IBM

Program Directory for

IBM Enterprise COBOL for z/OS

V06.03.00

Program Number 5655-EC6

FMIDs HADB630, JADB631, JADB632, JADB63H

for Use with
z/OS

Document Date: September 2019

GI13-4526-02

> **Note**
>
> Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 27.

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 Enterprise COBOL for z/OS. This publication refers to IBM Enterprise COBOL for z/OS as Enterprise COBOL.

The Program Directory contains the following sections:

- 2.0, "Program Materials" on page 3 identifies the basic program materials and documentation for Enterprise COBOL.

- 3.0, "Program Support" on page 6 describes the IBM support available for Enterprise COBOL.

- 4.0, "Program and Service Level Information" on page 8 lists the APARs (program level) and PTFs (service level) that have been incorporated into Enterprise COBOL.

- 5.0, "Installation Requirements and Considerations" on page 10 identifies the resources and considerations that are required for installing and using Enterprise COBOL.

- 6.0, "Installation Instructions" on page 18 provides detailed installation instructions for Enterprise COBOL. It also describes the procedures for activating the functions of Enterprise COBOL, or refers to appropriate publications.

Before installing Enterprise COBOL, 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. 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.

Enterprise COBOL 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 Enterprise COBOL are included on the CBPDO tape.

Do not use this program directory if you install Enterprise COBOL 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 Enterprise COBOL Description

IBM Enterprise COBOL for z/OS is a leading-edge, z/OS-based compiler that helps you create and maintain mission-critical, line-of-business COBOL applications to execute on your z/OS systems. The applications that are created by using Enterprise COBOL for z/OS can interoperate with IBM CICS, IBM Db2, IBM IMS, and other transactional and data systems.

Version 6.3 features

Enterprise COBOL for z/OS, V6.3 introduces the following new and improved features:

- Compiler and runtime support for the IBM z15 hardware and IBM z/OS V2.4 operating system so that applications can take advantage of the latest IBM Z architecture and operating system features and capabilities.

- Improved processing of UTF-8 data by supporting the UTF-8 data type. This enhancement improves efficiency for native language support.

- Support for creating 64-bit (AMODE 64) batch applications. 64-bit (AMODE 64) support in this compiler enables users to process large data tables that require greater than 2 GB of addressing space.

- From the COBOL 2002/2014 programming standards, addition of Dynamic Length elementary items.

- From the COBOL 2002/2014 programming standards, support for the FUNCTION keyword specifier in the REPOSITORY section to make the use of the keyword FUNCTION optional.

- The default ARCH changed to ARCH(8) (IBM System z10 BC) and removed support for ARCH(7) (IBM System z9 BC).

- Expanded signature information area for additional option byte definitions.

- Compiler listing enhancements for 64-bit and COBOL terminology.

- Predefined compilation variables available with IGY-prefixes to keep all variables in the IGY-xxxx namespace.

1.2 Enterprise COBOL FMIDs

Enterprise COBOL consists of the following FMIDs:

HADB630
JADB631
JADB632
JADB63H

2.0 Program Materials

An IBM program is identified by a program number. The program number for Enterprise COBOL is 5655-EC6.

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 Enterprise COBOL. 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 18 for more information about how to install the program.

You can find information about the physical media for the basic machine-readable materials for Enterprise COBOL in the *CBPDO Memo To Users Extension*.

Figure 1 describes the program file content for Enterprise COBOL. 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 (Page 1 of 2). Program File Content				
Name	**O R G**	**R E C F M**	**L R E C L**	**BLK SIZE**
SMPMCS	SEQ	FB	80	6400
IBM.HADB630.F1	PDS	FB	80	8800
IBM.HADB630.F2	PDSE	U	0	6144
IBM.HADB630.F3	PDS	FB	80	8800
IBM.JADB631.F1	PDSE	U	0	6144
IBM.JADB631.F2	PDS	FB	80	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**
IBM.JADB632.F1	PDSE	U	0	6144
IBM.JADB63H.F1	PDS	VB	255	27998

2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for Enterprise COBOL.

2.3 Program Publications

The following sections identify the basic publications for Enterprise COBOL.

Figure 2 identifies the basic unlicensed publications for Enterprise COBOL. Those that are in softcopy format publications can be obtained from the IBM Publications Center website at: http://www.ibm.com/shop/publications/order

Figure 2. Basic Material: Unlicensed		
Publication Title	**Form Number**	**Media Format**
IBM Enterprise COBOL for z/OS License Information	GI13-4532-02	http://www.ibm.com/software/sla/sladb.nsf
IBM Enterprise COBOL for z/OS Customization Guide	SC27-8712-02	http://www.ibm.com/support/docview.wss?uid=swg27036733
IBM Enterprise COBOL for z/OS Language Reference	SC27-8713-02	http://www.ibm.com/support/docview.wss?uid=swg27036733
IBM Enterprise COBOL for z/OS Programming Guide	SC27-8714-02	http://www.ibm.com/support/docview.wss?uid=swg27036733
IBM Enterprise COBOL for z/OS Migration Guide	GC27-8715-02	http://www.ibm.com/support/docview.wss?uid=swg27036733
IBM Enterprise COBOL for z/OS Performance Tuning Guide	SC27-9202-01	http://www.ibm.com/support/docview.wss?uid=swg27036733
IBM Enterprise COBOL for z/OS Messages and Codes	SC27-4648-01	http://www.ibm.com/support/docview.wss?uid=swg27036733

2.3.1 Optional Program Publications

No optional publications are provided for Enterprise COBOL.

2.4 Program Source Materials

No program source materials or viewable program listings are provided for Enterprise COBOL.

2.5 Publications Useful During Installation

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

Figure 3. Publications Useful During Installation		
Publication Title	**Form Number**	**Media Format**
IBM SMP/E for z/OS User's Guide	SA23-2277-02	http://www.ibm.com/shop/publications/order
IBM SMP/E for z/OS Commands	SA23-2275-05	http://www.ibm.com/shop/publications/order
IBM SMP/E for z/OS Reference	SA23-2276-02	http://www.ibm.com/shop/publications/order
IBM SMP/E for z/OS Messages, Codes, and Diagnosis	GA32-0883-04	http://www.ibm.com/shop/publications/order

3.0 Program Support

This section describes the IBM support available for Enterprise COBOL.

3.1 Program Services

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

3.2 Preventive Service Planning

Before you install Enterprise COBOL, 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 6.1.12, "Perform SMP/E APPLY" on page 23 for a sample APPLY command.

If you obtained Enterprise COBOL as part of a CBPDO, HOLDDATA is included.

If the CBPDO for Enterprise COBOL 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 https://www.ibm.com/mysupport/s/.

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 Enterprise COBOL are included in Figure 4.

Figure 4. PSP Upgrade and Subset ID		
UPGRADE	**SUBSET**	**Description**
COBOLZOS630	HADB630	Enterprise COBOL Base
	JADB631	Enterprise COBOL US English
	JADB632	Enterprise COBOL Japanese
	JADB63H	Enterprise COBOL HFS

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 Enterprise COBOL.

Figure 5. Component IDs			
FMID	**COMPID**	**Component Name**	**RETAIN Release**
HADB630	5655EC600	Enterprise COBOL Base	630
JADB631	5655EC600	Enterprise COBOL US English	631
JADB632	5655EC600	Enterprise COBOL Japanese	632
JADB63H	5655EC600	Enterprise COBOL HFS	63H

4.0 Program and Service Level Information

This section identifies the program and relevant service levels of Enterprise COBOL. 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

The following APAR fixes against Enterprise COBOL V06.02.00 have been incorporated into this release. They are listed by FMID.

- FMID HADB620

PH00018	PH04494	PH09309	PI90571	PI95036
PH00445	PH04497	PH09338	PI90572	PI95039
PH00449	PH04555	PH09458	PI90573	PI95043
PH00612	PH04639	PH09478	PI90574	PI95049
PH00613	PH04745	PH09479	PI90575	PI95052
PH00614	PH04770	PH09545	PI90576	PI95081
PH00615	PH04952	PH09682	PI90577	PI95085
PH00616	PH04953	PH11077	PI90578	PI95086
PH00617	PH04954	PH11355	PI90579	PI95087
PH00618	PH04956	PH11470	PI90580	PI95090
PH00619	PH05465	PH11634	PI90581	PI95091
PH00867	PH05510	PH11667	PI90582	PI95092
PH01731	PH05608	PH11946	PI90583	PI95093
PH02183	PH05855	PH11947	PI90655	PI95094
PH02251	PH05915	PH11948	PI90665	PI95934
PH02336	PH06076	PH12114	PI90712	PI96051
PH02353	PH06193	PH13365	PI91584	PI96135
PH02355	PH06255	PH13381	PI91585	PI97160
PH02398	PH06961	PH13886	PI91586	PI97289
PH02464	PH07068	PH14172	PI91587	PI97434
PH02465	PH07208	PH14218	PI91589	PI97481
PH02466	PH07210	PI87571	PI92503	PI97620
PH02935	PH07224	PI89560	PI92504	PI97621
PH03038	PH07322	PI90428	PI92505	PI97623
PH03435	PH08378	PI90560	PI93438	PI97624
PH03733	PH08436	PI90561	PI93648	PI97625
PH04028	PH08541	PI90562	PI93945	PI97626
PH04271	PH08642	PI90564	PI94451	PI97627
PH04369	PH08709	PI90566	PI94669	PI97628
PH04482	PH08994	PI90568	PI95028	PI97629
PH04485	PH09225	PI90570	PI95035	PI97632

| PI97685 | PI98509 | PI98516 | PI99351 | PI99703 |
| PI98480 | PI98514 | PI99191 | | PI99718 |

4.2 Service Level Information

No PTFs against this release of Enterprise COBOL have been incorporated into the product package.

Frequently check the Enterprise COBOL 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.TargetSystem-RequiredService.Enterprise-COBOL.V5R1,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V5R2,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R1,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R2,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R3).
```

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 Enterprise COBOL. 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 Enterprise COBOL.

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 or higher	N/A	No

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 http://www.ibm.com/systems/z/os/zos/support/zos_eos_dates.html.

If you plan on installing the Japanese FMID JADB632 then ensure you have codepage 939 which is the Latin-based Japanese codepage that displays both upper and lower case characters correctly. Mixed case character usage is required for the sample IGYWDDEF, IGYWZFS, and IGYISMKD jobs; therefore, codepage 939 is required to run these jobs from the driving system.

Enterprise COBOL is installed into a file system, either HFS or zFS. Before installing Enterprise COBOL, 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 Enterprise COBOL 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 Enterprise COBOL.

Enterprise COBOL installs in the z/OS (Z038) SREL.

5.2.1 Machine Requirements

Enterprise COBOL V06.03.00 will run on the following IBM System z servers:

- z15
- z14 or z14 ZR1
- z13 or z13s
- zEnterprise EC12 or zEnterprise BC12
- zEnterprise 196 or zEnterprise 114
- z10 Enterprise Class and z10 Business Class

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 7. 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	V02.02.00 or higher	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.

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.

Enterprise COBOL 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 8 (Page 1 of 2). Target System Mandatory Operational Requisites		
Program Number	Product Name and Minimum VRM/Service Level	Function
5650-ZOS	z/OS V02.02.00 or higher	z/OS Language Environment and Program Management, required to compile and run COBOL applications

Figure 8 (Page 2 of 2). Target System Mandatory Operational Requisites		
Program Number	**Product Name and Minimum VRM/Service Level**	**Function**
5650-ZOS	Language Environment for z/OS V2R2 with the PTFs for APARs PH10606, PH10740 and PH15585 applied **or** Language Environment for z/OS V2R3 with the PTFs for APARs PH07107, PH09543 and PH15589 applied	PH10606 CEEMKDIR REXX PH10740 LLVM and header files PH15585 COBOL run-time PH07107 CEEMKDIR REXX PH09543 LLVM and header files PH15589 COBOL run-time

Note:

1. Depending on the target system that you are running, ensure that the appropriated level of LE PTF(s) for the following APAR has been installed on your system.

   - PH10606, PH10740 and PH15585 (z/OS V2R2 Language Environment)
   - PH07107, PH09543 and PH15589 (z/OS V2R3 Language Environment)

2. Users must be on V2R3 or above in order to run a 64-bit COBOL application.

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.

You may need various other products (eg. Db2, CICS or IMS) depending on the Enterprise COBOL function you are using. Please check the Software Product Compatibilty Reports (SPCR) at https://www.ibm.com/software/reports/compatibility/clarity/index.html for a list of compatible software. From the SPCR home page, click Create a report under In-depth reports, search for Enterprise COBOL for z/OS and choose Version 6.3, and then click Submit.

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.

Enterprise COBOL 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.

IBM Enterprise COBOL Developer Trial for z/OS must not already be installed and must not be installed concurrently.

5.2.3 DASD Storage Requirements

Enterprise COBOL libraries can reside on all supported DASD types.

Figure 9 on page 14 lists the total space that is required for each type of library.

Figure 9. Total DASD Space Required by Enterprise COBOL	
Library Type	**Total Space Required in 3390 Trks**
Target	4547
Distribution	4555
File System	30

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 6.1.8, "Allocate SMP/E Target and Distribution Libraries" on page 22.

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, except for SIGYCOMP and AIGYMOD1, which must be PDSEs.

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 LNKLST.
   - These data sets are not required to be APF-authorized.
   - Enterprise COBOL 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.

The following figures describe the target and distribution libraries and file system paths required to install Enterprise COBOL. The storage requirements of Enterprise COBOL 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 10. Storage Requirements for Enterprise COBOL Target Libraries								
Library DDNAME	Member Type	Target Volume	TYPE	ORG	RECFM	LRECL	No. of 3390 Trks	No. of DIR Blks
SIGYCOMP	LMOD	ANY	U	PDSE	U	0	4500	n/a
SIGYMAC	MACRO	ANY	U	PDS	FB	80	10	5
SIGYPROC	PROC	ANY	U	PDS	FB	80	2	5
SIGYSAMP	SAMP	ANY	U	PDS	FB	80	35	10

Figure 11. Enterprise COBOL File System Paths		
DDNAME	**T Y P E**	**Path Name**
SIGYHFS	N	/usr/lpp/IBM/cobol/igyv6r3/bin/IBM

Figure 12. Storage Requirements for Enterprise COBOL 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**
AIGYHFS	U	PDS	VB	255	10	5
AIGYMOD1	U	PDSE	U	0	4500	n/a
AIGYSRC1	U	PDS	FB	80	45	12

5.3 FMIDs Deleted

Installing Enterprise COBOL 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 Enterprise COBOL 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

COBOL and COBOL Developer Trial Co-existence:

Enterprise COBOL for z/OS, Enterprise COBOL Value Unit Edition for z/OS, and Enterprise COBOL Developer Trial for z/OS, cannot be installed in the same CSI zone, or share the same target and distribution data set names.

PDSE Considerations:

Enterprise COBOL uses the "partitioned data set extended" or PDSE format for the SIGYCOMP target library. 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 (are in a 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 when 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, but 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 the SIGYCOMP data set between z/OS systems unless they are in a sysplex or are connected in a GRS complex. If you need to share the content of the SIGYCOMP data set, a separate copy must be created for each z/OS 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 Enterprise COBOL.

Please note the following points:

- 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 Enterprise COBOL

6.1.1 SMP/E Considerations for Installing Enterprise COBOL

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

6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 13. 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 13. SMP/E Options Subentry Values		
Subentry	**Value**	**Comment**
DSSPACE	(500,500,500)	3390 DASD tracks
PEMAX	SMP/E Default	IBM recommends using the SMP/E default for PEMAX.

6.1.3 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install Enterprise COBOL:

Figure 14 (Page 1 of 2). Sample Installation Jobs			
Job Name	**Job Type**	**Description**	**RELFILE**
IGYWEDIT	MACRO	ISPF editor macro to aid users in making changes to the sample jobs **(Optional)**	IBM.HADB630.F3

Job Name	Job Type	Description	RELFILE
IGYWSMPE	SMP/E	Sample job to define and prime a new SMP/E CSI **(Optional)**	IBM.HADB630.F3
IGYWRECV	RECEIVE	Sample RECEIVE job	IBM.HADB630.F3
IGYWALOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HADB630.F3
IGYWZFS	ALLOMZFS	Sample job to allocate, create mountpoint, & mount zFS data sets **(Optional)**	IBM.HADB630.F3
IGYISMKD	MKDIR	Sample job to invoke the supplied IGYMKDIR EXEC to allocate file system paths	IBM.HADB630.F3
IGYWDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HADB630.F3
IGYWAPLY	APPLY	Sample APPLY job	IBM.HADB630.F3
IGYWIVP1	IVP	Sample job to verify installation has been successful	IBM.HADB630.F3
IGYWIVP2	IVP	Sample job to verify installation has been successful	IBM.HADB630.F3
IGYWACPT	ACCEPT	Sample ACCEPT job	IBM.HADB630.F3

Figure 14 (Page 2 of 2). Sample Installation Jobs

You can access the sample installation jobs by performing an SMP/E RECEIVE (refer to 6.1.7, "Perform SMP/E RECEIVE" on page 21), and then copy the jobs from the RELFILES to a work data set for editing and submission. See Figure 14 on page 18 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.HADB630.F3,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.HADB630.F3,UNIT=tunit,
```

```
//*          VOL=SER=ADB630,LABEL=(4,SL),
//*          DISP=(OLD,KEEP)
//***************************************************************
//* Make the //FILEIN DD statement below active for          *
//* downloaded DASD files.                                    *
//***************************************************************
//*FILEIN   DD DSN=IBM.HADB630.F3,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=(IGYISMKD,IGYWACPT,IGYWALOC,IGYWAPLY)
 SELECT MEMBER=(IGYWDDEF,IGYWEDIT,IGYWIVP1,IGYWIVP2)
 SELECT MEMBER=(IGYWRECV,IGYWSMPE,IGYWZFS)
/*
```

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.HADB630.F3 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.

6.1.4 Run REPORT MISSINGFIX

The SMP/E REPORT MISSINGFIX command helps you determine whether any FIXCAT PTFs exist that are applicable and have not yet been installed. If you find that there are PTFs that need to be installed, we recommend that you install them, before installing COBOL Version 6.3.

Before you install Enterprise COBOL, it is recommended that you run REPORT MISSINGFIX. This requires a global zone with ZONEINDEX entries that describe all the target and distribution libraries to be reported on, the SET BOUNDARY command must specify the global zone.

Here is a sample REPORT MISSINGFIX command to run against your z/OS CSI, (include previous versions):

```
SET BDY(globalzone).
REPORT MISSINGFIX ZONES(targetzone)
FIXCAT(IBM.TargetSystem-RequiredService.Enterprise-COBOL.V5R1,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V5R2,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R1,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R2,
       IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R3).
```

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

6.1.5 Set up ISPF Editor Macro (Optional)

To aid you in making changes to the SMP/E installation jobs (IGYISMKD, IGYWACPT, IGYWALOC, IGYWAPLY, IGYWDDEF, IGYWIVP1, IGYWIVP2, IGYWRECV, IGYWSMPE, and IGYWZFS), an ISPF editor macro, called IGYWEDIT, is supplied and is copied to your output data set **jcl-library-name** above. (See Figure 14 on page 18).

This macro lets you substitute proper values for all of the required variables in those jobs instead of making the changes repeatedly by hand.

Edit macro IGYWEDIT and provide the proper values, then copy it to any data set in your TSO logon procedure SYSEXEC concatenation. Consult the instructions in the macro for more information.

6.1.6 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 IGYWSMPE 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.

6.1.7 Perform SMP/E RECEIVE

If you have obtained Enterprise COBOL as part of a CBPDO, use the RCVPDO job in the CBPDO RIMLIB data set to receive the Enterprise COBOL 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 IGYWRECV to perform the SMP/E RECEIVE for Enterprise COBOL. 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 SMP/E Target and Distribution Libraries

Edit and submit sample job IGYWALOC to allocate the SMP/E target and distribution libraries for Enterprise COBOL. 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 Allocate, create and mount ZFS Files (Optional)

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

If you plan to install Enterprise COBOL into a new z/OS UNIX file system, you can edit and submit the optional IGYWZFS 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/cobol/igyv6r3*.

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 Enterprise COBOL 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/cobol/igyv6r3')
  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/cobol/igyv6r3** 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.

6.1.10 Allocate File System Paths

The target system HFS or zFS data set must be mounted on the driving system when running the sample IGYISMKD 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 Enterprise COBOL into a file system that is zFS.

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

The recommended mountpoint is */usr/lpp/IBM/cobol/igyv6r3*.

Edit and submit sample job IGYISMKD to allocate the HFS or zFS paths for Enterprise COBOL. 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.

6.1.11 Create DDDEF Entries

Edit and submit sample job IGYWDDEF to create DDDEF entries for the SMP/E target and distribution libraries for Enterprise COBOL. 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.

6.1.12 Perform SMP/E APPLY

1. Ensure that you have the latest HOLDDATA; then edit and submit sample job IGYWAPLY to perform an SMP/E APPLY CHECK for Enterprise COBOL. 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/390holdata.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)
FIXCAT(IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R3)
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)
FIXCAT(IBM.TargetSystem-RequiredService.Enterprise-COBOL.V6R3)
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.

It is recommended that you run REPORT MISSINGFIX specifying your COBOL category against OTHER target zones, to identify required PTFs that are missing from those other target zones.

This is particularly important if COBOL is installed in a target zone different to LE (refer to 6.1.4, "Run REPORT MISSINGFIX" on page 20).

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.

6.1.13 Run the Installation Verification Programs

Make sure you have applied the PTFs for the Language Environment and Program Management APARs listed in Figure 8 on page 12, then edit and submit sample jobs IGYWIVP1 and IGYWIVP2 to verify that you have installed Enterprise COBOL correctly. Refer to the instructions in the sample jobs for more information and expected output.

Expected Return Codes and Messages: You will receive return codes of 0 if these jobs run correctly.

Note: If operational requisite PTFs for the Language Environment have not already been applied, the IGYWIVP1 sample job will fail at LINK step. You will receive abend code of RC=0008 and message:

IEW2456E 9207 SYMBOL IGZXLERR UNRESOLVED. MEMBER COULD NOT BE INCLUDED FROM THE DESIGNATED CALL LIBRARY.

6.1.14 Perform SMP/E ACCEPT

Edit and submit sample job IGYWACPT to perform an SMP/E ACCEPT CHECK for Enterprise COBOL. 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.

6.2 Activating Enterprise COBOL

6.2.1 Running Enterprise COBOL from Unix System Services

If you mount the file system in which you have installed Enterprise COBOL in read-only mode during execution, then you do not have to take further actions to activate Enterprise COBOL. Refer to 6.1.9, "Allocate, create and mount ZFS Files (Optional)" on page 22 for more information on the file system for Enterprise COBOL.

6.2.2 Product Customization

The publication *IBM Enterprise COBOL for z/OS Customization Guide* (SC27-8712-02) contains the necessary information to customize and use Enterprise COBOL.

The /usr/lpp/IBM/cobol/igyv6r3/bin/cob2 is a shell script. If you put it in a location other than the default Enterprise COBOL File System Path /usr/lpp/IBM/cobol/igyv6r3, then change the environment variable COBOL_INSTALL_DIR as needed.

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