to set the Java SSL support off. The -1 value is required when using the system AT-TLS support. When using the Java SSL library, with either a JKS or RACF, hkc.httpsPort=9443 is the default setting.

Similarly, Variable hkc.httpPort specifies the port used for client HTTP requests. When using the Java SSL library, use the setting hkc.httpPort=-1 to disable the non-SSL http port to enforce an SSL only policy.

When using the AT-TLS support with Policy Agent, the hkc.httpPort value will be the port number configured in Policy Agent for KC4z. Encyption/Decryption by both the Java Library and AT-TLS is a mis-configuration which must be avoided by configuring the port as unencrypted for the Java Library.

SSL and Your Browser

Your browser will access KC4z using SSL with the HTTPS URL. The pattern for the HTTPS URL is **https://<your.server.url>:<hkc.httpsPort>/zos/knowledgecenter.** You may observe the actual value of the URL(s) for your KC4z in console.log or messages.log.

The default HTTPS port number is 443. As with the default HTTP port, 80, the browser will not display 443 as the port number but will use it implicitly.

SSL with Java Key Store

IBM Knowledge Center for z/OS can be configured to use SSL certificates stored in a Java Key Store.

SSL support using a Java Key Store (JKS)

Using a JKS, four Levels of SSL support are possible

1. no support
2. Automatic Self-signed certificate
3. Customized Self-signed certificate
4. Certificate Authority (CA) Signed certificate

Disable the HTTPS port number to configure NO SSL support

As described in the previous topic: variables: hkc.httpsPort=9443 and hkc.httpPort=9080 can be set to value "-1" to disable the use of the respective protocol.

Automatic self-signed certificates

Automatic self-signed certificate support is present without additional configuration or service. Websphere Liberty includes automatic self-signed certificates primarily for developers and not for production environments.

KC4z PTFs UI57513 (z/OS 2.2) and UI57376 (z/OS 2.3) shipped service to support using Certificate Authority certificates with Java Key Stores.. Before this service for SSL support, when an SSL port was configured Websphere Liberty would automatically generate and use a default file "key.jks" containing a self-signed certificate in a default directory,

After the shipped SSL support service is in use, KC4z will use the file name "kc4zKeyStore.jks". Automatic self-signed SSL support will now generate and use a file named "kc4zKeyStore.jks" instead of "key.jks". For z/OS 2.2: /sharedapps/kc4z/servers/kc4zServer/kc4zKeyStore.jks is used instead of /var/kc4z/logs/kc4zServer/resources/security/key.jks. For z/OS 2.3 and above: /etc/kc4z/servers/kc4zServer/kc4zKeyStore.jks is used instead of /var/kc4z/logs/kc4zServer/resources/security/key.jks.

Customized Self-signed certificates

Generating a customized self-signed certificate is a necessary step in the procedure to obtain a CA signed certificate. A Certificate Signing Request (CSR) file is generated from the customized self-signed certificate. The CA will use the CSR as an input to generate your CA signed Certificate. If you do not require a CA signed certificate, you would choose to use customized support over automatic support in order to control the distinguished name fields, the expiration, or the algorithm or key size for your self-signed certificate.

To generate (and use) a customized self-signed certificate support, copy, modify, and run "genKC4zKeystore.cmd" to create or replace the kc4zKeyStore.jks file. Please refer to the instructions and notes included in /usr/lpp/kc4z/samples/genKC4zKeystore.cmd. The hkcsvr1 started task must be restarted to pick up the changes made to kc4zKeyStore.jks by genKC4zKeystore.cmd.

Certificate Authority (CA) Signed certificates

To achieve Certificate Authority (CA) SSL support you must replace the self-signed certificate in kc4zKeyStore.jks with your CA Certificate.

To accomplish this, typically a certificate for your URL is purchased from an Certificate Authority (CA) agency such as Digi-Cert. An output from genKC4zKeystore.cmd, the binary Certificate Signing Request (CSR) file must be forwarded/uploaded to the CA.

Once you have received the CA certificate back from your CA, and also the CA's root and intermediate certificate files, you will use the sample importCert.cmd to invoke the keytool commands to replace the

self signed certificate with the CA certificate. If the CA is registered in the Trust Store for your browser, the chain of trust from the CA to your server is established and the warning and adding your URL as exception in the browser will be suppressed.

To use CA signed certificate support, copy, modify, and run importCert.cmd Please refer to the instructions and notes included in /usr/lpp/kc4z/samples/importCert.cmd. The hkcsvr1 started task must be restarted to pick up the changes made to kc4zKeyStore.jks by importCert.cmd

KeySore and certificate Passwords

You may choose to periodically change the password for the keystore and the certificate. The password for kc4zKeyStore.jks does not expire, but your company policies might require password changes.

The password for kc4zKeyStore.jks must be synchronized with the password saved in bootstrap.properties. The sample updatePWD.cmd can be used to maintain this synchronization. To avoid disaster,either use the root userid, IBMUSER, or the permissions and ownership of kc4zKeyStore.jks and bootstrap.properties MUST be synchronized prior to running. Please refer to instructions and notes included in updatePWD.cmd

Certificate Expiration:

SSL certificates expire. Browser response to an expired certificate will not be good, access might be prevented..

Automatically generated self-signed certificates have a one year validity period. To respond to an expired automatic self-signed certificate, delete kc4zKeystore.jks and restart the hkcsvr1 started task.

The expiration of a customized self-signed certificate will follow the number of days specified in the keytool -validity parameter coded in genKC4zKeystore.cmd. The default is 9999 days. When 9999 days have passed, you will need to re-run genKC4zKeystore.cmd and restart hkcsvr1.

The expiration of a CA certificate will be determined by the CA certificate process. The CA will most likely have a "RENEW" process which may require the original CSR as input and produce a fresh .CRT CA signed certificate file. Having received that file, you will need to re-do importCert.cmd with the fresh .CRT file from the CA to have a certificate with an un-expired validity period.

To pro-actively monitor certificate expiration date use the keytool command

```
keytool -list -v -keystore kc4zKeyStore.jks
```

from a telnet or omvs command prompt.

SSL Support with RACF Key Rings

IBM Knowledge Center for z/OS can be configured to use SSL certificates connected to a RACF Key Ring.

SSL support with a KC4z RACF Key Ring

KC4z provides three samples to support using certificates connected to a RACF Key Ring. The first sample supports using a KC4z specific Key Ring and certificate. A second sample supports using a shared SITE certificate connected to a KC4z Key Ring. The third sample supports sharing a certificate and Key Ring owned by another user id.

RACF Key Ring support provides benefits compared to using a JKS file.

A JKS file is protected by file permissions and a password. In contrast, RACF Key rings are protected by RACF security policy definitions. A RACF administrator will not have to worry about the JKS password. The administrator's expertise and familiarity in using RACF Key rings with other products easily transfers to KC4z.

Preserving a previously configured Java Key Store

RACF key ring support shipped with PTF UI61914 in March 2019. JKS support shipped with PTF UI57376 in July 2018.

Customers who wish to continue to use a JKS following UI57376 need to take care to follow the caution of the ++HOLD action for UI57376 in order to preserve the bootstrap.properties value for the JKS password as they blend the new sample bootstrap.properties into the configuration directory copy.

The audience for the instructions below will be users who wish to introduce SSL support for KC4z using a RACF Key Ring. Customers who wish to migrate from a previously configured Java Keystore support to a RACF Key Ring will optionally be required to find and follow a procedure for migrating a Certificate from a JKS into a Key Ring

Using a KC4z specific RACF Key Ring and certificate

IBM Knowledge Center for z/OS can be configured to use either a self-signed or a Certificate Authority SSL certificates connected to a RACF Key Ring. This topic describes how to configure a certificate created to be used exclusively by KC4z. Subsequent chapters describe options to support certificates shared with other applications.

Configure KC4z to use RACF instead of a JKS

Within bootstrap.properties, the default sample values support using the JKS key store file. Commented lines are provided as examples for using a RACF Key Ring.

1. UNCOMMENT the following lines to use a RACF Key Ring:

```
#hkc.kc4zKeylocation="safkeyring://HKCSVR/HKCKeyring"
#hkc.kc4zKeyStorePWD="password"
#hkc.kc4zKeyStoreType="JCERACFKS"
#hkc.kc4zfileBased="false"
```

2. COMMENT the default lines which used the JKS key store:

```
hkc.kc4zKeylocation="kc4zKeyStore.jks"
hkc.kc4zKeyStorePWD={aes}AD6VgOr+KycwwzZr87HHY5cA8Y0Eoe0ks9ruxf06rJS+
hkc.kc4zKeyStoreType=JKS
hkc.kc4zfileBased="true"
```

Create the RACF Key Ring and Self-signed Certificate:

Perform these steps to define a self signed certificate stored in the RACF Key Ring

1. Run the supplied sample command file /usr/lpp/kc4z/samples/defracfssl.cmd

   Note that this command must be run with a user id which has authority to execute RACF commands.

   The value "safkeyring://HKCSVR/HKCKeyring" in bootstrap.properties refers to the key ring owner and name created by running "defracfssl.cmd"

2. Restart the KC4z server started task.

   a. STOP HKCSVR1

   b. START HKCSVR1.

3. Test RACF SSL support using self-signed KC4z certificate

   a. https://<your.server.url>:<hkc.httpsPort>/zos/knowledgecenter

      enter the URL for your KC4z and it's HTTPS port in a browser URL field.

Using a CA certificate in the RACF Key Ring

You have achieved self-signed certificate support for KC4z by following the directions above.

To replace the self signed certificate with a CA Certificate in the Key Ring:

- Follow instructions found herehttps://www.ibm.com/docs/en/zos/2.4.0?topic=is-scenario-1-secure-server-certificate-signed-by-certificate-authority
- and understand concepts found here:https://www.ibm.com/docs/en/zos/2.4.0?topic=guide-racf-digital-certificates

Using a shared SITE certificate with a RACF Key Ring

IBM Knowledge Center for z/OS can be configured to use an SITE certificate connected to the KC4z RACF Key Ring.

SSL support with a SITE certificate connected to the RACF Key Ring owned by userid HKCSVR

The RACF SITE certificate concept identifies certificates which may be shared amongst applications with a common URL.

Configure KC4z to use RACF instead of a JKS

Within bootstrap.properties, the default sample values support using the JKS key store file. Commented lines are provided as examples for using a RACF Key Ring.

1. Identical to the change for using the ID(HKCSVR) certificate,

   UNCOMMENT the following lines to use the KC4z Key Ring:

   ```
   #hkc.kc4zKeylocation="safkeyring://HKCSVR/HKCKeyring"
   #hkc.kc4zKeyStorePWD="password"
   #hkc.kc4zKeyStoreType="JCERACFKS"
   #hkc.kc4zfileBased="false"
   ```

2. COMMENT the default lines which used the JKS key store:

   ```
   hkc.kc4zKeylocation="kc4zKeyStore.jks"
   hkc.kc4zKeyStorePWD={aes}AD6VgOr+KycwwzZr87HHY5cA8Y0Eoe0ks9ruxf06rJS+
   hkc.kc4zKeyStoreType=JKS
   hkc.kc4zfileBased="true"
   ```

Create the KC4z Key Ring and Self-signed Certificate:

Perform this step to define a self signed SITE certificate connected to the RACF Key Ring

1. Run the supplied sample command file /usr/lpp/kc4z/samples/defracfsslSITE.cmd

   Note that this command must be run with a user id which has authority to execute RACF commands.

   The value "safkeyring://HKCSVR/HKCKeyring" in bootstrap.properties refers to the key ring owner and name created by running "defracfssl.cmd"

   If you modify the owner or ring name in defracfssl.cmd be sure to make the bootstrap.properties values match.

2. To use a previously defineed SITE certificate, it only needs to be connected to the RACF Key Ring. Modify defracfsslSITE.cmd before running.
3. Restart the KC4z server started task.

   a. STOP HKCSVR1

   b. START HKCSVR1.

4. Test RACF SSL support using self-signed KC4z certificate

   a. https://<your.server.url>:<hkc.httpsPort>/zos/knowledgecenter

enter the URL for your KC4z and it's HTTPS port in a browser URL field.

Using a shared user certificate and a shared RACF Key Ring

IBM Knowledge Center for z/OS can be configured to use a certificate stored in a RACF Key Ring owned by another user id.

SSL support with the z/OSMF RACF Key Ring

z/OSMF uses the KC4z LookAt component for it's "fly over" message explanation function. For many customers, we can assume that there exists a z/OSMF Key Ring and certificate which would be appropriate and convenient to use for KC4z as well. RACF RDATALIB supports this scenario.

Configure KC4z to use RACF instead of a JKS

Within bootstrap.properties, the default sample values support using the JKS key store file. Commented lines are provided as examples for using a RACF Key Ring.

1. UNCOMMENT the following lines to use the IZUSVR Key Ring:

```
#hkc.kc4zKeylocation="safkeyring://IZUSVR/IZUKeyring.IZUDFLT"
#hkc.kc4zKeyStorePWD="password"
#hkc.kc4zKeyStoreType="JCERACFKS"
#hkc.kc4zfileBased="false"
```

2. COMMENT the default lines which used the JKS key store:

```
hkc.kc4zKeylocation="kc4zKeyStore.jks"
hkc.kc4zKeyStorePWD={aes}AD6VgOr+KycwwzZr87HHY5cA8Y0Eoe0ks9ruxf06rJS+
hkc.kc4zKeyStoreType=JKS
hkc.kc4zfileBased="true"
```

Authorize the KC4z user id to access the IZUSVR Key Ring and Certificate:

Perform these steps to use a certificate connected to the RACF Key Ring owned by IZUSVR, the z/OSMF started task user id.

1. Run the supplied sample command file /usr/lpp/kc4z/samples/defracfsslIZUSVR.cmd

   Note that this command must be run with a user id which has authority to execute RACF commands.

   The value "safkeyring://IZUSVR/Keyring.IZUDFLT" in bootstrap.properties refers to the key ring owner and name which HKCSVR is authorized to use by running "defracfsslIZUSVR.cmd"

2. Restart the KC4z server started task.
   a. STOP HKCSVR1
   b. START HKCSVR1.
3. Test RACF SSL support using self-signed KC4z certificate
   a. https://<your.server.url>:<hkc.httpsPort>/zos/knowledgecenter

      enter the URL for your KC4z and it's HTTPS port in a browser URL field.

Note that these instruction assume that the z/OSMF certificate and Key Ring already exist.

SSL Support with AT-TLS and Policy Agent

SSL support can be configured outside IBM Knowledge Center for z/OS to provide SSL protection to the port.

SSL Support with AT-TLS and Policy Agent

In contrast to the Java SSL Library encryption used with a JKS file or RACF, many ports can easily share the same certificate using the system SSL support configured with Communications Server's Policy Agent.

The performance and cost implications of using System SSL compared to Java SSL library are not known at this time.

Refer to the Communications Server documentation: https://www.ibm.com/docs/en/zos/2.3.0?topic=applications-application-transparent-transport-layer-security-data-protection

The audience for the instructions below will be users who wish to introduce SSL support for KC4z using a previously established AT-TLS Policy Agent configuration.

Add the SSL port number to the Policy Agent List:

The concepts and steps required to implement your decision to use Comm Server's AT-TLS and System SSL support are beyond the scope of this document and beyond the expertise of the KC4z product team. If you are choosing this route to HTTPS, you or your company most likely have prior experience with Policy Agent which will make this configuration relatively easy.

Configure KC4z to use the port encrypted by AT-TLS as if it were an unencrypted port.

Set the bootstrap.properties file configuration value hkc.httpsPort=-1

Set the configuration value hkc.httpPort=9443

Note: The httpPort= and httpsPort= values are reversed from the default values which are appropriate when using either a JKS or RACF Key Ring (and the Java SSL library).

Configure KC4z to turn off the Java SSL library encrypted port.

Set the bootstrap.properties file configuration value hkc.httpsPort=-1

You accomplished this step in the previous section. It is repeated here for emphasis. We want to avoid double encryption/decryption.

Note: Having set the hkc.httpsPort= value to -1, the other SSL configuration values become irrelevant.

Connecting additional administrator users to the HKCADMIN group

Running the `/usr/lpp/kc4z/samples/defracf1.cmd` script created group id `hkcadmin` and user id `hkcsvr`, by default, as a member of the `HKCADMIN` group. Other user id's that need access to server configuration data, content-related data, runtime data or log data in the Knowledge Center execution time directories (`/etc/kc4z`, `/global/kc4z` and `/var/kc4z`, by default) and owned by `hkcsvr` must also be included in the `HKCADMIN` group.

Procedure

To connect any additional administrator users to the `HKCADMIN` group:

1. Using a privileged user id with RACF `SPECIAL` authority, run the following RACF command on the TSO command line for another such administrative user. For example, for an administrator user named `adminuser`:

```
CONNECT ADMINUSER GROUP(HKCADMIN)
```

2. Verify that the user id is connected to the group by running the following RACF command on the TSO command line (using `adminuser` as an example):

```
LISTUSER ADMINUSER
```

Attention: If the default group id `hkcadmin` was not used in the `defracf1.cmd` script, modify the **CONNECT** command with the appropriate value.

Configuration files reference

The configuration files copied into the configuration directory (`/etc/kc4z/servers/kc4zServer`, by default) by the `copycfg.cmd` script during initial configuration should be modified to reflect any customization of the default values made during the configuration process. The following list provides some customization considerations for each configuration file. Using a privileged or UID 0 user id, modify the files in the configuration directory to override default values.

server.xml

This is the main Knowledge Center server configuration file. Generally, it should not be modified. It is designed so that the bootstrap.properties file may be used to specify values for the parameters within server.xml.

Modify the bootstrap.properties file to make changes to the default server configuration, if necessary.

server.env

This file specifies important environment variables to be used by Liberty when launching the Knowledge Center server. The `/etc/kc4z` and `/var/kc4z` default directory path prefixes should be modified if you specified values other than the default in the setup and configuration instructions. The **JAVA_HOME** setting needs to be modified if you choose to point to another Java installation directory (IBM Java SDK8 64-bit is supported by Knowledge Center, and is the configuration default).

The following environment variable values need to be updated with new path prefixes if you do not use the default values shown here:

```
KC_HOME=/etc/kc4z/servers/kc4zServer
LOG_DIR=/var/kc4z/logs
WLP_OUTPUT_DIR=/var/kc4z/logs
JAVA_HOME=/usr/lpp/java/J8.0_64
```

kc.properties

This file specifies important settings required by the Knowledge Center application. The `/global/kc4z` and `/var/kc4z` default directory path prefixes should be modified if you specified values other than the defaults in the setup and configuration instructions. Also, if Knowledge Center is installed in a customized *PathPrefix* directory other than the default root filesystem, then all `/usr/lpp/kc4z` occurrences should be changed to *PathPrefix*`/usr/lpp/kc4z`.

The following parameters need to be updated with new path prefixes if you do not use the default values shown here:

```
conf.path=/global/kc4z/data/conf,/usr/lpp/kc4z/kc4z.infocr/conf
taxonomy.path=/usr/lpp/kc4z/samples/KC_taxonomy.ditamap
diskcache.path=/var/kc4z/data/runtime/diskcache
ditacache.path=/var/kc4z/data/runtime/ditacache
index.path=/var/kc4z/data/runtime/index
```

Important: The `conf.path` value is a list of comma-delimited directories within which Knowledge Center monitors product properties files. These properties files are normally deployed with product content by the Softcopy Librarian tool. If Softcopy Librarian is configured to deploy product properties files to directories other than, or in addition to, the default `/global/kc4z/data/conf` path specified in `conf.path`, those directories need to be appended to the list.

lookat.properties

This file specifies important settings required by the LookAt application.

The following keyword needs to be updated with the settings applicable to your installation. Following are the keyword values and a description of their possible settings:

msgReleases

A json structure of products, and the releases within each product, available for scoping the LoolAt message search function. For the LookAt EUI component, these are the products, and product releases, presented to the end user for selection. For the LookAt RESTful API component, this is the json structure of available products and product releases returned via the `msgReleases` RESTful API call. The default setting for this keyword is for release V2R3 of the z/OS product only, as follows:

```
msgReleases= { "count": "1", "products":[{"product":"z/OS", "releases":
[{"title":"z/OS V2R3","key":"SSLTBW_2.3.0"}] }] }
```

The lookat.properties file also has a commented out `msgReleases` keyword that demonstrates how to specify multiple releases for multiple products. Specifically it shows how to specify releases V2R2 and V2R1 for z/OS, releases V6.3 and V6.2 of z/VM and releases V6.1 and V5.3 of z/VSE as follows:

```
msgReleases= { "count": "3", "products":[{"product":"z/
OS","releases":[{"title":"z/OS V2R2","key":"SSLTBW_2.2.0"},{"title":"z/OS
V2R1","key":"SSLTBW_2.1.0"}]}, {"product":"z/VM","releases":[{"title":"z/VM
6.3","key":"SSB27U_6.3.0"},{"title":"z/VM 6.2","key":"SSB27U_6.2.0"}]},
{"product":"z/VSE","releases":[{"title":"z/VSE 6.1","key":"SSB27H_6.1.0"},
{"title":"z/VSE 5.3","key":"SSB27H_5.3.0"}]}]}
```

searchAPIurl

The URL prefix to be used by the LookAt message search function in both the EUI and the RESTful API components. The default setting for this keyword, as appears in the sample lookat.properties file, is:

```
searchAPIurl=/zos/knowledgecenter/api/search
```

which targets the LookAt message search to the Knowledge Center for z/OS (KC4z) running on the same host as LookAt.

If targeting the LookAt message search to a KC4z running on a different host than LookAt, the setting for this keyword should be as follows:

```
searchAPIurl=http://my.kc4z.host.com:9080/zos/knowledgecenter/api/search
```

where `my.kc4z.host.com` is the host on which KC4z is running, and `9080` is the corresponding server port.

If targeting the LookAt message search to the Knowledge Center hosted on www.ibm.com, the setting for this keyword, which appears as a comment line in the sample lookat.properties file, should be as follows:

```
searchAPIurl=http://www.ibm.com/support/knowledgecenter/v1/search
```

.

bootstrap.properties

This file contains Knowledge Center configuration settings that are used by the `server.xml` configuration file. The `/var/kc4z` default directory path prefixes should be modified if you specified values other than that default in the setup and configuration instructions. Also, if Knowledge Center is installed in a customized *PathPrefix* directory other than the default root filesystem, then all `/usr/lpp/kc4z` occurrences should be changed to *PathPrefix*`/usr/lpp/kc4z`. There are other settings such as host, port numbers, context root, ssl information, and trace settings that may be customized, as necessary.

The following parameters need to be updated with new path prefixes or with other settings if you do not use the default values shown here:

hkc.ssl.client.auth.supported
Choose whether an ssl port is enabled. The default value is `true`.

com.ibm.ws.logging.trace.specification
Trace settings string. The default value is `*=warning`.

com.ibm.ws.logging.log.directory and hkc.log.dir
The names of directories to contain logs. The default values are:

```
com.ibm.ws.logging.log.directory=/var/kc4z/logs
hkc.log.dir=/var/kc4z/logs/
```

hkc.install.dir
The parent directory of the `kc.war` file. The default value is `/usr/lpp/kc4z/`.

hkc.context.root
The Knowledge Center URL prefix. The default value is `zos/knowledgecenter`.

hkc.httpHost, hkc.httpPort, and hkc.httpsPort
The *httpEndpoint* variables. The default values are as follow, but care should be taken to ensure the specified values do not conflict with those specified for another server, such as z/OSMF:

```
      hkc.httpHost=*
      hkc.httpPort=9080
      hkc.httpsPort=9443
```

Note that the value -1 can be used to disable a port access.

hkc.unauthenticated.user
This is the guest RACF userid. The default value is HKCGUEST.

jvm.options

This file specifies the Java options that are used by the Knowledge Center JVM. The `/etc/kc4z` default directory path prefix specified should be modified if another path prefix has been specified in the setup and configuration instructions. Other option settings may be overridden or added, as required, but you should consult the Java documentation before making changes to these values.

The following parameter needs to be updated with the new path prefix or with other settings if you do not use the default value shown here:

```
-Djava.security.properties=/etc/kc4z/servers/kc4zServer/jvm.security.override.properties
```

jvm.security.override.properties

This file contains Java security property information and should not be modified.

hkcz.properties

This file contains Knowledge Center product identifiers and should not be modified.

Chapter 3. Managing product documentation content in Knowledge Center for z/OS

The Knowledge Center for z/OS `kc.properties` configuration file designates a list of directories as the Knowledge Center `conf.path`. Product properties files (*.properties) within the `conf.path` directories connect product content to the Knowledge Center taxonomy (`KC_taxonomy.ditamap`) which is used to form the Knowledge Center table of contents. The Knowledge Center for z/OS server monitors the `conf.path` directories for new or changed product properties files, and when detected, updates the Knowledge Center table of contents and search index for the corresponding products.

About this task

To add content packaged by IBM for Knowledge Center for z/OS, the procedures described in the following subtopics (“Managing IBM KC4z packaged content manually” on page 23 , “Command Line Interface Option to copy KC4z content” on page 25 , “z/OSMF Workflow Option to copy KC4z content ” on page 26 supersede both the previously provided options (Softcopy Librarian and the readme.text and receive.sh provided at https://public.dhe.ibm.com/systems/z/zos/sftp/kc/).

Adding content from other sources and other products manually to Knowledge Center for z/OS is possible if you copy product plugins to a content directory yourself, build and add your own product properties file to a `conf.path` directory, and register (if necessary) the product id with the Knowledge Center taxonomy file. The details for **manually** provisioning content are detailed in the following procedure:

Procedure

1. Copy a product's plugins to a subdirectory of the content directory.

   The default location for the content directory is `/global/kc4z/data/content`. If your content subdirectory is named `example`, then you place your content in `/global/kc4z/data/content/example`.

2. Create a *`product`*`.properties` file, in ASCII format, in a directory specified by the `conf.path` property within your `kc.properties` configuration file. For example, if the product id for your content is SSBLLD, then your product properties file should be named `SSBLLD.properties`.
   The following is an example of the contents of a properties file for a product with id SSBLLD and a content subdirectory named `example`:

   ```
   product=SSBLLD
   path=/global/kc4z/data/content/example
   toc=com.ibm.zos.v2r4.isp_isp.ditamap
   ```

   The `toc` property defines the name of the product's master ditamap file within the `path` directory. The master ditamap defines the table of contents structure for the product.

   Important: The `conf.path` property is specified in the `kc.properties` file located in `/etc/kc4z/servers/kc4zServer/`, by default. You can specify one directory for the value of `conf.path`, or multiple directories delimited by commas. The default `conf.path` value is `/global/kc4z/data/conf`.

3. Register the product in the Knowledge Center taxonomy file if it has not been registered already.

   The `kc.properties` file contains a configuration parameter called `taxonomy.path`. The value for this parameter is the fully qualified name of the `KC_taxonomy.ditamap` file. By default:

   ```
   taxonomy.path=/usr/lpp/kc4z/samples/KC_taxonomy.ditamap
   ```

You edit the KC_taxonomy.ditamap file to register your content with Knowledge Center. For example, to add a product named **ISPF for z/OS Version 1.9.0** with a product id of **SSBLLD**, you might add the following line to the KC_taxonomy.ditamap file:

```
<subjectdef type="CT701" class="- map/topicref subjectScheme/subjectdef "
    id="SSBLLD" keys="SSBLLD" navtitle="ISPF for z/OS 1.9.0"
    toc="no" processing-role="resource-only" product="product"/>
```

4. After modifying KC_taxonomy.ditamap, stop and restart the HKCSVR1 Knowledge Center Server started task in order to pick up the taxonomy changes.

Configuring content locations

The Knowledge Center for z/OS kc.properties configuration file designates a list of directories as the Knowledge Center conf.path. Product properties files (*.properties) within the conf.path directories connect product content to the Knowledge Center taxonomy (KC_taxonomy.ditamap) which is used to form the Knowledge Center table of contents. The Knowledge Center for z/OS server (with default settings) monitors the conf.path directories for new or changed product properties files, and when detected, updates the Knowledge Center table of contents and search index for the corresponding products.

By convention, IBM uses the Taxonomy Product ID (example SSLTBW_2.4.0) as the filename for the product properties file and for the content subdirectory names.

/global/kc4z/data/conf/SSLTBW_2.4.0.properties

/global/kc4z/data/content/SSLTBW_2.4.0/

If choosing to override or supplement the default content location and conf.path values, you should follow the subdirectory naming conventions. Sub directories named "conf" and "content" should be peers. The convention of the "conf" and "content" directories is followed within the .jar files which IBM distributes as the package for product documentation in Knowledge Center for z/OScompatible format. As described in the following topics, the tools and instructions to install the content as supplied by IBM assume this convention is followed.

Managing Space in the Content Location

The space allocated by HKCDATGZ as described in “Creating and mounting the runtime, data and log filesystems” on page 6 is sufficient to receive and extract one release of the z/OS content collection. To install additional product content or the content for an additional release of z/OS, it may be necessary to either increase the size of the file system created by HKCDATGZ, or to create and mount additional file systems.

About this task

To decide whether to use a larger filesystem or several smaller filesystem should weigh the cost of DASD against the cost of time. Historically when DASD was considered expensive, it made sense to intensively manage it. If DASD is cheap, increase by tenfold the primary and secondary cylinder allocations in HKCDATGZ, documented in “Creating and mounting the runtime, data and log filesystems” on page 6

If DASD warrants more intensive managing:

Procedure

1. create product ID content mount point sub-directories under the /global/kc4z/content directory;

   Example: /global/kc4z/content/SSLTBW_2.3.0/

   Use the mkdir command OR modify a copy of /usr/lpp/kc4z/samples/makemountpoints.cmd as described in “Creating mount point directories” on page 5 to achieve this step.

2. Modify and execute a copy of HKCDATGZ documented in “Creating and mounting the runtime, data and log filesystems” on page 6to specify a new filesystem name and the mount point created in step 1 above.
3. Add an ipl-time mount command for the new file system and mount point similar to the procedure followed in “Adding ipl-time mount commands for the newly created filesystems” on page 6
4. Use one of the three methods of adding content described in the following topics.
5. Monitor the amount of space consumed by the content relative to the space you defined in your file system by using the command:

   df -kPv /global/kc4z/content/SSLTBW_2.3.0/

   for example.

Managing IBM KC4z packaged content manually

The command line and z/OSMF workflow methods described in subsequent topics rely on an internet connection to perform an anonymous FTP file get. When there is not a connection from your z/OS host to the internet which can perform the FTP transfer, you may have to follow a short manual procedure to acquire and extract the content you wish to serve with your Knowledge Center for z/OS .

About this task

When your server is isolated in an intranet with no interest connection this procedure can be followed to provide content.

Procedure

1. Using a workstation or laptop down load a content packaged jar file using either

   ftp://public.dhe.ibm.com/systems/z/zos/sftp/kc/

   or

   https://public.dhe.ibm.com/systems/z/zos/sftp/kc/

   to a local directory.

   Note: Use binary file transfer.
2. Using the tools/methods available to you upload the packaged content jar file to the content parent directory

   Note: Default upload target directory: `/global/kc4z/data/`

   Note: Use binary file transfer.
3. Extract content from the packaged content jar file

   At a telnet or **OMVS** command prompt:

   ```
   cd /global/kc4z/data
   jar -xf <productID>.jar
   ```

   Note: The packaged content jar file contains two sub directories: "conf" and "content". The "content" subdirectory contains a subdirectory named "<product Id> wherein the content files are contained. The "conf" subdirectory will contain one or more ".properties" files. When extracted, the sub-directories will be created if they do not exist. The files extracted will overlay any existing files in the case of doing the extract again, or in the case of extracting an updated packaged content jar file.
4. To force a re-index for the <product Id> content, use the Unix Systems Services "touch" command to updated the time stamp for the ".properties" files associated with the <productID>.

z/OS product documentation content in PDF format

Knowledge Center for z/OS can provide access to PDF files. Place the z/OS collection PDF files correctly in the directory tree of Knowledge Center content to enable Knowledge Center for z/OS to respond to URLs which call for the PDF files to be served to the browser or downloaded.

About this task

Follow this procedure to add optional PDF files and update references to the PDF files so that the links refer to the same server.

The <product ID> for z/OS 2.4 is SSLTBW_2.4.0. The z/OS 2.4 PDF files are provided in SSLTBW_2.4.0.pdf.jar at https://public.dhe.ibm.com/systems/z/zos/sftp/kc/

Procedure

1. After following the procedure described in“Managing IBM KC4z packaged content manually” on page 23 substituting "SSLTBW_2.4.0" for <productID>to copy the required English Knowledge Center content to your machine, repeat the procedure substituting "SSLTBW_2.4.0.pdf" for <productID>.
2. “Accessing z/OS PDF files with Knowledge Center for z/OS ” on page 30 discusses two options which provide end user access to PDF files.

z/OS product documentation condtent translated to Japanese

End users can display Japanese translated content.

About this task

Follow this procedure to add the z/OS content which has been translated to Japanese to the z/OS English content.

Procedure

1. After following the procedure described in“Managing IBM KC4z packaged content manually” on page 23 , substituting "SSLTBW_2.4.0" for <productID>to copy the required English z/OS Knowledge Center content to your machine, repeat the procedure substituting "SSLTBW_2.4.0.jpn" for <product ID> to copy the additional Japanese translations of the z/OS collection content.
2. End users can access the Japanese content by selecting Japanese as the language on the Knowledge Center user interface. Both the Knowledge Center user interface and the content will be presented in Japanese. Only a subset of the content is translated. When content is not translated, the English version will be presented.

z/OS Japanese product documentation content in PDF format

End users may use Knowledge Center for z/OS to access Japanese PDF files.

About this task

When English PDF files and Japanese content have been added to the z/OS content, translated PDF files may be subsequently added. If Japanese PDF files are not added, the links to the PDF files on the Japanese translated pages will be links to the English versions of the PDF files on the IBM web site.

Procedure

1. After following the procedure described in “Managing IBM KC4z packaged content manually” on page 23 substituting "SSLTBW_2.4.0" for <productID>to copy the required z/OS English Knowledge Center content to your machine and repeating the procedure twice as described in “z/OS product documentation content in PDF format” on page 24 and “z/OS product documentation condtent

translated to Japanese" on page 24 and repeat the procedure one more time, substituting "SSLTBW_2.4.0.jpn.pdf" for <product ID> in order to copy the translated Japanese PDF files to your machine.

2. Referring to "Accessing z/OS PDF files with Knowledge Center for z/OS " on page 30 the links to local PDF files on the product "landing" pages will be automatically resolved to the Japanese copy of the PDF when Japanese has been selected as the end user's language. An alternate URL provides access to the index HTML file which provides access to the translated Japanese PDF files :

   http://your.host.name:9080/zos/knowledgecenter/api/content/nl/ja/SSLTBW_2.4.0/nl/ja/pdf/index.html

Command Line Interface Option to copy KC4z content

The shell script file `receive.sh` shipped in the samples directory provides a command line interface to transfer and extract the packaged content jar files which IBM distributes.

About this task

Note: With PH24318, May 2020, the HTTPS protocol can be used instead of FTP when required to meet security policy or firewall setup concerns.

Note: With minimum setup,`receive.sh` automates the commands described in "Managing IBM KC4z packaged content manually" on page 23

Procedure

Copy `receive.sh`

1. **`cd /global/kc4z/data`**
2. **`cp /usr/lpp/kc4z/samples/receive.sh .`**
3. To use HTTPS, skip this step. To use FTP, create OR update $HOME/`.netrc`

   Sample`.netrc` line entry for content download::

   ```
   machine public.dhe.ibm.com login anonymous password email@yourcompany.com
   ```

   update "email@yourcompany.com" appropriately.

   Using $HOME/`.netrc` will allow different users to use the same copy of receive.sh. Each user must create an appropriate $HOME/`.netrc`

   Note: Earlier versions of receive.sh supplied at https://public.dhe.ibm.com/systems/z/zos/sftp/kc/ used the login and password coded inline. To use the later version with .netrc, replace obsoleted copies of receive.sh.

   .
4. To use HTTPS, httpsCopy.jar must be either in /usr/lpp/kc4z/samples/ or in a directory included in the PATH environment variable.
5. If you have previously configured $HOME/.netrc and wish to use HTTPS, remove the line for public.dhe.ibm.com in $HOME/.netrc, If there is only one line, .netrc may be removed. Without this FTP configuration, HTTPS will be used.

Using receive.sh to acquire content

Once setup, using a user ID with sufficient privileges, invoke receive.sh as follows:

Procedure

1. **`cd /global/kc4z/data`**
2. **`./receive.sh <productID>`**

z/OS content and PDF files

For z/OS 2.3 and 2.4 PDF file format of the documentation is provided separately. The translated Japanese content and Japanese PDF files are also provided separately.

Use the receive.sh shell script to receive and extract English Knowledge Center content and PDF files.

The KC4z sample receive.sh shell script provides the download and extract function:

Example:

/global/kc4z/data->receive.sh SSLTBW_2.3.0

/global/kc4z/data->receive.sh SSLTBW_2.3.0.pdf

The first receive.sh removes /global/kc4z/data/content/SSLTBW_2.3.0 and extracts the English KC content back into that directory. The second, optional, receive.sh adds PDF files to /global/kc4z/data/content/SSLTBW_2.3.0/pdf. In addition, it overlays any .htm files which link to those PDF files on IBM's web site with links to the local copies.

Optionally, use the receive.sh shell script to receive and extract Japanese Knowledge Center content and PDF files.

Example:

/global/kc4z/data->receive.sh SSLTBW_2.3.0.jpn

/global/kc4z/data->receive.sh SSLTBW_2.3.0.jpn.pdf

The third receive.sh adds nl/ja subdirectories for the KC content under the directories in /global/kc4z/data/content/SSLTBW_2.3.0

The fourth receive.sh adds PDF files to /global/kc4z/data/content/SSLTBW_2.3.0/pdf/nl/ja. In addition, it overlays any Japanese .htm files which link to those files on IBM's web site with links to the local copies.

z/OSMF Workflow Option to copy KC4z content

Sample files to define a z/OSMF Workflow can be used to provide a web interface to automate transferring and extracting the content package jar files which IBM distributes.

With these steps, the workflow sample files can be installed to provide a web interface which performs the tasks required to install the additional content provided by IBM.

1. As with “Command Line Interface Option to copy KC4z content” on page 25, Create OR update $HOME/.netrc Sample .netrc line entry for KC4z content download::

   machine public.dhe.ibm.com login anonymous password email@yourcompany.com

   update "email@yourcompany.com" appropriately. Using $HOME/.netrc will allow different users to use the same workflow without modification. (Each user must create an appropriate $HOME/.netrc.)
2. Run the `copyworkflow.cmd` command file from samples directory to copy the workflow files to default target directory "/etc/kc4z/workflows". The admin can choose the different target by giving target in command line options or by editing the value of "targetdir" in `copyworkflow.cmd`.
3. This will copy the workflow definition file, workflow property file, receive content script and extract content script to target directory.

Having copied the Workflow files to an editable and usable location, you may proceed with “Setting up the z/OSMF workflow ” on page 27

Setting up the z/OSMF workflow

Copy the workflow sample files. Customize the properties.

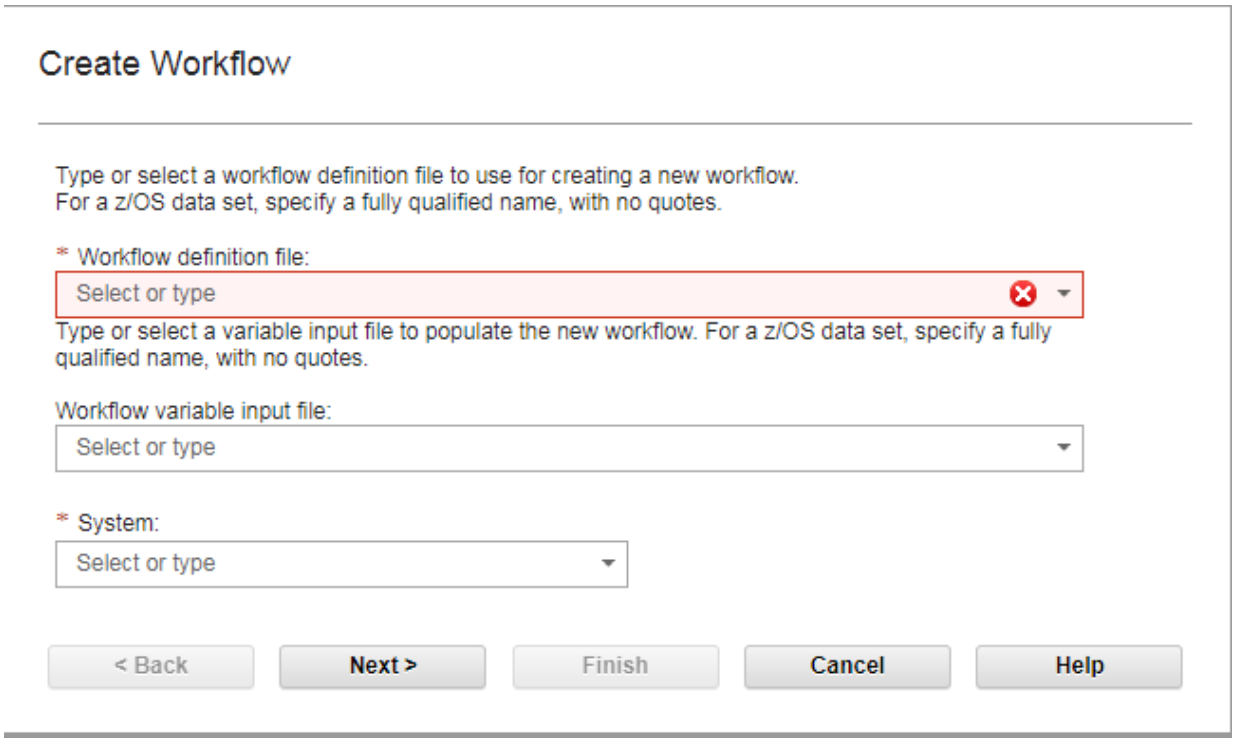
About this task

Use a sample exec to copy the files which comprise the workflow to the default usage directory and customize to prepare the workflow to be used..

Procedure

1. run `/usr/lpp/kc4z/samples/copyworkflow.cmd`

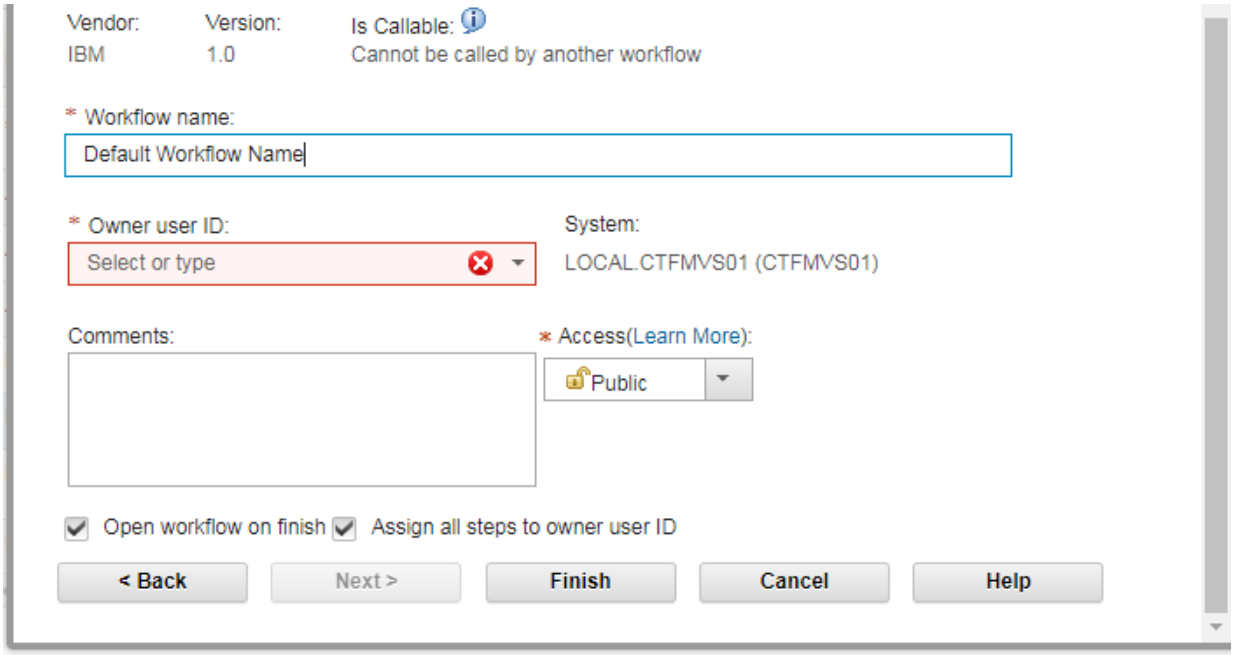
   `copyworkflow.cmd`copies the sample workflow definition file, workflow property file, receive content script and extract content script to `etc/kc4z/workflow` where they will be modified and used.. (default utilization location).
2. If the default content location `/global/kc4z/data` has been overridden, update the contentParentDirectory value in `/etc/kc4z/workflows/workflow_getjar.property`.
3. Logon to z/OSMF and select the Workflow TAB
4. Select Action ->Create WorkFlow



   `/etc/kc4z/workflows/receiveContentjcl.xml`

   would be the default value for "Workflow definition file"

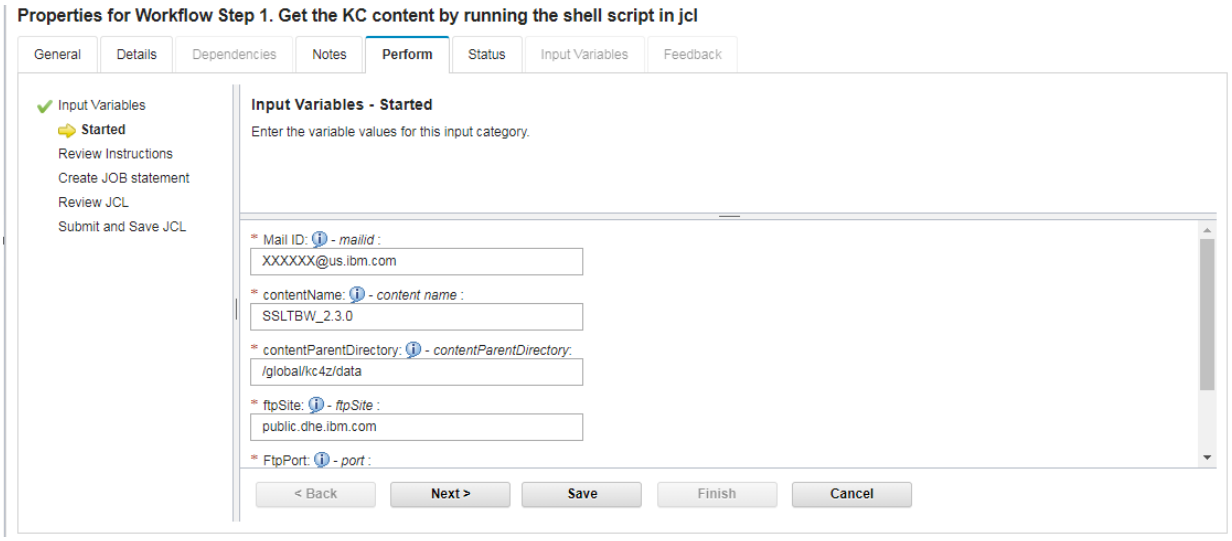
   `/etc/kc4z/workflows/workflow_getjar.property`would be the default value for "Workflow variable input file".
5. Give the system name under system
6. Click "Next"



a. Give the workflow name, owner ID and access according to your preferences.

b. Check the checkbox, "assign all steps to owner user ID".

7. Click "Finish"



8. Having successfully defined the z/OSMF workflow, you may proceed with “Using the z/OSMF workflow ” on page 28

Using the z/OSMF workflow

Using the z/OSMF workflow to retrieve and extract content packaged for KC4z.

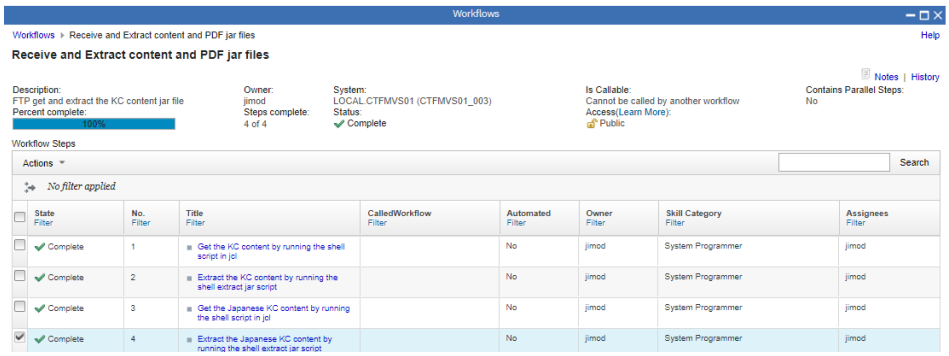
About this task

Executing the two step workflow will transfer and extract content that IBM packages and distributes for KC4z.

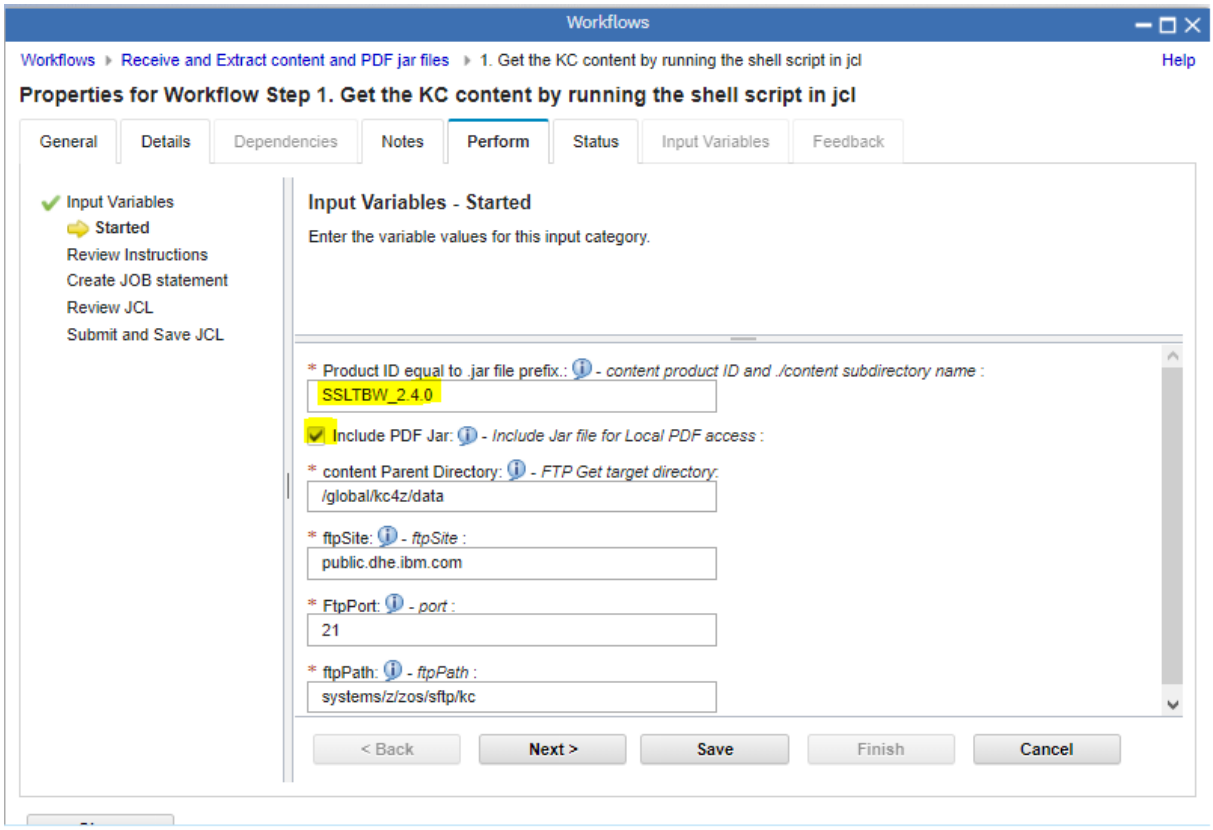
Procedure

1. logon to z/OSMF with the userid which owns the workflow

2. click "Workflows"
3. click "<Workflow title>" as assigned.



4. Right Click on the first step (Get the KC content)
5. select "Perform"
6. To perform a workflow step in "Complete" status, first select the step(s) and use "Actions->Override Complete",



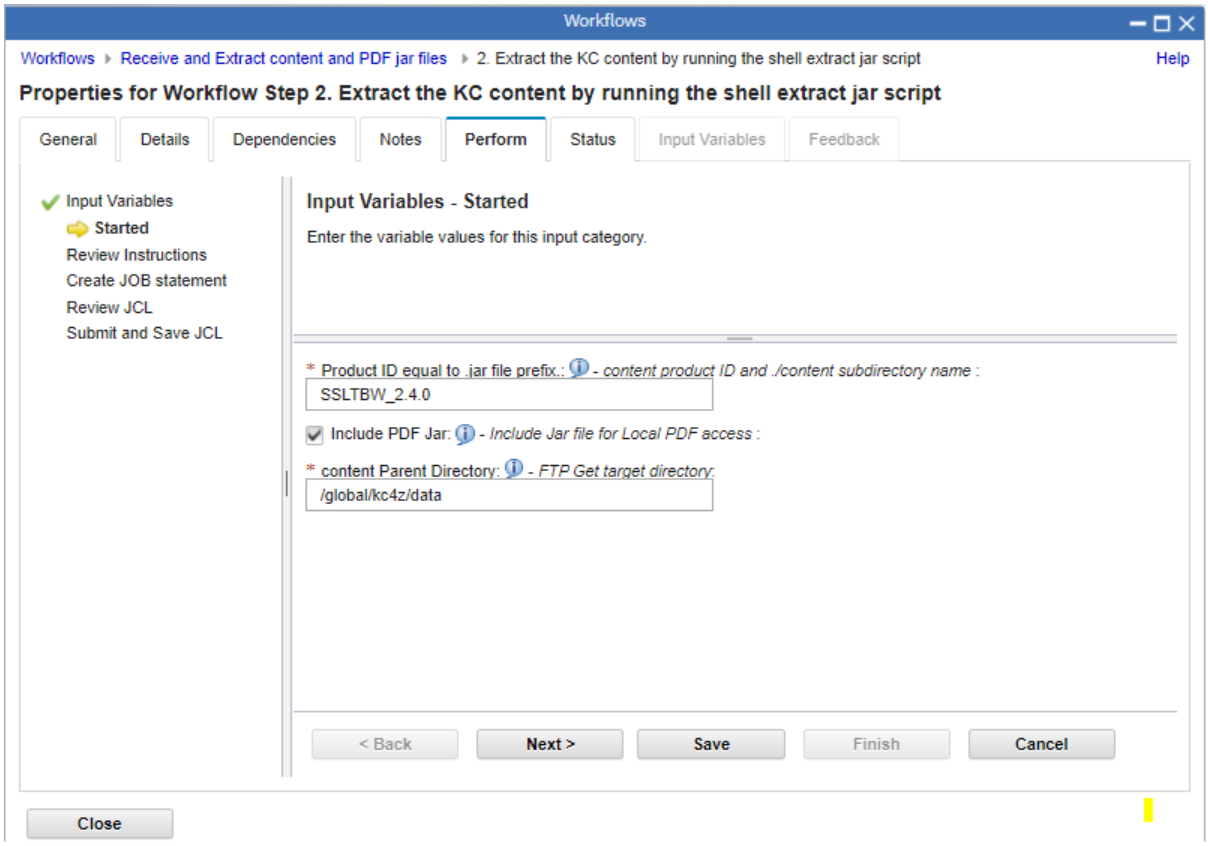
- Update the content name (product ID) to the prefix of one of the available KC4z content package jar files. (

7. Click "Next" on each of the "Input Variables", "Review Instructions", "Create Job Statement", "Review JCL", "Submit and Save JCL" panels.
8. Review the completion of the Submitted Job.

   You have completed the first of two steps. At this time, you should have, for example, `/global/kc4z/data/SSLTBW_2.3.0.jar`

   The next workflow step will extract the content from the jar file and delete it.

9. Perform the second workflow step (Extract the KC content) .



10. Click "Next" on each of the "Input Variables", "Review Instructions", "Create Job Statement", "Review JCL", "Submit and Save JCL" panels.
11. Review the completion of the submitted Job

    You have completed the second of the two steps. At this time, you should find subdirectory:

    `/global/kc4z/data/content/SSLTBW_2.3.0` <Parent Diretory Path>/content/<content name> and file `/global/kc4z/data/conf/SSLTBW_2.3.0.properties ( <Parent Diretory Path>/conf/<content name>.properties )` with recent update indication.

    When KC4z detects that SSLTBW_2.3.0.properties has been modified, indexing and caching processes will be initiated, resulting in the ability to display and search the content you have added. This process can take considerable time, as much as 20 minutes has been measured.
12. Use a browser to display your KC4z URL. Use the table of contents to navigate to the newly added or updated content.

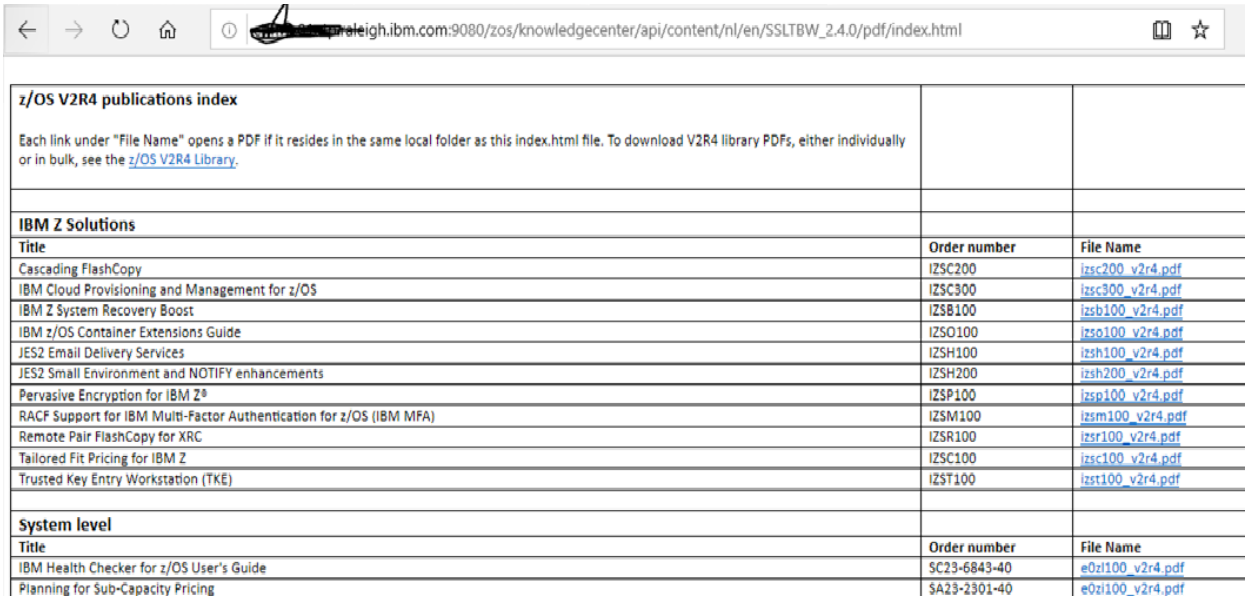
Accessing z/OS PDF files with Knowledge Center for z/OS

Once installed in the content sub-directory tree by one of the three previous methods, there are two methods which end users can use to access the PDF files.

Links to the PDF files are provided on an `index.html` page and on the product "landing pages".

- index.html

  Included with the PDF files and displayed using the same URL prefix which provides access to the PDF files.



z/OS V2R4 publications index

Each link under "File Name" opens a PDF if it resides in the same local folder as this index.html file. To download V2R4 library PDFs, either individually or in bulk, see the z/OS V2R4 Library.

IBM Z Solutions

Title	Order number	File Name
Cascading FlashCopy	IZSC200	izsc200_v2r4.pdf
IBM Cloud Provisioning and Management for z/OS	IZSC300	izsc300_v2r4.pdf
IBM Z System Recovery Boost	IZSB100	izsb100_v2r4.pdf
IBM z/OS Container Extensions Guide	IZSO100	izso100_v2r4.pdf
JES2 Email Delivery Services	IZSH100	izsh100_v2r4.pdf
JES2 Small Environment and NOTIFY enhancements	IZSH200	izsh200_v2r4.pdf
Pervasive Encryption for IBM Z®	IZSP100	izsp100_v2r4.pdf
RACF Support for IBM Multi-Factor Authentication for z/OS (IBM MFA)	IZSM100	izsm100_v2r4.pdf
Remote Pair FlashCopy for XRC	IZSR100	izsr100_v2r4.pdf
Tailored Fit Pricing for IBM Z	IZSC100	izsc100_v2r4.pdf
Trusted Key Entry Workstation (TKE)	IZST100	izst100_v2r4.pdf

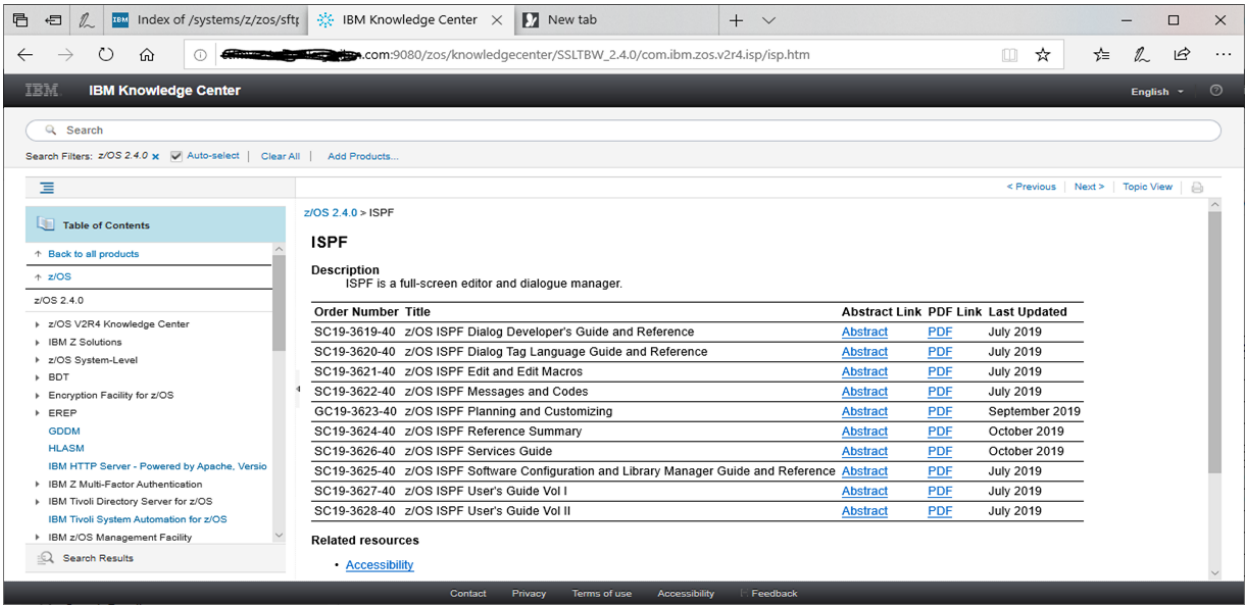
System level

Title	Order number	File Name
IBM Health Checker for z/OS User's Guide	SC23-6843-40	e0zl100_v2r4.pdf
Planning for Sub-Capacity Pricing	SA23-2301-40	e0zi100_v2r4.pdf

Figure 1. http://yourhost.com:9080/zos/knowledgecenter/api/content/nl/en/SSLTBW_2.4.0/pdf/index.html

- Product "Landing" Pages

  Each z/OS product in the collection provides a documentation summary page. The version of these summary pages shipped with the PDF files includes updates which replace the links to the PDF files on the IBM web site with links to the files on the same "local" server. The ISPF landing page serves as an example.



IBM Knowledge Center

z/OS 2.4.0 > ISPF

ISPF

Description
ISPF is a full-screen editor and dialogue manager.

Order Number	Title	Abstract Link	PDF Link	Last Updated
SC19-3619-40	z/OS ISPF Dialog Developer's Guide and Reference	Abstract	PDF	July 2019
SC19-3620-40	z/OS ISPF Dialog Tag Language Guide and Reference	Abstract	PDF	July 2019
SC19-3621-40	z/OS ISPF Edit and Edit Macros	Abstract	PDF	July 2019
SC19-3622-40	z/OS ISPF Messages and Codes	Abstract	PDF	July 2019
GC19-3623-40	z/OS ISPF Planning and Customizing	Abstract	PDF	September 2019
SC19-3624-40	z/OS ISPF Reference Summary	Abstract	PDF	October 2019
SC19-3626-40	z/OS ISPF Services Guide	Abstract	PDF	October 2019
SC19-3625-40	z/OS ISPF Software Configuration and Library Manager Guide and Reference	Abstract	PDF	July 2019
SC19-3627-40	z/OS ISPF User's Guide Vol I	Abstract	PDF	July 2019
SC19-3628-40	z/OS ISPF User's Guide Vol II	Abstract	PDF	July 2019

Related resources

- Accessibility

Figure 2. http://your.host.name:9080/zos/knowledgecenter/SSLTBW_2.4.0/com.ibm.zos.v2r4.isp/isp.htm

Content examples

A product's content is stored in a content directory indicated by the `path` keyword within its corresponding `<product>.properties` file. This file is located in one of the directories specified by the `conf.path` keyword within the `kc.properties` file. The product's content directory contains all of the product plugins, as well as the product's master ditamap file, which defines the product table of contents. Plugins can be stored as directories or as `.jar` files.

Important: Your product's *product*.properties file must also identify your table of contents master ditamap file (relative to the path value) via the toc keyword. In these examples, the "demo" *product*.properties file might look like this:

```
product=SSBLLD
path=/global/kc4z/data/content/demo/
toc=com.ibm.zos.v2r4.isp_isp.ditamap
```

Directory style plugin example

If your product content plugins are "directory style", each plugin directory is placed under the product content directory along with the product table of contents master ditamap file. In the following example, the "demo" product content directory has three content plugin directories, a root plugin directory, and the table of contents master ditamap file:

```
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.f54em00/
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.f54pd00/
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.f54u200/
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.isp/
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.isp_isp.ditamap
```

.jar file style plugin example

If your product content plugins are ".jar style", each plugin .jar file is placed under the product content directory along with the product table of contents master ditamap file. In the following example, the "demo" product content directory has three content plugin .jar files, a root plugin .jar file, and the table of contents master ditamap file:

```
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.f54sg00.jar
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.f54u200.jar
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.f54ug00.jar
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.isp.jar
/global/kc4z/data/content/demo/com.ibm.zos.v2r4.isp_isp.ditamap
```

Sharing content within a sysplex

By exploiting the new /global directory (introduced in z/OS V2R3) in a shared sysplex environment, a single copy of Knowledge Center product content and properties files can be shared by multiple IBM Knowledge Center for z/OS server instances in the sysplex.

In a z/OS V2R3 sysplex, if the Data file system is mounted at the default /global/kc4z/data directory in the sysplex root, it is shareable by all IBM Knowledge Center for z/OS (KC4z) server instances in the sysplex running on systems that exploit shared file system support. Since KC4z 1.1 (z/OS V2R3) servers, by default, are pre-configured to read data from the Data file system mounted at /global/kc4z/data/, such a KC4z 1.1 (z/OS V3R3) server would automatically use the shared copy of the data content and properties in the sysplex root.

Any older KC4z 1.0 (z/OS V2R2) servers in the sysplex that exploit shared file system support can also be made to read the same data from the shared Data file system mounted at /global/kc4z/data/ in the sysplex root by editing their /sharedapps/kc4z/servers/kc4zServer/kc.properties file to replace the conf.path keyword value of "/sharedapps/kc4z/data/conf" with "/global/kc4z/data/conf".

If you wish to migrate KC product content and configuration data previously provisioned to a KC4z 1.0 (z/OS V2R2) server to a KC4z 1.1 (z/OS V2R3) server(s), whether in a sysplex or single system environment, please refer to *z/OS Upgrade Workflow* (GA32-0889-30) for complete migration instructions.

Chapter 4. Using Knowledge Center

Knowledge Center for z/OS is a central location for finding and organizing information about your products. You can use advanced search tools to sort and filter your search. From either the search results or Table of Contents pane, you can browse through product or solution sets of information.

Accessing Knowledge Center for z/OS in a web browser

To access Knowledge Center content, point your web browser to your Knowledge Center for z/OS landing page, such as:

```
http://yourHostName:9080/zos/knowledgecenter/
```

The actual URL for your Knowledge Center for z/OS landing page is logged by the Knowledge Center for z/OS server started task (HKCSVR1) in the `/var/kc4z/logs/console.log` file. For example:

```
CWWKT0016I: Web application available (default_host):
http://yourHostName:9080/zos/knowledgecenter/
```

Accessibility

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully. Documentation is provided in HTML so that it is easily accessible through assistive technology.

With the accessibility features of Knowledge Center for z/OS, you can do the following tasks:

- Use screen-reader software and digital speech synthesizers to hear what is displayed on the screen. Consult the product documentation of the assistive technology for details on using assistive technologies with HTML-based information.
- Use screen magnifiers to magnify what is displayed on the screen.
- Operate specific or equivalent features by using only the keyboard.

Keys help:

- To move through the user interface controls, links, and subject areas, press the Tab key. To return to the previous control, link, or subject area, press Shift+Tab. Control keys vary, depending on the browser or operating system. For example, the operating system on recent Macintosh machines uses Ctrl+Opt instead of Shift+Alt and Chrome browsers use Alt instead of Shift+Alt.
- To go directly to the content area, press Shift+Alt+V.
- To go directly to the search field, press Shift+Alt+X.
- To go to the navigation area, press Shift+Alt+Z.
- To go directly to the Table of Contents tab, press Shift+Alt+T.
- To go directly to the Search Results tab, press Shift+Alt+S.
- To print the content that is in focus, press Shift+Alt+P.

Finding information by searching Knowledge Center

To search for information in Knowledge Center, enter your search terms into the search field. Knowledge Center returns a list of pages, ordered by relevance, that match your search terms. By default, only the topics that contain all the terms are returned.

Each search result shows which product and version that page is from. You can use operators to refine your searches.

OR
To search for pages that have one of two or more terms, include **OR** (capitalized) between the terms. Without **OR**, only pages that have all the terms in the specified search string are returned in the search results.

Each search displays a maximum of 500 results in ranked order. To see more than the first 20 search results, click **Next 20 results** to show 40 results. Click again to see 60 results in a single list, and so on.

Narrowing search results by selecting products

If a general search provides too many results, reduce the scope of the search to one or more products. You specify your product search scope by using the dialog presented when clicking **Add Products...** under the search field. Click **Done** to apply your search scope. Only results from the version, product, or products that you selected are returned. The products you selected are shown on the search bar.

Knowledge Center for z/OS tracks products as you browse content and follow links. This is called auto-select. To turn it off so that product filters are not added as you browse, clear the **Auto-select** check box. Auto-select does not add a product if you come to a topic through search; however, if you click a topic in the navigation tree after a search, the context is set to the product that contains that topic.

To broaden the scope of your search, click **Add Products...**, select another version or product, and click **Done**. Click **Clear All** to remove all the selected products from the search scope.

The product filters remain active until you select another option.

Refining search results by specifying category attributes

To find information more quickly, you can limit your search results by specifying attributes in the categories appearing beneath Search Results in the Navigation pane.

You can refine your search results by selecting attributes within any or all of the following categories:

Date Range
See only topics added or changed in the last week, month, or year, or define your own range of dates.

Tasks
Limit results to specific task types, such as installing, migrating, or troubleshooting. Only topics that are defined as that task type are included in search results. Results might be incomplete if some topics have not been assigned task types.

Operating System
You can limit search results to specific operating systems and versions.

Your specified search result refinements within categories can be removed by clicking any or all of **Any Time**, **Any Task** or **Any Operating System** in the corresponding category, as desired.

Browsing content

To browse content, click **Table of Contents**, then select a product, version, and topic. Expand the contents tree to see more content. When you select a version of a product, the Table of Contents scope adjusts to show the contents of the product that you have chosen. You can move back up the tree by clicking the link in the contents tree that has an up-arrow.

You can also browse content from any topic. For example, you can browse content from search results. When you click a search result, the topic opens and the Table of Contents shows the content structure for the product in which that topic appears. In the Table of Contents, you can then find related topics in that product.

Viewing content in your own language

By default, Knowledge Center shows content in the language that is specified in the Languages setting for your browser. For example, if your browser is set to French, then French content is shown if it exists. If

content does not exist in your preferred language, that content is shown in English. You can also set your language preference in Knowledge Center by selecting a language from the **Language** list.

Chapter 5. Configuring and Using the LookAt Function of Knowledge Center for z/OS

The LookAt message lookup function in Knowledge Center for z/OS is a Knowledge Center based replacement for the legacy BookManager based version of LookAt. This new LookAt function has both an end user component and a RESTful API component. This chapter describes how to configure LookAt, and how to use both components.

Configuring the LookAt Function

Configuration for the LookAt function is performed by setting the **msgReleases** and **searchAPIurl** values in the lookat.properties file.

For the EUI component the specified **msgReleases** value dictates which products and product releases are presented to the end user as radio button selections for scoping the message search to a particular product release. For the RESTful API component, the specified JSON string value is what is returned by the **msgReleases** API call for as the product release to search in a subsequent **msgURLs** call.

The **searchAPIurl** value is used by both the EUI and RESTful API components of LookAt to indicate where to target the message search, either to a local Knowledge Center for z/OS (KC4z) server, or to the Knowledge Center hosted via the support portal on ibm.com.

See "lookat.properties" in topic “Configuration files reference” on page 17 for details.

Using the End User Component of the LookAt Function

The LookAt EUI component is invoked by launching the **http://my.kc4z.host.com:9080/zos/LookAT** URL in a web browser, where my.kc4z.host is the domain of the host running your IBM Knowledge Center for z/OS server.

The LookAt dialog presented to the end user has a **Message ID** field in which the message to be searched must be specified. For example, "arc0506i" without the quotes. Then after clicking one of the product release radio buttons presented in the dialog (e.g. **z/OS 2.3**), clicking the **Retrieve Message Topic** button triggers the search. The following information is returned for a successful message search:

- The content for the topic whose topic title identifies the requested **Message ID**. Typically this content contains an explanation of the message, the system action, programmer response, source of the message and a link to the parent topic of this topic.
- The URL for the topic whose content is presented
- The URL that was submitted for the message search
- A JSON structure containing information about all the topics that were returned from the search. Note that the content for only the topic which best identifies the **Message ID** description is displayed in the content frame

If a suitable topic for the requested **Message ID** couldn't be found, an error message and associated information is returned.

Using the RESTful API Component of the LookAt Function

The Knowledge Center for z/OS message lookup function, LookAt, exposes three RESTful application programming interfaces:

- **msgReleases**

  Give me a JSON structure containing all the LookAt-configured releases on the server (as per lookat.properties)

- **msgURLs**

  For the specified message number and specified product release (one of the product releases returned from the LookAt "msgReleases" RESTful API call), give me a JSON structure containing the topic title, the complete KC api URL and the complete KC web URL for the topic of the specified message number

- **msgContent**

  For the specified KC api URL (one of those returned from the LookAt "msgURLs" REST API call), return me the content for the message number in the specified format

The output from msgReleases serves as input for msgURLs and the output from msgURLs serves as input for msgContent. Output from msgContent is meant to be presented to end users, and can be included programmatically in the EUI of other applications.

The apiDiscovery feature of Liberty presents these APIs, documentation for them, and a user interface to demonstrate the API in action. The apiDiscovery feature is similar to swagger which is a popular tool for RESTful API documentation.

To use the apiDiscovery for learning about the LookAt RESTful APIs included with Knowledge Center for z/OS, point your browser to your host with a URL suffix of "ibm/api/explorer/". For example, as so: "https://my.kc4z.host.com:9443/ibm/api/explorer/"

Note that "http://my.kc4z.host.com:9080/ibm/api/explorer/" will be redirected to "https://my.kc4z.host.com:9443/ibm/api/explorer/"

Accept the self signed certificate and then login with "user" as your userid and "pwd" as your password. Future changes to apiDiscovery may rescind the requirement for authentication and SSL.

Appendix A. Accessibility

Accessible publications for this product are offered through IBM Documentation (www.ibm.com/docs/en/zos).

If you experience difficulty with the accessibility of any z/OS information, send a detailed message to the Contact the z/OS team web page (www.ibm.com/systems/campaignmail/z/zos/contact_z) or use the following mailing address.

IBM Corporation
Attention: MHVRCFS Reader Comments
Department H6MA, Building 707
2455 South Road
Poughkeepsie, NY 12601-5400
United States

Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features in z/OS can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products such as screen readers function with the user interfaces found in z/OS. Consult the product information for the specific assistive technology product that is used to access z/OS interfaces.

Keyboard navigation of the user interface

You can access z/OS user interfaces with TSO/E or ISPF. The following information describes how to use TSO/E and ISPF, including the use of keyboard shortcuts and function keys (PF keys). Each guide includes the default settings for the PF keys.

- *z/OS TSO/E Primer*
- *z/OS TSO/E User's Guide*
- *z/OS ISPF User's Guide Vol I*

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users who access IBM Documentation with a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always present together (or always absent together), they can appear on the same line because they are considered a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that the screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1)

are mutually exclusive alternatives. If you hear the lines `3.1 USERID` and `3.1 SYSTEMID`, your syntax can include either `USERID` or `SYSTEMID`, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The `*` symbol is placed next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element `*FILE` with dotted decimal number 3 is given the format `3 \* FILE`. Format `3* FILE` indicates that syntax element `FILE` repeats. Format `3* \* FILE` indicates that syntax element `* FILE` repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol to provide information about the syntax elements. For example, the lines `5.1*, 5.1 LASTRUN, and 5.1 DELETE` mean that if you use more than one of the `LASTRUN` and `DELETE` syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, it indicates a reference that is defined elsewhere. The string that follows the % symbol is the name of a syntax fragment rather than a literal. For example, the line `2.1 %OP1` means that you must refer to separate syntax fragment `OP1`.

The following symbols are used next to the dotted decimal numbers.

? indicates an optional syntax element
The question mark (?) symbol indicates an optional syntax element. A dotted decimal number followed by the question mark symbol (?) indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example `5? NOTIFY`). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines `5 ?, 5 NOTIFY`, and `5 UPDATE`, you know that the syntax elements `NOTIFY` and `UPDATE` are optional. That is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.

! indicates a default syntax element
The exclamation mark (!) symbol indicates a default syntax element. A dotted decimal number followed by the `!` symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted decimal number. Only one of the syntax elements that share the dotted decimal number can specify the ! symbol. For example, if you hear the lines `2? FILE, 2.1! (KEEP), and 2.1 (DELETE)`, you know that `(KEEP)` is the default option for the `FILE` keyword. In the example, if you include the `FILE` keyword, but do not specify an option, the default option KEEP is applied. A default option also applies to the next higher dotted decimal number. In this example, if the `FILE` keyword is omitted, the default `FILE(KEEP)` is used. However, if you hear the lines `2? FILE, 2.1, 2.1.1! (KEEP)`, and `2.1.1 (DELETE)`, the default option KEEP applies only to the next higher dotted decimal number, `2.1` (which does not have an associated keyword), and does not apply to `2? FILE`. Nothing is used if the keyword `FILE` is omitted.

*** indicates an optional syntax element that is repeatable**
The asterisk or glyph (*) symbol indicates a syntax element that can be repeated zero or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line `5.1* data area`, you know that you can include one data area, more than one data area, or no data area. If you hear the lines `3* , 3 HOST, 3 STATE`, you know that you can include `HOST, STATE`, both together, or nothing.

Notes:

1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you can write `HOST STATE`, but you cannot write `HOST HOST`.
3. The `*` symbol is equivalent to a loopback line in a railroad syntax diagram.

+ indicates a syntax element that must be included

The plus (+) symbol indicates a syntax element that must be included at least once. A dotted decimal number followed by the + symbol indicates that the syntax element must be included one or more times. That is, it must be included at least once and can be repeated. For example, if you hear the line `6.1+ data area`, you must include at least one data area. If you hear the lines `2+, 2 HOST,` and `2 STATE`, you know that you must include `HOST, STATE,` or both. Similar to the `*` symbol, the + symbol can repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the `*` symbol, is equivalent to a loopback line in a railroad syntax diagram.

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Various z/OS elements, such as DFSMSdfp, JES2, JES3, and MVS™, contain code that supports specific hardware servers or devices. In some cases, this device-related element support remains in the product even after the hardware devices pass their announced End of Service date. z/OS may continue to service element code; however, it will not provide service related to unsupported hardware devices. Software problems related to these devices will not be accepted for service, and current service activity will cease if a problem is determined to be associated with out-of-support devices. In such cases, fixes will not be issued.

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The minimum supported hardware for z/OS releases identified in z/OS announcements can subsequently change when service for particular servers or devices is withdrawn. Likewise, the levels of other software products supported on a particular release of z/OS are subject to the service support lifecycle of those

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- For information about software support lifecycle, see: IBM Lifecycle Support for z/OS (www.ibm.com/software/support/systemsz/lifecycle)
- For information about currently-supported IBM hardware, contact your IBM representative.

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Index

P

S

T

U

V

Product Number: 5650-ZOS

SC27-6805-50