



*Program Directory for  
HCL Z Asset Optimizer for z/OS*

V2.2

Program Number 18OP1159

FMID AHZA220

for use with z/OS

Document Date: August 2022

HCL ZAO V2R2-01

Before using this information and the product it supports, be sure to read the general information under 7.0, “Notices” on page 24.

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## 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 HCL Z Asset Optimizer. This publication refers to HCL Z Asset Optimizer as ZAO.

The Program Directory contains the following sections:

- 2.0, “Program Materials” identifies the basic and optional program materials and documentation for ZAO.
- 3.0, “Program Support” describes the HCL support available for ZAO.
- 4.0, “Program and Service Level Information” lists the APARs (program level) and PTFs (service level) that have been incorporated into ZAO.
- 5.0, “Installation Requirements and Considerations” identifies the resources and considerations that are required for installing and using ZAO.
- 6.0, “Installation Instructions” provides detailed installation instructions for ZAO. It also describes the procedures for activating the functions of ZAO or refers to appropriate publications.

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### 1.1 ZAO Description

ZAO is used to scan the DASD of a z/OS system or systems and determine the software products installed on those systems. It includes the ability to monitor the execution, and report on the usage, of software products.

ZAO provides answers to the following questions:

1. What software is installed?
2. Who is using the software?
3. What are the usage trends of the installed software?

There are many benefits of accurate answers to these questions, including:

- Reduced or eliminated license compliance exposure.
- Improved data center consolidation and configuration management.
- Improved value-based charge-back programs.
- Effective disaster recovery.
- Obsolete versions of software are discovered and the usage of these versions understood which may result in reduced vendor software expense.
- The usage trends of software and libraries can be charted.

Some of the benefits your organization can achieve using ZAO are relatively easy to obtain and have immediate short-term value. For example, as soon as software inventory and usage data is created you can start using the information to review license and maintenance fees which may then be eliminated. When coordinated with a comprehensive software asset management program, the use of data provided by ZAO will help provide continued savings year on year.

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## **1.2 ZAO FMID**

ZAO 2.2 consists of the following FMID:

AHZA220

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## 2.0 Program Materials

A HCL program is identified by a program number. The program number for ZAO is 18OP1159.

Basic Machine-Readable Materials are materials that are supplied under the base license and feature numbers, and are required for the use of the product. Optional Machine-Readable Materials are orderable under separate feature numbers, and are not required for the product to function.

The program announcement material describes the features supported by ZAO. Ask your HCL representative for this information if you have not already received a copy.

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### 2.1 Basic Machine-Readable Material

The distribution medium for this program is downloadable files. This program is in SMP/E RELFILE format and is installed by using SMP/E. See 6.0, "Installation Instructions" for more information about how to install the program.

Figure 1 describes the program file content for ZAO. You can refer to the README file to see where the files reside.

#### 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 (Page 1 of 2). Program File Content*

<b>Name</b>	<b>O R G</b>	<b>R E C F M</b>	<b>L R E C L</b>	<b>BLK SIZE</b>
SMPMCS	SEQ	FB	80	3120
HCL.AHZA220.F1	PDSE	U	0	6144
HCL.AHZA220.F2	PDSE	FB	80	8800
HCL.AHZA220.F3	PDSE	FB	80	8800
HCL.AHZA220.F4	PDSE	FB	80	8800
HCL.AHZA220.F5	PDSE	FB	80	8800
HCL.AHZA220.F6	PDSE	FB	1024	8192
HCL.AHZA220.F7	PDSE	VB	259	8800
HCL.AHZA220.F8	PDSE	VB	255	8800



Figure 1 (Page 2 of 2). Program File Content

Name	O R G	R E C F M	L R E C L	BLK SIZE
HCL.AHZA220.F9	PDSE	VB	255	8800

## 2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for ZAO.

## 2.3 Program Publications

The following sections identify the basic and optional publications for ZAO.

### 2.3.1 Basic Program Publications

Figure 2 identifies the basic unlicensed or licensed publications that are not available in hardcopy format, but are available through the internet or other media for ZAO.

Figure 2. Basic Material: Licensed Publications

Publication Title	Form Number	Media Format
ZAO Administration Guide and Reference	HCL ZAO V2R2-01	PDF



## 2.3.2 Optional Program Publications

No optional publications are provided for ZAO.

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## 2.4 Program Source Materials

No program source materials or viewable program listings are provided for ZAO.

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## 2.5 Publications Useful During Installation

You might want to use the publications listed in Figure 3 during the installation of ZAO.

<i>Figure 3. Publications Useful During Installation</i>	
<b>Publication Title</b>	<b>Form Number</b>
<i>IBM SMP/E for z/OS User's Guide</i>	SA23-2277
<i>IBM SMP/E for z/OS Commands</i>	SA23-2275
<i>IBM SMP/E for z/OS Reference</i>	SA23-2276
<i>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</i>	GA32-0883

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## **3.0 Program Support**

This section describes the HCL support available for ZAO.

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### **3.1 Program Services**

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

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### **3.2 Preventive Service Planning**

N/A.

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## 4.0 Program and Service Level Information

This section identifies the program and relevant service levels of ZAO. 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.

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## 5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating ZAO. 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.

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### 5.1 Driving System Requirements

This section describes the environment of the driving system required to install ZAO.

#### 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 4. Driving System Software Requirements

Program Number	Product Name	Minimum VRM	Minimum Service Level will satisfy these APARs	Included in the shipped product?
Any <b>one</b> of the following:				
5650-ZOS	z/OS	V2.3.0	N/A	No
5650-ZOS	z/OS	V2.4.0	N/A	No
5650-ZOS	z/OS	V2.5.0	N/A	No
5655-G44	IBM SMP/E for z/OS	V3.6.0	N/A	No

**Note:** Installation might require migration to new z/OS releases to be service supported. See <https://www.ibm.com/support/pages/lifecycle/search?q=5650-zos>.

## 5.2 Target System Requirements

This section describes the environment of the target system required to install and use ZAO 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.

ZAO 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.

ZAO 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.

ZAO has no mandatory operational requisites.

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.

Figure 5. Target System Conditional Operational Requisites		
Program Number	Product Name and Minimum VRM/Service Level	Function
Any <b>one</b> of the following:		
5650-DB2	Db2 for z/OS V12.1.0	
5770-AF4	IBM Db2 Utilities Suite for z/OS V12.1.0	
<b>OR</b>		
5770-AF3	Db2 for z/OS Value Unit Edition for z/OS V12.1.0	
5770-AF4	IBM Db2 Utilities Suite for z/OS V12.1.0	
<b>OR</b>		
5698-DB2	Db2 for z/OS V13.1.0	
5698-DUT	IBM Db2 Utilities Suite for z/OS V13.1.0	
<b>OR</b>		
5698-DBV	Db2 for z/OS Value Unit Edition for z/OS V13.1.0	
5698-DUT	IBM Db2 Utilities Suite for z/OS V13.1.0	

### 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.

ZAO 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.

ZAO has no negative requisites.

### 5.2.3 DASD Storage Requirements

ZAO libraries can reside on all supported DASD types.

Figure 6 lists the total space that is required for each type of library.

Figure 6. Total DASD Space Required by ZAO	
Library Type	Total Space Required in 3390 Trks
Target	2549
Distribution	2549

#### Notes:

1. For non-RECFM U data sets, HCL recommends using system-determined block sizes for efficient DASD utilization. For RECFM U data sets, HCL 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 6.1.7, "Allocate SMP/E Target and Distribution Libraries".

3. 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.

4. 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.

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

- These data sets can be in the LPA, but they are not required to be in the LPA.
- These data sets can be in the LNKLIST.
- These data sets are not required to be APF-authorized.

If your existing SMPLTS is a PDS, you must allocate a new PDSE and copy your SMPLTS into it; then change the SMPLTS DDDEF entry to indicate the new PDSE data set.

The following figures describe the target and distribution libraries required to install ZAO. The storage requirements of ZAO 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 7. Storage Requirements for ZAO Target Libraries*

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SHZAANL1	HTML Reports	ANY	U	PDSE	VB	255	60	n/a
SHZAANL2	Charting	ANY	U	PDSE	VB	255	15	n/a
SHZAEXEC	Rexx EXECs	ANY	U	PDSE	FB	80	20	n/a
SHZAGKB1	Data	ANY	U	PDSE	FB	1024	900	n/a
SHZAMJPN	MMS Message - Japan	ANY	U	PDSE	VB	259	2	n/a
SHZAMOD1	Load Library	ANY	U	PDSE	U	0	1500	n/a
SHZAPARM	Parameters	ANY	U	PDSE	FB	80	20	n/a
SHZAPROC	JCL Procedures	ANY	U	PDSE	FB	80	3	n/a
SHZASAMP	Samples	ANY	U	PDSE	FB	80	30	n/a

Figure 8. Storage Requirements for ZAO Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
AHZAANL1	U	PDSE	VB	255	60	n/a
AHZAANL2	U	PDSE	VB	255	15	n/a
AHZAEXEC	U	PDSE	FB	80	20	n/a
AHZAGKB1	U	PDSE	FB	1024	900	n/a
AHZAMJPN	U	PDSE	VB	259	2	n/a
AHZAMOD1	U	PDSE	U	0	1500	n/a
AHZAPARM	U	PDSE	FB	80	20	n/a
AHZAPROC	U	PDSE	FB	80	2	n/a
AHZASAMP	U	PDSE	FB	80	30	n/a

## 5.3 FMIDs Deleted

Installing ZAO 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 ZAO 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

ZAO uses the "Partitioned Data Set Extended" or PDSE format for all libraries. There are some operational differences between PDS and PDSE data sets. The PDS format may be shared by more than one z/OS system and no special precautions are necessary. However, the PDSE format may only be shared by z/OS systems which are part of a sysplex or which are connected using Global Resource Serialization or GRS complex. If z/OS systems share use of a PDSE data set outside of a sysplex or GRS environment, you may experience severe problems if the data set is updated. This is due to the fact that PDSE directory information is cached in storage, and when the data set is updated from one system the other system(s) have no knowledge of the update, and their cached directory information will be incorrect. You must take care not to share PDSE data sets between z/OS systems unless they are in a sysplex or are connected in a GRS complex.

Web browser can be any of:

- Firefox with JavaScript and cookies enabled
- Microsoft Edge with JavaScript and cookies enabled
- Google Chrome with JavaScript and cookies enabled

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## 6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of ZAO.

Please note the following points:

- If you want to install ZAO into its own SMP/E environment, consult the SMP/E manuals for instructions on creating and initializing the SMP/CSI 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.

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### 6.1 Installing ZAO

#### 6.1.1 SMP/E Considerations for Installing ZAO

Use the SMP/E RECEIVE, APPLY, and ACCEPT commands to install this release of ZAO.

#### 6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 9. 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.

<i>Figure 9. SMP/E Options Subentry Values</i>		
<b>Subentry</b>	<b>Value</b>	<b>Comment</b>
DSSPACE	300,50,100	Space allocation for SMPTLIB datasets
PEMAX	SMP/E Default	HCL recommends using the SMP/E default for PEMAX.

### 6.1.3 SMP/E CALLLIBS Processing

ZAO does not use CALLLIBS processing.

### 6.1.4 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install ZAO.

<i>Figure 10. Sample Installation Jobs</i>			
<b>Job Name</b>	<b>Job Type</b>	<b>Description</b>	<b>RELFILE</b>
HZASRECV	RECEIVE	Sample RECEIVE job	HCL.AHZA220.F2
HZASALOC	ALLOCATE	Sample job to allocate target and distribution libraries	HCL.AHZA220.F2
HZASDDEF	DDDEF	Sample job to define SMP/E DDDEFs	HCL.AHZA220.F2
HZASAPLY	APPLY	Sample APPLY job	HCL.AHZA220.F2
HZASACPT	ACCEPT	Sample ACCEPT job	HCL.AHZA220.F2

You can access the sample installation jobs by performing a SMP/E RECEIVE (refer to 6.1.6, “Perform SMP/E RECEIVE”) then copy the jobs from the RELFILES to a work data set for editing and submission. See Figure 10 to find the appropriate relfile data set.

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=*
//FILEIN     DD DSN=HCL. AHZA220. F2, UNIT=SYSALLDA, DISP=SHR,
//           VOL=SER=filevol
//OUT        DD DSNAME=jcl-library-name,
//           DISP=(NEW, CATLG, DELETE),
//           VOL=SER=dasdvol, UNIT=SYSALLDA,
//           SPACE=(TRK, (15, 5, 4))
//SYSUT3     DD UNIT=SYSALLDA, SPACE=(CYL, (1, 1))
//SYSIN      DD *
COPY INDD=FILEIN, OUTDD=OUT
        SELECT MEMBER=(HZASACPT, HZASALOC, HZASAPLY, HZASDDEF, HZASRECV)
/*
```

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

FILEIN:

**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 dataset resides.

## 6.1.5 Allocate SMP/E datasets

Before you start to run the SMP/E RECEIVE job HZASRECV, you need to allocate and initialize the SMP/E datasets.

## 6.1.6 Perform SMP/E RECEIVE

You can also choose to edit and submit sample job HZASRECV to perform the SMP/E RECEIVE for ZAO. 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.

## 6.1.7 Allocate SMP/E Target and Distribution Libraries

Edit and submit sample job HZASALOC to allocate the SMP/E target and distribution libraries for ZAO. 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.

## 6.1.8 Create DDDEF Entries

Edit and submit sample job HZASDDEF to create DDDEF entries for the SMP/E target and distribution libraries for ZAO. 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 APPLY

Edit and submit sample job HZASAPLY to perform an SMP/E APPLY CHECK for ZAO. Consult the instructions in the sample job for more information.

You should install the FMIDs regardless of the status of unresolved APARs. However, do not deploy the software until you have reviewed all available PTFs. Any PTF referred to as a GA PTF should be installed before the software is executed.

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). Use of BYPASS(HOLDSYS) *may* be required to install available PTFs that have associated action requirements or documentation changes.

**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.

After installing new function, you should perform two operations:

1. Create a backup of the updated data sets, including any SMP/E data sets affected, in case something happens to the data sets during the next phase.
2. Do some testing before putting the new function into production.



After you are satisfied that an applied SYSMOD has performed reliably in your target system, you can install it in your distribution libraries using the ACCEPT process.

Another good practice is to accept most SYSMODs, particularly FMIDs, before performing another APPLY process. This provides you the ability to use the RESTORE process of SMP/E and to support the scenario where SMP/E needs to create a new load module from the distribution libraries during the APPLY process.

### 6.1.10 Perform SMP/E ACCEPT

Edit and submit sample job HZASACPT to perform an SMP/E ACCEPT CHECK for ZAO. 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 only *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.

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## 6.2 Activating ZAO

To make ZAO fully operational after the SMP/E installation, post SMP/E work needs to be done.

The publication *ZAO Administration Guide and Reference, HCL ZAO V2R2-01* contains the necessary information to customize and use ZAO.

ZAO requires a valid current HCL Software Z license certificate to be available for inspection during execution. Consult *HCL\_License\_Certificate\_Readme.pdf* which is included in the installation package for more information.

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## 7.0 Notices

This information was developed for products and services offered in the US.

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