



Program Directory for IBM Ported Tools for z/OS

V1.1.2

Program Number 5655-M23

FMIDs HOS1110, HPRL110, HPHP110

for Use with
z/OS V1.6 and z/OS.e V1.6 or higher

Document Date: May 25, 2007

GI10-0769-01

Note!

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 33.

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1.0 Introduction

This Program Directory is intended for the system programmer responsible for program installation and maintenance. It contains information concerning the material and procedures associated with the installation of IBM Ported Tools for z/OS™, which includes the following features:

- IBM Ported Tools for z/OS
- Perl for z/OS
- PHP for z/OS

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 5 identifies the basic and optional program materials and documentation for IBM Ported Tools for z/OS.
- 3.0, “Program Support” on page 9 describes the IBM support available for IBM Ported Tools for z/OS.
- 4.0, “Program and Service Level Information” on page 11 lists the APARs (program level) and PTFs (service level) incorporated into IBM Ported Tools for z/OS.
- 5.0, “Installation Requirements and Considerations” on page 13 identifies the resources and considerations required for installing and using IBM Ported Tools for z/OS.
- 6.0, “Installation Instructions” on page 23 provides detailed installation instructions for IBM Ported Tools for z/OS, Perl for z/OS and PHP for z/OS. It also describes the procedures for activating the functions of IBM Ported Tools for z/OS, Perl for z/OS, and PHP for z/OS, or refers to appropriate publications.

Before installing IBM Ported Tools for z/OS, read the *CBPDO Memo To Users* and the *CBPDO Memo To Users Extension* that were supplied with this program in softcopy form as well as this Program Directory and then keep them for future reference. Section 3.2, “Preventive Service Planning” on page 9 tells you how to find any updates to the information and procedures in this Program Directory.

IBM Ported Tools for z/OS is supplied in a Custom-Built Product Delivery Offering (CBPDO, 5751-CS3). The Program Directory is provided in softcopy form on the CBPDO tape which is identical to the hardcopy form provided with your order. Your CBPDO contains a softcopy preventive service planning (PSP) upgrade for this product. All service and HOLDDATA for IBM Ported Tools for z/OS are included on the CBPDO tape.

Do not use this Program Directory if you are installing IBM Ported Tools for z/OS with a SystemPac or ServerPac. When using these offerings, use the jobs and documentation supplied with the offering. This documentation may point you to specific sections of the Program Directory as required.

1.1 IBM Ported Tools for z/OS Description

If you are installing Perl for z/OS, see 1.1.1, “ Perl for z/OS Description.” If you are installing PHP for z/OS, see 1.1.2, “ PHP for z/OS Description.”

IBM Ported Tools for z/OS contains two base components: OpenSSH and Xvfb.

For the Xvfb function, you will need PTFs UA21829 and UA32671.

OpenSSH provides secure encryption for both remote login to the z/OS shell and remote file transfer. The following are some of the utilities that it includes:

- **ssh**, a client program for logging into a z/OS shell. It is an alternative to **rlogin**.
- **scp** for copying files between networks. It is an alternative to **rcp**.
- **sftp** for file transfers over an encrypted **ssh** transport. It is an interactive file transfer program similar to **ftp**.
- **sshd**, a daemon program for **ssh** that listens for connections from clients. The IBM Ported Tools for z/OS implementation of **sshd** supports both **SSH** protocol versions 1 and 2 simultaneously.

Other basic utilities such as **ssh-add**, **ssh-agent**, **ssh-keysign**, **ssh-keyscan**, **ssh-keygen** and **sftp-server** are also included.

To ensure secure encrypted communications, IBM Ported Tools for z/OS uses algorithms such as Blowfish and 3DES.

Xvfb is an X server that can run on machines with no display hardware and no physical input devices. It emulates a dumb framebuffer using virtual memory.

1.1.1 Perl for z/OS Description

The Perl for z/OS feature provides a port of the Perl (version 5.8.7) scripting language to the z/OS UNIX System Services platform. Perl (Practical Extraction and Report Language) is a very popular general-purpose programming language that is widely used on UNIX and other computing platforms. This port of Perl to the z/OS platform offers enhancements over other versions of Perl, in that it is preconfigured and precompiled, designed to address the ASCII/EBCDIC conversion, and provide Unicode support.

1.1.2 PHP for z/OS Description

PHP (recursive acronym for PHP: Hypertext Preprocessor) is an open-source server-side scripting language (freely downloadable from php.net and zend.com) for creating dynamic Web pages for e-commerce and other Web applications. A dynamic Web page is a page that interacts with the user, so that each user visiting the page sees customized information. Dynamic Web applications are prevalent in commercial (e-commerce) sites, where the content displayed is generated from information accessed in a database or other external source.

PHP offers a simple and universal solution for easy-to-program dynamic Web pages. The intuitive interface allows programmers to embed PHP statements right in the HTML page. PHP's syntax is similar to that of C and Perl, making it easy to learn for anyone with basic programming skills. Its elegant design makes PHP significantly easier to maintain and update than comparable scripts in other languages.

1.2 IBM Ported Tools for z/OS FMIDs

IBM Ported Tools for z/OS consists of the following FMIDs:

- HOS1110 - IBM Ported Tools for z/OS
- HPRL110 - IBM Ported Tools for z/OS - Perl
- HPHP110 - IBM Ported Tools for z/OS - PHP

2.0 Program Materials

An IBM program is identified by a program number. The program number for IBM Ported Tools for z/OS is 5655-M23.

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 IBM Ported Tools for z/OS application. Ask your IBM representative for this information if you have not already received a copy.

Note: When you have ordered the Perl for z/OS feature, or the PHP for z/OS feature, you will have also received IBM Ported Tools for z/OS (FMID HOS1110), which contains the OpenSSH function. You will not need to reinstall IBM Ported Tools for z/OS (FMID HOS1110) if you already have it. There are no changes to the original shipment. However, you may want to upgrade your service for this FMID at this time. Also, if you do not intend to use the functions provided in IBM Ported Tools for z/OS (FMID HOS1110), there is no need to install it. Both Perl for z/OS and PHP for z/OS do not require the functions in IBM Ported Tools for z/OS.

However, if you have ordered only the IBM Ported Tools for z/OS feature (FMID HOS1110), you will not receive Perl for z/OS (FMID HPRL110) and PHP for z/OS (FMID HPHP110).

2.1 Basic Machine-Readable Material

The distribution medium for this program is magnetic tape or downloadable files. It is installed using SMP/E, and is in SMP/E RELFILE format.

See 6.0, "Installation Instructions" on page 23 for more information about how to install the program FMIDs HOS1110, HPRL110, and HPHP110.

2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for IBM Ported Tools for z/OS.

2.3 Program Publications

The following sections identify the basic and optional publications for IBM Ported Tools for z/OS.

2.3.1 Basic Program Publications

The basic package includes a copy of the License Information Document (GA22-7986-01).

The basic publications and other information about the IBM Ported Tools for z/OS are available electronically at the IBM Ported Tools for z/OS Web site:

http://www.ibm.com/servers/eserver/zseries/zos/unix/port_tools.html

2.3.2 Optional Program Publications

Figure 1 identifies the optional unlicensed publication that is not available in hardcopy form, but are available through the internet for IBM Ported Tools for z/OS

<i>Figure 1. Optional Material: Other Optional Publications</i>		
Publication Title	Form Number	How Available
IBM Ported Tools for z/OS User's Guide	SA22-7985	http://www.ibm.com/servers/eserver/zseries/zos/unix/port_tools.html
IBM Ported Tools for z/OS: Perl for z/OS Feature User's Guide and Reference	SA23-1347	http://www.ibm.com/servers/eserver/zseries/zos/unix/perl/
IBM Ported Tools for z/OS: PHP for z/OS Feature User's Guide and Reference	SA23-2210	http://www.ibm.com/servers/eserver/zseries/zos/unix/php/

2.4 Program Source Materials

No program source materials or viewable program listings are provided for IBM Ported Tools for z/OS.

2.5 Publications Useful During Installation

The publications listed in Figure 2 may be useful during the installation of IBM Ported Tools for z/OS. To order copies, contact your IBM representative or visit the IBM Publications Center on the World Wide Web at:

<http://www.ibm.com/shop/publications/order>

<i>Figure 2 (Page 1 of 2). Publications Useful During Installation</i>	
Publication Title	Form Number
<i>IBM SMP/E for z/OS and OS/390 User's Guide</i>	SA22-7773
<i>IBM SMP/E for z/OS and OS/390 Commands</i>	SA22-7771

Figure 2 (Page 2 of 2). Publications Useful During Installation

Publication Title	Form Number
<i>IBM SMP/E for z/OS and OS/390 Reference</i>	SA22-7772
<i>IBM SMP/E for z/OS and OS/390 Messages, Codes, and Diagnosis</i>	GA22-7770
<i>z/OS Information Roadmap</i>	SA22-7500
<i>z/OS UNIX System Services Planning</i>	GA22-7800
<i>z/OS UNIX System Services Command Reference</i>	SA22-7802
<i>z/OS UNIX System Services User's Guide</i>	SA22-7801

3.0 Program Support

This section describes the IBM support available for IBM Ported Tools for z/OS features.

3.1 Program Services

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

3.2 Preventive Service Planning

Before installing the IBM Ported Tools for z/OS features, you should review the current Preventive Service Planning (PSP) information. If you obtained any IBM Ported Tools for z/OS features as part of a CBPDO, there is HOLDDATA and PSP information included on the CBPDO.

If the CBPDO is more than two weeks old when you install it, you should contact the IBM Support Center, use S/390 SoftwareXcel to obtain the current "PSP Bucket" or obtain the current PSP from the web at <https://techsupport.services.ibm.com/server/390.psp390>

For program support, access the Software Support web site at <http://www.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 IBM Ported Tools for z/OS are:

UPGRADE	SUBSET	Description
PORTED4ZOS	HOS1110	IBM Ported Tools for z/OS
PORTED4ZOS	HPRL110	IBM Ported Tools for z/OS - Perl
PORTED4ZOS	HPHP110	IBM Ported Tools for z/OS - PHP

3.3 Statement of Support Procedures

Report any difficulties you have using this program to your IBM Support Center. If an APAR is required, the Support Center will provide the address to which any needed documentation can be sent.

Figure 4 identifies the component IDs (COMPID) for IBM Ported Tools for z/OS, Perl for z/OS and PHP for z/OS.

Figure 4. Component IDs

FMID	COMPID	Component Name	RETAIN Release
HOS1110	5655M2301	Ported Tools	110
HPRL110	5655M2303	Perl for z/OS	110
HPHP110	5655M2304	PHP for z/OS	110

4.0 Program and Service Level Information

This section identifies the program and any relevant service levels of IBM Ported Tools for z/OS and features. The program level refers to the APAR fixes incorporated into the program. The service level refers to the PTFs incorporated into the program.

4.1 Program Level Information

No APARs have been incorporated into IBM Ported Tools for z/OS or its features.

4.2 Service Level Information

No PTFs have been incorporated into IBM Ported Tools for z/OS or its features.

5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating IBM Ported Tools for z/OS, Perl for z/OS and PHP for z/OS. The following terminology is used:

- *Driving system*: the system used to install the program.
- *Target system*: the system on which the program is installed.

In many cases, the same system can be used as both a driving system and a target system. However, you may want to set up a clone of your system to use as a target system by making a separate IPL-able copy of the running system. The clone should 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.

Some cases where two systems should be used include the following:

- When installing a new level of a product that is already installed, the new product will delete the old one. By installing onto a separate target system, you can test the new product while still keeping the old one in production.
- When installing a product that shares libraries or load modules with other products, the installation can disrupt the other products. Installing onto a test system or clone will allow you to 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 IBM Ported Tools for z/OS and its features.

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 5. Driving System Software Requirements for IBM Ported Tools for z/OS and its features

Program Number	Product Name and Minimum VRM/Service Level
Any one of the following:	
5694-A01	z/OS V1.6.0 or higher
5655-G52	z/OS.e V1.6.0 or higher

The user ID under which the SMP/E installation jobs execute must have the following characteristics:

- Defined to use z/OS UNIX System Services (z/OS UNIX) or OS/390 UNIX System Services (OS/390 UNIX)
- A superuser (UID=0) or have read access to the BPX.SUPERUSER resource in the RACF® facility class
- Have READ access to the BPX.FILEATTR.PROGCTL and BPX.FILEATTR.APF facility classes (or READ access to the BPX.FILEATTR.* generic facility class).

z/OS UNIX must be available in "full-function mode" with the shell and utilities available.

5.2 Target System Requirements

This section describes the environment of the target system required to install and use IBM Ported Tools for z/OS and its features.

5.2.1 Machine Requirements

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

5.2.2 Programming Requirements

5.2.2.1 Installation Requisites

An installation requisite is defined as a product that is required and **must** be present or one that is not required but **should** be present on the system for the successful installation of this product.

A mandatory installation requisite identifies products that are required, without exception, or this product **will not install** on your system. This includes products specified as PREs or REQs.

Note: When Perl for z/OS or PHP for z/OS is ordered, IBM Ported Tools for z/OS will also be included in the order.

Figure 6. Mandatory Installation Requisites for IBM Ported Tools for z/OS and its features

Program Number	Product Name and Minimum VRM/Service Level
Any one of the following:	
5694-A01	z/OS V1.6.0 or higher
5655-G52	z/OS.e V1.6.0 or higher

A conditional installation requisite identifies products that are **not** required for successful install but may resolve such things as certain warning messages at installation time. They include products that are specified as IF REQs.

IBM Ported Tools for z/OS has no conditional installation requisites. However, Perl for z/OS and PHP for z/OS do have conditional requisites. See below for more information.

<i>Figure 7. Conditional Installation Requisites for Perl for z/OS</i>		
Program Number	Product Name and Minimum VRM/Service Level	Function
5655-M23	IBM Ported Tools for z/OS PTF UA90262	Ported_Tools_License.readme update for Perl for z/OS

<i>Figure 8. Conditional Installation Requisites for PHP for z/OS</i>		
Program Number	Product Name and Minimum VRM/Service Level	Function
5655-M23	IBM Ported Tools for z/OS PTF UA33479	Ported_Tools_License.readme update for PHP for z/OS
5655-M23	IBM Ported Tools for z/OS: Perl for z/OS PTF UA33585	Ported_Tools_License.readme update for PHP for z/OS

5.2.2.2 Operational Requisites

An operational requisite is defined as a product that is required and **must** be present or a product that is not required but **should** be present on the system in order for this product to operate all or some of its functions.

A mandatory operational requisite identifies products that are required, without exception, or this product **will not operate** its basic function unless the requisite is met. This includes products specified as PREs or REQs.

<i>Figure 9. Mandatory Operational Requisites for IBM Ported Tools for z/OS and its features</i>	
Program Number	Product Name and Minimum VRM/Service Level
Any one of the following:	
5694-A01	z/OS V1.6.0 or higher
5655-G52	z/OS.e V1.6.0 or higher

A conditional operational requisite identifies products that are **not required** for the basic function but are needed at run time for this product to utilize specific functions. They may include products specified as IF REQs.

Figure 10. Conditional Operational Requisites for PHP for z/OS

Program Number	Product Name and Minimum VRM/Service Level	Description
5625-DB2	DB2 UDB for z/OS Version 8 and PTFs UQ86844, UK20888, and APAR PK41730 or higher	APAR PQ85495 LOB locator-based support APAR PK31468 SQL EXTENDED FETCH fix Fix for BLOB data over 2G
5635-DB2	DB2 V9 for z/OS and APAR PK41730 or higher	Fix for BLOB data over 2G

A toleration/coexistence requisite is defined as a product which must be present on a sharing system. 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 at different time intervals.

IBM Ported Tools for z/OS and its features have no toleration/coexistence requisites.

5.2.2.3 Incompatibility (Negative) Requisites

A negative requisite identifies products which must *not* be installed on the same system as this product.

IBM Ported Tools for z/OS and its features have no negative requisites.

5.2.3 DASD Storage Requirements

IBM Ported Tools for z/OS and its features' libraries can reside on all supported DASD types.

Figure 11 and Figure 12 lists the total space required for each type of library.

Figure 11. Total DASD Space Required by IBM Ported Tools for z/OS

Library Type	Total Space Required
Target	4 tracks of 3390
Distribution	474 tracks of 3390
HFS	470 tracks of 3390

Figure 12 (Page 1 of 2). Total DASD Space Required by Perl for z/OS

Library Type	Total Space Required
Target	4 tracks of 3390
Distribution	2400 tracks of 3390

Figure 12 (Page 2 of 2). Total DASD Space Required by Perl for z/OS

Library Type	Total Space Required
HFS	2400 tracks of 3390

Figure 13. Total DASD Space Required by PHP for z/OS

Library Type	Total Space Required
Target	4 tracks of 3390
Distribution	316 tracks of 3390
HFS	320 tracks of 3390

Notes:

1. IBM recommends use of system determined block sizes for efficient DASD utilization for all non-RECFM U data sets. For RECFM U data sets, IBM recommends a block size of 32760, which is the most efficient from a performance and DASD utilization perspective.
2. Abbreviations used for the data set type are:
 - U** Unique data set, allocated by this product and used only by this product. To determine the correct storage needed for this data set, this table provides all required information; no other tables (or Program Directories) need to be referenced for the data set size.
 - S** Shared data set, allocated by this product and used by this product and others. To determine the correct storage needed for this data set, the storage size given in this table needs to be added to 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 others. This data set is NOT allocated by this product. To determine the correct storage needed for this data set, the storage size given in this table needs to be added to other tables (perhaps in other program directories). This existing data set 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 one and reclaim the space used by the old release and any service that had been installed. You can determine whether or not 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 on the names and sizes of the required data sets, please refer to 6.1.6, "Allocate SMP/E Target and Distribution Libraries" on page 25.

3. Abbreviations used for the HFS Path type are:

- 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.

5. All target libraries listed have the following attributes:

- The data set may be SMS-managed.
- It is not required for the data set to be SMS-managed.
- It is not required for the data set to reside on the IPL volume.
- The values in the "Member Type" column are not necessarily the actual SMP/E element types identified in the SMPMCS.

6. All target libraries listed which contain load modules have the following attributes:

- The data set may be in the LPA.
- It is not required for the data set to be in the LPA.
- The data set may be in the LNKLIST.
- It is not required for the data set to be APF-authorized.

The following figures describe the target and distribution libraries and HFS paths required to install IBM Ported Tools for z/OS Perl for z/OS, and PHP for z/OS. The storage requirements of IBM Ported Tools for z/OS, Perl for z/OS and PHP for z/OS must be added to the storage required by other programs having data in the same library or path.

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 14. Storage Requirements for IBM Ported Tools for z/OS Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SAMPLIB	SAMPLIB	TVOL2	E	PDS	FB	80	4	2

Figure 15. Storage Requirements for Perl for z/OS Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SAMPLIB	sample	TVOL2	E	PDS	FB	80	4	2

Figure 16. Storage Requirements for PHP for z/OS 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
SAMPLIB	sample	TVOL2	E	PDS	FB	80	4	2

Figure 17. IBM Ported Tools for z/OS HFS Paths

DDNAME	T Y P E	Path Name
SFSUMBIN	P	/bin/IBM/
SFSUSAMP	P	/samples/IBM/
SFSUSBIN	P	/usr/sbin/IBM/
SFOTSSH	N	/usr/lib/ssh/IBM/
SFOM1MNC	P	/usr/man/C/man1/IBM/
SFSUMMSC	P	/usr/lib/nls/msg/C/IBM/
SEZABIN	P	/usr/lpp/tcpip/bin/IBM/

Figure 18. Perl for z/OS HFS Paths

DDNAME	T Y P E	Path Name
SHPEHFS	N	/usr/lpp/perl/IBM

Figure 19. PHP for z/OS HFS Paths

DDNAME	T Y P E	Path Name
SHPHPFS	N	/usr/lpp/php/IBM

Figure 20. Storage Requirements for IBM Ported Tools for z/OS Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
ASAMPLIB	E	PDS	FB	80	4	2
AFOMHFS	E	PDS	VB	255	20	3
AFOMMOD1	E	PDS	U	6144	450	5

Figure 21. Storage Requirements for Perl for z/OS Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
ASAMPLIB	E	PDS	FB	80	4	2
AHPEHFS	N	PDS	VB	255	2400	250

Figure 22. Storage Requirements for PHP for z/OS Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
ASAMPLIB	E	PDS	FB	80	4	2
AHPHPFS	N	PDS	VB	255	316	6

5.3 FMIDs Deleted

No FMIDs are deleted.

5.4 Special Considerations for IBM Ported Tools for z/OS

If you are using an unsupported version of OpenSSH, such as the version that can be obtained from the Tools and Toys page on the z/OS UNIX System Services (z/OS UNIX) Web site, you will need to migrate to the supported version. This process is described in Chapter 1 of the *IBM Ported Tools for z/OS User's Guide, SA22-7985*, which can be downloaded from the following Web site:

http://www.ibm.com/servers/eserver/zseries/zos/unix/port_tools.html

For your reference, the Tools and Toys page is at

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxaltoy.html>

5.5 Special Considerations for Perl for z/OS

If you are using an unsupported version of Perl, such as the version available from the CPAN.org Web site, or the version that can be obtained from the Tools and Toys page on the z/OS UNIX System Services (z/OS UNIX) Web site, you will need to migrate to the supported version. This process is described in Chapter 1 of the *IBM Ported Tools for z/OS: Perl for z/OS Feature User's Guide and Reference, SA23-1347*, which can be downloaded from the following Web site:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/perl/>

For your reference, the Tools and Toys page is at

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxaltoy.html>

5.6 Special Considerations for PHP for z/OS

If you are using an unsupported version of PHP, such as the version available from the php.net Web site, or the version that can be obtained from the Tools and Toys page on the z/OS UNIX System Services (z/OS UNIX) Web site, you will need to migrate to the supported version. This process is described in Chapter 1 of the *IBM Ported Tools for z/OS: PHP for z/OS Feature User's Guide and Reference, SA23-2210*, which can be downloaded from the following Web site:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/php/>

For your reference, the Tools and Toys page is at

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxaltoy.html>

6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of IBM Ported Tools for z/OS and its features.

Please note the following:

- If you want to install IBM Ported Tools for z/OS and its features into their own SMP/E environment, consult the SMP/E manuals for instructions on creating and initializing the SMPCSI and the SMP/E control data sets.

However, the IBM Ported Tools for z/OS FMID HOS1110 must be installed into the system target and dlib zones. FMID HOS1110 has installation requisites for the following z/OS base FMIDs: HLE7707, HOT7707, and HBB7707. Note that these requisite FMIDs can be satisfied by having these FMIDs or corresponding higher ones in the same zone as HOS1110.

- Sample jobs have been provided to help perform some or all of the installation tasks. The SMP/E jobs assume that all DDDEF entries required for SMP/E execution have been defined in the appropriate zones.
- The SMP/E dialogs may be used instead of the sample jobs to accomplish the SMP/E installation steps.

6.1 Installing IBM Ported Tools for z/OS and its features

6.1.1 SMP/E Considerations for installing IBM Ported Tools for z/OS and its features

This release of IBM Ported Tools for z/OS and its features is installed using the SMP/E RECEIVE, APPLY, and ACCEPT commands. The SMP/E dialogs may be used to accomplish the SMP/E installation steps.

6.1.2 SMP/E Options Subentry Values

The recommended values for some SMP/E CSI subentries are shown in Figure 23. Use of values lower than these may result in failures in the installation process. DSSPACE is a subentry in the GLOBAL options entry. PEMAX is a subentry of the GENERAL entry in the GLOBAL options entry. Refer to the SMP/E manuals for instructions on updating the global zone.

SUB-ENTRY	Value	Comment
DSSPACE	800,500,100	No comments
PEMAX	SMP/E Default	IBM recommends using the SMP/E default for PEMAX.

6.1.3 SMP/E CALLLIBS Processing

IBM Ported Tools for z/OS (FMID HOS1110) uses the CALLLIBS function provided in SMP/E to resolve external references during installation. When IBM Ported Tools for z/OS is installed, ensure that DDDEFs exist for the following libraries:

- CSSLIB
- SCEELKED

Note: The DDDEFs above are used only to resolve the link-edit for IBM Ported Tools for z/OS (FMID HOS1110) using CALLLIBS. These data sets are not updated during the installation.

Perl for z/OS (FMID HPRL110) and PHP for z/OS (FMID HPHP110) do not use the CALLLIBS function.

6.1.4 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install IBM Ported Tools for z/OS, Perl for z/OS and PHP for z/OS:

Figure 24. Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
FOTISMKD	MKDIR	Sample job to invoke the supplied FOTMKDIR EXEC to allocate HFS paths	IBM.HOS1110.F1
FOTISDDF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HOS1110.F1
HPEALLOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HPRL110.F1
HPEISMKD	MKDIR	Sample job to invoke the supplied HPEMKDIR EXEC to allocate HFS paths	IBM.HPRL110.F1
HPEDDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HPRL110.F1
HPEISHFS	ALLOCATE	Sample job to allocate separate optional HFS data set	IBM.HPRL110.F1
HPHPALLC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HPHP110.F1
HPHPMKD	MKDIR	Sample job to invoke the supplied HPHPMKDR EXEC to allocate HFS paths	IBM.HPHP110.F1
HPHPDDDF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HPHP110.F1
HPHPAPLY	APPLY	Sample SMP/E APPLY job	IBM.HPHP110.F1
HPHPACCP	ACCEPT	Sample SMP/E ACCEPT job	IBM.HPHP110.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 24 to find the appropriate relfile data set.

6.1.5 Perform SMP/E RECEIVE

Having obtained IBM Ported Tools for z/OS as part of a CBPDO, use the RCVPDO job found in the CBPDO RIMLIB data set to RECEIVE the IBM Ported Tools for z/OS FMIDs as well as any service, HOLDDATA, or preventive service planning (PSP) information included on the CBPDO tape. For more information, refer to the documentation included with the CBPDO.

6.1.6 Allocate SMP/E Target and Distribution Libraries

All data sets used by IBM Ported Tools for z/OS (FMID HOS1110), are allocated by other products, so no new allocations are required.

Edit and submit sample job HPEALLOC to allocate the SMP/E target and distribution libraries for Perl for z/OS (FMID HPRL110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

Edit and submit sample job HPHPALLC to allocate the SMP/E target and distribution libraries for PHP for z/OS (FMID HPHP110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

6.1.7 Allocate HFS Paths

Edit and submit sample job FOTISMKD to allocate the HFS paths for IBM Ported Tools for z/OS (FMID HOS1110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

Edit and submit sample job HPEISMKD to allocate the HFS paths for Perl for z/OS (FMID HPRL110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

Edit and submit sample job HPHPMKD to allocate the HFS paths for PHP for z/OS (FMID HPHP110). Consult the instructions in the sample job for more information.

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

Expected Return Codes and Messages: RC=0.

6.1.8 Create DDDEF Entries

Edit and submit sample job FOTISDDF to create DDDEF entries for the SMP/E target and distribution libraries for IBM Ported Tools for z/OS (FMID HOS1110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

Edit and submit sample job HPEDDDDF to create DDDEF entries for the SMP/E target and distribution libraries for Perl for z/OS (FMID HPRL110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

Edit and submit sample job HPHPDDDF to create DDDEF entries for the SMP/E target and distribution libraries for PHP for z/OS (FMID HPHP110). Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0.

6.1.9 Perform SMP/E APPLY CHECK and APPLY

Edit and submit the sample job - as shown in Figure 25 on page 27 - to perform an SMP/E APPLY CHECK for IBM Ported Tools for z/OS and its features.

If you are installing the PHP for z/OS feature, you can edit and submit sample job HPHPAPPLY to perform the SMP/E APPLY CHECK.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the following on the APPLY CHECK: PRE, ID, REQ, and IFREQ. This is because the SMP/E root cause analysis identifies the cause only of **ERRORS** and not of **WARNINGS** (SYSMODs that are bypassed are treated as warnings, not errors, by SMP/E).

Enhanced HOLDDATA introduced ERROR HOLDS against FMIDs for HIPER APARs. Prior to installing, you should ensure you have the latest Enhanced HOLDDATA (available at url <http://service.software.ibm.com/holdata/390holddata.html>). The FMID(s) should be installed regardless of the status of unresolved HIPERs, however, the software should not be deployed until the unresolved HIPERs have been analyzed to determine applicability.

There are two methods to complete an FMID installation where ++HOLDS for HIPERs exist for the FMID(s) being installed:

1. To ensure that all critical service is installed with the FMID(s), add the SOURCEIDs of PRP, and HIPER to the APPLY command. There may be PE or HIPER APARs that do not have resolving PTFs available yet. You need to analyze the symptom flags to determine if you want to BYPASS the specific ERROR HOLDS and continue the FMID installation.

```

APPLY S(fmid,fmid,...)
FORFMID(fmid,fmid,...)
SOURCEID(PRP,HIPER,...)
GROUPEXTEND .

```

This method requires more initial research, but will provide resolution for all HIPERs that have fixes available and are not in a PE chain. There may still be unresolved PEs or HIPERs which will require the use of BYPASS.

2. To install the FMID(s) as it would have been installed prior to Enhanced HOLDDATA, you can add a BYPASS(HOLDCLASS(HIPER)) operand to the APPLY command. This will allow the FMID to be installed even though there are HIPER ERROR HOLDS against it. Note that not all ERROR HOLDS were bypassed, only the HIPER ERROR HOLDS. After the FMID(s) are installed, the SMP/E REPORT ERRSYSMODS command should be run to identify any missing HIPER maintenance.

```

APPLY S(fmid,fmid,...)
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 bypass any HOLDS during the installation of the FMID(s) because fixing PTFs were not yet available you can use the APAR Status Tracking (AST) function of ServiceLink or the APAR Tracking function of ResourceLink to be notified when the fixing PTF is available.

Once you have taken any actions indicated by the APPLY CHECK, remove the CHECK operand and run the job again to perform the APPLY.

```

//APPLY JOB
//STEP1 EXEC PGM=GIMSMP,REGION=0M,TIME=NOLIMIT
//SMPCSI DD DSN=csiname,DISP=SHR
//SMPCNTL DD *
  SET BOUNDARY(targetzone) .
  APPLY CHECK
  FORFMID(HOS1110,HPRL110,HPHP110)
  SELECT(HOS1110,HPRL110,HPHP110)
  GROUPEXTEND(NOAPARS,NOUSERMODS)
  SOURCEID(PT4ZFIX,HIPER)
  BYPASS(HOLDSYSTEM,
  HOLDUSER,HOLDCLASS(UCLREL,ERREL,HIPER)) .
/*

```

Figure 25. SMP/E APPLY CHECK sample

Required Updates

1. Update the job parameters.
2. Replace the csiname on the SMPCSI DD statement with your CSI name.
3. Update targetzone to your target zone name.
4. Remove any FMIDs that you do not wish to install from the FORFMID and SELECT keywords.
5. Update 'PT4ZFIX' with the name of the fixes that were required, as documented in the software PSP bucket upgrade (PORTED4ZOS) subsets HOS1110, HPRL110, HPHP110.

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

Expected Return Codes and Messages from APPLY CHECK: RC=0.

Expected Return Codes and Messages from APPLY: RC=0.

6.1.10 Perform SMP/E ACCEPT CHECK and ACCEPT

Edit and submit the sample job - as shown in Figure 26 on page 29 - to perform an SMP/E ACCEPT CHECK for IBM Ported Tools for z/OS.

If you are installing the PHP for z/OS feature, you can edit and submit sample job HPHPACCP to perform the SMP/E ACCEPT CHECK.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the following on the ACCEPT CHECK: PRE, ID, REQ, and IFREQ. This is because the SMP/E root cause analysis identifies the cause only of **ERRORS** and not of **WARNINGS** (SYSMODs that are bypassed are treated as warnings, not errors, by SMP/E).

Before using SMP/E to load new distribution libraries, it is recommended that you set the ACCJCLIN indicator in the distribution zone. This will cause entries produced from JCLIN to be saved in the distribution zone whenever a SYSMOD containing inline JCLIN is ACCEPTed. For more information on the ACCJCLIN indicator, see the description of inline JCLIN in the SMP/E manuals.

Once you have taken any actions indicated by the ACCEPT CHECK, remove the CHECK operand and run the job again to perform the ACCEPT.

```

//ACCEPT JOB
//STEP1 EXEC PGM=GIMSMP,REGION=0M,TIME=NOLIMIT
//SMPCSI DD DSN=csiname,DISP=SHR
//SMPCNTL DD *
    SET BOUNDARY(dlibzone) .
    ACCEPT CHECK
    FORFMID(HOS1110,HPRL110,HPHP110)
    SELECT(HOS1110,HPRL110,HPHP110)
    GROUPEXTEND(NOAPARS,NOUSERMODS)
    SOURCEID(PT4ZFIX,HIPER)
    BYPASS(HOLDSYSTEM,
    HOLDUSER,HOLDCLASS(UCLREL,ERREL,HIPER)) .
/*

```

Figure 26. SMP/E ACCEPT CHECK sample

Required Updates

1. Update the job parameters.
2. Replace the csiname on the SMPCSI DD statement with your CSI name.
3. Update dlibzone to your dlib zone name.
4. Remove any FMIDs that you do not wish to install from the FORFMID and SELECT keywords.
5. Update PT4ZFIX with the name of the fixes that were required, as documented in the software PSP bucket upgrades (PORTED4ZOS) subsets HOS1110, HPRL110, HPHP110.

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

Expected Return Codes and Messages from ACCEPT CHECK: RC=0.

If PTFs containing replacement modules are being ACCEPTed, SMP/E ACCEPT processing will linkedit/bind the modules into the distribution libraries. During this processing, the Linkage Editor or Binder may issue messages documenting unresolved external references, resulting in a return code of 4 from the ACCEPT step. These messages can be ignored, because the distribution libraries are not executable and the unresolved external references will not affect the executable system libraries.

Expected Return Codes and Messages from ACCEPT: RC=0.

6.1.11 Run REPORT CROSSZONE

The SMP/E REPORT CROSSZONE command will identify requisites defined for products that have been installed in separate zones. This command will also create APPLY and ACCEPT commands in the SMPPUNCH data set which you can use to install those cross-zone requisites it identifies.

After you have installed IBM Ported Tools for z/OS, Perl for z/OS and PHP for z/OS, 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 describing all the target and distribution libraries to be reported on.

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

6.2 Activating IBM Ported Tools for z/OS

If you choose to have the HFS or zFS in which you have installed IBM Ported Tools for z/OS mounted in read-only mode during execution, then more tasks are required before making your filesystem read-only. Please refer to the publication described in the next paragraph.

The publication *IBM Ported Tools for z/OS User's Guide, SA22-7985* contains the step-by-step procedures to activate the functions of IBM Ported Tools for z/OS. It can be downloaded from the following Web site:

http://www.ibm.com/servers/eserver/zseries/zos/unix/port_tools.html

6.3 Activating Perl for z/OS

If you choose to have the HFS or zFS in which you have installed Perl for z/OS mounted in read-only mode during execution, then more tasks are required before making your filesystem read-only. Please refer to the publication described in the next paragraph.

The publication *IBM Ported Tools for z/OS: Perl for z/OS Feature User's Guide and Reference, SA23-1347* contains the step-by-step procedures to activate the functions of Perl for z/OS. It can be downloaded from the following Web site:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/perl/>

6.4 Activating PHP for z/OS

If you choose to have the HFS or zFS in which you have installed PHP for z/OS mounted in read-only mode during execution, then more tasks are required before making your filesystem read-only. Please refer to the publication described in the next paragraph.

The publication *IBM Ported Tools for z/OS: PHP for z/OS Feature User's Guide and Reference,*

SA23-2210 contains the step-by-step procedures to activate the functions of PHP for z/OS. It can be downloaded from the following Web site:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/php/>

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Reader's Comments

Program Directory for IBM Ported Tools for z/OS, May 25, 2007

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Ease of product installation	1	2	3	4	5	N
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Were the people who did the installation experienced with the installation of z/OS products?

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Printed in U.S.A.

G110-0769-01

