



**Program Directory for
IBM Enterprise PL/I for z/OS**

V3.9.0

Program Number 5655-H31

H270390, J270391

for Use with
z/OS V1.9.0 or later

Document Date: October 2009

GI10-8426-13

Note !

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 26.

A form for reader's comments appears at the back of this publication. When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© **Copyright International Business Machines Corporation 1999, 2009. All rights reserved.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

1.0 Introduction	1
1.1 Enterprise PL/I Description	1
1.2 Enterprise PL/I FMIDs	4
2.0 Program Materials	5
2.1 Basic Machine-Readable Material	5
2.2 Optional Machine-Readable Material	6
2.3 Program Publications	6
2.3.1 Basic Program Publications	6
2.3.2 Optional Program Publications	7
2.4 Program Source Materials	7
2.5 Publications Useful During Installation	7
3.0 Program Support	8
3.1 Program Services	8
3.2 Preventive Service Planning	8
3.3 Statement of Support Procedures	9
4.0 Program and Service Level Information	10
4.1 Program Level Information	10
4.2 Service Level Information	10
5.0 Installation Requirements and Considerations	11
5.1 Driving System Requirements	11
5.1.1 Machine Requirements	11
5.1.2 Programming Requirements	11
5.2 Target System Requirements	12
5.2.1 Machine Requirements	12
5.2.2 Programming Requirements	12
5.2.2.1 Installation Requisites	13
5.2.2.2 Operational Requisites	13
5.2.2.3 Toleration/Coexistence Requisites	14
5.2.2.4 Incompatibility (Negative) Requisites	14
5.2.3 DASD Storage Requirements	15
5.3 FMIDs Deleted	17
5.4 Special Considerations	17
6.0 Installation Instructions	18
6.1 Installing Enterprise PL/I	18
6.1.1 SMP/E Considerations for Installing Enterprise PL/I	18
6.1.2 SMP/E Options Subentry Values	18
6.1.3 Sample Jobs	18

6.1.4	Set up ISPF Editor Macro (Optional)	20
6.1.5	Allocate SMP/E CSI (Optional)	21
6.1.6	Perform SMP/E RECEIVE	21
6.1.7	Allocate SMP/E Target and Distribution Libraries	21
6.1.8	Allocate File System Paths	21
6.1.9	Create DDDEF Entries	22
6.1.10	Perform SMP/E APPLY	22
6.1.11	Run the Installation Verification Program	24
6.1.12	Change the defaults for the compiler options (Optional)	24
6.1.13	Perform SMP/E ACCEPT	24
6.1.14	Run REPORT CROSSZONE	25
6.2	Activating Enterprise PL/I	25
6.2.1	File System Execution	25
7.0	Notices	26
7.1	Trademarks	27
Reader's Comments		28

Figures

1.	Basic Material: Program Tape for Enterprise PL/I	5
2.	Basic Material: Program Tape - Japanese Language	5
3.	Program File Content	6
4.	Basic Material: Unlicensed Publications	6
5.	Publications Useful During Installation	7
6.	PSP Upgrade and Subset ID	8
7.	Component IDs	9
8.	Driving System Software Requirements	12
9.	Target System Conditional Operational Requisites	13
10.	Total DASD Space Required by Enterprise PL/I	15
11.	Storage Requirements for Enterprise PL/I Target Libraries	16
12.	Enterprise PL/I File System Paths	17
13.	Storage Requirements for Enterprise PL/I Distribution Libraries	17
14.	SMP/E Options Subentry Values	18
15.	Sample Installation Jobs	19

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

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 5 identifies the basic and optional program materials and documentation for Enterprise PL/I.
- 3.0, “Program Support” on page 8 describes the IBM support available for Enterprise PL/I.
- 4.0, “Program and Service Level Information” on page 10 lists the APARs (program level) and PTFs (service level) that have been incorporated into Enterprise PL/I.
- 5.0, “Installation Requirements and Considerations” on page 11 identifies the resources and considerations that are required for installing and using Enterprise PL/I.
- 6.0, “Installation Instructions” on page 18 provides detailed installation instructions for Enterprise PL/I. It also describes the procedures for activating the functions of Enterprise PL/I, or refers to appropriate publications.

Before installing Enterprise PL/I, 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 8 tells you how to find any updates to the information and procedures in this Program Directory.

Enterprise PL/I 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 that is provided with your order. All service and HOLDDATA for Enterprise PL/I are included on the CBPDO tape.

Do not use this program directory if you install Enterprise PL/I with a SystemPac or ServerPac. When you use these offerings, use the jobs and documentation supplied with the offering. This program directory can point you to specific sections of it as required.

1.1 Enterprise PL/I Description

With Enterprise PL/I for z/OS V3.9, you can leverage more than 30 years of IBM experience in application development to facilitate your new On Demand Business endeavors, helping integrate PL/I and Web-based business processes in Web services, XML, Java, and PL/I applications. This compiler's interoperability lets you capitalize on existing IT investment while smoothly incorporating new, Web-based applications as part of your organizations infrastructure.

Enterprise PL/I is a leading-edge, z/OS-based compiler that helps you create and maintain mission-critical, line-of-business PL/I applications to execute on your z/OS systems. It gives you access to DB2, CICS, and IBM IMS systems, and other data and transaction systems.

IBM Enterprise PL/I for z/OS, V3.9 offers additional performance improvements including hardware exploitation and a number of usability enhancements, serviceability improvements, and additional quality improvements, many of them customer requested.

This ninth release of Enterprise PL/I for z/OS V3, underscores IBM's continuing commitment to the PL/I programming language on the z/OS platform.

IBM Enterprise PL/I for z/OS V3.9 provides:

- Performance improvements including additional hardware exploitation
- Numerous usability improvements, many of them customer requested
- Serviceability enhancements to help programmers diagnose their code
- Continued quality improvements

PERFORMANCE IMPROVEMENTS:

- Additional exploitation of the hardware is implemented in the compiler in order to improve performance of the generated code:
 - CU12, CU14, CU21, CU24, CU41 and CU42 system instructions are used to give you faster Unicode conversions. For example CU12: Convert from UTF-8 to UTF-16
 - TRTT, TROT, TRTO, and TROO system instructions are now used to give you faster translations. For example TRTT: Translate two bytes to two bytes (could be used to uppercase UTF-16 data not containing surrogate pairs)
 - The compare-and-trap hardware instruction is used for faster tests for dereferencing of null pointers
- The ARCH (and TUNE) option controls the code generated by adjusting the instructions, scheduling, and other optimizations for a specific architecture level of the system. The PL/I compiler itself is now built with the higher level ARCH(6) resulting in a better overall performance of the compiler itself
- Miscellaneous improvements to generated code
 - Improve code generated for UVALID
 - Improve code generated for some array assignments
 - Directly inline ROUND for Decimal Float Pointing (DFP) instead of using a slower library call
 - Improve BIN(31,31) compares

USABILITY ENHANCEMENTS:

- Block-scoping in the CICS and SQL preprocessors is now supported
- You can include DFP in restricted expressions when using math built-in functions

- Support for UTF-8 and UTF-16 has been improved:
 - New built-in functions are provided to support fast conversions amongst UTF-8, UTF-16 and UTF-32
 - New built-in functions are added to support fast translations amongst UTF-8 and UTF-16
 - A new built-in function is provided to support for the testing of a UTF string for the presence of surrogate characters
 - UVALID is inlined for small strings
- The following date patterns with blank suppression are supported:
 - ZY-ZM-ZD
 - ZM/ZD/ZY
 - ZD.ZM.ZY
 - YY-ZM-ZD
 - ZM/ZD/YY
 - ZD.ZM.YY
- Support for INONLY, INOUT, and OUTONLY attributes is enabled so that function prototypes can be more self-documenting and the flagging of uninitialized variables can be more accurate
- You can now control whether sysnull or null is assigned to a pointer when the source in the assignment is a null string
- The MACRO preprocessor now leaves %include, %xinclude, %inscan, and %xinscan in the compiler listing as comments making it easier for programmers to locate that code in the listings
- An additional MACRO construct, %DO SKIP, makes it possible to support meta-comments
- You can specify that a DFP number should be rounded at the nth decimal digit. (rather than at the nth digit as provided by the ROUND built-in function in accordance with the ANSI definition)
- For ease of use and prevention of confusion for many PL/I programmers the flagging of seemingly unused %INCLUDE is now dropped
- A new compiler option is provided to suppress PUT FILE and/or DISPLAY statements. PL/I programmers can now use these statements for debug purposes while more easily compiling them out of the production version

QUALITY IMPROVEMENTS:

- The compiler now flags code where the result of a FIXED operation has a scale factor less than zero
- The compiler now flags ENTRYs used as functions but declared without the RETURNS attribute
- The compiler now flags with a new, unique message the use of a duplicate ORDINAL in a SELECT statement
- A new option is provided which will insert an ON STRINGRANGE SNAP; statement into a MAIN so that the calling module and module name of its occurrence can be identified by the programmer

- You can optionally have the compiler flag declares of FIXED DEC(p,q) and FIXED BIN(p,q) where q is less than 0 or q is greater than p
- The compiler now flags parameters declared inappropriately as BYVALUE, for example, declaring a FIXED DEC parameter BYVALUE
- An option is provided to flag statements generating lots of code. With this option, programmers have the knowledge to improve the efficiency of their programming
- A new option to force macro procedures and variable names to start with a specified character. This option allows you to enforce quality and naming standards for your organization
- An option is provided to check if null pointers are dereferenced
- The RULES suboption is enhanced to help identify areas where coding can be improved:
 - NOPROCENDONLY is added to flag END statements for PROCs that do not name the PROC they are closing
 - NOSTOP is added to flag the use of STOP and EXIT
 - NOLAXQUAL(STRICT) is added to flag references to variables not qualified with their level-1 name
 - NOGOTO(LOOSE) is added to allow GOTOs only if in the same block
- The following changes are made to the compiler options in order to simplify them
 - The COMPACT options has been dropped
 - The default setting for DEFAULT(REORDER/ORDER) has been changed to DEFAULT(REORDER)
 - The TUNE option has been dropped

SERVICEABILITY IMPROVEMENTS:

- When the compiler cannot open a file, the compiler will now, if possible, also include the related C runtime message in the message in the listing
- If user code requires a DFP conversion at compile time but the compile is running on a machine without DFP hardware, this error will be trapped and a meaningful error issued
- If the SQL preprocessor is invoked more than once without INONLY as its suboption, then the DBRM library created by the compiler will be empty, and now an E-level message will be issued to warn the user

1.2 Enterprise PL/I FMIDs

Enterprise PL/I consists of the following FMIDs:

H270390
J270391

2.0 Program Materials

An IBM program is identified by a program number and feature numbers. The program number for Enterprise PL/I is 5655-H31 and the feature numbers are 5832, and 5822.

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 Enterprise PL/I. 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 magnetic tape 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.

NOTE

If Enterprise PL/I was shipped to you in a CBPDO, you need to refer to the CBPDO Memo To Users Extension for the physical tape layout of the basic machine-readable materials.

Figure 1 describes the physical tape for Enterprise PL/I

<i>Figure 1. Basic Material: Program Tape for Enterprise PL/I</i>				
Medium	Feature Number	Physical Volume	External Label	VOLSER
3480 tape	5832	1 of 1	Enterprise PL/I	270390

Figure 2 describes the physical tape for the Japanese Language Feature

<i>Figure 2. Basic Material: Program Tape - Japanese Language</i>				
Medium	Feature Number	Physical Volume	External Label	VOLSER
3480 tape	5822	1 of 1	Enterprise PL/I	270390

Figure 3 on page 6 describes the program file content for Enterprise PL/I. 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 3. 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.H270390.F1	PDS	FB	80	8800
IBM.H270390.F2	PDSE	U	0	6144
IBM.J270391.F1	PDS	VB	255	27998

2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for Enterprise PL/I.

2.3 Program Publications

The following sections identify the basic and optional publications for Enterprise PL/I.

2.3.1 Basic Program Publications

Figure 4 identifies the basic unlicensed program publications for Enterprise PL/I. One copy of each of these publications is included when you order the basic materials for Enterprise PL/I. For additional copies, contact your IBM representative.

Figure 4. Basic Material: Unlicensed Publications

Publication Title	Form Number
Enterprise PL/I for z/OS License Information	GC27-1455

All IBM Enterprise PL/I for z/OS V3 publications are available free of charge in displayable softcopy format (BookManager, PDF) from the IBM PL/I Web site: <http://www.ibm.com/software/awdtools/pli/plizos/>

Subsequent updates (technical newsletters or revisions between releases) to the publications shipped with the product will be distributed to the user of record for as long as a license for this software remains in effect. A separate publication order or subscription is not needed.

2.3.2 Optional Program Publications

No optional publications are provided for Enterprise PL/I.

2.4 Program Source Materials

No program source materials or viewable program listings are provided for Enterprise PL/I.

2.5 Publications Useful During Installation

You might want to use the publications listed in Figure 5 during the installation of Enterprise PL/I. To order copies, contact your IBM representative or visit the IBM Publications Center at <http://www.ibm.com/shop/publications/order>.

<i>Figure 5. Publications Useful During Installation</i>	
Publication Title	Form Number
<i>IBM SMP/E for z/OS User's Guide</i>	SA22-7773
<i>IBM SMP/E for z/OS Commands</i>	SA22-7771
<i>IBM SMP/E for z/OS Reference</i>	SA22-7772
<i>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</i>	GA22-7770

3.0 Program Support

This section describes the IBM support available for Enterprise PL/I.

3.1 Program Services

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

3.2 Preventive Service Planning

Before you install Enterprise PL/I, make sure that you have reviewed the current Preventive Service Planning (PSP) information. The PSP Buckets maintain current lists (which have been identified since the package was created) of any recommended or required service for the installation of this package. This service includes software PSP information that contains HIPER and required PTFs against the base release.

Although SW, HW, and functional PSP Buckets might have overlap, review all that apply to this package to ensure that you identify all the known service that is required for your installation of this package.

If you obtained Enterprise PL/I as part of a CBPDO, HOLDDATA is included.

If the CBPDO for Enterprise PL/I is older than two weeks old by the time you install the product materials, you should contact the IBM Support Center or use S/390 SoftwareXcel to obtain the latest PSP Bucket information. You can also obtain the latest PSP Bucket information by going to the following Web site: <https://techsupport.services.ibm.com/server/390.psp390>

For program support, access the Software Support Web site at <http://www-01.ibm.com/software/support/>.

PSP Buckets are identified by UPGRADEs, which specify product levels; and SUBSETs, which specify the FMIDs for a product level. The UPGRADE and SUBSET values for Enterprise PL/I are shown as follows:

Figure 6. PSP Upgrade and Subset ID

UPGRADE	SUBSET	Description
PLIENT390	H270390	Enterprise PL/I Base
	J270391	Enterprise PL/I 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 7 on page 9 identifies the component IDs (COMPID) for Enterprise PL/I.

<i>Figure 7. Component IDs</i>			
FMID	COMPID	Component Name	RETAIN Release
H270390	5655H3100	Enterprise PL/I Base	390
J270391	5655H3100	Enterprise PL/I HFS	391

4.0 Program and Service Level Information

This section identifies the program and relevant service levels of Enterprise PL/I. 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 previous releases of Enterprise PL/I have been incorporated into this release. They are listed by FMID.

- FMID H270380

PK74907	PK80291	PK87038
PK75442	PK81084	PK89380
PK76664	PK81450	PK89422
PK76953	PK81739	PK91384
PK77281	PK89309	PK91385
PK77579	PK89724	PK94255
PK77851	PK90712	PK81215
PK78226	PK93628	PK91582
PK78332	PK93919	PK92774
PK78544	PK77050	PK74400
PK78561	PK82428	PK74992
PK78562	PK77283	PK77302
PK78751	PK77066	PK75180
PK79229	PK78825	PK82550
PK79325	PK79857	PK87134
PK79604	PK79921	

4.2 Service Level Information

No PTFs against this release of Enterprise PL/I have been incorporated into the product tape.

It is highly recommended that you frequently check the Enterprise PL/I PSP Bucket for HIPER and SPECIAL Attention PTFs against all FMIDs that you must install.

5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating Enterprise PL/I. The following terminology is used:

- *Driving system*: the system used to install the program; where SMP/E executes.
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 runs.
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 that is required to install Enterprise PL/I.

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 8. Driving System Software Requirements

Program Number	Product Name	Minimum VRM	Minimum Service Level will satisfy these APARs	Included in this product's shipment?
Any one of the following:				
5694-A01	z/OS	V01.09.00	N/A	No
5655-G44	IBM SMP/E for z/OS	V03.04.00	N/A	No

Note: Installation may require migration to new z/OS releases to be service supported. See http://www-03.ibm.com/systems/z/os/zos/support/zos_eos_dates.html.

Enterprise PL/I is installed into a file system, either HFS or zFS. Before installing Enterprise PL/I, 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 system data sets must be mounted on the driving system.

If you plan to install Enterprise PL/I 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 that is required to install and use Enterprise PL/I.

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

5.2.1 Machine Requirements

IBM Enterprise PL/I for z/OS V3.9 will run on the following IBM servers:

- z10 Enterprise Class, or follow-on
- IBM System z9 Enterprise Class or z9 Business Class, or follow-on
- zSeries z990, or follow-on
- zSeries z890, or follow-on

5.2.2 Programming Requirements

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

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

Enterprise PL/I has no mandatory installation requisites.

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

Enterprise PL/I has no conditional installation requisites.

5.2.2.2 Operational Requisites: Operational requisites are products that are required by and *must* be present on the system or products that are not required by 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. These products are specified as PREs or REQs.

Enterprise PL/I 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. These products are specified as IF REQs.

<i>Figure 9 (Page 1 of 2). Target System Conditional Operational Requisites</i>		
Program Number	Product Name and Minimum VRM/Service Level	Function
5696-234	High Level Assembler for MVS & VM & VSE	Interlanguage communication with assembler
5688-235	PL/I for MVS & VM V1.1.1	Interlanguage communication with PL/I
5668-909, 5668-910, 5668-911	OS PL/I V2.3	PL/I source programs (for interlanguage communication)
5668-806, 5688-087	VS Fortran V2.1.0	Interlanguage communication with Fortran
Any one of the following:		
5655-M15	CICS Transaction Server for z/OS, V3	CICS applications
5655-S97	CICS Transaction Server for z/OS, V4	CICS applications

Figure 9 (Page 2 of 2). Target System Conditional Operational Requisites

Program Number	Product Name and Minimum VRM/Service Level	Function
Any one of the following:		
5688-197	COBOL for MVS & VM V1.2.0	Interlanguage communication with COBOL
5648-A25	COBOL for OS/390 & VM V2.1.0	Interlanguage communication with COBOL
5655-G53	Enterprise COBOL for z/OS and OS/390 V3	Interlanguage communication with COBOL
5655-S71	Enterprise COBOL for z/OS V4	Interlanguage communication with COBOL
Any one of the following:		
5625-DB2	DB2 Universal Database for z/OS, V8	DB2 integrated coprocessor
5635-DB2	DB2 Universal Database for z/OS, V9	DB2 integrated coprocessor
Any one of the following:		
5655-R44	Debug Tool for z/OS V7.1.0	Application debugging support
5655-S17	Debug Tool for z/OS V8.1.0	Application debugging support
5655-U27	Debug Tool for z/OS V9.1.0	Application debugging support
Any one of the following:		
5655-R45	Debug Tool Utilities and Advanced Functions for z/OS V7.1.0	Advanced application debugging support
5655-S16	Debug Tool Utilities and Advanced Functions for z/OS V8.1.0	Advanced application debugging support
Any one of the following:		
5655-J38	IMS V9	IMS applications
5635-A01	IMS V10	IMS applications
Any one of the following:		
5694-A01	DFSORT element of z/OS	Sort support
5647-A01	DFSORT element of OS/390	Sort support

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 PL/I 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.

Enterprise PL/I has no negative requisites.

5.2.3 DASD Storage Requirements

Enterprise PL/I libraries can reside on all supported DASD types.

Figure 10 on page 15 lists the total space that is required for each type of library.

Library Type	Total Space Required in 3390 Trks
Target	1268 Tracks
Distribution	1298 Tracks
HFS	15 Tracks

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 21.

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 may 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 may be changed.
 - The default block size of the data set may be changed.
 - The data set may be merged with another data set that has equivalent characteristics.
 - The data set may be either a PDS or a PDSE, except SIBMZCMP and AIBMZMOD, 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.
7. Enterprise PL/I 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 you 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 required to install Enterprise PL/I. The storage requirements of Enterprise PL/I must be added to the storage required by other programs having data in the same library.

Note: The data in these tables should be used when determining which libraries can be merged into common data sets. In addition, since some ALIAS names may not be unique, ensure that no naming conflicts will be introduced before merging libraries.

Figure 11. Storage Requirements for Enterprise PL/I Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C O M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SIBMZCMP	LMOD	ANY	U	PDSE	U	0	1251	n/a
SIBMZPRC	PROC	ANY	U	PDS	FB	80	6	5
SIBMZSAM	SAMP	ANY	U	PDS	FB	80	11	5

Figure 12. Enterprise PL/I File System Paths

DDNAME	T Y P E	Path Name
SIBMZHFS	X	/usr/lpp/pli/IBM/

Figure 13. Storage Requirements for Enterprise PL/I 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
AIBMZHFS	U	PDS	VB	255	30	5
AIBMZMOD	U	PDSE	U	0	1251	n/a
AIBMZSRC	U	PDS	FB	80	17	5

5.3 FMIDs Deleted

Installing Enterprise PL/I 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 PL/I 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, see the SMP/E manuals for instructions.

5.4 Special Considerations

Enterprise PL/I has no special considerations for the target system.

6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of Enterprise PL/I.

Please note the following:

- If you want to install Enterprise PL/I 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.

6.1 Installing Enterprise PL/I

6.1.1 SMP/E Considerations for Installing Enterprise PL/I

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

6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 14. 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 14. SMP/E Options Subentry Values

Subentry	Value	Comment
DSSPACE	(200,200,500)	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 PL/I:

Figure 15. Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
IBMZWEDT	MACRO	ISPF Editor macro to aid users in making changes to the sample jobs (optional)	IBM.H270390.F1
IBMZWSMP	SMP/E	Sample job to define and prime a new SMP/E CSI (optional)	IBM.H270390.F1
IBMZWRCV	RECEIVE	Sample RECEIVE job for Enterprise PL/I	IBM.H270390.F1
IBMZWALO	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.H270390.F1
IBMISMKD	MKDIR	Sample job to invoke the supplied IBMMKDIR EXEC to allocate HFS paths	IBM.H270390.F1
IBMZWDDF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.H270390.F1
IBMZWAPL	APPLY	Sample APPLY job	IBM.H270390.F1
IBMZWIVP	IVP	Sample job to verify installation has been successful	IBM.H270390.F1
IBMZWIOP	IOP	Sample job to change default compiler options (optional)	IBM.H270390.F1
IBMZWACP	ACCEPT	Sample ACCEPT job	IBM.H270390.F1

You can access the sample installation jobs by performing an SMP/E RECEIVE and then copying the jobs from the relfiles to a work data set for editing and submission. See Figure 15 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=*
//TAPEIN DD DSN=IBM.H270390.F1,UNIT=tunit,
// VOL=SER=volser,LABEL=(x,SL),
// DISP=(OLD,KEEP)
//FILEIN DD DSN=IBM.H270390.F1,UNIT=SYSALLDA,DISP=SHR,
// VOL=SER=filevol
//OUT DD DSN=jc1-library-name,
// DISP=(NEW,CATLG,DELETE),
// VOL=SER=dasdvol,UNIT=SYSALLDA,
// SPACE=(TRK,(10,2,5))
//SYSUT3 DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN DD *
COPY INDD=xxxxIN,OUTDD=OUT
SELECT MEMBER=(IBMZWSMP,IBMZWRCV,IBMZWEDT)
SELECT MEMBER=(IBMZWALO,IBMZWDDF,IBMZWACP)
```

```
SELECT MEMBER=(IBMISMKD, IBMZWAPL, IBMZWIVP)
SELECT MEMBER=(IBMZWIOP)
/*
```

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

TAPEIN:

tunit is the unit value that matches the product tape.

volser is the volume serial that matches the product tape.

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.H270390.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.

6.1.4 Set up ISPF Editor Macro (Optional)

To aid you in making changes to the SMP/E installation jobs (IBMISMKD, IBMZWACP, IBMZWALO, IBMZWAPL, IBMZWDDF, IBMZWIOP, IBMZWIVP, IBMZWRECV and IBMZWSMP), an ISPF editor macro called IBMZWEDT, is supplied, which is copied to your output data set **jcl-library-name** above. (See Figure 15 on page 18).

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

Edit macro IBMZWEDT and provide the proper values. After making the changes, either copy IBMZWEDT to any data set in your TSO logon procedure SYSEXEC concatenation, or issue the commands below to make IBMZWEDT immediately accessible to your current ISPF session:

From ISPF option 6, issue:

```
ALLOCATE FI(SYSUEXEC) DA('jcl-library-name') SHR REU
ALTLIB ACTIVATE USER(EXEC)
```

Then edit your installation jobs from this ISPF session.

Consult the instructions in the macro for more information.

6.1.5 Allocate SMP/E CSI (Optional)

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

If you are allocating a new SMP/E data set for this install, edit, and submit sample job IBMZWSMP to allocate the SMP/E data set for Enterprise PL/I. 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 Enterprise PL/I as part of a CBPDO, use the RCVPDO job in the CBPDO RIMLIB data set to receive the Enterprise PL/I FMIDs, service, and HOLDDATA that are included on the CBPDO tape. For more information, see the documentation that is included in the CBPDO.

You can also choose to edit and submit sample job IBMZWRCV to perform the SMP/E RECEIVE for Enterprise PL/I. 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 IBMZWALO to allocate the SMP/E target distribution libraries for Enterprise PL/I. 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 File System Paths

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

Before running the sample job to create the paths in the file system, must ensure that OMVS is active on the driving system, and that the targ system's HFS or zFS file system is mounted to the driving system. zFS mu be active on the driving system if you are installing Enterprise PL/I into a file system that is zFS.

If you plan to install Enterprise PL/I into a new HFS or zFS file system, y must create the mountpoint and mount the new file system to the driving For Enterprise PL/I, the recommended mountpoint is: /usr/lpp/pli/

Edit and submit sample job IBMISMKD to allocate the HFS or zFS paths Enterprise PL/I. Consult the instructions in the sample job for more information.

If you create a new HFS or zFS for this product, you should consider updating the BPXPRMxx PARMLIB member to mount the new file system at IPL. This may be helpful if an IPL occurs before the installation is complete.

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

6.1.9 Create DDDEF Entries

Edit and submit sample job IBMZWDDF to create DDDEF entries for the SMP/E target and distribution libraries for Enterprise PL/I. Consult the instructions in the sample job for more information.

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

6.1.10 Perform SMP/E APPLY

1. Ensure that you have the latest HOLDDATA; then edit and submit sample job IBMZWAPL to perform an SMP/E APPLY CHECK for Enterprise PL/I. Consult the instructions in the sample job for more information.

HOLDDATA introduces ERROR HOLDS against FMIDs for HIPER APARs. Before the installation, ensure that you have the latest HOLDDATA, which is available through several different portals, including <http://service.software.ibm.com/holdata/390holdata.html>. Install the FMIDs regardless of the status of unresolved HIPERs. However, don't deploy the software until the unresolved HIPERs are analyzed to determine applicability.

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. This is because 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 two methods to install FMIDs when ++HOLDS for HIPERs exist for the FMIDs that you install:

- a. To ensure that all recommended and critical service is installed with the FMIDs, if you are using SMP/E 3.5 or higher and have received the latest HOLDDATA, add the FIXCAT operand to the APPLY command as shown below. If you are using a prior release of SMP/E, add the SOURCEID(HIPER,RSU*) operand to the APPLY command.

```

If using SMP/E V3.5 or higher:
APPLY S(fmid,fmid,...)
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND .
If using SMP/E V3.4 or prior:
APPLY S(fmid,fmid,...)
FORFMID(fmid,fmid,...)
SOURCEID(HIPER,RSU*)
GROUPEXTEND .

```

Some HIPER APARs might not have PTFs available yet. You have to analyze the symptom flags to determine if you want to bypass the specific ERROR HOLDS and continue the installation of the FMIDs.

This method requires more initial research, but can provide resolution for all HIPERs that have fixes 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 the HIPERs, you can add a BYPASS(HOLDCLASS(HIPER)) operand to the APPLY command. In this way, you can install FMIDs even though HIPER ERROR HOLDS against them still exist. Only the HIPER ERROR HOLDS are bypassed. After the FMIDs are installed, run the SMP/E REPORT ERRSYSMODS command to identify missing HIPER maintenance.

```

APPLY S(fmid,fmid,...)
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
GROUPEXTEND
BYPASS(HOLDCLASS(HIPER)) .
..any other parameters documented in the program directory

```

This method is the quicker of the two, but requires subsequent review of the REPORT ERRSYSMODS to investigate any HIPERs. If you are running SMP/E V3.5 or higher and have received the latest HOLDDATA, you can also choose to run REPORT MISSINGFIX for Fix Category IBM.ProductInstall-RequiredService to investigate missing recommended service.

If you bypass HOLDS during the installation of the FMIDs because PTFs are not yet available, you can make yourself notified when the 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.

6.1.11 Run the Installation Verification Program

Edit and submit sample job IBMZWIVP to verify that you have installed Enterprise PL/I correctly. Consult the instructions in the sample job for more information.

Consult the instructions in the sample job for the expected output from the GO step.

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

6.1.12 Change the defaults for the compiler options (Optional)

If you want to change the supplied default compiler options, then edit and submit sample job IBMZWIOP. This job will let you specify options that will be applied before any other options, thus effectively changing the default options. This job will also let you specify options that will be applied after all other options, thus effectively changing the default options and preventing them from being overridden. Consult the instructions in the sample job for more information.

6.1.13 Perform SMP/E ACCEPT

Edit and submit sample job IBMZWACP to perform an SMP/E ACCEPT CHECK for Enterprise PL/I. 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. This is because 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 manuals.

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-edits or binds the modules into the distribution libraries. During this processing, the Linkage Editor or Binder might

issue messages that indicate unresolved external references, which will result in a return code of 4 during the ACCEPT phase. You can ignore these messages, because the distribution libraries are not executable and the unresolved external references do not affect the executable system libraries.

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

6.1.14 Run REPORT CROSSZONE

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

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

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

6.2 Activating Enterprise PL/I

6.2.1 File System Execution

If you mount the file system in which you have installed Enterprise PL/I in read-only mode during execution, then you do not have to take further actions to activate Enterprise PL/I.

Enterprise PL/I is fully operational after the SMP/E installation is completed. You do not have to do further customization to activate this function.

7.0 Notices

References in this document to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe on any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

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 or use S/390 SoftwareXcel to obtain the current "PSP Bucket".

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, New York 10504-1785
USA

For online versions of this book, we authorize you to:

- Copy, modify, and print the documentation contained on the media, for use within your enterprise, provided you reproduce the copyright notice, all warning statements, and other required statements on each copy or partial copy.
- Transfer the original unaltered copy of the documentation when you transfer the related IBM product (which may be either machines you own, or programs, if the program's license terms permit a transfer). You must, at the same time, destroy all other copies of the documentation.

You are responsible for payment of any taxes, including personal property taxes, resulting from this authorization.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Some jurisdictions do not allow the exclusion of implied warranties, so the above exclusion may not apply to you.

Your failure to comply with the terms above terminates this authorization. Upon termination, you must destroy your machine readable documentation.

7.1 Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Reader's Comments

Program Directory for IBM Enterprise PL/I for z/OS, October 2009

You may use this form to comment about this document, its organization, or subject matter with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

For each of the topics below please indicate your satisfaction level by circling your choice from the rating scale. If a statement does not apply, please circle N.

RATING SCALE						
very satisfied	<----->				very dissatisfied	not applicable
1	2	3	4	5	N	

	Satisfaction					
Ease of product installation	1	2	3	4	5	N
Contents of Program Directory	1	2	3	4	5	N
Installation Verification Programs	1	2	3	4	5	N
Time to install the product	1	2	3	4	5	N
Readability and organization of Program Directory tasks	1	2	3	4	5	N
Necessity of all installation tasks	1	2	3	4	5	N
Accuracy of the definition of the installation tasks	1	2	3	4	5	N
Technical level of the installation tasks	1	2	3	4	5	N
Ease of getting the system into production after installation	1	2	3	4	5	N

How did you order this product?

- CBPDO
- CustomPac
- ServerPac
- Independent
- Other

Is this the first time your organization has installed this product?

- Yes
- No

Were the people who did the installation experienced with the installation of z/OS products?

- Yes

International Business Machines Corporation
Reader's Comments
Department DTX/E269
555 Bailey Avenue
San Jose, California
USA
95141-9989

E-Mail: comments@us.ibm.com



Printed in USA

G110-8426-13

