Program Directory for

IBM z/OS Source Code Analysis

V14.2.0

Program Number 5655-AC5, 5724-T07, 5737-J31

FMID HAKGE20

for Use with
z/OS V02.02.00 or later

Document Date: September 2019

GI13-2864-09

Note

Before using this information and the product it supports, be sure to read the general information under 7.0, “Notices” on page 29.

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Contents

Figures

1.0 Introduction

This program directory is intended for system programmers who are responsible for program installation and maintenance. It contains information about the material and procedures associated with the installation of IBM z/OS Source Code Analysis. This publication refers to IBM z/OS Source Code Analysis as z/OS Source Code Analysis.

z/OS Source Code Analysis is available as a component of multiple products. Depending on which product you acquired, different functions of z/OS Source Code Analysis will be enabled or disabled.

- IBM Developer for z/OS Enterprise Edition V14.2.0, program number 5655-AC5 (Shopz orderable)
- IBM Developer for z/OS V14.2.0, program number 5724-T07 (web download)
- IBM Z Open Unit Test V2.0.0, program number 5737-J31 (web download)

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 3 identifies the basic program materials and documentation for z/OS Source Code Analysis.
- 3.0, “Program Support” on page 6 describes the IBM support available for z/OS Source Code Analysis.
- 4.0, “Program and Service Level Information” on page 8 lists the APARs (program level) and PTFs (service level) that have been incorporated into z/OS Source Code Analysis.
- 5.0, “Installation Requirements and Considerations” on page 9 identifies the resources and considerations that are required for installing and using z/OS Source Code Analysis.
- 6.0, “Installation Instructions” on page 16 provides detailed installation instructions for z/OS Source Code Analysis. It also describes the procedures for activating the functions of z/OS Source Code Analysis, or refers to appropriate publications.

The rest of this section only applies when z/OS Source Code Analysis is ordered via Shopz. It does not apply when you downloaded it from the web.
Select this link to go to the next section: 1.1, “z/OS Source Code Analysis Description” on page 2

Before installing z/OS Source Code Analysis, read the *CBPDO Memo To Users* and the *CBPDO Memo To Users Extension* that are supplied with this program in softcopy format and this program directory; after which, keep the documents for your reference. Section 3.2, “Preventive Service Planning” on page 6 tells you how to find any updates to the information and procedures in this program directory.

z/OS Source Code Analysis is supplied in a Custom-Built Product Delivery Offering (CBPDO, 5751-CS3). The program directory that is provided in softcopy format on the CBPDO is identical to the hardcopy format if one was included with your order. All service and HOLDDATA for z/OS Source Code Analysis are included on the CBPDO.

Do not use this program directory if you install z/OS Source Code Analysis with a SystemPac or ServerPac. When you use one of those offerings, use the jobs and documentation supplied with the offering. The offering will point you to specific sections of this program directory as needed.

1.1 z/OS Source Code Analysis Description

Similar to functions available on the client that comes with the product, IBM z/OS Source Code Analysis provides code analysis tools. A benefit of doing code analysis on the host is that it can be integrated in your daily batch processing.

1.2 z/OS Source Code Analysis FMIDs

z/OS Source Code Analysis consists of the following FMIDs:

HAKGE20

2.0 Program Materials

An IBM program is identified by a program number.

z/OS Source Code Analysis is available as a component of multiple products. Depending on which product you acquired, different functions of z/OS Source Code Analysis will be enabled or disabled.

- IBM Developer for z/OS Enterprise Edition V14.2.0, program number 5655-AC5 (Shopz orderable)
- IBM Developer for z/OS V14.2.0, program number 5724-T07 (web download)
- IBM Z Open Unit Test V2.0.0, program number 5737-J31 (web download)

Basic Machine-Readable Materials are materials that are supplied under the base license and are required for the use of the product.

The program announcement material describes the features supported by z/OS Source Code Analysis. Ask your IBM representative for this information if you have not already received a copy.

2.1 Basic Machine-Readable Material

The distribution medium for this program is physical media or downloadable files. This program is in SMP/E RELFILE format and is installed by using SMP/E. See 6.0, “Installation Instructions” on page 16 for more information about how to install the program.

The rest of this section only applies when z/OS Source Code Analysis is ordered via Shopz. It does not apply when you downloaded it from the web.
Select this link to go to the next section: 2.2, “Program Publications” on page 4

You can find information about the physical media for the basic machine-readable materials for z/OS Source Code Analysis in the *CBPDO Memo To Users Extension*.

Figure 1 describes the program file content for z/OS Source Code Analysis. You can refer to the *CBPDO Memo To Users Extension* to see where the files reside on the image.

Notes:

1. The data set attributes in this table must be used in the JCL of jobs that read the data sets. However, because the data sets are in IEBCOPY unloaded format, their actual attributes might be different.
2. If any RELFILEs are identified as PDSEs, ensure that SMPTLIB data sets are allocated as PDSEs.

Figure 1. Program File Content

Name	ORG	RECFM	LRECL	BLK SIZE
SMPMCS	SEQ	FB	80	8800
IBM.HAKGE20.F1	PDSE	FB	80	8800
IBM.HAKGE20.F2	PDSE	FB	80	8800
IBM.HAKGE20.F3	PDSE	VB	8796	8800
IBM.HAKGE20.F4	PDSE	VB	8796	8800
IBM.HAKGE20.F5	PDSE	VB	8796	8800
IBM.HAKGE20.F6	PDSE	VB	8796	8800

2.2 Program Publications

The following sections identify the basic publications for z/OS Source Code Analysis.

Figure 2 identifies the basic unlicensed program publications for z/OS Source Code Analysis. Those that are in softcopy format publications can be obtained from the IBM Publications Center website at https://www-05.ibm.com/e-business/linkweb/publications/servlet/pbi.wss.

Figure 2 (Page 1 of 2). Basic Material: Unlicensed Publications

Publication Title	Form Number	Media Format
IBM Developer for z/OS Enterprise Edition		
Developer for z/OS Host Configuration Guide	SC27-9413	See note[1]
Developer for z/OS Host Configuration Reference	SC27-9414	See note[1]
IBM Developer for z/OS		
Developer for z/OS Host Configuration Guide	SC27-9413	See note[2]
Developer for z/OS Host Configuration Reference	SC27-9414	See note[2]
IBM Z Open Unit Test		
IBM Z Open Unit Test Host Configuration Guide	SC27-9413	See note[3]

Figure 2 (Page 2 of 2). Basic Material: Unlicensed Publications		
Publication Title	**Form Number**	**Media Format**
IBM Z Open Unit Test Host Configuration Reference	SC27-9414	See note[3]

Note:

1. These, and other, publications can be obtained from the IBM Developer for z/OS Enterprise Edition online library, https://www-01.ibm.com/support/docview.wss?uid=swg27048563.
2. These, and other, publications can be obtained from the IBM Developer for z/OS online library, https://www-01.ibm.com/support/docview.wss?uid=swg27048563.
3. These, and other, publications can be obtained from the IBM Z Open Unit Test online library, https://www-01.ibm.com/support/docview.wss?uid=ibm10787531.

Note: Requisite information can be obtained by creating a report for your product on https://www.ibm.com/software/reports/compatibility/clarity/index.html.

2.2.1 Optional Program Publications

No optional publications are provided for z/OS Source Code Analysis.

2.3 Program Source Materials

No program source materials or viewable program listings are provided for z/OS Source Code Analysis.

2.4 Publications Useful During Installation

You might want to use the publications listed in Figure 3 during the installation of z/OS Source Code Analysis.

Figure 3. Publications Useful During Installation		
Publication Title	**Form Number**	**Media Format**
IBM SMP/E for z/OS User's Guide	SA23-2277	See note[1]
IBM SMP/E for z/OS Commands	SA23-2275	See note[1]
IBM SMP/E for z/OS Reference	SA23-2276	See note[1]
IBM SMP/E for z/OS Messages, Codes, and Diagnosis	GA32-0883	See note[1]

Note:

1. https://www-05.ibm.com/e-business/linkweb/publications/servlet/pbi.wss

3.0 Program Support

This section describes the IBM support available for z/OS Source Code Analysis. The service number for z/OS Source Code Analysis is 0513891.

3.1 Program Services

Contact your IBM representative for specific information about available program services.

3.2 Preventive Service Planning

Before you install z/OS Source Code Analysis, make sure that you have reviewed the current Preventive Service Planning (PSP) information. Review the PSP Bucket for General Information, Installation Documentation, and the Cross Product Dependencies sections. For the Recommended Service section, instead of reviewing the PSP Bucket, it is recommended you use the IBM.PRODUCTINSTALL-REQUIREDSERVICE fix category in SMP/E to ensure you have all the recommended service installed. Use the **FIXCAT(IBM.PRODUCTINSTALL-REQUIREDSERVICE)** operand on the **APPLY CHECK**command. See 6.1.14, “Perform SMP/E APPLY” on page 25 for a sample APPLY command

If you obtained z/OS Source Code Analysis as part of a CBPDO, HOLDDATA is included.

If the CBPDO for z/OS Source Code Analysis is older than two weeks by the time you install the product materials, you can obtain the latest PSP Bucket information by going to the following website:

http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp

You can also use S/390 SoftwareXcel or contact the IBM Support Center to obtain the latest PSP Bucket information.

For program support, access the Software Support Website at http://wwww.ibm.com/support/.

PSP Buckets are identified by UPGRADEs, which specify product levels; and SUBSETs, which specify the FMIDs for a product level. The UPGRADE and SUBSET values for z/OS Source Code Analysis are included in Figure 4.

Figure 4. PSP Upgrade and Subset ID

UPGRADE	SUBSET	Description
AKGE20	HAKGE20	z/OS Source Code Analysis

3.3 Statement of Support Procedures

Report any problems which you feel might be an error in the product materials to your IBM Support Center. You may be asked to gather and submit additional diagnostics to assist the IBM Support Center in their analysis.

Figure 5 on page 7 identifies the component IDs (COMPID) for z/OS Source Code Analysis.

Figure 5. Component IDs

FMID	COMPID	Component Name	RETAIN Release
HAKGE20	5724T0733	z/OS Source Code Analysis	E20

4.0 Program and Service Level Information

This section identifies the program and relevant service levels of z/OS Source Code Analysis. The program level refers to the APAR fixes that have been incorporated into the program. The service level refers to the PTFs that have been incorporated into the program.

4.1 Program Level Information

All resolved APARs of previous releases of z/OS Source Code Analysis have been incorporated into z/OS Source Code Analysis.

4.2 Service Level Information

No PTFs against this release of z/OS Source Code Analysis have been incorporated into the product package.

Frequently check the z/OS Source Code Analysis PSP Bucket for HIPER and SPECIAL attention PTFs against all FMIDs that you must install. You can also receive the latest HOLDDATA, then add the **FIXCAT(IBM.PRODUCTINSTALL-REQUIREDSERVICE)** operand on your **APPLY CHECK** command. This will allow you to review the recommended and critical service that should be installed with your FMIDs.

5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating z/OS Source Code Analysis. The following terminology is used:

- *Driving system*: the system on which SMP/E is executed to install the program.

  The program might have specific operating system or product level requirements for using processes, such as binder or assembly utilities during the installation.

- *Target system*: the system on which the program is configured and run.

  The program might have specific product level requirements, such as needing access to the library of another product for link-edits. These requirements, either mandatory or optional, might directly affect the element during the installation or in its basic or enhanced operation.

In many cases, you can use a system as both a driving system and a target system. However, you can make a separate IPL-able clone of the running system to use as a target system. The clone must include copies of all system libraries that SMP/E updates, copies of the SMP/E CSI data sets that describe the system libraries, and your PARMLIB and PROCLIB.

Use separate driving and target systems in the following situations:

- When you install a new level of a product that is already installed, the new level of the product will replace the old one. By installing the new level onto a separate target system, you can test the new level and keep the old one in production at the same time.
- When you install a product that shares libraries or load modules with other products, the installation can disrupt the other products. By installing the product onto a separate target system, you can assess these impacts without disrupting your production system.

5.1 Driving System Requirements

This section describes the environment of the driving system required to install z/OS Source Code Analysis.

5.1.1 Machine Requirements

The driving system can run in any hardware environment that supports the required software.

5.1.2 Programming Requirements

Figure 6. Driving System Software Requirements

Program Number	Product Name	Minimum VRM	Minimum Service Level will satisfy these APARs	Included in the shipped product?
5650-ZOS	z/OS	V02.02.00	N/A	No

Note: The minimum z/OS level is either what is listed in the table, or the currently minimum supported OS level, whichever is the most recent.

Note: SMP/E is a requirement for Installation and is an element of z/OS but can also be ordered as a separate product, 5655-G44, minimally V03.06.00.

Note: Installation might require migration to new z/OS releases to be service supported. See https://www-01.ibm.com/software/support/lifecycle/index_z.html.

z/OS Source Code Analysis is installed into a file system, either HFS or zFS. Before installing z/OS Source Code Analysis, you must ensure that the target system file system data sets are available for processing on the driving system. OMVS must be active on the driving system and the target system file data sets must be mounted on the driving system.

If you plan to install z/OS Source Code Analysis in a zFS file system, this requires that zFS be active on the driving system. Information on activating and using zFS can be found in *z/OS Distributed File Service zSeries File System Administration*, SC24-5989.

5.2 Target System Requirements

This section describes the environment of the target system required to install and use z/OS Source Code Analysis.

z/OS Source Code Analysis installs in the z/OS (Z038) SREL.

5.2.1 Machine Requirements

The target system can run in any hardware environment that supports the required software.

5.2.2 Programming Requirements

5.2.2.1 Installation Requisites

Installation requisites identify products that are required and *must* be present on the system or products that are not required but *should* be present on the system for the successful installation of this product.

Mandatory installation requisites identify products that are required on the system for the successful installation of this product. These products are specified as PREs or REQs.

z/OS Source Code Analysis has no mandatory installation requisites.

Conditional installation requisites identify products that are *not* required for successful installation of this product but can resolve such things as certain warning messages at installation time. These products are specified as IF REQs.

z/OS Source Code Analysis has no conditional installation requisites.

5.2.2.2 Operational Requisites

Operational requisites are products that are required and *must* be present on the system or products that are not required but *should* be present on the system for this product to operate all or part of its functions.

Mandatory operational requisites identify products that are required for this product to operate its basic functions.

Figure 7. Target System Mandatory Operational Requisites

Program Number	**Product Name and Minimum VRM/Service Level**
5650-ZOS	z/OS V02.02.00 or later

Note: The minimum z/OS level is either what is listed in the table, or the currently minimum supported OS level, whichever is the most recent.

Conditional operational requisites identify products that are *not* required for this product to operate its basic functions but are required at run time for this product to operate specific functions. These products are specified as IF REQs.

z/OS Source Code Analysis has no conditional operational requisites.

5.2.2.3 Toleration/Coexistence Requisites

Toleration/coexistence requisites identify products that must be present on sharing systems. These systems can be other systems in a multisystem environment (not necessarily sysplex), a shared DASD environment (such as test and production), or systems that reuse the same DASD environment at different time intervals.

z/OS Source Code Analysis has no toleration/coexistence requisites.

5.2.2.4 Incompatibility (Negative) Requisites

Negative requisites identify products that must *not* be installed on the same system as this product.

z/OS Source Code Analysis has no negative requisites.

5.2.3 DASD Storage Requirements

z/OS Source Code Analysis libraries can reside on all supported DASD types.

Figure 8 lists the total space that is required for each type of library.

Figure 8. Total DASD Space Required by z/OS Source Code Analysis

Library Type	Total Space Required in 3390 Trks	Description
Target	35 Tracks	
Distribution	21480 Tracks	
File System(s)	43500 Tracks	
Web Download	74671 Tracks	This row only applies when z/OS Source Code Analysis is downloaded from the web. It does not apply when you ordered it via Shopz. These are temporary data sets, which can be removed after the SMP/E install.

Notes:

1. For non-RECFM U data sets, IBM recommends using system-determined block sizes for efficient DASD utilization. For RECFM U data sets, IBM recommends using a block size of 32760, which is most efficient from the performance and DASD utilization perspective.
2. Abbreviations used for data set types are shown as follows.

   U Unique data set, allocated by this product and used by only this product. This table provides all the required information to determine the correct storage for this data set. You do not need to refer to other tables or program directories for the data set size.

   S Shared data set, allocated by this product and used by this product and other products. To determine the correct storage needed for this data set, add the storage size given in this table to those given in other tables (perhaps in other program directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.

   E Existing shared data set, used by this product and other products. This data set is *not* allocated by this product. To determine the correct storage for this data set, add the storage size given in this table to those given in other tables (perhaps in other program directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.

If you currently have a previous release of this product installed in these libraries, the installation of this release will delete the old release and reclaim the space that was used by the old release and any service that had been installed. You can determine whether these libraries have enough space by deleting the old release with a dummy function, compressing the libraries, and comparing the space requirements with the free space in the libraries.

For more information about the names and sizes of the required data sets, see 6.1.10, “Allocate SMP/E Target and Distribution Libraries” on page 23.

3. Abbreviations used for the file system path type are as follows.

   N New path, created by this product.
   X Path created by this product, but might already exist from a previous release.
   P Previously existing path, created by another product.

4. All target and distribution libraries listed have the following attributes:

   - The default name of the data set can be changed.
   - The default block size of the data set can be changed.
   - The data set can be merged with another data set that has equivalent characteristics.
   - The data set can be either a PDS or a PDSE, with some exceptions. If the value in the "ORG" column specifies "PDS", the data set must be a PDS. If the value in "DIR Blks" column specifies "N/A", the data set must be a PDSE.

5. All target libraries listed have the following attributes:

   - These data sets can be SMS-managed, but they are not required to be SMS-managed.
   - These data sets are not required to reside on the IPL volume.
   - The values in the "Member Type" column are not necessarily the actual SMP/E element types that are identified in the SMPMCS.

6. All target libraries that are listed and contain load modules have the following attributes:

   - These data sets can not be in the LPA, with some exceptions. If the value in the "Member Type" column specifies "LPA", it is advised to place the data set in the LPA.
   - These data sets can be in the LNKLST.
   - These data sets are not required to be APF-authorized, with some exceptions. If the value in the "Member Type" column specifies "APF", the data set must be APF-authorized.

Figure 9. Storage Requirements for SMP/E Work Data Sets

Library DDNAME	TYPE	ORG	RECFM	LRECL	No. of 3390 Trks	No. of DIR Blks
SMPWRK6	S	PDS	FB	80	(300,3000)	10
SYSUT1	U	SEQ	--	--	(300,3000)	0

Figure 10. Storage Requirements for SMP/E Data Sets

Library DDNAME	TYPE	ORG	RECFM	LRECL	No. of 3390 Trks	No. of DIR Blks
SMPPTS	S	PDSE	FB	80	21450	10

The following figures describe the target and distribution libraries and file system paths required to install z/OS Source Code Analysis. The storage requirements of z/OS Source Code Analysis must be added to the storage required by other programs that have data in the same library or path.

Note: Use the data in these tables to determine which libraries can be merged into common data sets. In addition, since some ALIAS names may not be unique, ensure that no naming conflicts will be introduced before merging libraries.

Figure 11. Storage Requirements for z/OS Source Code Analysis Target Libraries

Library DDNAME	Member Type	Target Volume	TYPE	ORG	RECFM	LRECL	No. of 3390 Trks	No. of DIR Blks
SAKGPROC	REXX	ANY	U	PDSE	FB	80	20	5
SAKGSAMP	Samples	ANY	U	PDSE	FB	80	15	5

Figure 12. z/OS Source Code Analysis File System Paths

DDNAME	TYPE	Path Name
SAKGZFS	X	/usr/lpp/IBM/akg/IBM

Figure 13. Storage Requirements for z/OS Source Code Analysis Distribution Libraries

Library DDNAME	TYPE	ORG	RECFM	LRECL	No. of 3390 Trks	No. of DIR Blks
AAKGSAMP	U	PDSE	FB	80	30	10
AAKGZFS	U	PDSE	VB	8796	21450	21450

The rest of this section only applies when z/OS Source Code Analysis is downloaded from the web. It does not apply when you ordered it via Shopz.
Select this link to go to the next section: 5.3, "FMIDs Deleted"

The following figures list data sets that are not used by z/OS Source Code Analysis, but are required as input for SMP/E.

Figure 14. Storage Requirements for z/OS Source Code Analysis Web Download Data Sets

Data Set Name	TYPE	ORG	RECFM	LRECL	No. of 3390 Trks	No. of DIR Blks
hlq.IBM.HAKGE20.F1	U	PDSE	FB	80	8	N/A
hlq.IBM.HAKGE20.F2	U	PDSE	FB	80	19	N/A
hlq.IBM.HAKGE20.F3	U	PDSE	VB	8796	3935	N/A
hlq.IBM.HAKGE20.F4	U	PDSE	U	0	8062	N/A
hlq.IBM.HAKGE20.F5	U	PDSE	VB	256	8390	N/A
hlq.IBM.HAKGE20.F6	U	PDSE	VB	256	7905	N/A
hlq.IBM.HAKGE20.SMPMCS	U	SEQ	FB	80	2	N/A
z/OS UNIX file system	U	zFS	N/A	N/A	46350	N/A

Note: These are temporary data sets, which can be removed after the SMP/E install.

5.3 FMIDs Deleted

Installing z/OS Source Code Analysis might result in the deletion of other FMIDs. To see which FMIDs will be deleted, examine the ++VER statement in the SMPMCS of the product.

If you do not want to delete these FMIDs at this time, install z/OS Source Code Analysis into separate SMP/E target and distribution zones.

Note: These FMIDs are not automatically deleted from the Global Zone. If you want to delete these FMIDs from the Global Zone, use the SMP/E REJECT NOFMID DELETEFMID command. See the SMP/E Commands book for details.

5.4 Special Considerations

z/OS Source Code Analysis has no special considerations for the target system.

6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of z/OS Source Code Analysis.

Please note the following points:

- If you want to install z/OS Source Code Analysis into its own SMP/E environment, consult the SMP/E manuals for instructions on creating and initializing the SMPCSI and the SMP/E control data sets.
- You can use the sample jobs that are provided to perform part or all of the installation tasks. The SMP/E jobs assume that all DDDEF entries that are required for SMP/E execution have been defined in appropriate zones.
- You can use the SMP/E dialogs instead of the sample jobs to accomplish the SMP/E installation steps.

6.1 Installing z/OS Source Code Analysis

6.1.1 SMP/E Considerations for Installing z/OS Source Code Analysis

Use the SMP/E RECEIVE, APPLY, and ACCEPT commands to install this release of z/OS Source Code Analysis.

6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 15. Using values lower than the recommended values can result in failures in the installation. DSSPACE is a subentry in the GLOBAL options entry. PEMAX is a subentry of the GENERAL entry in the GLOBAL options entry. See the SMP/E manuals for instructions on updating the global zone.

Figure 15. SMP/E Options Subentry Values

Subentry	Value	Comment
DSSPACE	(1200,1200,1400)	Space allocation
PEMAX	SMP/E Default	IBM recommends using the SMP/E default for PEMAX.

6.1.3 Overview of the installation steps

Overview of steps required to install IBM z/OS Source Code Analysis.

1. Allocate file system to hold web download package
   (only applicable for web download, not Shopz orders)
2. Upload the web download package to the host
   (only applicable for web download, not Shopz orders)
3. Extract and expand the compressed SMPMCS and RELFILEs
   (only applicable for web download, not Shopz orders)

   Select this link to skip the web download specific steps: 6.1.7, “Sample Jobs” on page 21
4. Create SMP/E environment (optional)
5. Perform SMP/E RECEIVE
6. Allocate SMP/E target and distribution libraries
7. Allocate and mount z/OS UNIX file system (optional)
8. Allocate z/OS UNIX paths
9. Create DDDEF entries
10. Perform SMP/E APPLY
11. Perform SMP/E ACCEPT
12. Run REPORT CROSSZONE

6.1.4 Allocate file system to hold web download package

This section only applies when z/OS Source Code Analysis is downloaded from the web. It does not apply when it is ordered via Shopz.
Select this link to skip the web download specific steps: 6.1.7, “Sample Jobs” on page 21

The SMP/E input data sets to install IBM z/OS Source Code Analysis are provided as compressed files in HAKGE20.pax.Z, which must be uploaded to z/OS as a z/OS UNIX file. You can either create a new z/OS UNIX file system (zFS) or create a new directory in an existing file system to place HAKGE20.pax.Z.

You can use the following sample JCL to create a new file system, and directory, for the download package.

```
//FILESYS  JOB <job information>
//*
//* - Provide valid job card information
//* - Change:
//*   @zfs_path@
//*   ----+----1----+----2----+----3----+----4----+----5
//*              - To the absolute z/OS UNIX path for the download
//*                package (starting with /)
//*              - Maximum length is 50 characters
//*              - Do not include a trailing /
//*   @zfs_dsn@
//*              - To your file system data set name
//*
//* Your userid MUST be defined as a SUPERUSER to successfully
//* run this job
//*
//CREATE   EXEC PGM=IDCAMS,REGION=0M,COND=(0,LT)
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
  DEFINE CLUSTER ( -
         NAME(@zfs_dsn@) -
         TRK(46350 10) -
         LINEAR -
         SHAREOPTIONS(3) -
         )
//*
//         SET ZFSDSN='@zfs_dsn@'
//FORMAT   EXEC PGM=IOEAGFMT,REGION=0M,COND=(0,LT),
//            PARM='-aggregate &ZFSDSN -compat'
//*STEPLIB  DD DISP=SHR,DSN=IOE.SIOELMOD        before z/OS 1.13
//*STEPLIB  DD DISP=SHR,DSN=SYS1.SIEALNKE       from z/OS 1.13
//SYSPRINT DD SYSOUT=*
//*
//MOUNT    EXEC PGM=IKJEFT01,REGION=0M,COND=(0,LT)
//SYSEXEC  DD DISP=SHR,DSN=SYS1.SBPXEXEC
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
  PROFILE MSGID WTPMSG
  oshell umask 0022; +
    mkdir -p @zfs_path@
  MOUNT +
    FILESYSTEM('@zfs_dsn@') +
    MOUNTPOINT('@zfs_path@') +
    MODE(RDWR) TYPE(ZFS) PARM('AGGRGROW')
//*
```

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.5 Upload the web download package to the host

This section only applies when z/OS Source Code Analysis is downloaded from the web. It does not apply when it is ordered via Shopz.
Select this link to skip the web download specific steps: 6.1.7, “Sample Jobs” on page 21

Upload the HAKGE20.readme.txt file in text format and the HAKGE20.pax.Z file in binary format from your workstation to the z/OS UNIX file system.

In the following sample dialog, we use FTP from a Microsoft Windows command line to do the transfer. Commands or other information entered by the user are in bold, and the following values are assumed:

Figure 16. User Entered Values

User enters:	**Values**
mvsaddr	TCP/IP address or hostname of the z/OS system
tsouid	Your TSO user ID
tsopw	Your TSO password
d:	Location of the downloaded files
@zfs_path@	z/OS UNIX path where to store the files. This matches the @zfs_path@ variable you specified in the previous step.

```
C:\>ftp mvsaddr
Connected to mvsaddr.
220-FTPD1 IBM FTP CS %version% at mvsaddr, %time% on %date%.
220 Connection will close if idle for more than 5 minutes.
User (mvsaddr:(none)): tsouid
331 Send password please.
Password: tsopw
230 tsouid is logged on.  Working directory is "tsouid.".
ftp> cd @zfs_path@
250 HFS directory @zfs_path@ is the current working directory
ftp> ascii
200 Representation type is Ascii NonPrint
ftp> put d:\HAKGE20.readme.txt
200 Port request OK.
125 Storing data set @zfs_path@/HAKGE20.readme.txt
250 Transfer completed successfully.
ftp: 19521 bytes sent in 0.01 sec. (1366.67 Kb/s)
ftp> binary
200 Representation type is Image
ftp> put d:\HAKGE20.pax.Z
200 Port request OK.
125 Storing data set @zfs_path@/HAKGE20.pax.Z
250 Transfer completed successfully.
ftp: 1085317632 bytes sent in 1.26 sec. (1040.52 Kb/s)
```

```
ftp> quit
221 Quit command received. Goodbye.
```

6.1.6 Extract and expand the compressed SMPMCS and RELFILEs

This section only applies when z/OS Source Code Analysis is downloaded from the web. It does not apply when it is ordered via Shopz.
Select this link to skip the web download specific steps: 6.1.7, “Sample Jobs” on page 21

The HAKGE20.readme.txt file uploaded in the previous step holds a sample JCL to expand the compressed SMPMCS and RELFILEs from the uploaded HAKGE20.pax.Z file into data sets for use by the SMP/E RECEIVE job. The JCL is repeated here for your convenience.

- @zfs_path@ matches the variable you specified in the previous step.
- If the 'oshell' command gets a RC=256 and message "pax: checksum error on tape (got ee2e, expected 0)", then the archive file was not uploaded to the host in binary format.
- GIMUNZIP allocates data sets to match the definitions of the original data sets. You may encounter errors if your SMS ACS routines alter the attributes used by GIMUNZIP.
  If this occurs, specify a non-SMS managed volume for the GIMUNZIP allocation of the data sets. For example:
  <ARCHDEF archid="..."
  storclas="storage_class" volume="data_set_volume"
  newname="..."/>

```
//EXTRACT  JOB <job information>
//*
//*   - Provide valid job card information
//*   - Change:
//*       @PREFIX@
//*       ----+----1----+----2----+
//*                   - To your desired data set name prefix
//*                   - Maximum length is 25 characters
//*                   - This value is used for the names of the
//*                     data sets extracted from the download-package
//*       @zfs_path@
//*       ----+----1----+----2----+----3----+----4----+----5
//*                   - To the absolute z/OS UNIX path for the
//*                     download-package (starting with /)
//*                   - Maximum length is 50 characters
//*                   - Do not include a trailing /
//*
//UNPAX    EXEC PGM=IKJEFT01,REGION=0M,COND=(0,LT)
//SYSEXEC  DD DISP=SHR,DSN=SYS1.SBPXEXEC
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
```

```
  oshell cd @zfs_path@/ ; +
    pax -rvf HAKGE20.pax.Z
//*
//GIMUNZIP EXEC PGM=GIMUNZIP,REGION=0M,COND=(0,LT)
//*STEPLIB  DD DISP=SHR,DSN=SYS1.MIGLIB
//SYSUT3   DD UNIT=SYSALLDA,SPACE=(CYL,(50,10))
//SYSUT4   DD UNIT=SYSALLDA,SPACE=(CYL,(25,5))
//SMPOUT   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SMPDIR   DD PATHDISP=KEEP,
// PATH='@zfs_path@/'
//SYSIN    DD *
<GIMUNZIP>
<ARCHDEF archid="SMPMCS"
         newname="@PREFIX@.IBM.HAKGE20.SMPMCS"/>
<ARCHDEF archid="IBM.HAKGE20.F1"
         newname="@PREFIX@.IBM.HAKGE20.F1"/>
<ARCHDEF archid="IBM.HAKGE20.F2"
         newname="@PREFIX@.IBM.HAKGE20.F2"/>
<ARCHDEF archid="IBM.HAKGE20.F3"
         newname="@PREFIX@.IBM.HAKGE20.F3"/>
<ARCHDEF archid="IBM.HAKGE20.F4"
         newname="@PREFIX@.IBM.HAKGE20.F4"/>
<ARCHDEF archid="IBM.HAKGE20.F5"
         newname="@PREFIX@.IBM.HAKGE20.F5"/>
<ARCHDEF archid="IBM.HAKGE20.F6"
         newname="@PREFIX@.IBM.HAKGE20.F6"/>
</GIMUNZIP>
//*
```

6.1.7 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install z/OS Source Code Analysis:

Figure 17 (Page 1 of 2). Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
AKG1SMPE	SMP/E	Sample job to create an SMP/E environment (optional)	IBM.HAKGE20.F1
AKG2RCVE	RECEIVE	Sample SMP/E RECEIVE job	IBM.HAKGE20.F1
AKG3ALOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HAKGE20.F1
AKG4ZFS	ALLOMZFS	Sample job to allocate, create mountpoint, and mount zFS data sets	IBM.HAKGE20.F1

Figure 17 (Page 2 of 2). Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
AKG5MKD	MKDIR	Sample job to invoke the supplied AKGMKDIR EXEC to allocate file system paths	IBM.HAKGE20.F1
AKG6DDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HAKGE20.F1
AKG7APLY	APPLY	Sample SMP/E APPLY job	IBM.HAKGE20.F1
AKG8ACPT	ACCEPT	Sample SMP/E ACCEPT job	IBM.HAKGE20.F1

Note: When z/OS Source Code Analysis is downloaded from the web, the RELFILE data set name will be prefixed by your chosen high level qualifier, as documented in section 6.1.6, “Extract and expand the compressed SMPMCS and RELFILEs” on page 20.

The rest of this section only applies when z/OS Source Code Analysis is ordered via Shopz. It does not apply when you downloaded it from the web.
Select this link to go to the next section: 6.1.8, “Create SMP/E environment (optional)” on page 23

You can access the sample installation jobs by performing an SMP/E RECEIVE (refer to 6.1.9, “Perform SMP/E RECEIVE” on page 23) then copy the jobs from the RELFILES to a work data set for editing and submission. See Figure 17 on page 21 to find the appropriate relfile data set.

You can also copy the sample installation jobs from the product files by submitting the following job. Before you submit the job, add a job card and change the lowercase parameters to uppercase values to meet the requirements of your site.

```
//STEP1    EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//IN       DD DSN=IBM.HAKGE20.F1,
//            DISP=SHR,
//*           VOL=SER=filevol,
//            UNIT=SYSALLDA
//OUT      DD DSNAME=jcl-library-name,
//            DISP=(NEW,CATLG,DELETE),
//            SPACE=(TRK,(10,5,5)),
//*           VOL=SER=dasdvol,
//            UNIT=SYSALLDA
//SYSUT3   DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN    DD *
    COPY INDD=IN,OUTDD=OUT
/*
```

See the following information to update the statements in the previous sample:

IN:

filevol is the volume serial of the DASD device where the downloaded files reside.

OUT:

jcl-library-name is the name of the output data set where the sample jobs are stored.

dasdvol is the volume serial of the DASD device where the output data set resides. Uncomment the statment if a volume serial must be provided.

6.1.8 Create SMP/E environment (optional)

If you are using an existing CSI, do not run the sample job AKG1SMPE.

If you choose to create a new SMP/E environment for this install, a sample job is provided or you may choose to use your own JCL. If you choose to use the sample job provided, edit and submit AKG1SMPE. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.9 Perform SMP/E RECEIVE

If you have obtained z/OS Source Code Analysis as part of a CBPDO, use the RCVPDO job in the CBPDO RIMLIB data set to receive the z/OS Source Code Analysis FMIDs, service, and HOLDDATA that are included on the CBPDO package. For more information, see the documentation that is included in the CBPDO.

You can also choose to edit and submit sample job AKG2RCVE to perform the SMP/E RECEIVE for z/OS Source Code Analysis. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.10 Allocate SMP/E Target and Distribution Libraries

Edit and submit sample job AKG3ALOC to allocate the SMP/E target and distribution libraries for z/OS Source Code Analysis. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.11 Allocate, create and mount ZFS Files (Optional)

This job allocates, creates a mountpoint, and mounts zFS data sets.

If you plan to install z/OS Source Code Analysis into a new z/OS UNIX file system, you can edit and submit the optional AKG4ZFS job to perform the following tasks:

- Create the z/OS UNIX file system
- Create a mountpoint
- Mount the z/OS UNIX file system on the mountpoint

Consult the instructions in the sample job for more information.

The recommended z/OS UNIX file system type is *zFS*. The recommended mountpoint is */usr/lpp/IBM/akg*.

Before running the sample job to create the z/OS UNIX file system, you must ensure that OMVS is active on the driving system. zFS must be active on the driving system if you are installing z/OS Source Code Analysis into a file system that is zFS.

If you create a new file system for this product, consider updating the BPXPRMxx PARMLIB member to mount the new file system at IPL time. This action can be helpful if an IPL occurs before the installation is completed.

```
MOUNT FILESYSTEM('#dsn')
 MOUNTPOINT('/usr/lpp/IBM/akg')
 MODE(RDWR)         /* can be MODE(READ) */
 TYPE(ZFS) PARM('AGGRGROW') /* zFS, with extents */
```

See the following information to update the statements in the previous sample:

#dsn is the name of the data set holding the z/OS UNIX file system.
/usr/lpp/IBM/akg is the name of the mountpoint where the z/OS UNIX file system will be mounted.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.12 Allocate File System Paths

The target system HFS or zFS data set must be mounted on the driving system when running the sample AKG5MKD job since the job will create paths in the HFS or zFS.

Before running the sample job to create the paths in the file system, you must ensure that OMVS is active on the driving system and that the target system's HFS or zFS file system is mounted to the driving system. zFS must be active on the driving system if you are installing z/OS Source Code Analysis into a file system that is zFS.

If you plan to install z/OS Source Code Analysis into a new HFS or zFS file system, you must create the mountpoint and mount the new file system to the driving system for z/OS Source Code Analysis.

The recommended mountpoint is */usr/lpp/IBM/akg*.

Edit and submit sample job AKG5MKD to allocate the HFS or zFS paths for z/OS Source Code Analysis. Consult the instructions in the sample job for more information.

If you create a new file system for this product, consider updating the BPXPRMxx PARMLIB member to mount the new file system at IPL time. This action can be helpful if an IPL occurs before the installation is completed.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.13 Create DDDEF Entries

Edit and submit sample job AKG6DDEF to create DDDEF entries for the SMP/E target and distribution libraries for z/OS Source Code Analysis. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.14 Perform SMP/E APPLY

1. Ensure that you have the latest HOLDDATA; then edit and submit sample job AKG7APLY to perform an SMP/E APPLY CHECK for z/OS Source Code Analysis. Consult the instructions in the sample job for more information.

   The latest HOLDDATA is available through several different portals, including http://service.software.ibm.com/holdata/390holddata.html. The latest HOLDDATA may identify HIPER and FIXCAT APARs for the FMIDs you will be installing. An APPLY CHECK will help you determine if any HIPER or FIXCAT APARs are applicable to the FMIDs you are installing. If there are any applicable HIPER or FIXCAT APARs, the APPLY CHECK will also identify fixing PTFs that will resolve the APARs, if a fixing PTF is available.

   You should install the FMIDs regardless of the status of unresolved HIPER or FIXCAT APARs. However, do not deploy the software until the unresolved HIPER and FIXCAT APARs have been analyzed to determine their applicability. That is, before deploying the software either ensure fixing PTFs are applied to resolve all HIPER or FIXCAT APARs, or ensure the problems reported by all HIPER or FIXCAT APARs are not applicable to your environment.

   To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the PRE, ID, REQ, and IFREQ on the APPLY CHECK. The SMP/E root cause analysis identifies the cause only of *errors* and not of *warnings* (SMP/E treats bypassed PRE, ID, REQ, and IFREQ conditions as warnings, instead of errors).

   Here are sample APPLY commands:

   a. To ensure that all recommended and critical service is installed with the FMIDs, receive the latest HOLDDATA and use the APPLY CHECK command as follows

      ```
      APPLY S(fmid,fmid,...) CHECK
      FORFMID(fmid,fmid,...)
      SOURCEID(RSU*)
      FIXCAT(IBM.PRODUCTINSTALL-REQUIREDSERVICE)
      GROUPEXTEND .
      ```

      Some HIPER APARs might not have fixing PTFs available yet. You should analyze the symptom flags for the unresolved HIPER APARs to determine if the reported problem is applicable to your environment and if you should bypass the specific ERROR HOLDs in order to continue the installation of the FMIDs.

      This method requires more initial research, but can provide resolution for all HIPERs that have fixing PTFs available and are not in a PE chain. Unresolved PEs or HIPERs might still exist and require the use of BYPASS.

b. To install the FMIDs without regard for unresolved HIPER APARs, you can add the BYPASS(HOLDCLASS(HIPER)) operand to the APPLY CHECK command. This will allow you to install FMIDs even though one or more unresolved HIPER APARs exist. After the FMIDs are installed, use the SMP/E REPORT ERRSYSMODS command to identify unresolved HIPER APARs and any fixing PTFs.

```
APPLY S(fmid,fmid,...) CHECK
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
FIXCAT(IBM.PRODUCTINSTALL-REQUIREDSERVICE)
GROUPEXTEND
BYPASS(HOLDCLASS(HIPER)) .
 ..any other parameters documented in the program directory
```

This method is quicker, but requires subsequent review of the Exception SYSMOD report produced by the REPORT ERRSYSMODS command to investigate any unresolved HIPERs. If you have received the latest HOLDDATA, you can also choose to use the REPORT MISSINGFIX command and specify Fix Category IBM.PRODUCTINSTALL-REQUIREDSERVICE to investigate missing recommended service.

If you bypass HOLDs during the installation of the FMIDs because fixing PTFs are not yet available, you can be notified when the fixing PTFs are available by using the APAR Status Tracking (AST) function of ServiceLink or the APAR Tracking function of ResourceLink.

2. After you take actions that are indicated by the APPLY CHECK, remove the CHECK operand and run the job again to perform the APPLY.

   Note: The GROUPEXTEND operand indicates that SMP/E applies all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions.

   Expected Return Codes and Messages from APPLY CHECK: You will receive a return code of 0 if this job runs correctly.

   Expected Return Codes and Messages from APPLY: You will receive a return code of 0 if this job runs correctly.

6.1.15 Perform SMP/E ACCEPT

Edit and submit sample job AKG8ACPT to perform an SMP/E ACCEPT CHECK for z/OS Source Code Analysis. Consult the instructions in the sample job for more information.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the PRE, ID, REQ, and IFREQ on the ACCEPT CHECK. The SMP/E root cause analysis identifies the cause of *errors* but not *warnings* (SMP/E treats bypassed PRE, ID, REQ, and IFREQ conditions as warnings rather than errors).

Before you use SMP/E to load new distribution libraries, it is recommended that you set the ACCJCLIN indicator in the distribution zone. In this way, you can save the entries that are produced from JCLIN in the distribution zone whenever a SYSMOD that contains inline JCLIN is accepted. For more information about the ACCJCLIN indicator, see the description of inline JCLIN in the SMP/E Commands book for details.

After you take actions that are indicated by the ACCEPT CHECK, remove the CHECK operand and run the job again to perform the ACCEPT.

Note: The GROUPEXTEND operand indicates that SMP/E accepts all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions.

Expected Return Codes and Messages from ACCEPT CHECK: You will receive a return code of 0 if this job runs correctly.

If PTFs that contain replacement modules are accepted, SMP/E ACCEPT processing will link-edit or bind the modules into the distribution libraries. During this processing, the Linkage Editor or Binder might issue messages that indicate unresolved external references, which will result in a return code of 4 during the ACCEPT phase. You can ignore these messages, because the distribution libraries are not executable and the unresolved external references do not affect the executable system libraries.

Expected Return Codes and Messages from ACCEPT: You will receive a return code of 0 if this job runs correctly.

6.1.16 Run REPORT CROSSZONE

The SMP/E REPORT CROSSZONE command identifies requisites for products that are installed in separate zones. This command also creates APPLY and ACCEPT commands in the SMPPUNCH data set. You can use the APPLY and ACCEPT commands to install those cross-zone requisites that the SMP/E REPORT CROSSZONE command identifies.

After you install z/OS Source Code Analysis, it is recommended that you run REPORT CROSSZONE against the new or updated target and distribution zones. REPORT CROSSZONE requires a global zone with ZONEINDEX entries that describe all the target and distribution libraries to be reported on.

For more information about REPORT CROSSZONE, see the SMP/E manuals.

6.1.17 Cleaning Up Obsolete Data Sets, Paths, and DDDEFs

The web download data sets listed in Figure 14 on page 15 (section 5.2.3, “DASD Storage Requirements” on page 12) are temporary data sets. You can delete these data sets after you complete the SMP/E install.

The following file system paths, which were created and used by previous releases of this product, are no longer used in this release. You can delete these obsolete file system paths after you delete the previous release from your system.

- /usr/lpp/rdzutil/
- /usr/lpp/IBM/idzutil/

6.2 Activating z/OS Source Code Analysis

6.2.1 File System Execution

If you mount the file system in which you have installed z/OS Source Code Analysis in read-only mode during execution, then you do not have to take further actions to activate z/OS Source Code Analysis.

6.3 Product Customization

Depending one which product you acquired, one of the following publications contains the necessary information to customize and use z/OS Source Code Analysis.

- IBM Developer for z/OS Enterprise Edition:
  Developer for z/OS Host Configuration Guide (SC27-9413)
- IBM Developer for z/OS:
  Developer for z/OS Host Configuration Guide (SC27-9413)
- IBM Z Open Unit Test:
  IBM Z Open Unit Test Host Configuration Guide (SC27-9413)

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