



**Program Directory for  
IBM Open Enterprise Foundation for z/OS**

1.1.0

Program Number 5655-OEF

FMIDs HAMN110

for Use with  
z/OS

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**Note**

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 22.

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## 1.0 Introduction

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

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 3 identifies the basic program materials and documentation for Open Enterprise Foundation for z/OS.
- 3.0, “Program Support” on page 5 describes the IBM support available for Open Enterprise Foundation for z/OS.
- 4.0, “Program and Service Level Information” on page 6 lists the APARs (program level) and PTFs (service level) that have been incorporated into Open Enterprise Foundation for z/OS.
- 5.0, “Installation Requirements and Considerations” on page 7 identifies the resources and considerations that are required for installing and using Open Enterprise Foundation for z/OS.
- 6.0, “Installation Instructions” on page 14 provides detailed installation instructions for Open Enterprise Foundation for z/OS. It also describes the procedures for activating the functions of Open Enterprise Foundation for z/OS, or refers to appropriate publications.

Before installing Open Enterprise Foundation for z/OS, 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; then keep them for future reference.

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

Do not use this program directory if you install Open Enterprise Foundation for z/OS 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.

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## 1.1 Open Enterprise Foundation for z/OS Description

### IBM Open Enterprise Foundation for z/OS

IBM Open Enterprise Foundation for z/OS provides a comprehensive suite of open-source UNIX-based development tools that are enabled to run natively on z/OS, designed to enhance the development and deployment experience on the z/OS platform. This integrated collection includes:

- **GNU Make:** Based on GNU Make 4.4.1, GNU Make automates the software build process, streamlining compilation and linking tasks, and minimizing errors. It offers dependency management capabilities, ensuring efficient rebuilding of files based on modifications. In addition, advanced features such as parallel builds and user-defined build rules, empower developers to customize the build process for optimal efficiency.
- **Git:** Based on Git 2.45, Git offers a robust version control system, enabling collaborative development and efficient code management. Developers can track changes, revert to previous versions, and merge code branches seamlessly.
- **GNU Bash:** Based on GNU Bash 5.2.21, GNU Bash provides a powerful command-line shell environment, allowing users to execute commands and automate tasks with scripting capabilities.
- **Curl:** Based on Curl 8.7.1, Curl enables efficient data transfers across diverse network protocols, facilitating seamless communication between applications and remote systems.
- **Less:** Based on Less-654, Less enhances the user experience for navigating and viewing text files. Less allows for efficient scrolling and searching within large text files.
- **Vim:** Based on Vim 9.1, Vim provides a highly configurable and versatile text editing environment. Vim offers powerful editing features and can be customized to meet individual developer preferences.
- **Ncurses:** Based on Ncurses 6.5, Ncurses enables the development of text-based user interfaces (TUIs), providing a programmatic interface for creating interactive applications within a terminal environment.
- **Perl:** Based on Perl 5.39, Perl integrates a renowned scripting language, known for its text processing capabilities and extensive module ecosystem. Perl offers powerful tools for data manipulation, text analysis, and system administration tasks.

By leveraging Open Enterprise Foundation for z/OS with its integrated open source tools, developers can modernize their development and deployment workflows. This enables developers to embrace the latest technologies, enhance productivity, and achieve higher performance on the z/OS platform.

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## 1.2 Open Enterprise Foundation for z/OS FMID

Open Enterprise Foundation for z/OS consists of the following FMID:

HAMN110

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## 2.0 Program Materials

An IBM program is identified by a program number. The program number for Open Enterprise Foundation for z/OS is 5655-OEF.

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 Open Enterprise Foundation for z/OS. Ask your IBM 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 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 14 for more information about how to install the program.

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

Figure 1 describes the program file content for Open Enterprise Foundation for z/OS. You can refer to the *CBPDO Memo To Users Extension* to see where the files reside on the tape.

#### 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*

<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	6400
IBM.HAMN110.F1	PDS	FB	80	6160
IBM.HAMN110.F2	PDS	VB	255	27998

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### 2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for Open Enterprise Foundation for z/OS.

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## 2.3 Program Publications

This section identifies the basic and optional publications for Open Enterprise Foundation for z/OS.

### 2.3.1 Optional Program Publications

No optional publications are provided for Open Enterprise Foundation for z/OS.

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## 2.4 Program Source Materials

No program source materials or viewable program listings are provided for Open Enterprise Foundation for z/OS.

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## 2.5 Publications Useful During Installation

You might want to use the publications listed in Figure 2 during the installation of Open Enterprise Foundation for z/OS.

<i>Figure 2. 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

**Note:** These publications can be found in IBM Documentation. Use a web browser with internet access to refer to: <https://www.ibm.com/docs/en/zos/2.5.0?topic=zos-smpe> for z/OS 2.5, or <https://www.ibm.com/docs/en/zos/3.1.0?topic=zos-smpe> for z/OS 3.1



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## 3.0 Program Support

This section describes the IBM support available for Open Enterprise Foundation for z/OS.

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### 3.1 Program Services

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

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### 3.2 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 3 lists the component IDs (COMPID) for Open Enterprise Foundation for z/OS.

<i>Figure 3. Component IDs</i>			
<b>FMID</b>	<b>COMPID</b>	<b>Component Name</b>	<b>RETAIN Release</b>
HAMN110	5655OEF00	IBM Open Enterprise Foundation for z/OS	110

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## 4.0 Program and Service Level Information

This section identifies the program and relevant service levels of Open Enterprise Foundation for z/OS. 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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### 4.1 Program Level Information

The following APAR fixes against previous releases of Open Enterprise Foundation for z/OS have been incorporated into this release. They are listed by FMID:

- (N/A - this is the first release of this product)

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### 4.2 Service Level Information

No PTFs against this release of Open Enterprise Foundation for z/OS have been incorporated into the product package.

You can also receive the latest HOLDDATA, and then add the **FIXCAT(IBM.PRODUCTINSTALL-REQUIRESERVICE)** operand on your APPLY CHECK command. This will allow you to review the recommended and critical service that should be installed with your FMIDs.

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## 5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating Open Enterprise Foundation for z/OS. 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 Open Enterprise Foundation for z/OS.

#### 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?
5650-ZOS	z/OS	2.5.0	N/A	No
5655-ZOS	z/OS	3.1.0 or later	N/A	No

**Note:** SMP/E is a requirement for Installation and is an element of z/OS.

**Note:** Installation might require migration to later z/OS releases to be service supported. See <https://www.ibm.com/support/lifecycle/>

Open Enterprise Foundation for z/OS is installed into a file system, either HFS or zFS. Before installing Open Enterprise Foundation for z/OS, 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 Open Enterprise Foundation for z/OS in a zFS file system, this procedure/process 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.

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## 5.2 Target System Requirements

This section describes the environment of the target system required to install and use Open Enterprise Foundation for z/OS.

Open Enterprise Foundation for z/OS installs in the z/OS (Z038) SREL.

### 5.2.1 Machine Requirements

Open Enterprise Foundation for z/OS 1.1.0 will run on the following IBM Z servers:

- IBM z16™ (all models)
- IBM z15® (all models)
- IBM z14® (all models)
- IBM z13® (all models)

### 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.

*Figure 5. Target System Mandatory Installation Requisites*

Program Number	Product Name	Minimum VRM	Minimum Service Level will satisfy these APARs	Included in the shipped product?
5650-ZOS	z/OS	2.5.0	N/A	No
5655-ZOS	z/OS	3.1.0 or later	N/A	No

**Note:** Installation might require migration to new z/OS releases to be service supported. See [http://www.ibm.com/systems/z/os/zos/support/zos\\_eos\\_dates.html](http://www.ibm.com/systems/z/os/zos/support/zos_eos_dates.html).

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.

Open Enterprise Foundation for z/OS 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 6. Target System Mandatory Operational Requisites*

Program Number	Product Name and Minimum VRM/Service Level	Function
5650-ZOS	z/OS 2.5.0	
5650-ZOS	z/OS UNIX System Service for z/OS 2.5.0	
5655-ZOS	z/OS 3.1.0 or later	
5655-ZOS	z/OS UNIX System Service for z/OS 3.1.0 or later	

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.

There are no conditional operational requisites for this product.

**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.

Open Enterprise Foundation for z/OS has no toleration or 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.

Open Enterprise Foundation for z/OS has no negative requisites.

### 5.2.3 DASD Storage Requirements

Open Enterprise Foundation for z/OS libraries can reside on all supported DASD types.

Figure 7 lists the total space that is required for each type of library.

Library Type	Total Space Required in 3390 Trks
Target	15
Distribution	5300
File System(s)	7800

#### 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 6.1.7, “Allocate SMP/E Target and Distribution Libraries” on page 17.

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.

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 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.
- Open Enterprise Foundation for z/OS requires that the SMPLTS data set must be a PDSE. If your existing SMPLTS is a PDS, you will need to allocate a new PDSE and copy your existing SMPLTS into it and then change the SMPLTS DDDEF entry to indicate the new PDSE data set.

7. The total space required listed in Figure 7 on page 10 for File System is accounted sufficiently for Open Enterprise Foundation for z/OS at base release. On the other hand, due to the natural growth in size for Open Enterprise Foundation for z/OS during PTFs to avoid encountering insufficient space quota problems, it is advised to allocate File Systems that can be auto-extended.

The following figures describe the target and distribution libraries and file system paths required to install Open Enterprise Foundation for z/OS. The storage requirements of Open Enterprise Foundation for z/OS 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 8. Storage Requirements for Open Enterprise Foundation for z/OS 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
SFOZJCL	SAMP	ANY	U	PDS	FB	80	6	3

*Figure 9. Open Enterprise Foundation for z/OS File System Paths*

DDNAME	T Y P E	Path Name
SFOZH10	N	/usr/lpp/IBM/foz/v1r1/IBM

*Figure 10. Storage Requirements for Open Enterprise Foundation for z/OS 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
AFOZSR1	U	PDS	FB	80	15	5
AFOZSR2	U	PDS	VB	255	5250	50

### 5.3 FMIDs Deleted

Installing Open Enterprise Foundation for z/OS 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 Open Enterprise Foundation for z/OS 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.



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## 5.4 Special Considerations

There are no special considerations for this product.

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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 Open Enterprise Foundation for z/OS.

Notes:

- 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 Open Enterprise Foundation for z/OS

#### 6.1.1 SMP/E Considerations for Installing Open Enterprise Foundation for z/OS

Use the SMP/E RECEIVE, APPLY, and ACCEPT commands to install this release of Open Enterprise Foundation for z/OS.

Note: The default High Level Qualifier prefix used in the install JCL for SMP/E datasets, distribution libraries, and target libraries is CBC.HAMN110, change this if you have chosen a different SMPPRFX, DSTPRFX, or TGTPRFX respectively. The recommended default high level directory name for zFS path is root "/", update #PathPrefix in the respective install JCL sample respectively or change this if you have chosen a different directory path. If a non-default prefix is chosen for the #PathPrefix for zFS directory, make sure to prepend the paths in the IVT steps in 6.1.12 with the chosen #PathPrefix

#### 6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 11. 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 11. SMP/E Options Subentry Values*

Subentry	Value	Comment
DSSPACE	(4500,500,500)	3390 DASD tracks
PEMAX	SMP/E Default	IBM suggests using the SMP/E default for PEMAX.

### 6.1.3 SMP/E CALLLIBS Processing

Open Enterprise Foundation for z/OS uses the CALLLIBS function provided in SMP/E to resolve external references during installation.

### 6.1.4 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install Open Enterprise Foundation for z/OS:

<i>Figure 12. Sample Installation Jobs</i>			
Job Name	Job Type	Description	RELFILE
FOZWSMPE	SMP/E	Sample job to define and prime a new SMP/E CSI <b>(Optional)</b>	IBM.HAMN110.F1
FOZWRECV	RECEIVE	Sample RECEIVE job	IBM.HAMN110.F1
FOZWALOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HAMN110.F1
FOZWZFS	ALLOMZFS	Sample job to allocate, create mountpoint, & mount zFS data sets <b>(Optional)</b>	IBM.HAMN110.F1
FOZISMKD	MKDIR	Sample job to invoke the supplied FOZMKDIR EXEC to allocate file system paths	IBM.HAMN110.F1
FOZWDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HAMN110.F1
FOZWAPLY	APPLY	Sample APPLY job	IBM.HAMN110.F1
FOZWACPT	ACCEPT	Sample ACCEPT job	IBM.HAMN110.F1

You can access the sample installation jobs by performing an SMP/E RECEIVE (refer to 6.1.6, “Perform SMP/E RECEIVE” on page 17) then copy the jobs from the RELFILES to a work data set for editing and submission. See Figure 12 to find the appropriate relfile data set.

You can also copy the sample installation jobs from the tape or product files by submitting the following job. Depending on your distribution medium, use either the //TAPEIN or the //FILEIN DD statement and comment out or delete the other statement. 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=*
//*****
/* Make the //TAPEIN DD statement below active if you install*
/* from a CBPDO tape by uncommenting the DD statement below. *
//*****
/*TAPEIN DD DSN=IBM.HAMN110.F1,UNIT=tunit,
/* VOL=SER=volser,LABEL=(x,SL),
/* DISP=(OLD,KEEP)
```

```

/*****
/* Make the //TAPEIN DD statement below active if you install*
/* from a product tape received outside the CBPDO process *
/* (using the optional SMP/E RECEIVE job) by uncommenting *
/* the DD statement below. *
/*****
/*TAPEIN DD DSN=IBM.HAMN110.F1,UNIT=tunit,
/* VOL=SER=AMN110,LABEL=(2,SL),
/* DISP=(OLD,KEEP)
/*****
/* Make the //FILEIN DD statement below active for *
/* downloaded DASD files. *
/*****
/*FILEIN DD DSN=IBM.HAMN110.F1,UNIT=SYSALLDA,DISP=SHR,
/* VOL=SER=filevol
//OUT DD DSNAME=jcl-library-name,
// DISP=(NEW,CATLG,DELETE),
// VOL=SER=dasdvol,UNIT=SYSALLDA,
// SPACE=(TRK,(20,10,5))
//SYSUT3 DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN DD *
COPY INDD=xxxxIN,OUTDD=OUT
SELECT MEMBER=(FOZISMKD,FOZWACPT,FOZWALOC,FOZWAPLY)
SELECT MEMBER=(FOZWDEF)
SELECT MEMBER=(FOZWRECV,FOZWSMPE,FOZWZFS)
/*

```

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

**TAPEIN:**

- tunit** is the unit value that matches the product package.
- volser** is the volume serial that matches the product package.
- x** is the tape file number that indicates the location of the data set name on the tape.
- See the documentation that is provided by CBPDO for the location of IBM.HAMN110.F1 on the tape.

**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 data set resides.

**SYSIN:**

- xxxxIN** is either TAPEIN or FILEIN depending on your input DD statement.

## 6.1.5 Allocate and Initialize the SMP/E CSI (Optional)

If you are using an existing CSI do not execute this job.

If you install into existing SMP/E data sets, make sure that you have enough space.

If you plan to install into an existing zone, the cluster should already have been allocated and primed. You can go on to the next step to perform a SMP/E RECEIVE.

To install into a new zone, use the FOZWSMPE sample job to allocate and prime the SMPCSI cluster. 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.

## 6.1.6 Perform SMP/E RECEIVE

If you have obtained Open Enterprise Foundation for z/OS as part of a CBPDO, use the RCVPDO job in the CBPDO RIMLIB data set to receive the Open Enterprise Foundation for z/OS 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 FOZWRECV to perform the SMP/E RECEIVE for Open Enterprise Foundation for z/OS. Consult the instructions in the sample job for more information.

Note: By default the RECEIVE job will look for the relfiles under IBM.HAMN110.\* If instead they are stored under #relhlq.IBM.HAMN110.\*, RFPREFIX(#relhlq) will need to be added to the RECEIVE job. For example: RECEIVE S( HAMN110 ) RFPREFIX(#relhlq) SYSMODS LIST.

**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 FOZWALOC to allocate the SMP/E target and distribution libraries for Open Enterprise Foundation for z/OS. 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 Allocate, create and mount zFS Files (Optional)

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

If you plan to install Open Enterprise Foundation for z/OS into a new z/OS UNIX file system, you can edit and submit the optional FOZWZFS job to perform the following tasks:

- Create the z/OS UNIX file system

- Create a mount point
- 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 mount point is */usr/lpp/IBM/foz/v1r1*.

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 Open Enterprise Foundation for z/OS 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/foz/v1r1')
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/foz/v1r1** is the name of the mount point 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.

## 6.1.9 Allocate File System Paths

The target system HFS or zFS data set must be mounted on the driving system when running the sample FOZISMKD 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 Open Enterprise Foundation for z/OS into a file system that is zFS.

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

The recommended mountpoint is */usr/lpp/IBM/foz/v1r1*.

Edit and submit sample job FOZISMKD to allocate the HFS or zFS paths for Open Enterprise Foundation for z/OS. 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.

## 6.1.10 Create DDDEF Entries

Edit and submit sample job FOZWDDEF to create DDDEF entries for the SMP/E target and distribution libraries for Open Enterprise Foundation for z/OS. 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 Perform SMP/E APPLY

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

The latest HOLDDATA is available through several different portals, including <https://www.ibm.com/support/pages/enhanced-holddata-zos>. 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),HOLDFIXCAT) .
..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.

## 6.1.12 Run the Installation Verification Programs

Change to the install directory of IBM Open Enterprise Foundation for z/OS, source the environment file *.env*, then execute the install test script *install\_test.sh*. For example:



```
cd /usr/lpp/IBM/foz/v1r1
. ./env
./install_test.sh
```

Note: please change the path /usr/lpp/IBM/foz/v1r1 to the correct filesystem mountpoint if it's changed from the recommended mountpoint.

**Expected Return Codes and Messages:** Return code will be 0 if this IVP runs correctly.

### 6.1.13 Perform SMP/E ACCEPT

Edit and submit sample job FOZWACPT to perform an SMP/E ACCEPT CHECK for Open Enterprise Foundation for z/OS. 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.

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## 7.0 Notices

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APAR numbers are provided in this document to assist in locating PTFs that may be required. Ongoing problem reporting may result in additional APARs being created. Therefore, the APAR lists in this document may not be complete. To obtain current service recommendations and to identify current product service requirements, always contact the IBM Customer Support Center.

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## Reader's Comments

### Program Directory for IBM Open Enterprise Foundation for z/OS, May, 2024

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