

IBM SMP/E for z/OS



User's Guide

IBM SMP/E for z/OS



User's Guide

Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 225.

Tenth edition, May 2006

This book replaces the previous edition, SA22-7773-08, which is now obsolete. Changes or additions to text and illustrations are indicated by a vertical line to the left of the change.

This edition applies to IBM SMP/E for z/OS, V3R4, program number 5655-G44, and to all subsequent releases and modifications, unless otherwise indicated in new editions.

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Contents

Figures	vii
--------------------------	------------

Tables	ix
-------------------------	-----------

About this book	xi
----------------------------------	-----------

Who should read this publication	xi
--	----

Bibliography	xi
------------------------	----

Summary of changes	xiii
-------------------------------------	-------------

Chapter 1. SMP/E primer	1
--	----------

What is SMP/E, and why should I use it?	1
---	---

Understanding your system	1
-------------------------------------	---

Changing the elements of the system	2
---	---

Keeping track of the elements of the system	7
---	---

How does SMP/E work?	9
--------------------------------	---

The distribution and target libraries	10
---	----

The consolidated software inventory (CSI)	11
---	----

What are the basic SMP/E commands I need to know?	12
---	----

Setting the zone you want to work on	13
--	----

Receiving the SYSMOD into SMP/E's data sets	13
---	----

Applying the SYSMOD to the target libraries	13
---	----

Restoring the target libraries to the previous level	13
--	----

Accepting the SYSMOD and updating the distribution libraries	13
--	----

Displaying SMP/E data	13
---------------------------------	----

Flow of SMP/E SYSMOD processing	14
---	----

Receiving the SYSMOD into SMP/E's data sets	14
---	----

What happens during RECEIVE processing	15
--	----

What happens during internet service retrieval	15
--	----

How SMP/E keeps track of RECEIVE processing	16
---	----

Using the RECEIVE command	17
-------------------------------------	----

Summary of the RECEIVE command	19
--	----

Applying the SYSMOD to the target libraries	19
---	----

What happens during APPLY processing	19
--	----

How SMP/E keeps track of APPLY processing	20
---	----

Using the APPLY command	21
-----------------------------------	----

Summary	23
-------------------	----

Restoring the target libraries to the previous level	23
--	----

What happens during RESTORE processing	24
--	----

How SMP/E keeps track of RESTORE processing	24
---	----

Using the RESTORE command	25
-------------------------------------	----

Summary	26
-------------------	----

Accepting the SYSMOD into the distribution libraries	27
--	----

What happens during ACCEPT processing	27
---	----

How SMP/E keeps track of ACCEPT processing	28
--	----

Using the ACCEPT command	28
------------------------------------	----

Summary	30
-------------------	----

Displaying SMP/E data	31
---------------------------------	----

Using the query dialogs	31
-----------------------------------	----

Using the LIST command	33
----------------------------------	----

Using the REPORT commands	34
-------------------------------------	----

SMP/E CSI application programming interface	35
---	----

Summary	35
-------------------	----

Chapter 2. SMP/E concepts	37
--	-----------

What is SMP/E?	37
--------------------------	----

What are SYSMODs?	37
-----------------------------	----

Data sets used by SMP/E	39
-----------------------------------	----

How SMP/E can help you install and maintain products	41
--	----

Where to begin	41
--------------------------	----

Installing SYSMODs	42
------------------------------	----

Monitoring your system	44
----------------------------------	----

Managing the SMP/E database	44
---------------------------------------	----

Managing zones	46
--------------------------	----

Linking and relinking modules	47
---	----

General SMP/E processing	47
------------------------------------	----

Chapter 3. Preparing to use SMP/E	49
--	-----------

Allocating and initializing data sets in the SMP/E database	49
---	----

CSI data sets	49
-------------------------	----

PTS data sets	62
-------------------------	----

SCDS data sets	62
--------------------------	----

How to dynamically allocate data sets to be used during SMP/E processing	62
--	----

Sources of information for dynamic allocation	63
---	----

How dynamic allocation works	64
--	----

Defining utility programs and associated parameters to SMP/E	64
--	----

Using default values for utility programs	65
---	----

Defining values for utility programs	66
--	----

Example: How to request the desired utility processing	68
--	----

Recovering after errors from utility processing	69
---	----

Overview of your input to retry processing	69
--	----

Example: How to request the desired retry processing	70
--	----

Connecting SMP/E dialogs to ISPF	71
--	----

Check for required programs	71
---------------------------------------	----

Add dialog modules to the PCF command table	71
---	----

Concatenate the dialog libraries	72
--	----

Connect the dialogs to ISPF	74
---------------------------------------	----

Customize the SMP/E dialogs	75
---------------------------------------	----

Setting up SMP/E for easier operation	76
---	----

Recommended values for OPTIONS entry	76
--	----

Recommended link edit utility output DDDEF entries	77
--	----

Specifying automatic cross-zone requisite checking	78
--	----

Defining the information needed to invoke SMP/E	81
---	----

Required JCL statements	81
-----------------------------------	----

Sample cataloged procedure for SMP/E	82
--	----

Defining exit routines	86
----------------------------------	----

Chapter 4. Preparing to use internet service retrieval	87
Identity and authentication overview	87
Obtaining a user certificate	88
Uploading the user certificate to z/OS	88
Setting up z/OS security server RACF	89
Access to the RACDCERT command	89
Creating keyrings	90
Enabling certificate authority certificates.	90
Adding the user certificate to your RACF data base	91
Sharing a user certificate among multiple userids	91
Refreshing RACF Classes	92
Setting up alternate security products	92
Define the ORDERSERVER input for RECEIVE ORDER.	92
Define the CLIENT Input for RECEIVE ORDER	93
Options that affect Java	93
Options that affect HTTPS operations.	94
Options that affect FTP operations.	95
Network configuration notes	96
Summary	97
Example	98

Chapter 5. Installing a new function 101

Introduction	101
RECEIVE-APPLY-ACCEPT method	101
Using the standard RECEIVE-APPLY-ACCEPT method	102
Preparing your system	102
Staging the SYSMODs: The RECEIVE process	103
Updating the target libraries: The APPLY process	104
Testing the new function	106
Updating the distribution libraries: The ACCEPT process	107
Checking other zones for requisites: REPORT CROSSZONE	108

Chapter 6. Installing preventive service 109

Introduction	109
CBPDO tapes	109
ESO tapes	110
A RECEIVE ORDER request	111
Preventive service process: Summary	111
Preparing your system	112
Staging the SYSMODs: The RECEIVE process	112
Updating the target libraries: The APPLY process	113
Checking the update (APPLY CHECK)	114
Updating the target library (APPLY).	117
Installing PTFs that need special processing	118
Testing the new service level	118
Updating the distribution libraries: The ACCEPT process	119
Checking the update (ACCEPT CHECK)	119
Updating the distribution library (ACCEPT)	120
Installing PTFs that need special processing	121

Chapter 7. Installing corrective service 123

Introduction	123
Building or checking the fix	124
Preparing your system	125
Staging the SYSMODs: the RECEIVE process	125
Generating a service request using the RECEIVE ORDER Command	126
Updating the target libraries: the APPLY process	126
Checking the update (APPLY CHECK)	127
Updating the target library (APPLY).	127
Testing the corrective service	128
Updating the distribution libraries: the ACCEPT process	128
Checking the update (ACCEPT CHECK)	128
Updating the distribution library (ACCEPT)	129

Chapter 8. Installing a user modification 131

Introduction	131
Preparing your system	131
Staging the SYSMODs: The RECEIVE process	131
Updating the target libraries: The APPLY process	132
Checking the update (APPLY CHECK)	132
Updating the target library (APPLY).	133
Testing the USERMOD	133
Updating the distribution libraries: The ACCEPT process	133

Chapter 9. Managing exception SYSMODs 135

Introduction	135
What SMP/E does with the HOLDDATA	136
Initial entry into staging data sets: RECEIVE	136
Updating target libraries: APPLY	137
Updating distribution libraries: ACCEPT	138
Removing HOLDDATA from SMP/E data sets	138
Sources of HOLDDATA	139
CBPDO tapes	139
ESO tapes	139
PSP information	140
Automated service delivery package	140
How to process HOLDDATA	140

Chapter 10. Creating cross-product, cross-zone load modules: The LINK MODULE command 147

When to use LINK MODULE	147
How to use LINK MODULE	148

Chapter 11. Displaying the data managed by SMP/E: The LIST command 149

Introduction	149
Listing all the SMP/E data	149
Listing by specific entry type	150
Listing specific entries	151
Listing by FMID or FMIDSET	152
Listing to compare two zones	153
Summary	154

Chapter 12. Changing the data SMP/E manages: The UCLIN command . . . 155

Introduction	155
When to use UCLIN	155
How to use UCLIN	156

Chapter 13. Identifying cross-zone requisites: The REPORT CROSSZONE command 159

Introduction	159
Defining a ZONESET	159
Running the REPORT CROSSZONE command	160
Installing the SYSMODs	161

Chapter 14. Identifying installed SYSMODs affected by error holds: The REPORT ERRSYSMODS command 163

Introduction	163
Running the REPORT ERRSYSMODS command	163
Installing the SYSMODs	164

Chapter 15. Listing the source IDs in a zone: The REPORT SOURCEID command 165

Introduction	165
Running the REPORT SOURCEID command	165
Listing the SYSMODs	165

Chapter 16. Comparing the SYSMODs installed in two zones: The REPORT SYSMODS command 167

Introduction	167
Running the REPORT SYSMODS command	167
Installing the SYSMODs	167

Chapter 17. Building a user modification 169

Choosing between a USERMOD and a function SYSMOD	169
Creating the MCSs	170
The ++USERMOD MCS	170
The ++VER MCS	170
The ++JCLIN MCS	172
++MOD and ++ZAP MCSs	172
++MAC and ++MACUPD MCSs	172
++SRC and ++SRCUPD MCSs	173
The ++PROGRAM MCS	173
Data element MCSs	173
Hierarchical file system element MCSs	174
Examples of USERMODs	174
Example 1: Updating a module	174
Example 2: Replacing a module	175
Example 3: Adding new modules	175
Example 4: Replacing a macro or source code	176
Example 5: Updating a macro or source code	177
Example 6: Adding new source code	177

Example 7: Adding new source code that uses an IBM-supplied macro	179
Example 8: Adding a new module that uses an IBM-Supplied macro	180

Chapter 18. Determining which SYSMODs led others to fail: The causer SYSMOD summary report. . . 183

Introduction	183
Using causer SYSMOD information	183
Resolving errors for all SYSMODs that failed	183
Resolving errors for a single SYSMOD that failed	184
Example	184

Chapter 19. Java archive update exploiter's guide 187

JAR replacements in FMIDs	187
JAR updates in PTFs	187
JAR replacements in PTFs	188

Appendix A. Migration 191

Migration overview	191
Terms you need to know	191
SMP/E release levels	192
Developing a migration strategy	192
SMP/E V3R4 overview	193
Enhancement to the RECEIVE command	194
Impacts to SMP/E zone entries	194
ICSF not required for GIMZIP and RECEIVE FROMNETWORK	195
Improved load module build processing	195
SMP/E administration dialog	195
SMP/E query dialog	195
SMP/E V3R3 overview	196
GIMGTPKG service routine	196
Enhancements to GIMZIP and GIMUNZIP service routines	196
RECEIVE FROMNETWORK FTP interface enhancements	196
REJECT CHECK command	197
Extended RECEIVE SOURCEID processing	197
SPCLCMOD and CMWA	197
SMP/E V3R2 overview	197
LINK LMODS command	197
REPORT CALLLIBS command removal	198
UPGRADE command	198
GIMXSID service routine	198
GIMZIP: Archive segmentation	198
GIMZIP: User defined subdirectories	199
Java archive files	199
Smaller SMPLTS data set	199
DUMMY data set for SYSDEFSD	200
SMP/E dialog customization	201
GIMUTTBLE removal	201
SMP/E V3R1 overview	201
Defining exit routines using SMPPARM member GIMEXITS	202
Dynamic allocation using SMPPARM member GIMDDALC	202

Enhanced link name values.	202	Enhanced internal HOLD SYS processing	211
Removal of function to create backup		Enhanced ZONEEDIT command	211
IEANUC01 load modules	203	Enhancements to the binder utility in	
Conditional JCLIN processing	203	DFSMS/MVS	211
Network delivery of SMP/E input	203	System/390 service update facility	212
AMODE=64 and COMPAT=PM4 link edit		OS/390 version 1 release 2 SMP/E overview	212
parameters	204	BLOCKSIZE=8800 for SMP/E data sets.	212
Selected SMP/E data sets may now reside in a		BUILDMCS command	212
UNIX file system	204	Bypassing system holds for specific SYSMODs	212
HFS data set identification	204	FMIDSET selection	213
SMPPTS spill data sets	204	Receiving relative file data sets created from	
HOLDDATA summary reports	205	PDSEs.	213
SMP/E load modules and service routines		SMP/E dialogs: FIND command	213
moved to SYS1.MIGLIB	205	SMP/E GIMOPCDE member moved from	
GIMXTRX service routine	205	PARMLIB	213
OS/390 version 2 release 7 SMP/E overview	205	Summary of interface changes.	213
SMP/E planning and migration assistant	205	Commands	214
Data element reformatting	205	Data sets and files.	214
Description for a SYSMOD	206	Exits	215
Improved protection for UNIX file system files	206	Macros	215
Pre-built load module support.	206	Messages.	215
Product data	206	Panels.	215
Sequential data set support.	206	Programming interfaces	217
Shell script support	206	Service routines	217
Symbolic link support	207	SMPPARM members	218
OS/390 version 2 release 5 SMP/E overview	207	SYS1.SAMPLIB members	218
CBIPO dialogs	207		
Client code installation	207	Appendix B. Recommended service	
Global zone merge	207	upgrade (RSU)	221
Library change interface.	207		
Improved load module build processing	208	Appendix C. Accessibility	223
Load module return code	208	Using assistive technologies	223
Performance improvements.	208	Keyboard navigation of the user interface	223
PTF compaction in SMPPTS data set	208	z/OS information	223
Enhanced RECEIVE command processing.	208		
Reduced SMP/E message output.	209	Notices	225
GIMAPI: All entries and subentries support	209	Trademarks	226
GIMAPI: Version support	209		
OS/390 version 1 release 3 SMP/E overview	209	Glossary	229
API for user access to the CSI	209		
Enhanced cross-zone requisite checking	210	Index	243
Enhanced exception SYSMOD report	210		
Enhanced ++IF FMID processing	211		

Figures

1. Load module creation	2	24. Sample multiple-CSI structure	51
2. Introducing an element	4	25. Using a separate global zone for each subsystem	52
3. Preventing problems with an element	5	26. Using one CSI for the whole system	53
4. Fixing problems with an element.	6	27. Using a master CSI	54
5. Customizing an element	7	28. Using a master CSI and a separate CSI for each zone	55
6. PTF replacement	8	29. Using a master CSI and one CSI per SREL	56
7. PTF prerequisite	8	30. Relationships between zone definition entries	59
8. Load module constructions.	9	31. Relationships of OPTIONS, UTILITY, zone definition entries and the SET command	67
9. The Public Library	10	32. Sample logon procedure that concatenates SMP/E and ISPF libraries.	74
10. The distribution and target libraries	11	33. Sample SMP/E cataloged procedure	84
11. z/OS system with SMP/E	12	34. APPLY SYSLIB concatenation: APPLY different from ACCEPT.	86
12. Flow of SMP/E SYSMOD Processing	14	35. ACCEPT SYSLIB concatenation: APPLY different from ACCEPT	86
13. Results of RECEIVE processing	17	36. SYSMOD Status Report: Sample Report for APPLY.	184
14. Results of APPLY Processing.	21	37. Causer SYSMOD summary report: sample report for APPLY	185
15. Results of RESTORE Processing.	25		
16. Results of ACCEPT Processing	28		
17. Query selection menu	32		
18. CSI query panel	32		
19. CSI query - Select entry panel	32		
20. CSI query - SYSMOD entry panel	33		
21. Example of a SYSMOD hierarchy	39		
22. Summary of zone relationships	40		
23. Sample single-CSI structure	50		

Tables

1. Publications for IBM SMP/E for z/OS, V3R4	xi	13. Alternatives to UCLIN	156
2. Entries controlling SMP/E processing.	59	14. Comparison of USERMODs and function SYSMODs	169
3. Entries describing the status and structure of the target and distribution libraries	60	15. Information needed to add new source code	177
4. Default values for UTILITY entries.	65	16. Summary of changed commands	214
5. How to request the desired utility processing	68	17. Summary of changed data sets.	214
6. How to request the desired retry processing	70	18. Summary of Changed Macros	215
7. ISPF libraries and related SMP/E target libraries.	72	19. Summary of new and changed panels	215
8. SMPTABL data set allocations	73	20. Summary of SMP/E programming interfaces	217
9. Sources for functions and their installation information	101	21. Summary of SMP/E service routines	218
10. Format of a CBPDO tape.	110	22. Summary of SMP/E changes to SYS1.SAMPLIB	218
11. Format of an ESO	110	23. Summary of SMP/E changes to SYS1.SAMPLIB	218
12. CBPDO/service level/PSP HOLDDATA example	144		

About this book

This publication documents a new and enhanced version of SMP/E. New or changed information is identified by revision bars (|) to the left of the addition or change.

Who should read this publication

Anyone who uses SMP/E, or who wants to understand SMP/E processes, should read this publication.

After reading this publication, you should be able to do most SMP/E processes. You may have to refer to *SMP/E Commands* for details on commands.

Bibliography

This section tells you more about the SMP/E library.

- The IBM SMP/E for z/OS, V3R4 publications are available as printable PDF files and BookManager-viewable softcopy at <http://www.ibm.com/servers/eserver/zseries/zos/bkserv/>
- Table 1 lists the IBM SMP/E for z/OS, V3R4 publications and briefly describes each one.
- For information on z/OS publications and more information on the IBM SMP/E for z/OS, V3R4 books, see *z/OS Information Roadmap*.

Table 1. Publications for IBM SMP/E for z/OS, V3R4

Title	Description
<i>SMP/E Messages, Codes, and Diagnosis</i> , GA22-7770	Explains SMP/E messages and return codes and the actions to take for each; and how to handle suspected SMP/E problems.
<i>SMP/E Commands</i> , SA22-7771	Explains SMP/E commands and processing in detail.
<i>SMP/E Reference</i> , SA22-7772	Explains SMP/E modification control statements, data sets, exit routines, and programming interfaces in detail and provides additional SMP/E reference material.
<i>SMP/E User's Guide</i> , SA22-7773	Describes how to use SMP/E to install programs and service.

Bibliography

Summary of changes

Summary of changes for SA22-7773-09 May, 2006 SMP/E Version 3 Release 4

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

Changed information

Chapter 4, "Preparing to use internet service retrieval", has been rewritten to support APAR IO03469. New information has been added and some topics have been moved within the chapter.

Summary of changes for SA22-7773-08 April, 2006 SMP/E Version 3 Release 4

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

Changed information

- The last portion of the topic "Options that affect Java" on page 93 has been updated.

Summary of changes for SA22-7773-07 September 15, 2005 SMP/E Version 3 Release 4

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

New Information

- "Refreshing RACF Classes" on page 92 has been added.

Changed information

- The notes of "Setting up z/OS security server RACF" on page 89 has been updated.

Summary of changes for SA22-7773-07 SMP/E Version 3 Release 4

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

Changed information

- Added **javahome** attribute information to “Options that affect Java” on page 93.
- Updated the summary and example at the end of Chapter 4, “Preparing to use internet service retrieval,” on page 87.

**Summary of changes
for SA22-7773-06
SMP/E Version 3 Release 4**

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

New information

- “What happens during internet service retrieval” on page 15 has been added.
- “Requesting a new PTF order with the RECEIVE ORDER command” on page 18 has been added.
- “Using internet service retrieval to request PTF or HOLDDATA: RECEIVE ORDER” on page 42 has been added.
- Chapter 4, “Preparing to use internet service retrieval,” on page 87 has been added.

Changed information

- Chapter 6, “Installing preventive service,” on page 109 has been updated.
- Chapter 7, “Installing corrective service,” on page 123 has been updated.
- Chapter 9, “Managing exception SYSMODs,” on page 135 has been updated.
- Chapter 11, “Displaying the data managed by SMP/E: The LIST command,” on page 149 has been updated.
- Chapter 12, “Changing the data SMP/E manages: The UCLIN command,” on page 155 has been updated.

Moved information

- None.

Deleted information

- None

**Summary of changes
for SA22-7773-04
SMP/E Version 3 Release 3**

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

New information

- Figure 18 on page 32 has been updated to reflect the new entry name wildcard capability of the CSI Query dialog panel (GIMQU1PO).
- “SMP/E V3R3 overview” on page 196 has been added to “Appendix A. Migration”. It includes migration information on:
 - “SPCLCMOD and CMWA” on page 197
 - “Extended RECEIVE SOURCEID processing” on page 197
 - “GIMGTPKG service routine” on page 196

- “Enhancements to GIMZIP and GIMUNZIP service routines” on page 196
- “RECEIVE FROMNETWORK FTP interface enhancements” on page 196
- “REJECT CHECK command” on page 197

Changed information

- None.

Moved information

- None.

Deleted information

- None.

Summary of changes for SA22-7773-03

SMP/E Version 3 Release 2

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (|) in the left margin indicates changes to the text and illustrations.

New information

- “SMP/E V3R2 overview” on page 197 has been added to “Appendix A. Migration”. It includes migration information on:
 - “LINK LMODS command” on page 197
 - “REPORT CALLLIBS command removal” on page 198
 - “UPGRADE command” on page 198
 - “GIMXSID service routine” on page 198
 - “GIMZIP: Archive segmentation” on page 198
 - “Java archive files” on page 199
 - “Smaller SMPLTS data set” on page 199
 - “DUMMY data set for SYSDEFSD” on page 200
 - “GIMZIP: User defined subdirectories” on page 199
 - “SMP/E dialog customization” on page 201
 - “GIMUTTBL removal” on page 201.
- Chapter 19, “Java archive update exploiter’s guide,” on page 187 has been added.
- “Relinking load modules that use CALLLIBS: LINK LMODS” on page 47 has been added.

Changed information

- Member GIMSAMPU in SYS1.SAMPLIB has been updated to provide sample job steps to allocate SMPCSI data sets and SMP/E operational data sets (such as SMPPTS and SMPLOG) and UCLIN statements to initialize the newly allocated SMPCSI data sets, as shown in “Allocating a CSI data set” on page 56 and Table 23 on page 218.
- “Handling cross-zone link-edits: LINK MODULE” on page 47 has been updated.
- “How dynamic allocation works” on page 64 has been updated.
- “Customize the SMP/E dialogs” on page 75 has been updated.
- “Updating target libraries: APPLY” on page 137 has been updated.

- “How to use LINK MODULE” on page 148 has been updated.
- “SMP/E load modules and service routines moved to SYS1.MIGLIB” on page 205 has been updated.
- “GIMXTRX service routine” on page 205 has been updated.
- Appendix B, “Recommended service upgrade (RSU),” on page 221 has been updated.

Moved information

- None.

Deleted information

- The chapter on using the REPORT CALLLIBS command has been deleted, because that command is no longer supported.

Summary of changes for SA22-7773-02 as Updated, March 2002

This revision reflects the deletion, addition, or modification of information to support miscellaneous maintenance items. A vertical bar (v) in the left margin indicates changes to the text and illustrations.

New information

- An appendix with z/OS product accessibility information has been added.

Changed information

- Table 23 on page 218 has been updated to include GIMCRSAM, GIMPRSAM, and GIMSAMPU.

Moved information

- None.

Deleted information

- None.

Summary of changes for SA22-7773-01 SMP/E Version 3

The book contains information previously presented in SA22-7773-00, which applied to z/OS Version 1 Release 1.

New information

- Appendix A, “Migration,” on page 191 has been added.
- SMPPARM member GIMDDALC in “How to dynamically allocate data sets to be used during SMP/E processing” on page 62 has been added.

Changed information

- “Example 1: Updating a module” on page 174 has been updated.

Moved information

- None.

Deleted information

- Information related to backup IEANUC01 load modules has been removed.

This book contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change. You may notice changes in the style and structure of some content in this book — for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our books.

Chapter 1. SMP/E primer

This chapter provides an introduction to SMP/E to new SMP/E users. If you are already familiar with SMP/E, you can skip this chapter.

What is SMP/E, and why should I use it?

SMP/E is a tool designed to manage the installation of software products on your z/OS system and to track the modifications you make to those products. Usually, it is the system programmer's responsibility to ensure that all software products and their modifications are properly installed on the system. The system programmer also has to ensure that all products are installed at the proper level so all elements of the system can work together. At first, that might not sound too difficult, but as the complexity of the software configuration increases, so does the task of monitoring all the elements of the system. To better understand this, let's take a closer look at your z/OS system and see how SMP/E can help you maintain it.

Understanding your system

Your z/OS system may appear to be one big block of code that drives your CPU. Actually, z/OS is a complex system comprising many different smaller blocks of code. Each of those smaller blocks of code perform a specific function within the system.

For example, some of the functions that can appear in a Z/OS system include:

- Base Control Program (BCP)
- C/C++ IBM Open Class Library
- Communications Server (CS z/OS)
- Cryptographic Services
- DCE Application Support
- DCE Base Services
- DFSMSdfp
- DFSORT
- Distributed File Service
- Encina Toolkit Executive
- Hardware Configuration Definition (HCD)
- High Level Assembler (HLASM)
- IBM HTTP Server
- IBM License Manager (ILM)
- Infoprint Server
- ISPF
- JES2 or JES3
- Language Environment
- Managed System Infrastructure (msys) for Setup
- Network File System
- Open Systems Adapter/Support Facility (OSA/SF)
- Resource Measurement Facility (RMF)

Introduction

- System Display and Search Facility (SDSF)
- SMP/E
- Time Sharing Option/Extensions (TSO/E)
- z/OS UNIX[®] System Services (z/OS UNIX)

Each system function is composed of one or more load modules. In a z/OS environment, a load module represents the basic unit of machine-readable, executable code. Load modules are created by combining one or more object modules and processing them with a link-edit utility. The link-editing of modules is a process that resolves external references and addresses. The functions on your system, therefore, are one or more object modules that have been combined and link-edited.

To see where the object modules come from, let's take a look at the example in Figure 1.

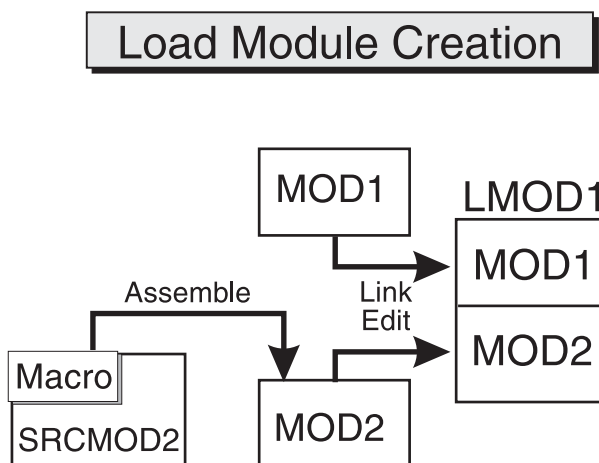


Figure 1. Load module creation

Most of the time, object modules are sent to you as part of a product. In this example, the object module MOD1 was sent as part of the product. Other times, you may need to assemble source code sent to you by product packagers to create the object module. You can modify the source code and then assemble it to produce an object module. In the example, SRCMOD2 is source code that you assemble to create object module MOD2. When assembled, you link-edit object module MOD2 with object module MOD1 to form the load module LMOD1.

In addition to object modules and source code, most products distribute many additional parts, such as macros, help panels, dialog elements, and other z/OS library members. These modules, macros, and other types of data and code are the basic building blocks of your system. All of these building blocks are called *elements*.

Changing the elements of the system

Over time, you may need to change some of the elements of your system. These changes may be necessary to improve the usability or reliability of a product. You may want to add some new functions to your system, upgrade some of the elements of your system, or modify some elements for a variety of reasons. In all cases, you are making system modifications. In SMP/E, we refer to these system modifications as *SYSMODs*.

A SYSMOD is the actual package containing information SMP/E needs to install and track system modifications. SYSMODs are composed of two parts:

- Modification control statements (MCS), designated by ++ as the first two characters, that tell SMP/E:
 - What elements are being updated or replaced
 - How the SYSMOD relates to product software and other SYSMODs
 - Other specific installation information
- Modification text, which is the object modules, macros, and other elements supplied by the SYSMOD

There are four different categories of SYSMODs, each supporting a task you might want to perform:

Function SYSMODs Introduce the elements for a product.

PTF (program temporary fix) SYSMODs
Prevent or fix problems with an element, or
introduce new element s.

APAR (authorized program analysis reports) SYSMODs
Fix problems with an element.

USERMOD (user modifications) SYSMODs
Customize an element.

Introducing an element—the function SYSMOD

One way you can modify your system is to introduce new elements into that system. To accomplish this with SMP/E, you can install a function SYSMOD. The function SYSMOD introduces a new product, a new version or release of a product, or updated functions for an existing product into the system. All other types of SYSMODs are dependent upon the function SYSMOD, because they are all modifications of the elements originally introduced by the function SYSMOD.

When we refer to installing a function SYSMOD, we are referring to the placing of all the product's elements in the system data sets, or *libraries*. Examples of these libraries are SYS1.LPALIB, SYS1.MIGLIB, and SYS1.SVCLIB. Figure 2 depicts the process of creating executable code in the production system libraries.

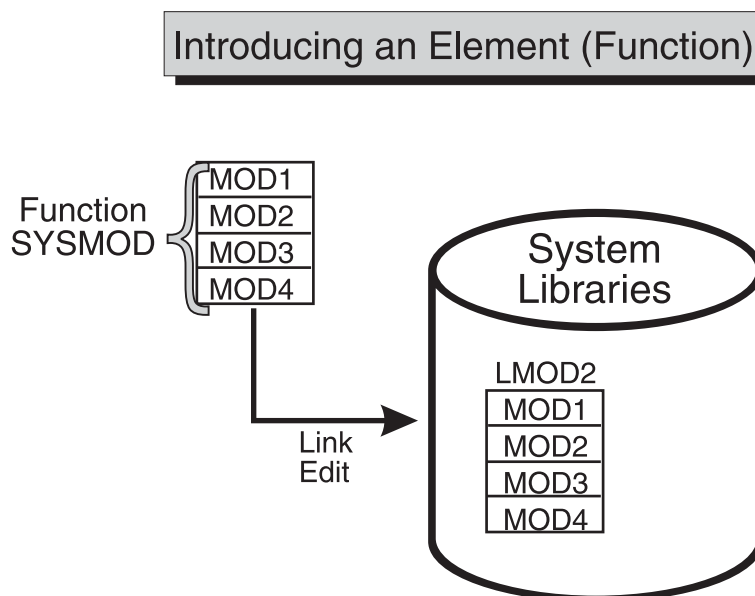


Figure 2. Introducing an element

In this figure, the installation of a function SYSMOD link-edits object modules MOD1, MOD2, MOD3, and MOD4 to create load module LMOD2. The executable code created in load module LMOD2 is installed in the system libraries through the installation of the function SYSMOD.

There are two types of function SYSMODs:

- A *base* function SYSMOD adds or replaces an entire system function. Examples of base functions are SMP/E and JES2.
- A *dependent* function SYSMOD provides an addition to an existing system function. It is called dependent because its installation depends upon a base function already being installed. Examples of dependent functions are the language features for SMP/E.

Both base function SYSMODs and dependent function SYSMODs are used to introduce new elements into the system.

Here's an example of a simple function SYSMOD that introduces four elements:

```

++FUNCTION(FUN0001)          /* SYSMOD type and identifier. */.
++VER(Z038)                  /* For MVS SREL */.
++MOD(MOD1)  RELFILE(1)      /* Introduce this module */.
                        DISTLIB(AOSFB) /* in this distribution library. */.
++MOD(MOD2)  RELFILE(1)      /* Introduce this module */.
                        DISTLIB(AOSFB) /* in this distribution library. */.
++MOD(MOD3)  RELFILE(1)      /* Introduce this module */.
                        DISTLIB(AOSFB) /* in this distribution library. */.
++MOD(MOD4)  RELFILE(1)      /* Introduce this module */.
                        DISTLIB(AOSFB) /* in this distribution library. */.

```

Preventing or fixing problems with an element—the PTF SYSMOD

When a problem with a software element is discovered, IBM supplies its customers with a tested fix for that problem. This fix comes in the form of a program temporary fix (PTF). Although you may not have experienced the problem the PTF

is intended to prevent, it is wise to install the PTF on your system. The PTF SYSMOD is used to install the PTF, thereby preventing the occurrence of that problem on your system.

Usually, PTFs are designed to replace or update one or more complete elements of a system function. Let's look at Figure 3.

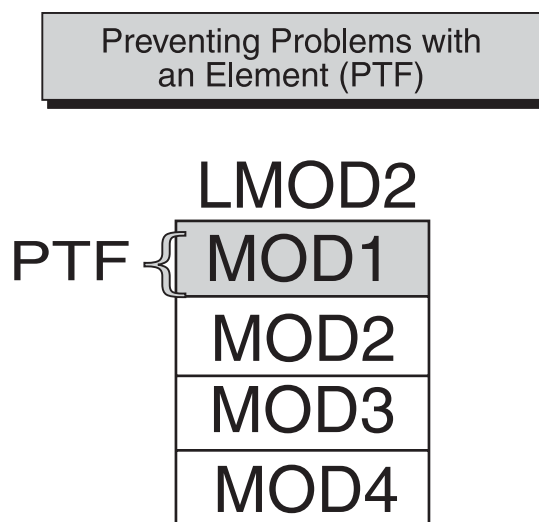


Figure 3. Preventing problems with an element

In Figure 3, we see a previously installed load module, LMOD2. If we want to replace the element MOD1, we should install a PTF SYSMOD that contains the module MOD1. That PTF SYSMOD replaces the element in error with the corrected element. As part of the installation of the PTF SYSMOD, SMP/E relinks LMOD2 to include the new and corrected version of MOD1.

Here is an example of a simple PTF SYSMOD:

```

++PTF(PTF0001)          /* SYSMOD type and identifier. */.
++VER(Z038) FMID(FUN0001) /* Apply to this product. */.
++MOD(MOD1)              /* Replace this module */.
                        DISTLIB(AOSFB) /* in this distribution library. */.
...
... object code for module
...

```

PTF SYSMODs are always dependent upon the installation of a function SYSMOD. In some cases, some PTF SYSMODs may also be dependent upon the installation of other PTF SYSMODs. These dependencies are called *prerequisites*. We will look at a typical PTF prerequisite when we discuss the complexity of keeping track of the elements of the system.

Fixing problems with an element—the APAR SYSMOD

You may sometimes find it is necessary to correct a serious problem that occurs on your system before a PTF is ready for distribution. In this situation, IBM supplies you with an authorized program analysis report (APAR). An APAR is a fix designed to quickly correct a specific area of an element or replace an element in error. You install an APAR SYSMOD to implement a fix, thereby updating the incorrect element.

In Figure 4, the shaded section shows an area of MOD2 containing an error.

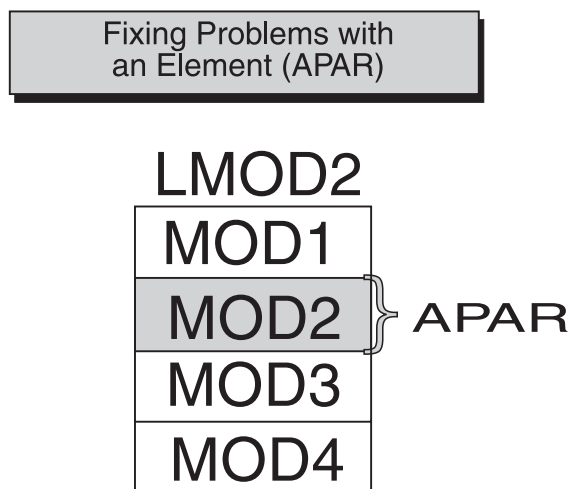


Figure 4. Fixing problems with an element

The processing of the APAR SYSMOD provides a modification for object module MOD2. During the installation of the APAR SYSMOD, MOD2 is updated (and corrected) in load module LMOD2.

Here is an example of a simple APAR SYSMOD:

```
++APAR(APAR001)          /* SYSMOD type and identifier. */.
++VER(Z038) FMID(FUN0001) /* Apply to this product      */.
                        PRE(UZ00004) /* at this service level. */.
++ZAP(MOD2)              /* Update this module       */.
                        DISTLIB(AOSFB) /* in this distribution library. */.
...
... zap control statements
...
```

The APAR SYSMOD always has the installation of a function SYSMOD as a prerequisite, and can also be dependent upon the installation of other PTF or APAR SYSMODs.

Customizing an element—the USERMOD SYSMOD

If you had a requirement for a product to perform differently from the way it was designed, you might want to customize that element of your system. IBM provides you with certain modules that allow you to tailor IBM code to meet your specific needs. After making the desired changes, you add these modules to your system by installing a USERMOD SYSMOD. This SYSMOD can be used to replace or update an element, or to introduce a totally new user-written element into the system. In either case, the USERMOD SYSMOD is built by you either to change IBM code or to add your own code to the system.

In Figure 5, MOD3 has been updated through the installation of a USERMOD SYSMOD.

Customizing an Element (USERMOD)

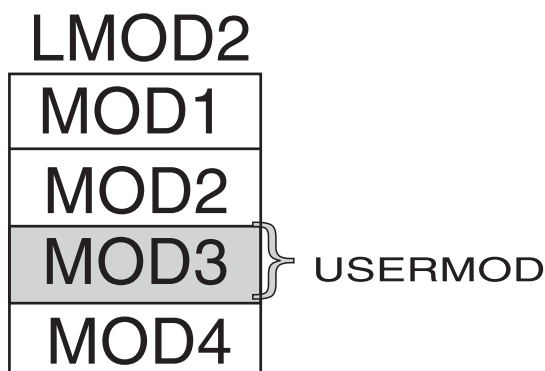


Figure 5. Customizing an element

Here is an example of a simple USERMOD SYSMOD:

```

++USERMOD(USRMOD1)          /* SYSMOD type and identifier. */.
++VER(Z038) FMID(FUN0001)    /* Apply to this product */.
                             PRE(UZ00004) /* at this service level. */.
++SRCUPD(JESMOD3)           /* Update this source module */.
                             DISTLIB(AOSFB) /* in this distribution library. */.
...
... update control statements
...

```

Prerequisites for USERMOD SYSMODs are the installation of a function SYSMOD, and possibly the installation of other PTF, APAR, or USERMOD SYSMODs.

SYSMOD prerequisites

As you have learned, PTF, APAR, and USERMOD SYSMODs all have the function SYSMOD as a prerequisite. In addition to their dependencies on the function SYSMOD:

- PTF SYSMODs may be dependent upon other PTF SYSMODs.
- APAR SYSMODs may be dependent upon PTF SYSMODs and other APAR SYSMODs.
- USERMOD SYSMODs may be dependent upon PTF SYSMODs, APAR SYSMODs, and other USERMOD SYSMODs.

Consider the complexity of these dependencies. When you multiply that complexity by hundreds of load modules in dozens of libraries, the need for a tool like SMP/E becomes apparent.

Let's examine the impact of these dependencies on the maintenance of software in a z/OS environment.

Keeping track of the elements of the system

The importance of keeping track of system elements and their modifications becomes readily apparent when we examine the z/OS maintenance process. Often, a PTF contains multiple element replacements. In the example in Figure 6, PTF1 contains replacements for two modules, MOD1 and MOD2. Although load module LMOD2 contains four modules, only two of those modules are being replaced.

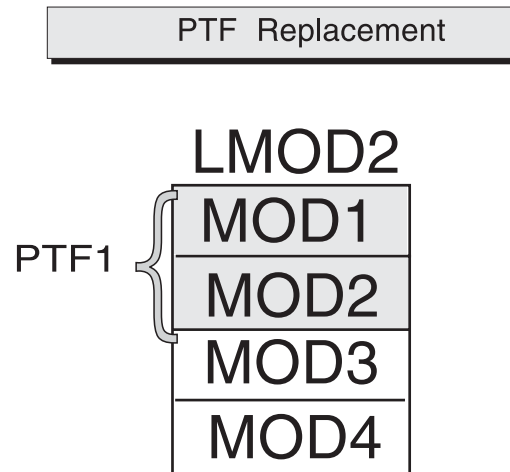


Figure 6. PTF replacement

But what happens if a second PTF replaces some of the code in a module that was replaced by PTF1? Let's look at Figure 7.

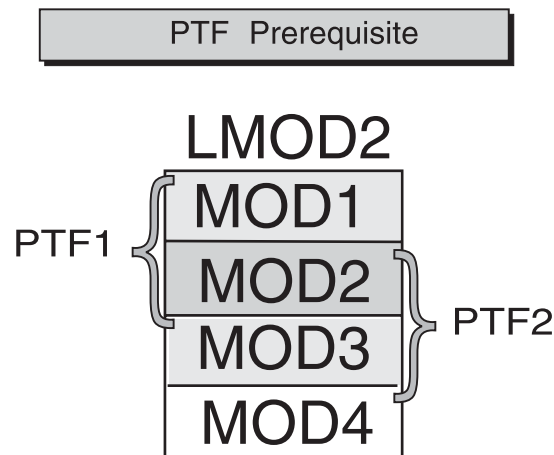


Figure 7. PTF prerequisite

In this example, PTF2 contains replacements for MOD2 and MOD3. For MOD1, MOD2, and MOD3 to interface successfully, PTF1 must be installed before PTF2. That's because MOD3 supplied in PTF2 may depend on the PTF1 version of MOD1 to be present. It is this dependency that constitutes a prerequisite. SYSMOD prerequisites are identified in the modification control statements (MCS) part of the SYSMOD package we discussed in "Changing the elements of the system" on page 2.

In addition to tracking prerequisites, there is another important reason to track system elements. The same module is often part of many different load modules. Let's take a look at the example in Figure 8 on page 9.

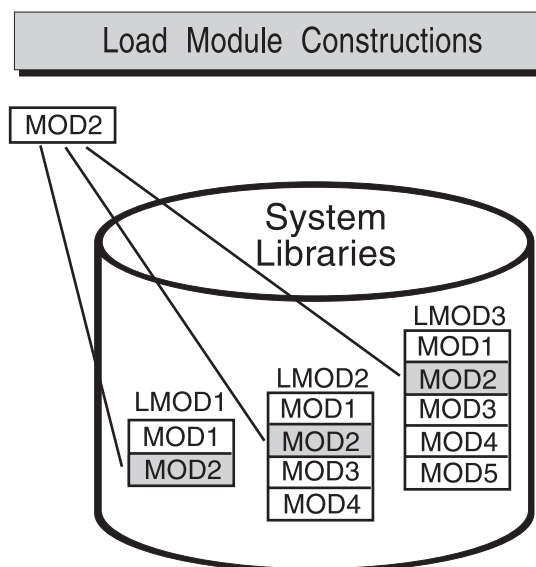


Figure 8. Load module constructions

In Figure 8, the same MOD2 module is present in LMOD1, LMOD2, and LMOD3. When a PTF is introduced that replaces the element MOD2, that module must be replaced in all the load modules in which it exists. Therefore, it is imperative that we keep track of all load modules and the modules they contain.

You can now appreciate how complicated the tracking of system elements and their modification levels can become. Let's take a brief look at how we implement the tracking capabilities of SMP/E.

Tracking and controlling requisites

To track and control elements successfully, all elements and their modifications and updates must be clearly identified to SMP/E. SMP/E relies on *modification identifiers* to accomplish this. There are three modification identifiers associated with each element:

- **Function modification identifiers (FMIDs)** that identify the function SYSMOD that introduced the element into the system.
- **Replacement modification identifiers (RMIDs)** that identify the last SYSMOD (usually a PTF SYSMOD) to replace the element.
- **Update modification identifiers (UMIDs)** that identify the SYSMODs that have updated an element since it was last replaced.

SMP/E uses these modification identifiers to track all SYSMODs installed on your system. This ensures that they are installed in the proper sequence. Now that we realize the need for element tracking and know the types of things SMP/E tracks, let's look at how SMP/E performs its tracking function.

How does SMP/E work?

Let's review our discussion of how functions are installed into the system. We begin with elements, such as modules, macros, and source code. These elements are then processed by utilities, such as an assembler or link-editor, to create load modules. The load modules contain the machine-readable, executable code.

Your production system in a z/OS environment consists of the z/OS operating system and all the code needed to do your everyday work. That's fine, but where is all that stuff kept, and how is it organized? Let's find out.

The distribution and target libraries

To properly perform its processing, SMP/E must maintain a great deal of information about the structure, content, and modification status of the software it manages. Think of all the information SMP/E has to maintain as if it were all the information contained in the public library. To follow this analogy, let's refer to Figure 9.

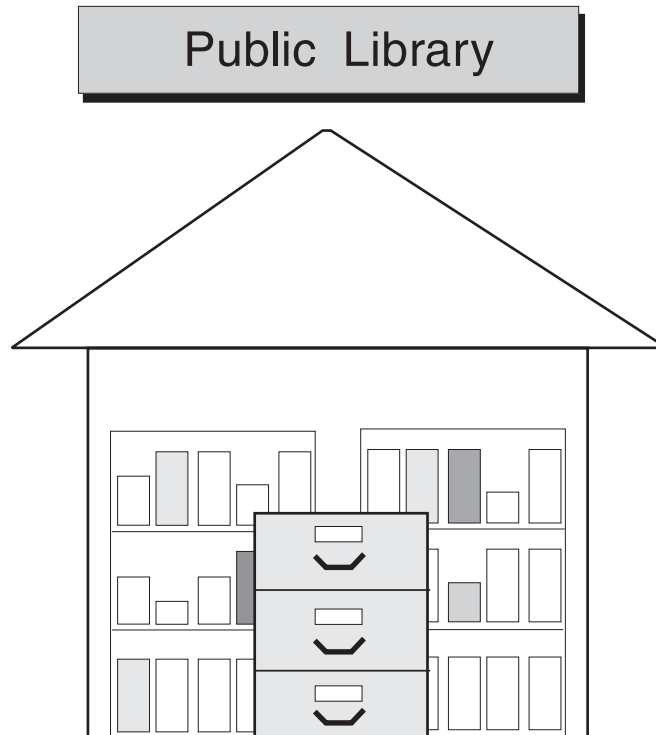


Figure 9. The Public Library

If you look at this figure depicting the public library, you see bookshelves filled with books and a card catalog with drawers containing a card for each book in the library. These cards contain information, such as the title, author, publishing dates, type of book, and a pointer to the actual book on the shelf.

In the SMP/E environment, there are two distinct types of "bookshelves." They are referred to as the *distribution libraries* and the *target libraries*. Figure 10 on page 11 depicts these two types of SMP/E libraries.

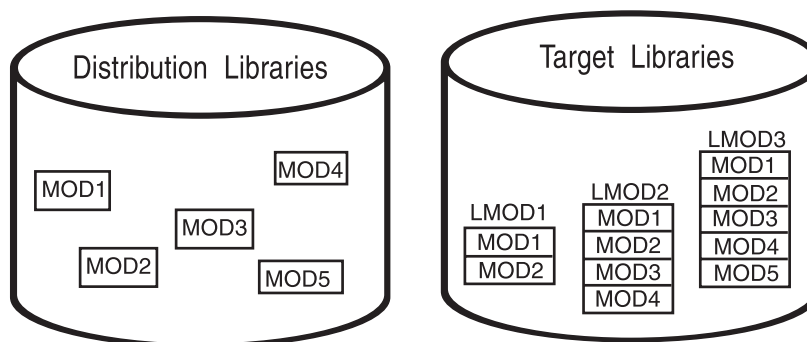


Figure 10. The distribution and target libraries

In much the same way the bookshelves in the public library hold the library books, the distribution and target libraries hold the elements of the system.

Distribution libraries contain all the elements, such as modules and macros, that are used as input for running your system. One very important use of the distribution libraries is for backup. Should a serious error occur with an element on the production system, the element can be replaced by a stable level found in the distribution libraries.

Target libraries contain all the executable code needed to run the system.

The consolidated software inventory (CSI)

As you refer to the analogy of the public library, you can see that there is one important piece of Figure 9 that we have not yet considered. In the public library, there is a card catalog to help you find the book or piece of information you are looking for. SMP/E provides the same type of tracking mechanism in the form of the *consolidated software inventory* (CSI).

The CSI data sets contain all the information SMP/E needs to track the distribution and target libraries. As the card catalog contains a card for each book in the library, the CSI contains an entry for each element in its libraries. The CSI entries contain the element name, type, history, how the element was introduced into the system, and a pointer to the element in the distribution and target libraries. The CSI does not contain the element itself, but rather a description of the element it represents.

Let's see exactly how these entries are arranged in the CSI.

The SMP/E zones

The cards in the public library card catalog are arranged alphabetically by the author's last name, and by the topic and title of the book. In the CSI, entries for the elements in the distribution and target libraries are grouped according to their installation status. That is, entries representing elements found in the distribution libraries are contained in the *distribution zone*. Entries representing elements found in the target libraries are contained in the *target zone*. Both of these zones serve the same purpose as the drawers of the public library card catalog.

In addition to the distribution and target zones, the SMP/E CSI also contains a *global zone*. The global zone contains:

- Entries needed to identify and describe each target and distribution zone to SMP/E
- Information about SMP/E processing options
- Status information for all SYSMODs SMP/E has begun to process

How SMP/E works

- Exception data for SYSMODs requiring special handling or that are in error

In SMP/E, when we speak of exception data, we are usually referring to *HOLDDATA*. *HOLDDATA* is often supplied for a product to indicate a specified SYSMOD should be held from installation. Reasons for holding a SYSMOD can be:

- A PTF is in error and should not be installed until the error is corrected (ERROR HOLD).
- Certain system actions may be required before SYSMOD installation (SYSTEM HOLD).
- The user may want to perform some actions before installing the SYSMOD (USER HOLD).

All the information found in the global zone, combined with the information found in the distribution and target zones, represents the data SMP/E needs to install and track your system software.

Remember the picture of the public library in Figure 9 on page 10? Now look at Figure 11.

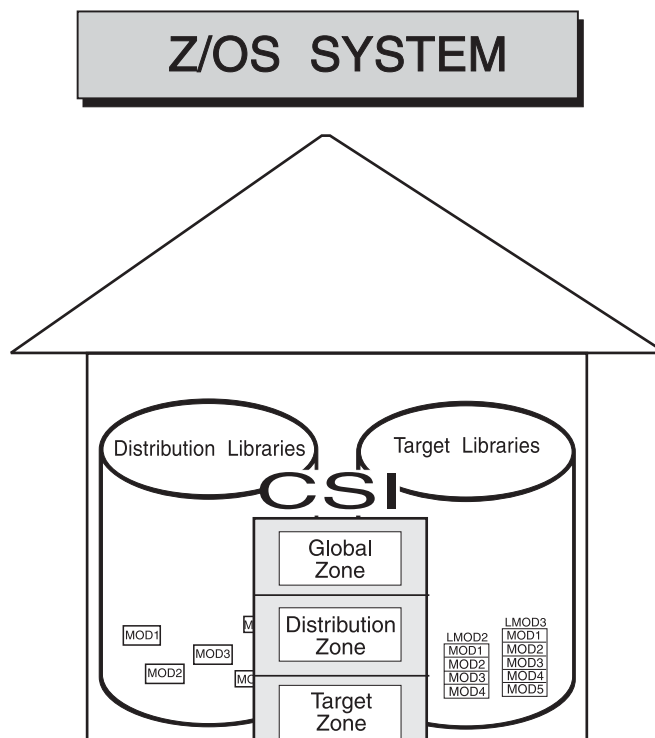


Figure 11. z/OS system with SMP/E

Now you can see how all the elements of the system fit together, and how they can be installed, modified, and tracked using SMP/E.

What are the basic SMP/E commands I need to know?

Now that you are familiar with SMP/E and what it can do, you are probably wondering what you need to know to get started using SMP/E. Let's take a look at the basic processing commands you need to know to use SMP/E.

Setting the zone you want to work on

Before processing SMP/E commands, you must first set the zone on which you want SMP/E to work (global, target, or distribution). You do this by issuing the **SET** command. The SET command identifies the zone and, therefore, the libraries, upon which subsequent SMP/E commands are to act.

The SET command can also be used to request a particular set of predefined processing options. For more information about the SET command, refer to *SMP/E Commands*.

Receiving the SYSMOD into SMP/E's data sets

For SMP/E to install a SYSMOD, the SYSMOD must be “received” into data sets that can be used by SMP/E. The SMP/E RECEIVE command performs the task of copying the SYSMOD from the distribution medium from which it was sent into the data sets used by SMP/E.

For more information about the RECEIVE command, refer to “Receiving the SYSMOD into SMP/E's data sets” on page 14.

Applying the SYSMOD to the target libraries

Once a SYSMOD has been received, you want to “apply” the SYSMOD to the appropriate target libraries. The SMP/E APPLY command invokes various system utilities to install the SYSMOD's elements into the target libraries.

For more information about the APPLY command, refer to “Applying the SYSMOD to the target libraries” on page 19.

Restoring the target libraries to the previous level

Should you experience problems after applying a SYSMOD, you may want to “restore” its elements in error to a previous and stable level. The SMP/E RESTORE command replaces a failing element with a copy from the distribution libraries.

For more information about the RESTORE command, refer to “Restoring the target libraries to the previous level” on page 23.

Accepting the SYSMOD and updating the distribution libraries

After you have performed a SYSMOD RECEIVE and APPLY, you want to “accept” the elements into the distribution libraries for backup. However, this should be done only after you are satisfied with the performance and stability of the elements of the SYSMOD. Once you ACCEPT a SYSMOD, you cannot RESTORE its element to a previous level. The SMP/E ACCEPT command updates the distribution libraries so they are available for backup of any future SYSMODs.

For more information about the ACCEPT command, refer to “Accepting the SYSMOD into the distribution libraries” on page 27.

Displaying SMP/E data

The SMP/E CSI and other primary data sets contain a great deal of information you may find useful when installing new elements or functions, preparing user modifications, or debugging problems. There are several ways SMP/E allows you to display that information, as well as information about modules, macros, and other elements:

Basic SMP/E commands

- **Query dialogs** display specific information you request through interactive dialogs with SMP/E.
- The **LIST command** generates a hardcopy listing of information about your system.
- **REPORT commands** check, compare, and generate hardcopy information about the contents of zones on your system.
- The **SMP/E CSI application programming interface** can be used to write application programs to query the contents of your system's CSI data sets.

For more information about displaying SMP/E data, refer to “Displaying SMP/E data” on page 31.

Flow of SMP/E SYSMOD processing

To see the flow of SMP/E SYSMOD processing for the RECEIVE, APPLY, RESTORE, and ACCEPT commands, let's look at Figure 12.

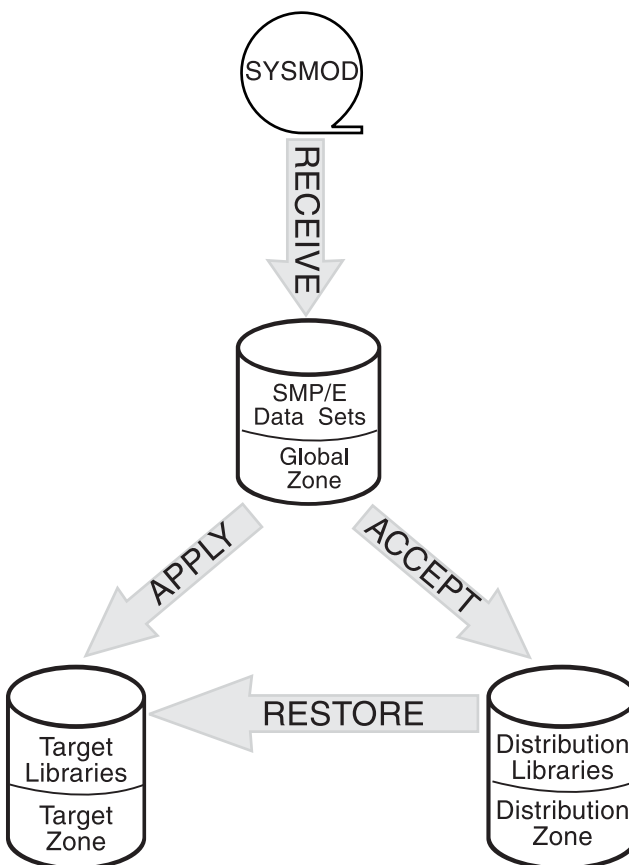


Figure 12. Flow of SMP/E SYSMOD Processing

Receiving the SYSMOD into SMP/E's data sets

To initiate SMP/E processing, you must first install the software into SMP/E data sets. You can use the RECEIVE command to load the SYSMOD information from the distribution medium into the SMPPTS and SMPTLIB data sets for later installation of the SYSMODs.

In this chapter, you will learn about those data sets and the following topics:

- “What happens during RECEIVE processing” on page 15

- “What happens during internet service retrieval”
- “How SMP/E keeps track of RECEIVE processing” on page 16
- “Using the RECEIVE command” on page 17
- “Summary of the RECEIVE command” on page 19

What happens during RECEIVE processing

SMP/E knows software in terms of SYSMODs. Each SYSMOD processed by SMP/E contains two types of information:

- Instructions telling SMP/E what elements are in the SYSMOD and how to install them
- The actual element replacements or updates contained in the SYSMOD

The instructions are made up of a series of control statements called *modification control statements* (MCSs). The element replacements or updates can be packaged in several ways:

- The **RELFILE** method packages the elements in relative files that are separate from the MCSs. This method is used mostly for function SYSMODs. (The examples in the remainder of this book assume that function SYSMODs are packaged in RELFILE format.)
- The **inline** method packages the elements immediately following the associated MCSs.
- The **indirect library** method packages elements in DASD data sets that are separate from the MCSs.

For more details about packaging, see the *z/OS Packaging Rules* manual.

During RECEIVE processing, the MCS for each SYSMOD is copied to an SMP/E temporary storage area called the *SMPPTS data set*. The MCS entry contains the MCS and any inline element replacements or updates for the SYSMOD. Relative files, however, are stored in another temporary storage area called the *SMPTLIB data sets*.

We briefly mentioned HOLDDATA earlier in the book (see “The SMP/E zones” on page 11). HOLDDATA is processed by the RECEIVE command and is stored for use later on during installation of the affected SYSMODs.

What happens during internet service retrieval

Internet Service Retrieval uses the SMP/E RECEIVE ORDER command to order software service directly from IBM. With RECEIVE ORDER processing, you run an SMP/E job that places the service order directly with the IBM Automated Delivery Request server, waits for the order to be fulfilled, and then downloads and processes the service package contents.

You can use the RECEIVE ORDER command to request HOLDDATA or PTF service orders based on criteria you specify. When you request HOLDDATA only, you receive the last two years of Enhanced HOLDDATA for the entire z/OS platform. You can request two types of PTF service orders:

Corrective

You can order PTFs that resolve specific APARS. The package resulting from such an order is tailored to your SMP/E environment and contains the PTFs you requested plus any requisite PTFs not already present in your environment.

Receiving the SYSMOD

Preventive

You can order all currently available PTFs that meet your selection criteria. The package resulting from such an order is tailored to your SMP/E environment and contains the PTFs that match your selection criteria plus any requisite PTFs not already present in your environment. There are three selection criteria:

Critical

Includes all available PTFs that resolve high impact pervasive (HIPER) problems or PTFs in error (PE).

Recommended

Includes all available PTFs identified with Recommended Service Update SOURCEID (RSUyymm) and all available PTFs that resolve a critical problem (HIPER or PE). Recommended service includes PTFs through the most recent RSU level.

All

Includes all available PTFs.

All PTF packages also contain the last two years of Enhanced HOLDDATA for the entire z/OS software platform.

Using the RECEIVE ORDER command, you can automate the service update process. For example, you can have an SMP/E job run every night at 1:00 AM to order and download the latest HOLDDATA and critical service, so the information is available locally and ready for use every morning.

How SMP/E keeps track of RECEIVE processing

SMP/E updates the global zone with information about the SYSMODs that have been received:

- **SYSMOD entries** are created in the global zone for each SYSMOD that has been received.
- **HOLDDATA entries** are created in the global zone for each ++HOLD statement that has been received. HOLDDATA entries identify SYSMODs that should be held back from being installed because they require special handling or are in error.

Figure 13 shows what you have learned about RECEIVE processing.

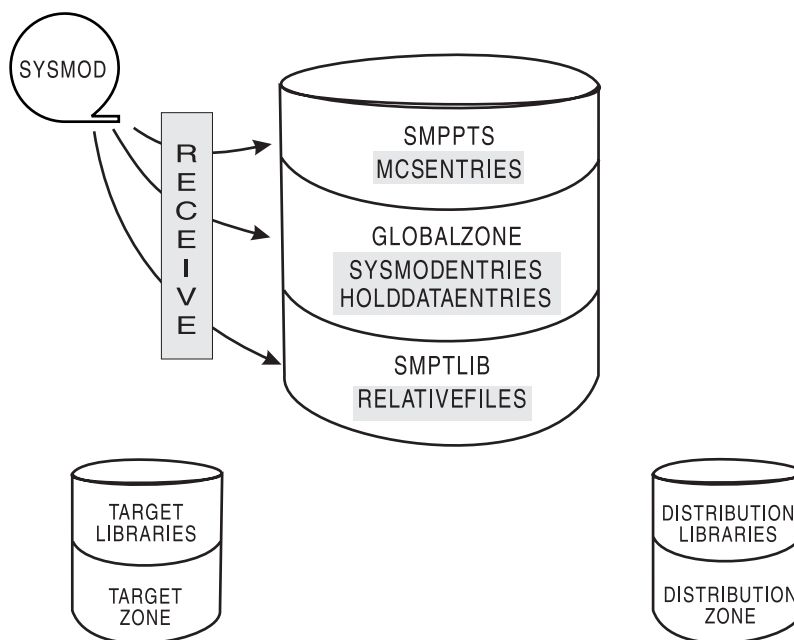


Figure 13. Results of RECEIVE processing

Using the RECEIVE command

In this section, you will see some basic examples of how you might use the RECEIVE command.

Examples

Let's look at a few of these examples.

Receiving SYSMODs and HOLDDATA: In the course of maintaining your system, you need to install service and process the related HOLDDATA. Assume IBM has supplied you with a service tape (such as a CBPDO tape or an ESO tape), and you want to install it on your system. The first step is to receive the SYSMODs and HOLDDATA that are contained on the tape. You can accomplish this by specifying the following commands:

```
SET      BDY(GLOBAL).
RECEIVE.
```

When you issue these commands, SMP/E receives all the SYSMODs and HOLDDATA on the service tape into the global zone.

Receiving only HOLDDATA: There may be times when you do not want to receive the SYSMODs from a service tape, but you do want to receive the HOLDDATA. Because the HOLDDATA provides information about SYSMODs requiring special handling or that are in error, it is important for you to receive the HOLDDATA into SMP/E's storage repository as soon as possible. The following commands process only the HOLDDATA:

```
SET      BDY(GLOBAL).
RECEIVE HOLDDATA.
```

By issuing these commands, you direct SMP/E to receive only the HOLDDATA from the service tape into the global zone.

Receiving the SYSMOD

Receiving only SYSMODs: Assume you have previously received only the HOLDDATA from a service tape and are now ready to install the SYSMODs. To install these SYSMODs (using the APPLY and ACCEPT commands), you must first receive them. This can be done by specifying the following commands:

```
SET      BDY(GLOBAL).
RECEIVE  SYSMODS.
```

When you issue these commands, you direct SMP/E to receive only the SYSMODs from the service tape into the global zone.

Receiving SYSMODs and HOLDDATA for a specific product: You may want to receive SYSMODs and HOLDDATA for a particular product from the service tape. You can accomplish this task by specifying the following commands:

```
SET      BDY(GLOBAL).
RECEIVE  FORFMID(HOP0001).
```

By issuing these commands, you direct SMP/E to receive SYSMODs and HOLDDATA for the product whose FMID is HOP0001 from the service tape into the global zone.

Requesting a new PTF order with the RECEIVE ORDER command: Assume you want to order two specific PTFs (UQ12345 and UQ98765). You can accomplish this task by specifying the following SMP/E job:

```
//jobname    JOB ...
//RECEIVE    EXEC PGM=GIMSMP
//SMPCSI     DD DSN=SMPE.GLOBAL.CSI,DISP=SHR
//SMPNTS     DD PATH='/u/smpe/smpnts/',PATHDISP=KEEP
//SMPOUT     DD SYSOUT=*
//SMPRPT     DD SYSOUT=*
//SYSPRINT   DD SYSOUT=*
//SMPCNTL    DD *
SET          BOUNDRY(GLOBAL).
RECEIVE      SYSMODS HOLDDATA
              ORDER(                               /* Place an order for service */
                  ORDERSERVER(ORDRSVR)
                  CONTENT(
                      PTFs(UQ12345,UQ98765) /* Get these PTFs, and any.. */
                      )                      /* ..requisites.. */
                  FORTGTZONES(ZOS14)        /* ..for this target zone */
                  ).
/*
//ORDRSVR DD *
<ORDERSERVER
  url="https://eccgw01.boulder.ibm.com/services/projects/ecc/ws/"
  keyring="MRWKYRNG"
  certificate="SMPE Client Certificate">
</ORDERSERVER>
/*
```

Note: An alternative url for the IBM Automated Delivery Request server is <https://eccgw02.rochester.ibm.com/services/projects/ecc/ws/>. In addition to receiving the specified PTFs, you receive any requisites for these PTFs that are not already present in the ZOS14 target zone.

For a more complete description of all the RECEIVE command operands and other examples, see The RECEIVE Command in *SMP/E Commands*.

Reporting output

When RECEIVE processing is complete, these reports will help you analyze the results:

- The **RECEIVE summary report** provides you with an at-a-glance look at all the SYSMODs that were processed during the RECEIVE command run. It shows you which SYSMODs were received, which were not received, and why.

Note: The SYSMODs listed in this report depend on the operands you specify on the RECEIVE command.

- The **RECEIVE exception SYSMOD Data report** provides you with a quick summary of the HOLDDATA information processed during the RECEIVE command run. It lists the SYSMODs requiring special handling or that are in error, and those SYSMODs no longer requiring special handling or that have had an error fixed.
- The **File allocation report** provides you with a list of the data sets used for RECEIVE processing and supplies information about these data sets.

For more information about these reports (and samples of actual reports), see SMP/E Reports in *SMP/E Commands*.

Summary of the RECEIVE command

Let's summarize what you have learned about using the RECEIVE command to load a SYSMOD into SMP/E's storage area. The RECEIVE command:

- Copies the MCS for each SYSMOD to the SMPPTS data set
- Loads elements into SMPTLIB data sets for SYSMODs using the relative file packaging method
- Records what is received in the global zone
 - SYSMOD entries
 - HOLDDATA entries
- Reports the results of processing

The RECEIVE ORDER command:

- Places the service order directly with the IBM Server
- Waits for the order to be fulfilled
- Downloads and processes the service package contents.

Applying the SYSMOD to the target libraries

After the SYSMODs have been received, you can use the APPLY command to install them into the appropriate target system libraries. The APPLY command calls system utilities, which are responsible for the actual updating of those libraries.

In this chapter, you will learn about the following topics:

- What happens during APPLY processing
- How SMP/E keeps track of APPLY processing
- Examples of using the APPLY command
- A summary of the APPLY command

What happens during APPLY processing

Throughout the APPLY process, SMP/E helps you manage the complexities of your system when installing SYSMODs.

Selecting the SYSMODs

You can specify operands on the APPLY command that tell SMP/E which of the received SYSMODs are to be selected for installation in the target libraries. SMP/E checks to make sure all other required SYSMODs (prerequisites) have been

Applying the SYSMOD

installed or are being installed concurrently and in the proper sequence. For more information about prerequisites, see “Keeping track of the elements of the system” on page 7.

Selecting the elements

During APPLY processing, SMP/E uses the information provided in the selected SYSMODs to determine which elements should be installed in the target libraries. The selection of elements is monitored by SMP/E to make sure that the correct functional level of each element is selected.

Checking the APPLY process

SMP/E provides you with an option to stop APPLY processing just before any updating takes place so you can ensure all prerequisites are satisfied before the installation of the SYSMODs. This helps you see what will happen (and helps you detect problem SYSMODs) without actually updating the target libraries.

Updating the target libraries

After the proper SYSMODs have been selected and the proper functional and service level of each element has been determined, the APPLY command directs SMP/E to call the system utilities. It is the system utilities that actually place the elements into the target libraries described in the target zone. The source of the elements is the SMPDLIB data sets, the SMPPTS data set, or the indirect libraries, depending on how the SYSMOD was packaged.

Note: Because the APPLY command updates the system libraries, you should **never** use it on a live production system. When you process the APPLY command, you should always use a **copy** of the target libraries and target zone. By using a copy, you minimize the risk of new code causing an outage of your system. This process of copying is called *cloning* and is explained in detail in the *OS/390 Software Management Cookbook*, SG24-4775.

How SMP/E keeps track of APPLY processing

SMP/E updates the information about the SYSMODs that have been applied. Remember, the target zone reflects the contents of the target libraries. Therefore, after the utility work is complete, and the target libraries have been updated, the target zone is updated to accurately reflect the status of those libraries.

- A SYSMOD entry is created in the **target zone** for each SYSMOD that has been applied. Element entries (such as MOD and LMOD) are also created in the target zone for those elements that have been installed in the target libraries.
- SYSMOD entries in the **global zone** are updated to reflect that the SYSMOD has been applied to the target zone.
- BACKUP entries are created in the **SMPSCDS data set** so the SYSMOD can later be restored, if necessary.

Figure 14 on page 21 shows what you have learned about APPLY processing.

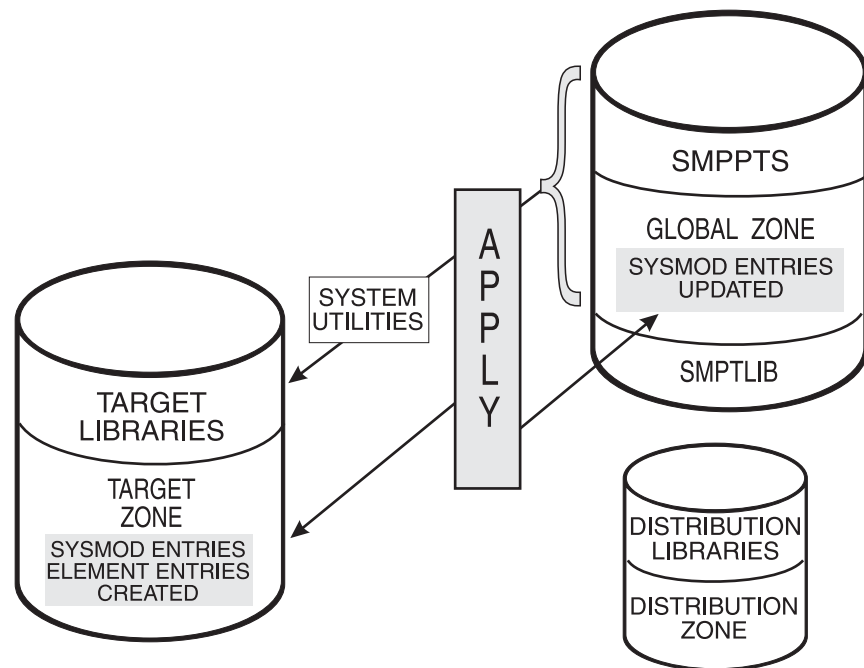


Figure 14. Results of APPLY Processing

Using the APPLY command

The APPLY command has many operands that allow you great flexibility in choosing which SYSMODs you want installed in your target libraries. It also provides you with a variety of output based on the operands you specify.

Examples

Let's look at a few examples of how you might use the APPLY command.

Applying PTF SYSMODs: After you have received the SYSMODs into the global zone, you can tell SMP/E that you want to install only the PTF SYSMODs. You can do this by specifying the following commands:

```
SET      BDY(ZOSTGT1).
APPLY    PTFS.
```

By issuing these commands, you direct SMP/E to apply all eligible PTF SYSMODs to target zone ZOSTGT1.

Suppose you do not want to install all the PTF SYSMODs, but only a select few. You can do this by specifying the following commands:

```
SET      BDY(ZOSTGT1).
APPLY    SELECT(UZ00001,UZ00002).
```

Issuing these commands results in the selection of only PTFs UZ00001 and UZ00002 for installation in target zone ZOSTGT1.

Applying APAR and USERMOD SYSMODs: You may want to install just corrective fixes (APARs) or user modifications (USERMODs) into the target libraries. You can accomplish this with the following commands:

Applying the SYSMOD

```
SET      BDY(ZOSTGT1).  
APPLY    APARS  
          USERMODS.
```

When you issue these commands, SMP/E installs all eligible APARs and USERMODs into target zone ZOSTGT1.

Applying SYSMODs for selected products: There may be times when you want to update only certain products on your system with the SYSMODs contained on a service tape. Assume you want to install all PTFs for a particular product to your system. This can be accomplished by specifying the following commands:

```
SET      BDY(ZOSTGT1).  
APPLY    PTFS  
          FORFMID(HOP0001).
```

or

```
SET      BDY(ZOSTGT1).  
APPLY    FORFMID(HOP0001).
```

In both cases, SMP/E applies all applicable PTFs for the product with FMID HOP0001 to target zone ZOSTGT1. Unless you specify otherwise, PTFS is the default SYSMOD type.

Applying SYSMODs having prerequisites: When installing a SYSMOD, you might not always know if it has prerequisites, or if the prerequisites are available. (Sometimes a prerequisite SYSMOD might not be received, or it might be held because it is in error.) In cases such as this, you can direct SMP/E to check whether an equivalent (or superseding) SYSMOD is available, by specifying the GROUPEXTEND operand.

Assume you want to update a product with all the eligible PTFs and APARs. You can do this by specifying the following commands:

```
SET      BDY(ZOSTGT1).  
APPLY    PTFS  
          APARS  
          FORFMID(HOP0001)  
          GROUPEXTEND.
```

By issuing these commands, you direct SMP/E to apply all PTFs and APARs, along with any other required SYSMODs to the product whose FMID is HOP0001 and is located in the ZOSTGT1 target zone. If SMP/E cannot find a required SYSMOD, it looks for and uses a SYSMOD that supersedes the required one.

Applying SYSMODs using the CHECK operand: In the previous example, you directed SMP/E to automatically include all SYSMODs needed for the specified product. There may be times when you want to see which SYSMODs are included before you actually install them. You can do this with the CHECK operand by issuing the following commands:

```
SET      BDY(ZOSTGT1).  
APPLY    PTFS  
          APARS  
          FORFMID(HOP0001)  
          GROUPEXTEND  
          CHECK.
```

After these commands are processed, you can check the SYSMOD Status report to see which SYSMODs would have been installed if you had not specified the

CHECK operand. If you are satisfied with the results of this trial run, you can issue the commands again, without the CHECK operand, to actually install the SYSMODs.

For a more complete description of all the APPLY command operands, and for additional examples, see APPLY Command in *SMP/E Commands*.

Reporting output

When APPLY processing is complete, these reports will help you analyze the results:

- The **SYSMOD status report** provides you with a summary of the processing that took place for each eligible SYSMOD, based on the operands you specified on the APPLY command. It shows you which SYSMODs were applied, which were not applied, and why.
- The **Element summary report** provides you with a detailed look at each element affected by APPLY processing. It tells you in which libraries the elements were installed.
- The **Causer SYSMOD summary report** provides you with a list of SYSMODs that caused other SYSMODs to fail, and describes the errors that must be fixed to successfully process the SYSMODs. This report can reduce the amount of work involved in figuring out which errors caused SYSMODs to fail.
- The **File allocation report** provides you with a list of the data sets used for APPLY processing and supplies information about these data sets.

Additional reports may be produced depending on the work being done and the content of the SYSMODs. For more information about all the reports produced by the APPLY command (and samples of actual reports), see The APPLY Command in *SMP/E Commands*.

Summary

Let's summarize what you have learned about using the APPLY command to install a SYSMOD in the target libraries. The APPLY command:

- Selects SYSMODs to install
- Checks that all other required SYSMODs have been (or are being) installed
- Based on SYSMODs, selects elements to install
- Directs SMP/E to call the system utilities to update the target libraries
- Records what is applied:
 - Target zone: Creates SYSMOD entries and element entries
 - Global zone: Updates SYSMOD entries
 - SMPSCDS data set: Creates BACKUP entries
- Reports the results of processing

Remember, you should **never** perform APPLY processing on a live production system!

Restoring the target libraries to the previous level

If you discover that a particular SYSMOD is causing a problem in your target libraries, you can remove it and replace the elements affected by it with the previous level of those elements, which is obtained from the backup (or distribution) libraries. If you are wondering how a backup version came to exist in the distribution libraries, this topic is covered in "Accepting the SYSMOD into the distribution libraries" on page 27.

Restoring target libraries

You can use the RESTORE command to remove SYSMODs from the target libraries and restore them to a previous level. The RESTORE command reverses APPLY processing, but has no effect on ACCEPT processing.

In this chapter, you will learn about the following topics:

- What happens during RESTORE processing
- How SMP/E keeps track of RESTORE processing
- Examples of using the RESTORE command
- A summary of the RESTORE command

What happens during RESTORE processing

SMP/E provides you with a method for removing an applied SYSMOD when its installation results in unexpected problems.

Removing the SYSMODs

SMP/E ensures the eligibility of the selected SYSMODs and checks whether other SYSMODs are affected before continuing with RESTORE processing. Because of the various relationships and dependencies among the many SYSMODs, this checking is very important to the integrity of your system. In fact, to ensure that the requisites for a SYSMOD being restored are processed appropriately, SMP/E may require the whole chain of prerequisites to be restored.

Selecting the elements

During RESTORE processing, SMP/E uses the information provided in the selected SYSMODs to determine which elements in the target zone should be replaced by elements in the related distribution libraries. The selection of elements is monitored by SMP/E to make sure that the correct functional level of each element is selected.

Checking the RESTORE process

SMP/E provides you with an option to stop RESTORE processing just before any updating takes place so you can ensure all prerequisites are satisfied before restoring any SYSMODs. This helps you see what will happen without actually making any changes to the elements in the target libraries.

Replacing the elements in the target libraries

When SMP/E is satisfied that the proper SYSMODs have been selected, it uses information from the target zone to determine which distribution zone describes the elements necessary to replace the SYSMOD's elements in the target libraries. The RESTORE command directs SMP/E to call system utilities that replace the elements in the target libraries with the previous level of the elements from the related distribution libraries.

How SMP/E keeps track of RESTORE processing

SMP/E updates the information about the SYSMODs that have been restored. Remember, the target zone reflects the contents of the target libraries. Therefore, after the utility work is complete, and the target libraries have been updated, the target zone is updated to accurately reflect the status of those libraries.

- All information in the **target zone** pertaining to the restored SYSMOD is removed. The element entries in the target zone are restored to reflect the distribution zone level of the elements.
- The **global zone** SYSMOD entries and MCS statements, which are stored in the SMPPTS data set, are deleted for those SYSMODs that have been restored. Any

SMPTLIB data sets created during RECEIVE processing are also deleted for the restored SYSMOD. SMP/E automatically performs this global zone clean-up, unless you specify otherwise.

Figure 15 shows what you have learned about RESTORE processing.

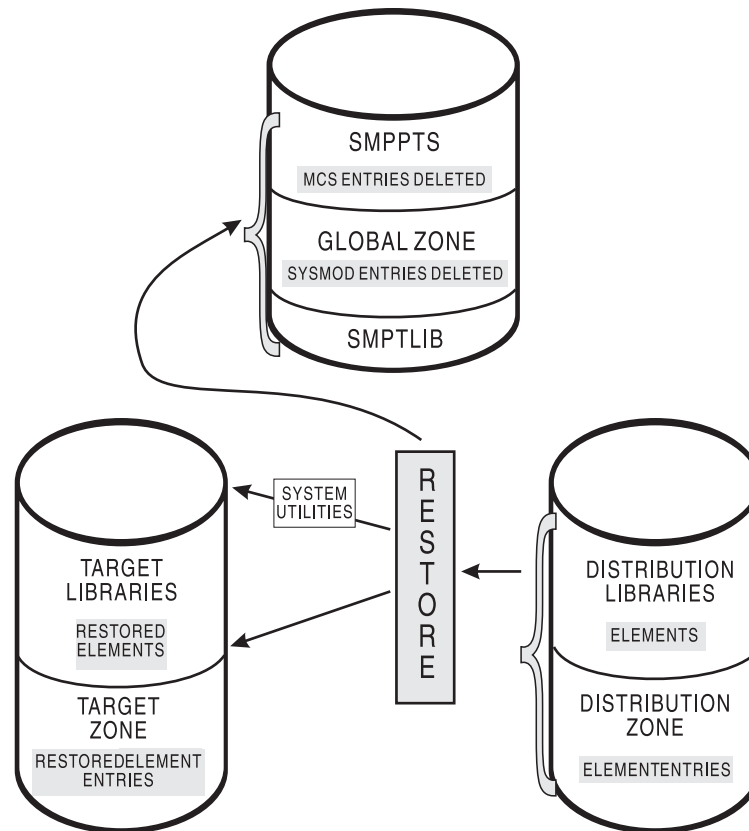


Figure 15. Results of RESTORE Processing

Using the RESTORE command

The RESTORE command has operands that allow you to specify the criteria for removing SYSMODs from the target libraries. It also produces output that reports on its processing.

Examples

Let's look at a few examples of how you might use the RESTORE command.

Restoring a single SYSMOD: Assume you have applied a SYSMOD and, after some initial testing, you discover that a PTF SYSMOD is causing problems on your system. You can remove this SYSMOD by specifying the following commands:

```
SET      BDY(ZOZTGT1).
RESTORE  SELECT(UZ00001).
```

By issuing these commands, you instruct SMP/E to remove PTF UZ00001 from target zone ZOZTGT1 and replace its elements in the target libraries with the previous level of elements from the distribution libraries.

Restoring SYSMODs using the GROUP operand: When you want to remove a particular SYSMOD, it is not always easy to determine other SYSMODs that need to be restored in order to remove the bad one. Assume a particular PTF SYSMOD

Restoring target libraries

is causing a problem, and you want to know if it is dependent on any other SYSMODs so you can also restore those SYSMODs. This can be accomplished by specifying the following commands:

```
SET      BDY(ZOZTGT1) .
RESTORE  SELECT(UZ00003)
          GROUP.
```

By issuing these commands, you instruct SMP/E to restore PTF UZ00003 and any other related PTFs from target zone ZOZTGT1, and replace their elements with the previous level from the distribution zone.

Restoring SYSMODs using the CHECK operand: In the previous example, you directed SMP/E to restore any dependent SYSMODs in order to remove the bad one. There may be times when you want to see which SYSMODs are restored without actually restoring them. You can do this with the CHECK operand by issuing the following commands:

```
SET      BDY(ZOZTGT1) .
RESTORE  SELECT(UZ00003)
          GROUP
          CHECK.
```

After these commands are processed, you can check the SYSMOD Status report to see which SYSMODs would have been restored if you had not specified the CHECK operand. If you are satisfied with the results of this trial run, you can issue the commands again, without the CHECK operand, to actually restore the SYSMODs.

For a more complete description of all the RESTORE command operands, and for additional examples, see The RESTORE Command in *SMP/E Commands*.

Reporting output

When RESTORE processing is complete, these reports will help you analyze the results:

- The **SYSMOD status report** provides you with a summary of the processing that took place for each eligible SYSMOD, based on the operands you specified on the RESTORE command. It shows you which SYSMODs were restored, which were not restored, and why.
- The **Element summary report** provides you with a detailed look at each element replaced or modified by RESTORE processing. It tells you in which libraries the elements were restored.
- The **Causer SYSMOD summary report** provides you with a list of SYSMODs that caused other SYSMODs to fail, and describes the errors that must be fixed to successfully process the SYSMODs. This report can reduce the amount of work involved in figuring out which errors caused SYSMODs to fail.
- The **File allocation report** provides you with a list of the data sets used for RESTORE processing and supplies information about these data sets.

Additional reports may be produced depending on the work being done and the content of the SYSMODs. For more information about all the reports produced by the RESTORE command (and samples of actual reports), see The RESTORE Command in *SMP/E Commands*.

Summary

Let's summarize what you have learned about using the RESTORE command to remove a SYSMOD from the target libraries. The RESTORE command:

- Removes the SYSMOD from the indicated target zone
- Calls system utilities to replace the SYSMOD's elements in the target libraries with elements from the related distribution libraries
- Records what is restored:
 - Target zone: Restores element entries to reflect their distribution zone level and deletes all information about restored SYSMOD.
 - Global zone: Deletes SYSMOD entries and MCS statements in SMPPTS for restored SYSMOD. Any SMPDLIB data sets created during RECEIVE processing are also deleted for the restored SYSMOD. (This global zone processing is optional.)
 - SMPSCDS data set: Deletes BACKUP entries for restored SYSMOD.
- Reports the results of processing

Note: Not all SYSMODs can be restored. For example, SMP/E cannot restore a SYSMOD that deletes another SYSMOD or that deletes a load module during APPLY processing.

Accepting the SYSMOD into the distribution libraries

You can use the ACCEPT command to install software in backup (or distribution) libraries. ACCEPT processing is very similar to APPLY processing with one important exception: ACCEPT processing is irreversible.

In this chapter, you will learn about the following topics:

- What happens during ACCEPT processing
- How SMP/E keeps track of ACCEPT processing
- Examples of using the ACCEPT command
- A summary of the ACCEPT command

What happens during ACCEPT processing

After you are satisfied that an applied SYSMOD has performed reliably in your target system, you can install it in your backup system (distribution) libraries.

Selecting the SYSMODs

You can specify operands on the ACCEPT command that tell SMP/E which of the received SYSMODs are to be selected for installation in the distribution libraries. SMP/E ensures that all other required SYSMODs have been installed or are being installed concurrently and in the proper sequence.

Selecting the elements

During ACCEPT processing, SMP/E uses the information provided in the selected SYSMODs to determine which elements should be installed in the distribution libraries. The selection of elements is monitored by SMP/E to make sure that the correct functional level of each element is selected.

Checking the ACCEPT process

SMP/E provides you with an option to stop ACCEPT processing before any updating takes place so you can ensure all prerequisites are satisfied before the installation of the SYSMODs. This helps you see what will happen (and helps you detect problem SYSMODs) without actually updating the distribution libraries.

Updating the distribution libraries

After the proper SYSMODs have been selected and the proper functional and service level of each element has been checked, SMP/E calls the system utilities (in

Accepting the SYSMOD

the same manner as APPLY and RESTORE) to place the elements into the distribution libraries described in the distribution zone. The source of the elements is the SMPTLIB data sets, the SMPPTS data set, or the indirect libraries, depending on how the SYSMOD was packaged.

Note: When ACCEPT processing has been completed, there is no way it can be undone.

How SMP/E keeps track of ACCEPT processing

SMP/E updates the information about the SYSMODs that have been accepted. Remember, the distribution zone reflects the contents of the distribution libraries. Therefore, after the utility work is complete, and the distribution libraries have been updated, the distribution zone is updated to accurately reflect the status of those libraries.

- A SYSMOD entry is created in the **distribution zone** for each SYSMOD that has been accepted. Element entries (such as MOD and LMOD) are also created in the distribution zone for the elements that have been installed in the distribution libraries.
- **Global zone** SYSMOD entries and MCS statements in the SMPPTS data set are deleted for those SYSMODs that have been accepted into the distribution zone. Any SMPTLIB data sets created during RECEIVE processing are also deleted. If you do not want SMP/E to do this global zone clean-up, you have the option to indicate this to SMP/E, and the information is saved.

Figure 16 shows what you have learned about ACCEPT processing.

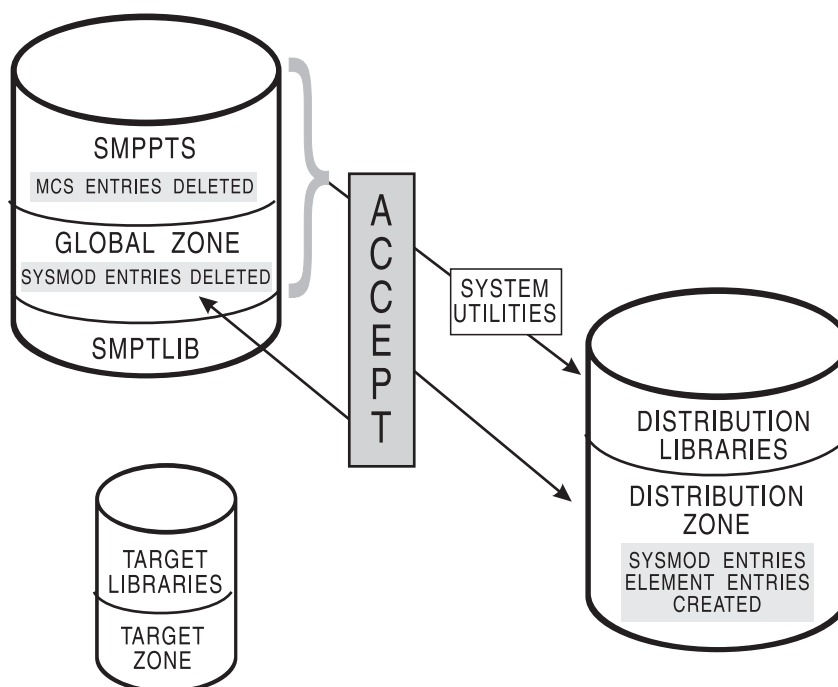


Figure 16. Results of ACCEPT Processing

Using the ACCEPT command

The ACCEPT command has many operands that allow you great flexibility for further defining which SYSMODs you want installed in your distribution libraries. It also provides you with a variety of output based on the operands you specify.

Examples

Let's look at a few examples of how you might use the ACCEPT command.

Accepting PTF SYSMODs: After you have applied the SYSMODs into the target zone, you can define to SMP/E that you want to install only the PTF SYSMODs into the distribution zone. You can do this by specifying the following commands:

```
SET      BDY(ZOSDLB1).
ACCEPT   PTFS.
```

By issuing these commands, you direct SMP/E to accept all eligible PTF SYSMODs into distribution zone ZOSDLB1.

Suppose you do not want to install all the PTF SYSMODs, but only a select few. You can do this by specifying the following commands:

```
SET      BDY(ZOSDLB1).
ACCEPT   SELECT(UZ00001,UZ00002).
```

When you issue these commands, only PTFs UZ00001 and UZ00002 are installed in distribution zone ZOSDLB1.

Accepting SYSMODs for selected products: There may be times when you want to update only certain products on your system with the SYSMODs contained on a service tape. Assume you want to install all PTFs for a particular product. This can be accomplished by specifying the following commands:

```
SET      BDY(ZOSDLB1).
ACCEPT   PTFS
          FORFMID(HOP0001).
```

or

```
SET      BDY(ZOSDLB1).
ACCEPT   FORFMID(HOP0001).
```

In both cases, SMP/E accepts all applicable PTFs for the product whose FMID is HOP0001 and that is located in distribution zone ZOSDLB1. Unless you specify otherwise, PTFS is the default SYSMOD type.

Accepting SYSMODs having prerequisites: When installing a SYSMOD, you might not always know if it has prerequisites, or if the prerequisites are available. (Sometimes a prerequisite SYSMOD might not be received, or it might be held because it is in error.) In cases such as this, you can direct SMP/E to check whether an equivalent (or superseding) SYSMOD is available, by specifying the GROUPEXTEND operand.

Assume you want to process all PTFs for a product on your system, and you want to ensure that all other required SYSMODs are also processed. You can do this by specifying the following commands:

```
SET      BDY(ZOSDLB1).
ACCEPT   PTFS
          FORFMID(HOP0001)
          GROUPEXTEND.
```

By issuing these commands, you direct SMP/E to accept all PTFs, along with any other required SYSMODs, to the product whose FMID is HOP0001 and is located in the ZOSDLB1 target zone. If SMP/E cannot find a required SYSMOD, it looks for and uses a SYSMOD that supersedes the required one.

Accepting the SYSMOD

Accepting SYSMODs using the CHECK operand: In the previous example, SMP/E was directed to automatically include all SYSMODs needed for the specified product. There may be times when you want to see which SYSMODs are included before you actually install them. You can do this with the CHECK operand by issuing the following commands:

```
SET      BDY(ZOSTGT1).
ACCEPT  PTFS
        FORFMID(HOP0001)
        GROUPEXTEND
        CHECK.
```

After these commands are processed, you can check the SYSMOD Status report to see which SYSMODs would have been installed if you had not specified the CHECK operand. If you are satisfied with the results of this trial run, you can issue the commands again, without the CHECK operand, to actually install the SYSMODs.

For a more complete description of all the ACCEPT command operands and other examples, see *The ACCEPT Command in SMP/E Commands*.

Reporting output

When ACCEPT processing is complete, these reports will help you analyze the results:

- The **SYSMOD status report** provides you with a summary of the processing that took place for each eligible SYSMOD, based on the operands you specified on the ACCEPT command. It shows you which SYSMODs were accepted, which were not accepted, and why.
- The **Element summary report** provides you with a detailed look at each element affected by ACCEPT processing. It tells you in which libraries the elements were installed.
- The **Causer SYSMOD summary report** provides you with a list of SYSMODs that caused other SYSMODs to fail, and describes the errors that must be fixed to successfully process the SYSMODs. This report can reduce the amount of work involved in figuring out which errors caused SYSMODs to fail.
- The **File allocation report** provides you with a list of the data sets used for ACCEPT processing and supplies information about these data sets.

Additional reports may be produced depending on the work being done and the content of the SYSMODs. For more information about all the reports produced by the ACCEPT command (and samples of actual reports), see *The ACCEPT Command in SMP/E Commands*.

Summary

Let's summarize what we have learned about using the ACCEPT command to install a SYSMOD in the distribution (or backup) libraries. The ACCEPT command:

- Selects SYSMODs to install
- Checks that all other required SYSMODs have been (or are being) installed
- Based on SYSMODs, selects elements to install
- Directs SMP/E to call the system utilities to update the distribution libraries
- Records what is accepted:
 - Distribution zone: Creates SYSMOD entries and element entries.

- Global zone: Deletes SYSMOD entries and MCS statements in SMPPTS. Any SMPTLIB data sets created during RECEIVE processing are also deleted. (This global zone processing is optional.)
- Reports the results of processing

Remember, once you have accepted a SYSMOD, it **cannot** be restored!

Displaying SMP/E data

You can use SMP/E to provide helpful information for planning new installations, debugging problems, and other instances when you want to know the function and service level of your product software. There are several ways you can display data in the SMP/E database.

In this chapter, you will learn about the kinds of information that help you manage your system and the best method by which the information can be obtained.

- **Query dialogs:** The easiest and fastest way to obtain just the information you want
- **LIST command:** When you need an all-inclusive hardcopy listing of information about your system
- **REPORT commands:** To check and compare the zone contents and generate command output that can be used to update your system
- **SMP/E CSI application programming interface:** To write an application program to query the contents of your system's CSI data sets.

Using the query dialogs

The SMP/E dialogs provide you with an online method of system management, software inventory, data base inquiries, and guidance. For example, with the Query dialogs, you can look up information in the CSI data set. The Query dialogs are one of the easiest and most direct methods you can use to obtain the content and status of any SYSMOD that has been processed by SMP/E. You can use the Query dialogs to display an entry in either a specific zone (CSI query) or in all zones (cross-zone query).

You can use the SMP/E dialogs to view a SYSMOD, even if it has been compacted. Use the Query dialog (zone is GLOBAL, entry type MCS, entry name is the SYSMOD name) and you will be shown the complete SYSMOD in an edit session. You may save the SYSMOD in a different location from this session. If you are using SMPPTS spill data sets, there is another benefit of viewing the SYSMOD from the Query dialog, in that you do not have to know in which SMPPTS data set the SYSMOD is stored; SMP/E will find it for you.

To get to the Query dialogs, you select SMP/E (option 1) on the initial SMP/E dialog panel (CIDPGV2). Then, on the main menu for SMP/E options (GIM@PRIM), select Query (option 3). This takes you to the initial Query panel, shown in Figure 17 on page 32. If you need assistance with using the Query dialogs, (or any of the SMP/E dialogs), help panels are available.

Let's assume you want to find out which SYSMODs have been applied to a particular target zone on your system. You can accomplish this task using the QUERY SELECTION MENU and selecting the CSI QUERY option (1), as shown in Figure 17 on page 32.

Displaying SMP/E Data

```
GIMQUPO                                QUERY SELECTION MENU
===> 1

  1 CSI QUERY          - Display SMPCSI entries
  2 CROSS-ZONE QUERY   - Display status of an entry in
                        all zones
  3 SOURCEID QUERY     - Display SOURCEIDs for specified zone

  D DESCRIBE           - Overview of using QUERY
  T TUTORIAL           - Information on using QUERY

To return to the SMP/E primary option menu, enter  END .

5694-A01 5655-G44(C) COPYRIGHT IBM CORP 1982, 2005
```

Figure 17. Query selection menu

When the CSI QUERY panel is displayed (see Figure 18), you can indicate that you want SMP/E to check target zone ZOSTGT1 for all SYSMOD entries.

```
GIMQU1PO                                CSI QUERY
===>

Specify the zone, entry type, and name to be queried:

  ZONE NAME      ===> ZOSTGT1 Name of the zone to be queried.
                                     To display a list of all zones,
                                     leave blank

  ENTRY TYPE     ===> SYSMOD Entry type to be queried.
                                     To display a list of all valid
                                     entry types, leave ENTRY TYPE
                                     and ENTRY NAME blank

  ENTRY NAME     ===>          Entry name to be queried.
                                     Leave blank or use a wildcard
                                     (entry name pattern) to display
                                     a selection list.

To return to the Query selection menu, enter  END .
```

Figure 18. CSI query panel

Because the ENTRY NAME was left blank on the CSI QUERY panel, SMP/E displays another panel (see Figure 19) that lists all the SYSMOD entries in target zone ZOSTGT1.

```
GIMQUSEA                                CSI QUERY - SELECT ENTRY
===>                                SCROLL ===> PAGE

Select one entry to query from target zone ZOSTGT1 :

S  NAME          ACTION
  AZ00005
s  UZ00001
  UZ00002
```

Figure 19. CSI query - Select entry panel

The CSI QUERY - SELECT ENTRY panel shows that SYSMODs AZ00005, UZ00001, and UZ00002 have been applied to target zone ZOSTGT1. If you want more

information about the contents of SYSMOD UZ00001, you can select that entry by entering an **S** next to it, and another panel is displayed (see Figure 20).

```

GIMQIT26          CSI QUERY - SYSMOD ENTRY          SCROLL ==> PAGE
===>

To return to the previous panel, enter  END .

Entry Type: SYSMOD          Zone Name: ZOSTGT1
Entry Name: UZ00001         Zone Type:  TARGET

Type: PTF                  Status: APPLIED
FMID: HOP0001
Date/Time: 03.341   13.57:31   APPLIED

-----
MODS      MOD01   MOD02
  
```

Figure 20. CSI query - SYSMOD entry panel

The CSI QUERY - SYSMOD ENTRY panel displays all the relevant information pertaining to SYSMOD UZ00001.

As you can see, the QUERY dialog panels provide a quick and easy way for you to obtain information about your system.

Using the LIST command

In the course of managing your system, there may be times when you need a hardcopy listing of some type of information. You can use the LIST command to accomplish this task. For example, it might be necessary for you to have a record of the following:

- All entries of a specific type
- Selected entries of a specific type
- All entries that meet certain criteria

The LIST command can provide you with a listing of this information.

Examples

Let's look at a few basic examples of how you might use the LIST command.

Listing entries in a particular zone: In the course of managing your system, you might need to know which SYSMOD entries exist in the global zone. You can find this out by specifying the following commands:

```

SET      BDY(GLOBAL).
LIST     SYSMODS.
  
```

By issuing these commands, you direct SMP/E to list all the SYSMOD entries in the global zone.

Listing Specific Entries: Suppose you discover a problem on your system and need to determine whether a particular SYSMOD has been installed in the target zone. You can accomplish this by specifying the following commands:

```

SET      BDY(ZOSTGT1).
LIST     SYSMOD(UZ00001).
  
```

By issuing these commands, you direct SMP/E to provide you with information about SYSMOD UZ00001 in target zone ZOSTGT1.

Displaying SMP/E Data

Listing SYSMODs that are received but not installed: You might have received service into the global zone and are in the process of installing the service on your system. You want to see which of the SYSMODs you have received have not yet been installed in a target zone. This can be accomplished by specifying the following commands:

```
SET      BDY(GLOBAL) .
LIST     SYSMODS
         NOAPPLY(ZOSTGT1) .
```

By issuing these commands, you direct SMP/E to list the SYSMODs that have been received, but have not yet been applied to target zone ZOSTGT1.

Reporting output

When LIST processing is complete, these reports will provide you with the information that was requested:

- The **LIST summary report** provides you with information about the type of entry, name of entry, and status of entry for zones and data sets you have specified.
- The **File allocation report** provides you with a list of the data sets used for LIST processing, and supplies information about these data sets.

For a more complete description of the LIST command, additional examples, and samples of actual reports, see The LIST Command in *SMP/E Commands*.

Using the REPORT commands

You can use the REPORT commands to check and compare the SYSMODs installed in the different zones that exist on your system. In addition to this checking, you can tell SMP/E to generate the necessary commands to synchronize the specified zones. You can later modify these commands, if necessary, and use them to install the indicated SYSMODs.

One of the REPORT commands (REPORT SYSMODS) is very useful if you want to compare the SYSMODs installed in two zones. This command allows you to compare the following:

- One distribution zone to another distribution zone
- One target zone to another target zone
- A distribution zone to a target zone
- A target zone to a distribution zone

Example

Let's look at a basic example of how you might use the REPORT SYSMODS command. Assume you have two systems using the same global zone, and you want to check which SYSMODs are installed in a target zone on one system, but are not installed in a target zone on the other system. You can accomplish this by specifying the following commands:

```
SET      BDY(GLOBAL) .
REPORT   SYSMODS
         INZONE(ZOSTGT1)
         COMPARED(ZOSTGT2) .
```

By issuing these commands, you direct SMP/E to compare the SYSMOD content of zone ZOSTGT1 to that of zone ZOSTGT2. Any SYSMODs that are in zone ZOSTGT1 and are not in zone ZOSTGT2 appear in the resulting report.

SMP/E also provides output you can use to install those SYSMODs you deem appropriate.

Reporting output

When REPORT SYSMODs processing is complete, these reports will provide you with the information that was requested:

- The **SYSMOD comparison report** provides you with a summary of the SYSMODs found in the input zone, but not found in the comparison zone. It can help you determine which SYSMODs might need to be installed in the comparison zone so its content reflects that of the input zone.
- The **File allocation report** provides you with a list of the data sets used for REPORT processing, and supplies information about these data sets.

For a more complete description of the REPORT commands, additional examples, and samples of actual reports, see SMP/E Reports in *SMP/E Commands*.

SMP/E CSI application programming interface

The SMP/E CSI application program interface (GIMAPI) allows you to write application programs that have read-only access to data stored in SMP/E's CSI (Consolidated Software Inventory) data sets. GIMAPI is described in detail in *SMP/E Reference*.

Summary

Let's summarize what you have learned about using the Query dialogs, the LIST command, the REPORT command, and the CSI API to check SMP/E's records for your system:

- Query dialogs: Easy and fast way to obtain information
- LIST command: Best for hardcopy listing
- REPORT commands: Best for checking and comparing zone contents
- SMP/E CSI application programming interface: Best for writing an application program to query the contents of your system's CSI data sets.

Displaying SMP/E Data

Chapter 2. SMP/E concepts

This chapter summarizes some basic concepts that you will need to understand before you can use SMP/E. It briefly describes:

- What SMP/E is
- What system modifications are
- The data sets used by SMP/E
- How SMP/E can help you install and maintain products, and monitor changes to products

What is SMP/E?

SMP/E is the basic tool for installing and maintaining software in OS/390 or z/OS systems and subsystems. It controls these changes at the element level by:

- Selecting the proper levels of elements to be installed from a large number of potential changes
- Calling system utility programs to install the changes
- Keeping records of the installed changes

SMP/E is an integral part of the installation, service, and maintenance processes for CBPDOs, ProductPacs, RefreshPacs, and selective follow-on service for CustomPacs. In addition, SMP/E can be used to install and service any software that is packaged in SMP/E system modification (SYSMOD) format.

SMP/E can be run either using batch jobs or using dialogs under Interactive System Productivity Facility/Program Development Facility (ISPF/PDF). SMP/E dialogs help you interactively query the SMP/E database, as well as create and submit jobs to process SMP/E commands.

These are some of the types of software that can be installed by SMP/E:

- Products and service provided in CBPDOs and CustomPac offerings
- Products and service from IBM Software Distribution Centers not provided in CBPDOs or CustomPac offerings
- Service provided in Expanded Service Options (ESOs)
- Other products and service

SMP/E can install software from any of these sources, provided it is packaged as a system modification, or *SYSMOD*.

What are SYSMODs?

Software, whether it is a product or service, consists of *elements* such as macros, modules, source, and other types of data (such as CLISTs or sample procedures). For software to be installed by SMP/E, it must include control information for the elements. This information describes the elements and any relationships the software has with other products or service that may also be installed on the same system. The combination of elements and control information is called a system modification, or *SYSMOD*.

There are four types of SYSMODs:

- **Function SYSMODs (or functions).** These introduce a new product, a new version or release of a product, or updated functions for an existing product into the system.

There are two types of function SYSMODs:

- A *base function* either adds or replaces an entire functional area in the system. Examples of base functions are SMP/E and MVS.
 - A *dependent function* provides an addition to an existing functional area in the system. It is called dependent because its installation depends on a base function already being installed. Examples of dependent functions are the language features for SMP/E.
- **PTFs.** These are IBM-supplied, tested fixes for reported problems. They are meant to be installed in all environments. PTFs may be used as preventive service to avoid certain known problems that may have not yet appeared on your system, or they may be used as corrective service to fix problems you have already encountered. The installation of a PTF must always be preceded by that of a function SYSMOD, and often other PTFs as well.
 - **APAR fixes.** Authorized program analysis reports (APARs) are temporary fixes designed to fix or bypass a problem for the first reporter of the problem. These fixes may not be applicable to your environment. The installation of an APAR must always be preceded by that of a function SYSMOD, and sometimes of a particular PTF. That is, an APAR is designed to be installed on a particular preventive-service level of an element.
 - **User modifications (USERMODs).** These are SYSMODs built by you, either to change IBM code or to add independent functions to the system. The installation of a USERMOD must always be preceded by that of a function SYSMOD, sometimes certain PTFs, APAR fixes, or other USERMODs.

Note: If you want to package a user application program or new system function in SMP/E format, the correct way is to build a base or dependent function SYSMOD, not a USERMOD.

Figure 21 on page 39 shows the hierarchy of the various SYSMOD types. This example shows two service chains: one for the base function HZY1101 and one for the dependent function JZY1121.

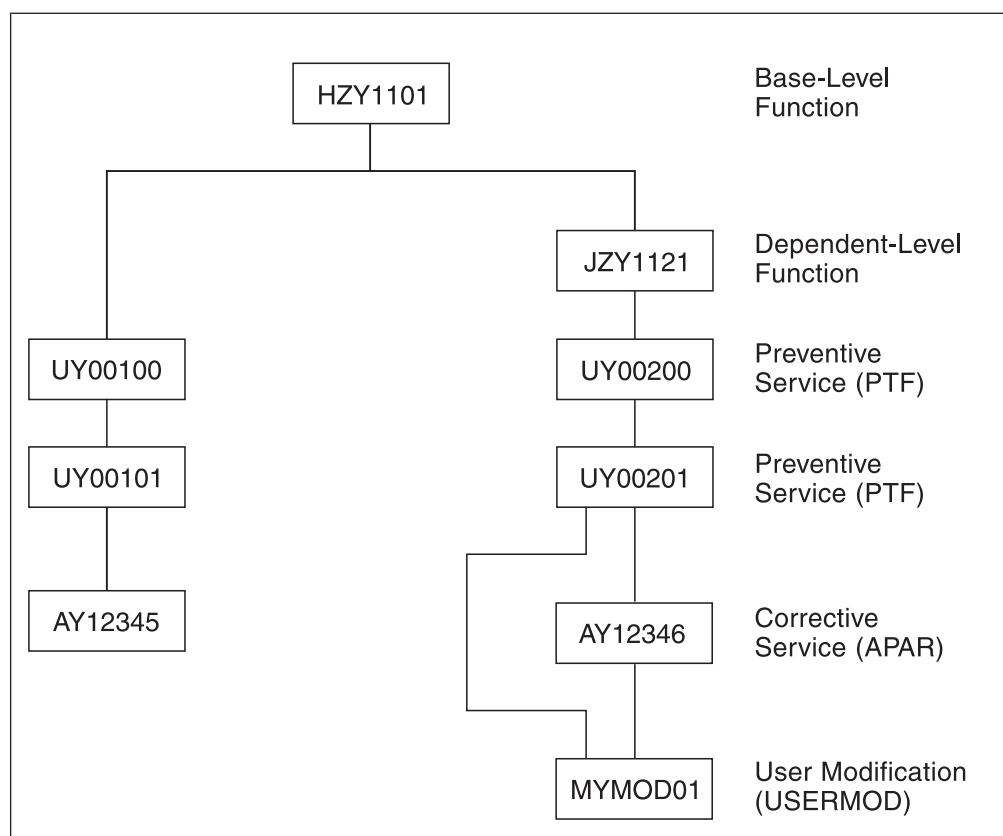


Figure 21. Example of a SYSMOD hierarchy

SMP/E keeps track of the functional and service levels of each element and uses the SYSMOD hierarchy to determine such things as which functional and service levels of an element should be installed and the correct order for installing updates for elements. For more information about how SMP/E determines the processing order of changes, as well as the functional and service levels of elements, see The APPLY Command and The ACCEPT Command in *SMP/E Commands*.

Data sets used by SMP/E

When SMP/E processes SYSMODs, it installs the elements in the appropriate libraries and updates its own records of the processing it has done. SMP/E installs program elements into two types of libraries:

- **Target libraries** contain the executable code needed to run your system (for example, the libraries from which you run your production system or your test system).
- **Distribution libraries (DLIBs)** contain the master copy of each element for a system. They are used as input to the SMP/E GENERATE command or the system generation process to build target libraries for a new system. They are also used by SMP/E for backup when elements in the target libraries have to be replaced or updated.

To install elements in these libraries, SMP/E uses a database made up of several types of data sets:

- **SMPCSI (CSI) data sets** are Virtual Sequential Access Method (VSAM) data sets used to control the installation process and record the results of processing.

The CSI data set is a VSAM data set in which SMP/E maintains information about the system. A CSI can be divided into multiple partitions through the VSAM key structure. Each partition is referred to as a *zone*.

There are three types of zones:

- A single **global zone** is used to record information about SYSMODs that have been received into the SMPPTS data set. The global zone also contains information enabling SMP/E to access the other two types of zones, information about system utilities that SMP/E calls to install elements from SYSMODs, and information allowing you to tailor SMP/E processing.
- One or more **target zones** are used to record information about the status and structure of the operating system (or target) libraries. Each target zone also points to the related distribution zone, which can be used during APPLY, RESTORE, and LINK when SMP/E is processing a SYSMOD and needs to check the level of the elements in the distribution libraries.
- One or more **distribution zones** are used to record information about the status and structure of the distribution libraries (DLIBs). Each DLIB zone also points to the related target zone, which is used when SMP/E is accepting a SYSMOD and needs to check if the SYSMOD has already been applied.

Figure 22 shows the relationships between SMP/E zones and libraries.

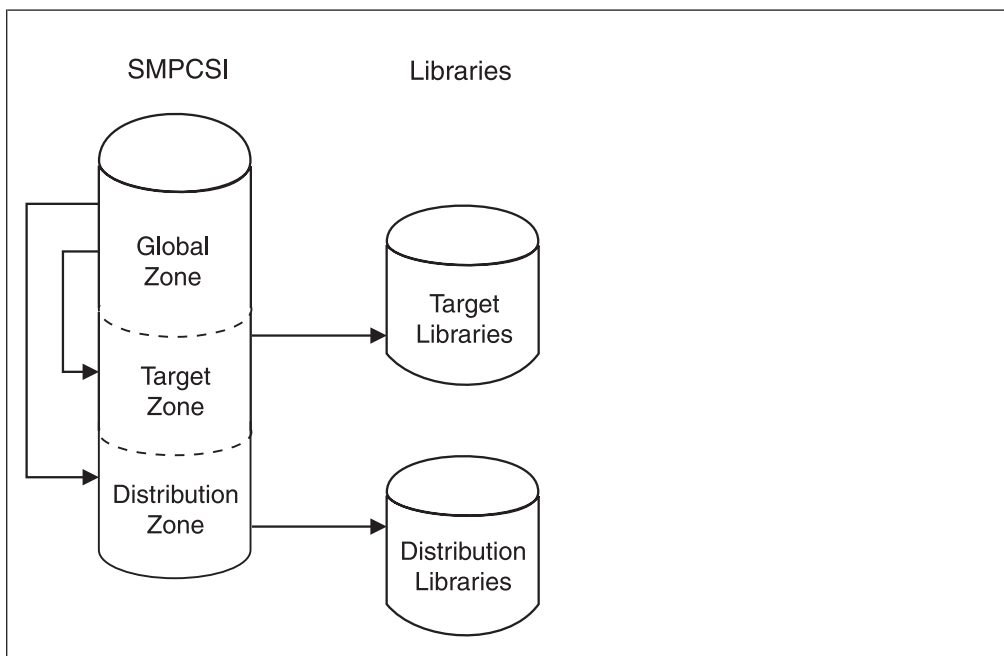


Figure 22. Summary of zone relationships

There can be more than one zone in an SMPCSI data set (in fact, there can be up to 32766 zones per data set). For example, an SMPCSI data set can contain a global zone, several target zones, and several distribution zones. The zones can also be in separate SMPCSI data sets. One SMPCSI data set can contain just the global zone, a second SMPCSI data set the target zones, and a third SMPCSI data set the distribution zones. For more information on ways to structure SMPCSI data sets, see the *SMP/E Reference* manual.

- An **SMPPTS (PTS) data set** is a data set for temporary storage of SYSMODs waiting to be installed.

The PTS is used strictly as a storage data set for SYSMODs. The RECEIVE command stores SYSMODs directly on the PTS without any modifications of SMP/E information. The PTS is related to the global zone in that both data sets contain information about the received SYSMODs. Only one PTS can be used for a given global zone. Therefore, you can look at the global zone and the PTS as a pair of data sets that must be processed (for example, deleted, saved, or modified) concurrently.

- The **SMPSCDS (SCDS) data set** contains backup copies of target zone entries modified during APPLY processing. Therefore, each SCDS is directly related to a specific target zone, and each target zone must have its own SCDS.

SCDS data sets are used by SMP/E to store backup copies of target zone entries modified during APPLY processing. Therefore, each SCDS is directly related to a specific target zone, and each target zone must have its own SCDS.

SMP/E also uses the following data sets:

- The **SMPMTS (MTS) data set** is a library in which SMP/E stores copies of macros during installation when no other target macro library is identified. Therefore, the MTS is related to a specific target zone, and each target zone must have its own MTS data set.
- The **SMPSTS (STS) data set** is a library in which SMP/E stores copies of source during installation when no other target source library is identified. Therefore, the STS is related to a specific target zone, and each target zone must have its own STS data set.
- The **SMPLTS (LTS) data set** is a library that maintains the base version of a load module. The load module in this library specifies a SYSLIB allocation in order to implicitly include modules. Therefore, the LTS is related to a specific target zone, and each target zone must have its own LTS data set.
- **Other utility and work data sets.**

SMP/E uses information in the CSI data sets to select proper element levels for installation, to determine which libraries should contain which elements, and to identify which system utilities should be called for the installation.

System programmers can also use the CSI data sets to obtain the latest information on the structure, content, and status of the system. SMP/E provides this information in reports, listings, and dialogs to help you:

- Investigate function and service levels
- Understand intersections and relationships of SYSMODs (either installed or waiting to be installed)
- Build job streams for SMP/E processing

How SMP/E can help you install and maintain products

This section briefly describes the tasks involved in general SMP/E processing, installing SYSMODs, and monitoring and maintaining your system, as well as the commands used to accomplish these tasks. Following is a guide to the commands that help you with these tasks. (You can use SMP/E dialogs for all the tasks in this list.) For more information about these commands, see the *SMP/E Commands* manual.

Where to begin

You must specify a SET command before SMP/E can process any other commands.

Specifying the zone to be processed: SET

The main SMP/E database is a set of CSIs. When you establish the SMP/E database, you use the UCLIN command or the administration dialogs to divide the CSI into one or more partitions called *zones*. A zone contains control information for the following:

- A set of target libraries. (These zones are called *target zones*.)
- A set of distribution libraries. (These zones are called *distribution zones*.)
- The data present in the PTS and for general SMP/E processing. (This zone is called the *global zone*.)

You must tell SMP/E which zone you are working with before it can execute any other commands. You direct SMP/E processing to a specific zone by coding the zone name on the SET command.

Installing SYSMODs

The primary purpose of SMP/E is to install SYSMODs. This section describes the tasks and commands you can use.

Loading SYSMODs into the SMPPTS: RECEIVE

The RECEIVE command performs the following functions:

- Reads in SYSMODs from a sequential input file, defined by the SMPPTFIN DD statement
- Reads in HOLDDATA for exception SYSMODs from another sequential input file, defined by the SMPHOLD DD statement
- Determines which SYSMODs and HOLDDATA are applicable to your system
- Stores the SYSMODs and HOLDDATA in a storage data set (the PTS data set) and in the global zone

Note: The RECEIVE command can also be used to transfer software packages from a TCP/IP network connected server directly into an SMP/E directory or data sets.

Using internet service retrieval to request PTF or HOLDDATA: RECEIVE ORDER

You can use the RECEIVE ORDER command to request a new PTF service order from the IBM Automated Delivery Request server, or to download pending PTF service orders that resulted from a previous request.

Requesting a new PTF service order: The RECEIVE ORDER command performs the following functions:

1. Builds a software inventory based on the target zones specified. If no zones were specified, then SMP/E uses all target zones.
2. Submits a HOLDDATA or PTF order request to the IBM Automated Delivery Request server. The order request includes the content criteria specified by the user and contains the software inventory.
3. The server responds to SMP/E to indicate that the order was accepted.
4. SMP/E records information about the order in the global zone by creating a new ORDER entry. At this point the order is in a pending state, and remains so until its package is downloaded.
5. When the server receives the order request, it initiates the manufacturing processes to fulfill the HOLDDATA or PTF order. The IBM manufacturing

processes use the supplied content criteria and the software inventory information to build a package containing either PTFs or HOLDDATA, or both, as specified in the request.

6. SMP/E waits a period of time for the order to be fulfilled. During this time SMP/E periodically queries the status of the order on the server. If the order is not fulfilled within the maximum allowed time, then the RECEIVE command processing ends and the order remains in a pending state.
7. If the order is fulfilled within the allowed time, the server sends SMP/E the information required to download the resultant package (FTP server name, directory where the package resides on the FTP server, userid, password, and the package SHA-1 hash value).
8. SMP/E downloads the package to the local SMPNTS directory using FTP and the capabilities of the RECEIVE FROMNETWORK command. Once the package has been completely downloaded, SMP/E changes the status value for the order's ORDER entry in the global zone from PENDING to DOWNLOADED.
9. SMP/E expands the contents of the downloaded package and traditional RECEIVE processing stores PTFs and HOLDDATA into the global zone and SMPPTS data set (SMP/E skips this step if the user specified TRANSFERONLY on the RECEIVE command).

Downloading pending orders: When a requested PTF service order is not fulfilled within the allowed time, RECEIVE command processing stops and the order remains in the pending state. The IBM Automated Delivery Request server, however, continues to fulfill the order. You can use the RECEIVE ORDER command to process a pending order.

When the RECEIVE command is executed to process a pending order, SMP/E performs the following steps:

1. Reads the global zone to find the entry for the specified ORDER and determines if the order has a status of PENDING.
2. Queries the status for the pending order on the server. The server responds to indicate either that the order has been fulfilled and is ready to be downloaded, or that the order is not yet ready.
3. If the order is not yet ready for downloading, SMP/E again waits a period of time for the order to be fulfilled and be ready for downloading. During this time, SMP/E periodically queries the status of the order on the server. If the order is not fulfilled within the maximum allowed time, then RECEIVE processing ends and the order remains in a pending state.
4. If the order is fulfilled within the maximum allowed time, the server responds to SMP/E with the information required to download the resultant package (FTP server, directory where the package resides on the server, userid, password, and the package SHA-1 hash value).
5. SMP/E downloads the package to the local SMPNTS directory using FTP and the capabilities of the RECEIVE FROMNETWORK command. Once the package has been completely downloaded, SMP/E changes the status value for the order's ORDER entry in the global zone from PENDING to DOWNLOADED.
6. SMP/E expands the contents of the downloaded package and traditional RECEIVE processing stores PTFs and HOLDDATA into the global zone and SMPPTS data set (SMP/E skips this step if the user specified TRANSFERONLY on the RECEIVE command).

Installing SYSMODs in the target libraries: APPLY

After the SYSMODs have been received, you can use the APPLY command to direct SMP/E to install them in the appropriate target libraries.

Installing SYSMODs in the distribution libraries: **ACCEPT**

After installing a SYSMOD in the target libraries and testing it to your satisfaction, you can use the ACCEPT command to have SMP/E install that SYSMOD in the distribution libraries and delete it from the PTS and the global zone.

Note: Though the usual order of processing a SYSMOD is RECEIVE, APPLY, and then ACCEPT, you skip the APPLY step and go directly from RECEIVE to ACCEPT. For further information, see Chapter 5, “Installing a new function,” on page 101.

Building a system from a set of distribution libraries: **GENERATE**

Use the GENERATE command to create a job stream that builds a system (a set of target libraries) from a set of distribution libraries.

Monitoring your system

This section describes the tasks and commands you can use to monitor your system.

Displaying information from the SMP/E database: **LIST**

Use the Query dialogs or the LIST command to display the data SMP/E retains. There are several operands you can use to list subsets of the data.

Checking and comparing zone contents: **REPORT**

The REPORT command helps you obtain information about SYSMODs installed on your system. There are several types of REPORT commands that you can use to do the following:

- **REPORT CROSSZONE** to list conditional requisites that must be installed in certain zones because of SYSMODs installed in other zones. This information can help you synchronize service for related products that are in different zones.
- **REPORT ERRSYSMODS** to list SYSMODs that have already been installed but are affected by error holds subsequently received.
- **REPORT SOURCEID** to list source IDs assigned to SYSMODs in a given zone or ZONESET.
- **REPORT SYSMODS** to list SYSMODs installed in one zone and applicable to a second zone, but not yet installed in it.

Managing the SMP/E database

This section describes the tasks and commands you can use to remove SYSMODs and process the SMP/E database as a part of your system maintenance.

Notes:

1. There is no SMP/E command to remove a SYSMOD from the distribution libraries once you have accepted it.
2. Because all SMP/E processing is controlled by information in the CSI data set, you must provide the required information in the CSI before you process any SYSMODs.

Removing SYSMODs from the target libraries: **RESTORE**

After you have installed a SYSMOD in the target libraries, you should test it to make sure the change works correctly. If during testing you find an error in one of the SYSMODs you applied, you can use the RESTORE command to remove that SYSMOD from the system.

The RESTORE command causes the elements in the distribution libraries to be reinstalled on the target libraries. Therefore, when restoring a SYSMOD, you may have to restore more than the one SYSMOD in error. All SYSMODs that have not been accepted and that affect some of the same elements or need the same service level requisites as the one you are restoring must also be restored.

Removing SYSMODs from the PTS: REJECT

After receiving a SYSMOD, you can use the REJECT command to remove that SYSMOD from the PTS and the global zone. This can be done to rework a SYSMOD.

You can also use REJECT after you use NOPURGE to accept a SYSMOD into the distribution libraries. Using NOPURGE in the OPTIONS entry prevents SMP/E from deleting the global zone SYSMOD entry and the PTS MCS entry during ACCEPT processing. Later, you can delete the SYSMOD and MCS entries by using REJECT.

Processing the SMP/E database to create, update, or delete a single entry: UCLIN

You can use the Administration dialogs or the UCLIN command to create or change entries in CSI data sets. UCLIN can be used to create entries required during SMP/E processing, such as entries for:

- Identifying the utilities SMP/E is to use
- Providing information for dynamic allocation support

You can use UCLIN to delete orders from the SMPCSI data set. You can also use UCLIN to correct errors in entries or to alter processing information (including the ORDER RETENTION subentry in the OPTIONS entry).

Note: This command should be used with **extreme** caution; an incorrect change can cause a SYSMOD to be installed incorrectly later.

UCLIN updates only entries in SMP/E data sets. It does nothing to any elements or load modules in any product libraries. You must ensure that the appropriate changes are made to the libraries.

Processing the SMP/E database to update several entries of the same type: ZONEEDIT

Use the ZONEEDIT command to quickly change the values for a field in different DDDEF or UTILITY entries in the same zone. You can also use ZONEEDIT to change the cross-zone subentries of MOD, LMOD, and TARGETZONE entries.

Processing the SMP/E database to define the structure of the target libraries: JCLIN

To install a SYSMOD successfully, SMP/E must have information about the structure of your target libraries, such as:

- The library in which an element resides
- How modules are link-edited together to form load modules
- Where the load modules exist and their characteristics

The JCLIN command enables you to define the target library structure. In some instances, such as defining the target library structure for data elements, it is not necessary to use JCLIN, because the definition in the MCS statement is sufficient.

When processing the JCLIN command, you provide SMP/E with a job stream containing all the job steps (such as copies, link-edits, and assemblies) needed to

create a set of target libraries from a set of distribution libraries. SMP/E then scans that input and builds all required entries to define the target system structure.

Processing the SMP/E database to write information to the SMPLOG data set: LOG

Use the LOG command to write to the SMPLOG and SMPLOGA data sets. This is useful for maintaining documentation about your system, such as who installed a certain SYSMOD, and why.

Processing the SMP/E database to clean up the SMPLTS, SMPMTS, SMPSTS, and SMPSCDS data sets: CLEANUP

Use the CLEANUP command to delete entries from the SMPMTS, SMPSTS, and SMPSCDS data sets for a particular target zone, if any entries still exist after the associated SYSMOD has been accepted into the related distribution zone. The CLEANUP command can also be used to remove the base version of load modules that are no longer needed from the SMPLTS data set.

Managing zones

This section describes the tasks and commands you can use to manage zones.

Copying a zone from one CSI to another: ZONECOPY

Use the ZONECOPY command to copy an entire target or distribution zone from one CSI data set to another. When you use the ZONECOPY command, SMP/E checks that the zone you copy into is empty except for a ZPOOL record.

Copying a zone to a sequential data set: ZONEEXPORT

The ZONEEXPORT command creates a copy of a specified distribution, target, or global zone and places it into another data set (a variable-block sequential data set). Having this copy of a specified zone gives you two advantages:

- You can use it as a backup copy to recreate a zone that has been accidentally erased or destroyed.
- You can use it as a “transportable” copy to create the same zone on another system or in another CSI data set on the same system.

Copying a zone from a sequential data set to a CSI data set: ZONEIMPORT

Use the ZONEIMPORT command to reload an exported zone into a distribution, target, or global zone. ZONEIMPORT can be used only with output from ZONEEXPORT.

Deleting a zone: ZONEDELETE

Sometimes you need to delete the SMP/E data related to one of the systems you are supporting. These are some examples of when you need to delete a zone:

- After a full system generation, you have to delete the information describing the previous target system libraries. Then you rebuild that information to describe the new set of target system libraries built from the distribution libraries.
- After installing a new level of a product that existed in its own target zone and distribution zone, you want to delete the information about the old level of the product and continue processing only the new level.

Merging zones: ZONEMERGE

Use the ZONEMERGE command to merge one zone into another zone after you use the GENERATE command or do a full system generation. When you use the ZONEMERGE command, SMP/E looks through the zones that ZONEMERGE works on and merges the data from them.

Renaming a zone: ZONERENAME

Use the ZONERENAME command to rename a zone. This command can help you keep meaningful names for your zones. You can also use ZONERENAME after a GENERATE command or a full system generation to help you change the name of the distribution zone that GENERATE or the system generation uses to build a new target zone.

Linking and relinking modules

This section describes the tasks and commands you can use to link or relink modules into load modules.

Handling cross-zone link-edits: LINK MODULE

Use the LINK MODULE command to link modules in one zone with load modules in another zone and to track this inclusion so that subsequent APPLY and RESTORE processing can automatically maintain the affected load modules.

Relinking load modules that use CALLLIBS: LINK LMODS

Use the LINK LMODS command to relink load modules that have a CALLLIBS subentry list in their LMOD entry (and therefore use the automatic library call option to implicitly include modules from a specified library). The LINK LMODS command may also be used to relink specific load modules that do not contain CALLLIBS, rebuilding them from scratch if necessary.

General SMP/E processing

This section describes general SMP/E processing tasks and the commands you can use to do them.

Requesting diagnostic processing: DEBUG

Use the DEBUG command to display the name of the issuing routine in each SMP/E message, to dump SMP/E control blocks, to dump VSAM request parameter list (RPL) control blocks, and to get a SNAP dump of SMP/E and its work areas whenever a specified message is issued.

Resetting return codes: RESETRC

Normally, the execution of an SMP/E command depends on the successful execution of all preceding commands. However, you can use the RESETRC command to reset the return code to zero. This allows SMP/E to run the next command, even if a preceding command failed.

Chapter 3. Preparing to use SMP/E

This chapter discusses how to prepare to use SMP/E after it has been installed. It describes how to do the following:

1. Allocate and initialize data sets in the SMP/E database.
2. Define entries in the CSI data set to do the following:
 - Create the zones associated with the PTS, distribution libraries, and target libraries.
 - Define the product and SMP/E libraries used during SMP/E processing.
 - Define the utility programs and associated parameters used during SMP/E processing.
 - Define the libraries that are eligible for retry processing after x37 abends.
3. Connect the SMP/E dialogs to ISPF
4. Set up SMP/E for easier operation:
 - Specify SMP/E OPTIONS entry
 - Specify link edit utility output DDDEF entries
 - Specify automatic cross-zone requisite checking
5. Define the information needed to invoke SMP/E.
6. Define exit routines, if desired, to customize SMP/E processing.

Allocating and initializing data sets in the SMP/E database

To install SYSMODs, SMP/E needs information about them and about the target and distribution libraries where they are to be installed. This information is kept in a database composed of the following data sets:

- SMPCSI (CSI)
- SMPPTS (PTS)
- SMPSCDS (SCDS)

CSI data sets

SMP/E uses CSIs to keep records of the system. To define the CSI data sets for your system, you need to do the following:

1. Decide how to organize the CSI data sets.
2. Understand catalog considerations for CSI data sets.
3. Allocate the CSI data sets.
4. Define alias entries for user catalogs.
5. Initialize the CSI data sets.
6. Define the zones for your system.
7. Understand how to reorganize a CSI data set to reclaim space.

Deciding how to organize CSI data sets

Before you allocate any CSI data sets, you must decide how to organize those data sets. Consider the following when you make your decision:

- The DASD configuration of your system libraries
- The organization of your system support structure
- How you want to use SMP/E

There are two basic structures for CSI data sets:

- Single-CSI
- Multiple-CSI

Allocating and initializing data sets

Descriptions of these structures are followed by examples.

Single-CSI structure: You can define the CSI structure to have one CSI that keeps track of all your system activity. The single-CSI data set has one global zone and one or more target and distribution zones. These are some reasons for having a single-CSI data set:

- The single-CSI data set optimizes the use of direct access storage.
- The single-CSI data set puts your whole establishment in one VSAM data set. This provides you with a single control point and one source of information for your whole system.

Single-CSI systems do have a drawback. When SMP/E needs to process a zone, it cannot request access to that specific zone; it must request access to the CSI data set containing that zone. As a result, if you have a single-CSI system, you can run only one background SMP/E job at a time.

Figure 23 shows a single-CSI data set structure.

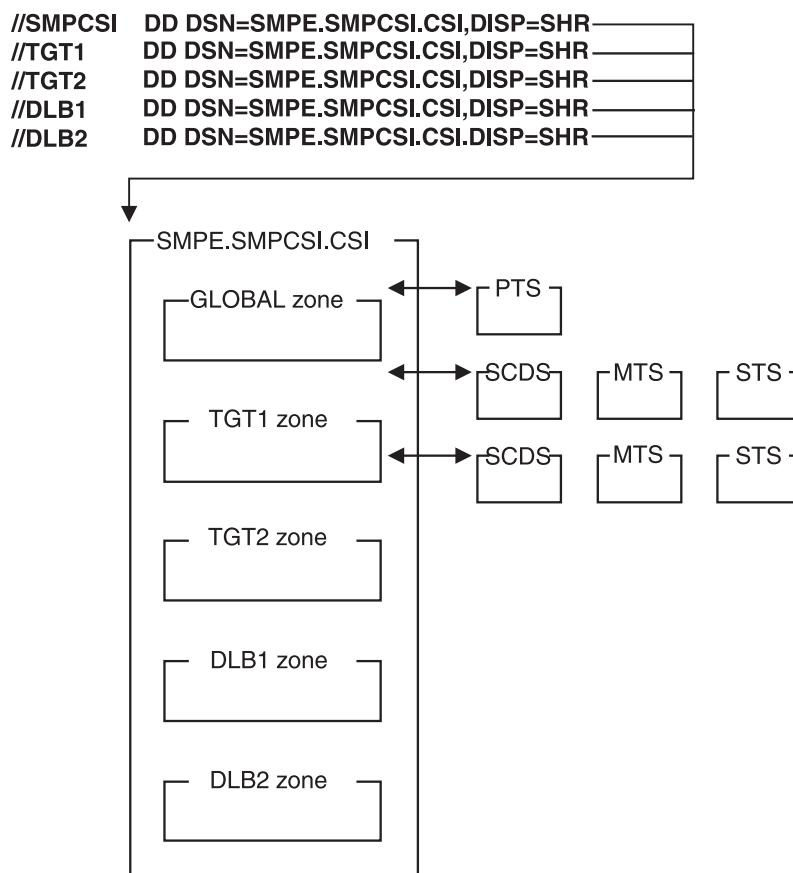


Figure 23. Sample single-CSI structure

Multiple-CSI structure: Multiple CSI data sets can be:

- Separate from each other, each with its own global zone.
- Connected by ZONEINDEX entries to a single global zone. (The global zone must be in one of the CSI data sets.)

Multiple CSIs enable you to use more than one VSAM data set for the global, target, and distribution zones. These are some reasons for having multiple CSI data sets:

- Your system may need multiple CSIs because of the characteristics of a particular installation—its programming support, its backup and update needs, and its need for added security and data integrity. For example, keeping libraries and their associated zones synchronized when you dump them for backup is easier if you keep them on the same physical DASD.
- Your system may need multiple CSIs if the support teams for different subsystems—such as MVS, CICS, IMS, and NCP—are at different places.
- You may want to be able to run more than one background SMP/E job at a time. When SMP/E needs to process a zone, it cannot request access to that specific zone; it must request access to the CSI data set containing that zone. If your zones are in separate CSI data sets, processing for one zone does not prevent access to another zone.

Figure 24 shows a multiple-CSI data set structure.

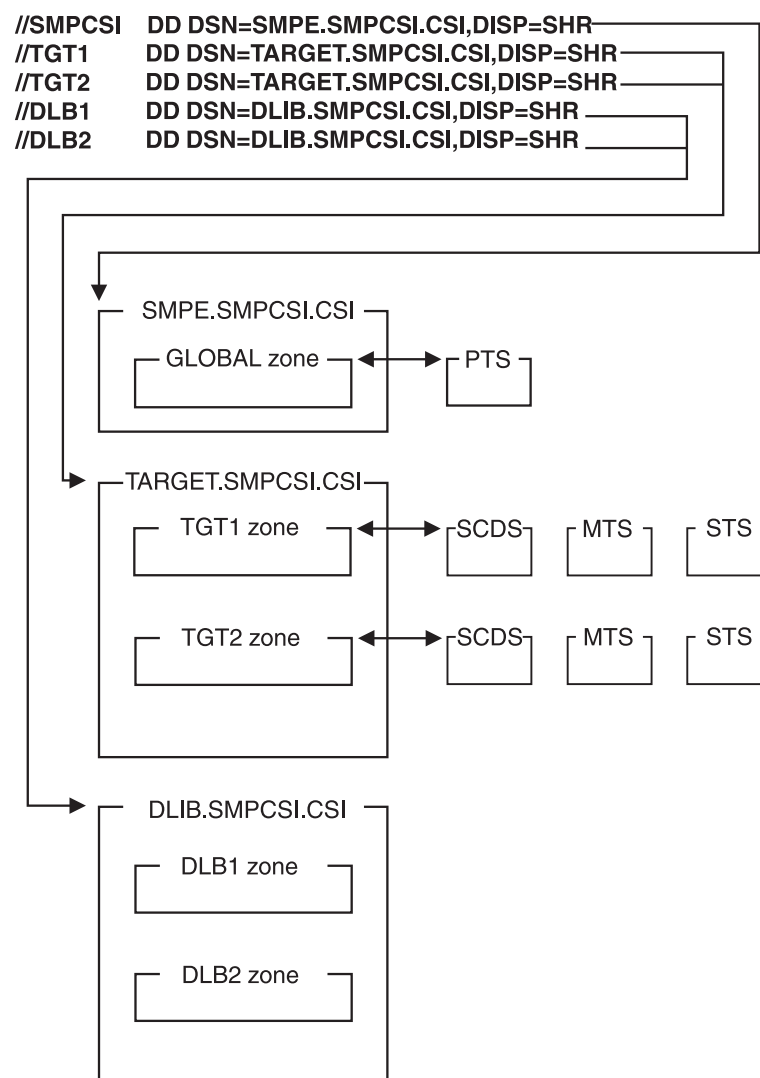


Figure 24. Sample multiple-CSI structure

Allocating and initializing data sets

Examples of CSI structures: The following examples show several ways to define a CSI structure describing a sample z/OS system with Job Entry Subsystem 3 (JES3) and an Information Management System (IMS) subsystem. In some of the examples, a single CSI contains multiple zones. Others show zones that are separated into multiple CSI data sets. Zones in separate CSIs can be connected by a single global zone. The CSI that contains the global zone is called the *master CSI*.

Example 1: Using a separate global zone for each subsystem: In Figure 25, the existing DASD structure for the libraries is maintained, and a separate global zone is defined for each of the subsystems (MVS, JES3, and IMS). This CSI structure keeps control of the three subsystems separate. You might use this structure if the system programming support for the three subsystems is organizationally separate. A disadvantage is that there is no single control point (global zone) from which to manage or query the entire system.

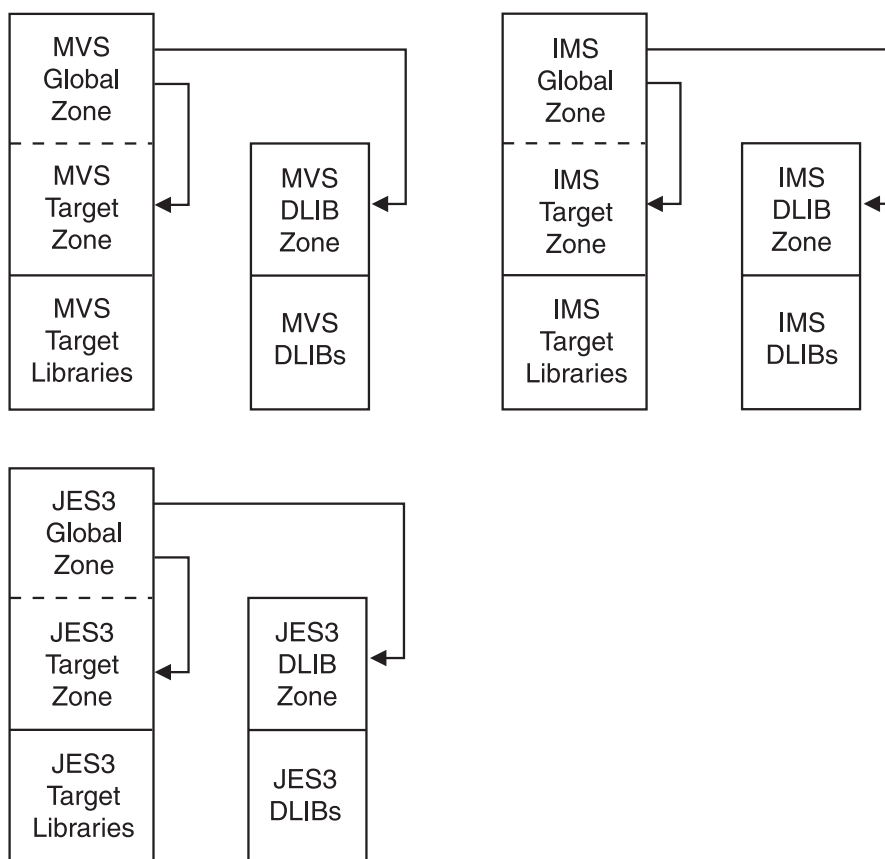


Figure 25. Using a separate global zone for each subsystem

Example 2: Using a single CSI for the whole system: In Figure 26 on page 53, all the SMP/E control information for the system is contained in a single CSI. The system structure is reflected by separate zones for MVS, JES3, and IMS. This CSI structure provides a single control point from which to manage or query the entire system.

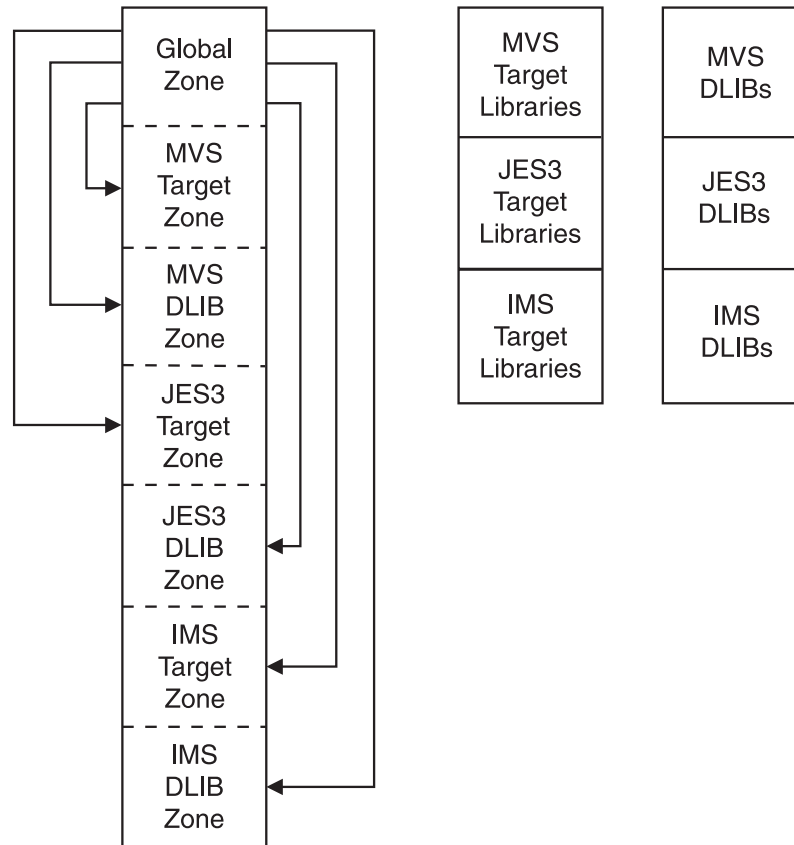


Figure 26. Using one CSI for the whole system

Example 3: Using a master CSI and multiple CSIs: In Figure 27 on page 54, one global zone is defined for the entire system in a master CSI, and separate CSIs are allocated for the JES3 and IMS subsystems on the packs where the subsystem libraries reside. This CSI structure provides the advantages of a common control point (as in Example 2) and keeps the SMP/E control information physically associated with the libraries it describes. This is useful when you dump packs for backup.

Allocating and initializing data sets

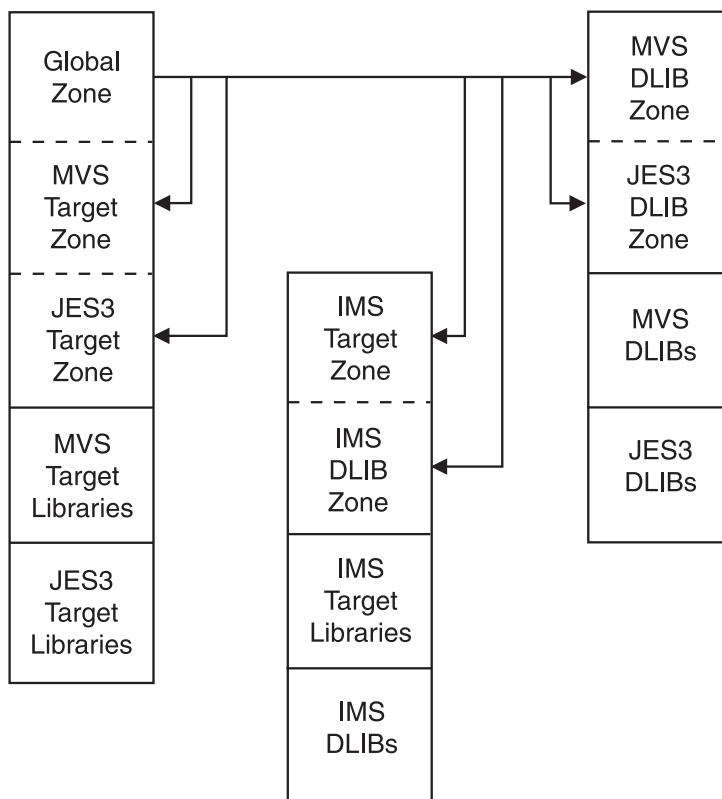


Figure 27. Using a master CSI

Example 4: Using a master CSI and a separate CSI for each zone: In Figure 28 on page 55, one global zone is defined for the entire system in a master CSI, and separate CSIs are allocated for the JES3 and IMS subsystems on the packs where the subsystem libraries reside. Unlike Example 3, each zone is in its own separate CSI. This CSI structure provides the advantages of a common control point (as in Example 2) and keeps the SMP/E control information physically associated with the libraries it describes. This is useful when you dump packs for backup.

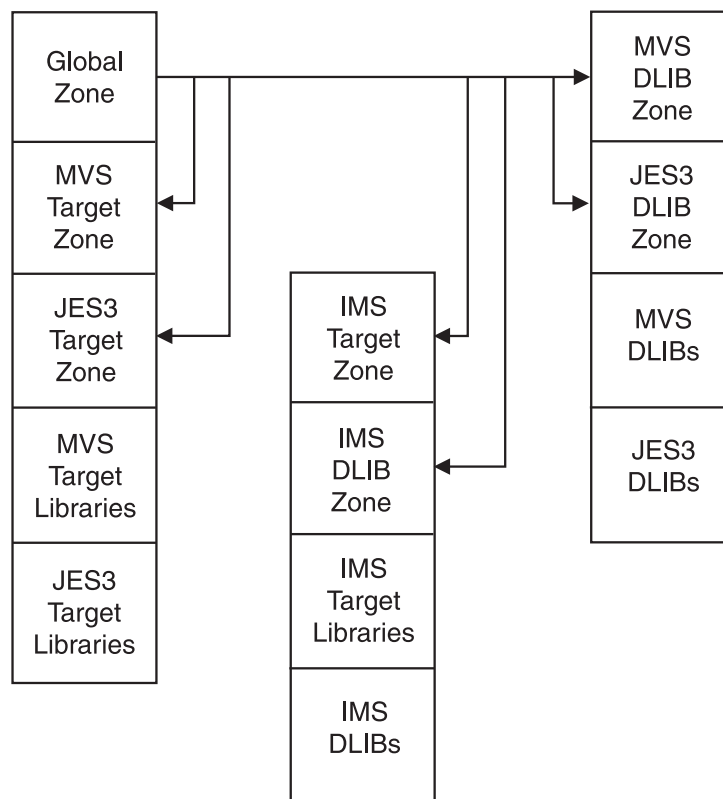


Figure 28. Using a master CSI and a separate CSI for each zone

Example 5: Using a master CSI and one CSI per SREL: In Figure 29 on page 56, one global zone is defined for the entire system in a master CSI, and separate CSIs are allocated for each SREL (MVS, CICS, NCP, and IMS/DB2). The target zones and DLIB zones associated with a given SREL are in the same CSI. This CSI structure provides the advantages of a common control point through one global zone (as in Example 2) and keeps the SMP/E control information physically associated with the libraries it describes. This is useful when you dump packs for backup.

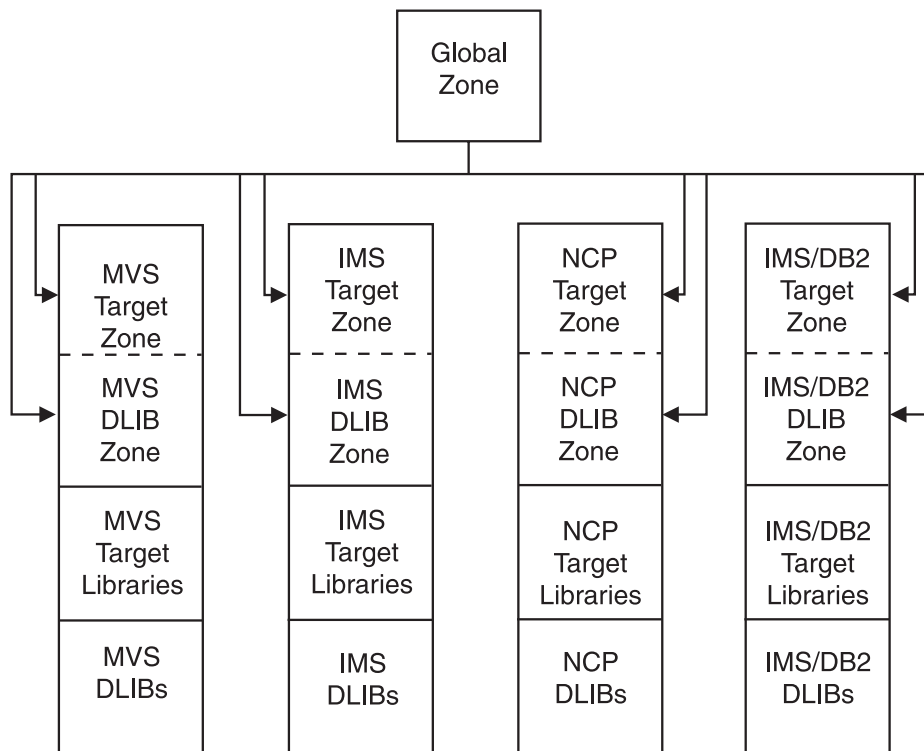


Figure 29. Using a master CSI and one CSI per SREL

Catalog considerations

When you catalog the CSI data sets used by SMP/E, remember these considerations:

- **User catalogs:** You should catalog each CSI in a user catalog, not in the master catalog. However, the user catalog does not need to be on the same volume as the CSI.
- **Alias entries for user catalogs:** Catalog information should be accessible through your master catalog. You can do it by defining each user catalog as an alias in the master catalog. For an example of defining an alias for a user catalog, see “Defining an alias entry for a user catalog” on page 58. Defining alias entries for user catalogs enables you to access all the CSI data sets and it eliminates the need to restore both the DASD containing the master catalog and the DASD containing the CSI after an I/O error.

Allocating a CSI data set

CSI data sets are keyed VSAM clusters and are allocated by use of access method services. For additional information and a description of the parameters, see *z/OS DFSMS Access Method Services for Catalogs*.

The GIMSAMPU member in SYS1.SAMPLIB is a sample job to allocate and prime CSI and SMP/E operational data sets. The following sample job step, which is taken from the sample job in GIMSAMPU, allocates a CSI data set with enough space to have multiple target or distribution zones and then initializes the CSI with the zpool record:

```
//DEFZONES EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//GIMZPOOL DD DSN=SYS1.MACLIB(GIMZPOOL),DISP=SHR
```

```
//SYSIN DD *
DEFINE CLUSTER(                                +
    NAME(SMPE.GLOBAL.CSI)                      +
    VOLUMES(valid)                             +
    CYLINDERS(100 10)                          +
    FREESPACE(10 5)                            +
    KEYS(24 0)                                 +
    RECORDSIZE(24 143)                        +
    SHAREOPTIONS(2 3)                         +
    )                                           +
    DATA (                                    +
        NAME(SMPE.GLOBAL.CSI.DATA)            +
        CONTROLINTERVALSIZE(8192)             +
    )                                           +
    INDEX (NAME(SMPE.GLOBAL.CSI.INDEX)        +
        CONTROLINTERVALSIZE(4096)            +
    )                                           +
    REPRO INFILE(GIMZPOOL)                    +
        OUTDATASET(SMPE.GLOBAL.CSI)
/*
```

In your own job, be sure to include:

- NAME

These are the naming conventions for CSI data sets:

- The high-level qualifier must not be **SYS1** if the CSI data set is cataloged in a user catalog rather than in the master catalog. However, the user catalog should be accessible through an alias entry in the master catalog.
- The low-level qualifier must be **CSI**.

These are examples of SMP/E data set names:

```
'SMPE.SMPCSI.CSI'
'PP.SMPCSI.CSI'
'IMS.SMPCSI.CSI'
'TEST.CSI'
```

- KEYS(24 0)
- RECORDSIZE(24 143)
- SHAREOPTIONS(2 3)

SMP/E requires 2 as the cross-region SHAREOPTIONS value. It uses the default value of 3 as the cross-system SHAREOPTIONS value. Because SMP/E does not support cross-system sharing of the CSI, you cannot specify 4 as the cross-system value for SHAREOPTIONS. If you want to support cross-zone sharing, you must either use Global Resource Serialization (GRS) or a similar function, or ensure that the data set is not updated by multiple systems simultaneously.

- CONTROLINTERVALSIZE (CISIZE)

If you allocate more than one CSI data set, ensure that they all have the same data CI size and index CI size. Doing so will allow SMP/E to take advantage of local shared resources (LSR) and VSAM resource pools. If the CSI data sets have different CISIZE values, SMP/E may open the data sets without using LSR.

- CYLINDERS

The CYLINDERS value is only an **estimated** starting value. Your cylinder value may vary according to the device type, the software arrangement, the amount of service you install, and the number of CSIs.

Defining an alias entry for a user catalog

After allocating the CSI data sets, you should define alias entries for the high-level qualifiers of your CSI data sets in your master catalog and relate them to your SMP/E user catalog.

The following job creates an alias entry in the master catalog for a CSI data set named **SMPE.SMPCSI.CSI** that is cataloged in a user catalog named **SMPECAT**:

```
//CREATE JOB 'accounting info',MSGLEVEL=(1,1)
//ALIAS EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
DEFINE ALIAS -
        (NAME(SMPE) -
        RELATE(SMPECAT)) -
        CATALOG(AMASTCAT/password)
/*
```

If the CSI data sets are cataloged in different user catalogs, they must have different high-level qualifiers.

Defining zones for your system

Once you have allocated and initialized the CSI data sets, you need to create within them the entries SMP/E uses to maintain your system. The first entries you need to define are the *zone definition entries* — GLOBALZONE, TARGETZONE, and DLIBZONE entries —,which set up zones in CSI data sets.

- **GLOBALZONE entry.** A global zone is created by defining a GLOBALZONE entry. The GLOBALZONE entry contains processing-related information for SMP/E. It is also used by SMP/E as an index to target and distribution zones, either in the same CSI or in different CSI data sets. The GLOBALZONE entry must be defined before you can do any other processing for that global zone.
- **TARGETZONE entry.** A target zone is created by defining a TARGETZONE entry. The TARGETZONE entry contains information SMP/E uses to process a specific target zone and the associated target libraries. It must be defined before you can do any other processing for that target zone.
- **DLIBZONE entry.** A distribution zone is created by defining a DLIBZONE entry. The DLIBZONE entry contains the information SMP/E uses to process a specific distribution zone and the associated distribution libraries. It must be defined before you can do any other processing for that distribution zone.

Figure 30 on page 59 illustrates how zone definition entries define the relationships between zones.

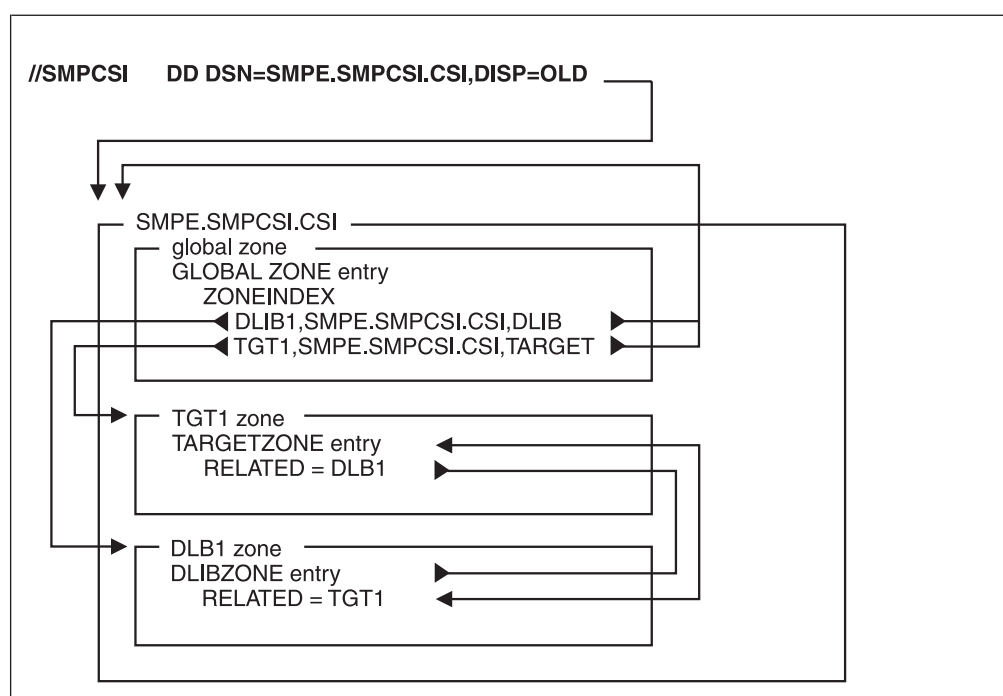


Figure 30. Relationships between zone definition entries

After you have defined the zones for your system, you can create other entries. SMP/E zones contain two basic types of entries:

- Entries controlling SMP/E processing.
You generally define processing control entries through the SMP/E Administration dialogs or with the UCLIN command. Table 2 summarizes the information specified in these entries.
- Entries describing the structure and status of the target and distribution libraries.
Status and structure entries are generally created by SMP/E when you install SYSMODs, run the JCLIN command, or copy entries from one zone to another. Table 3 on page 60 summarizes the information specified in these entries.

SMP/E provides a member in SYS1.SAMPLIB (GIMSAMPU) containing sample UCLIN statements to define entries for a basic z/OS system. You can access this member by use of standard system utilities. The sample definitions are syntactically correct and can be used as the basis for your CSI entries. This sample is not complete for all systems, but it is an example of the types of information various entries need. For examples of UCLIN to define entries, see The UCLIN Command in *SMP/E Commands*, which shows the UCLIN syntax for each entry type, and SMP/E Data Set Entries in *SMP/E Reference*, which contains a description of the syntax plus examples and notes on its use.

Table 2. Entries controlling SMP/E processing

Type of information	Entry type	Zone where defined		
		Global	Target	DLIB
Data set definitions for dynamic allocation ¹	DDDEF	X	X	X
DLIB zone processing information	DLIBZONE			X
Exception (held) SYSMODs ²	HOLDDATA ²	X		
FMIDs to limit the SYSMODs processed by an SMP/E command	FMIDSET	X		

Allocating and initializing data sets

Table 2. Entries controlling SMP/E processing (continued)

Type of information	Entry type	Zone where defined		
		Global	Target	DLIB
Global zone processing information	GLOBALZONE	X		
Processing options ³	OPTIONS	X		
Target zone processing information	TARGETZONE		X	
Utility program parameters ⁴	UTILITY	X		
Zone names to limit the SYSMODs processed by an SMP/E command	ZONESET	X		
Notes: <ol style="list-style-type: none"> 1. For more information about dynamically allocating data sets, see “How to dynamically allocate data sets to be used during SMP/E processing” on page 62. 2. For more information about processing exception SYSMODs, see Chapter 9, “Managing exception SYSMODs.” HOLDDATA entries cannot be updated by UCLIN or the Administration dialogs. 3. For more information about defining information to be used during SMP/E’s retry processing after x37 abends, see “Recovering after errors from utility processing” on page 69. 4. For more information about defining utility programs and associated parameters, see “Defining utility programs and associated parameters to SMP/E” on page 64. 				

Table 3. Entries describing the status and structure of the target and distribution libraries

Type of information	Entry type	Zone where defined		
		Global	Target	DLIB
Assembler statements that can be assembled to create an object module	ASSEM		X	X
Data elements installed in the target or distribution libraries (data elements are elements other than macros, modules, or source)	Data element entries		X	X
Distribution libraries that were totally copied to target libraries	DLIB		X	X
Elements installed in a UNIX file system	Hierarchical file system element entries		X	X
Java Archive files	JAR		X	X
Java Archive update files	JARUPD		X	X
Load module information	LMOD		X	X
Macros that have been installed in the target or distribution libraries	MAC		X	X
Module source that has been installed in the target or distribution libraries	SRC		X	X
Modules used to create load modules in the target libraries	MOD		X	X
Program objects	PROGRAM		X	X
Software product information	PRODUCT	X		
Software product feature information	FEATURE	X		
SYSMODs that have been processed	SYSMOD	X	X	X

Reorganizing a CSI data set to reclaim space

During normal SMP/E processing, VSAM control interval splits and control area splits can occur. These splits use up some of the free space in each control interval or control area, and this can degrade SMP/E performance and DASD space utilization. You should monitor your VSAM data sets regularly to determine how many splits have occurred and how much free space remains. The following job lists the catalog entry for data set **SMPE.SMPCSI.CSI**:

```
//LISTCAT JOB      'accounting info',MSGLEVEL=(1,1)
//STEP01 EXEC      PGM=IDCAMS
//SYSPRINT DD       SYSOUT=A
//SYSIN  DD         *
LISTCAT
          ENTRIES(SMPE.SMPCSI.CSI) -
          ALL
/*
```

After examining the LISTCAT output, you may determine that the CSI should be reorganized to eliminate splits in the control intervals or control areas and to reset the amount of free space available. This can be done through the access method services EXPORT and IMPORT commands. Once a CSI has been exported, a new CSI can be allocated, and the exported CSI can be imported so that normal SMP/E processing can continue.

Note: These examples are not the only way of compressing the CSI. You may prefer to use another method, drawing on your experience and knowledge of VSAM.

The following is a sample job for exporting the CSI:

```
//EXPORT JOB      'accounting info',MSGLEVEL=(1,1)
//STEP01 EXEC      PGM=IDCAMS
//SMPCSI DD         DSN=SMPE.SMPCSI.CSI,DISP=OLD
//TEMPCSI DD        DSN=SMPCSI.DATA,DISP=OLD
//SYSPRINT DD       SYSOUT=A
//SYSIN  DD         *
EXPORT SMPE.SMPCSI.CSI -
        INFILE(SMPCSI) -
        OUTFILE(TEMPCSI)
/*
```

The following is an sample job for importing the CSI:

```
//IMPORT JOB      'accounting info',MSGLEVEL=(1,1)
//STEP01 EXEC      PGM=IDCAMS
//SMPCSI DD         DSN=SMPE.SMPCSI.CSI,DISP=OLD
//TEMPCSI DD        DSN=SMPCSI.DATA,DISP=OLD
//SYSPRINT DD       SYSOUT=A
//SYSIN  DD         *
IMPORT INFILE(TEMPCSI) -
        OUTFILE(SMPCSI) -
        INTOEMPTY
/*
```

Notes:

1. If you want to delete the original CSI (SMPE.SMPCSI.CSI) when the exported copy (SMPCSI.DATA) is created, do **not** use the IDCAMS TEMPORARY keyword on the EXPORT command.

If you want to make a backup copy of the CSI, you can use the TEMPORARY keyword on the EXPORT command to keep the original CSI intact.

2. Use a sequential data set to receive the exported CSI.

Allocating and initializing data sets

3. After allocating a new CSI to be imported into, do **not** prime it with the GIMZPOOL record provided in SYS1.MACLIB; if you do, the import operation will fail.

PTS data sets

The PTS data set is used as temporary storage for SYSMODs. It contains one member for each SYSMOD received. Each member is called a modification control statement (MCS) entry and is an exact copy of the SYSMOD as it was received from the SMPPTFIN data set. The name of an MCS entry matches the ID of the SYSMOD it contains. Generally, the MCS entries are kept on the PTS until the SYSMOD is accepted; then, under normal processing, they are deleted.

Each PTS data set must be associated with only one global zone. The allocation of space and directory blocks for the SMPPTS depends on your plans for installing and maintaining the functions managed by the global zone. For more information about allocating the SMPPTS data set, see *SMP/E Reference*.

SCDS data sets

The SCDS data set contains backup copies of target-zone entries that are modified during APPLY processing. These backup copies are made before the entries are (1) changed by inline JCLIN, a ++MOVE MCS, or a ++RENAME MCS or (2) deleted by an element MCS with the DELETE operand. The backup copies are used during RESTORE processing to return the entries to the way they were before APPLY processing.

Each backup copy of an entry is associated with the SYSMOD that caused the entry to be backed up. Together, the collection of entries associated with a SYSMOD is called the *BACKUP* entry for that SYSMOD. When you process the SCDS (for example, to list entries), you can specify only BACKUP entries; you cannot process individual entries within a BACKUP entry.

Each target zone within a CSI must have its own SCDS. The correct SCDS to be used during processing is determined either by the SMPSCDS DDDEF entry in each specific target zone or by a DD statement in the JCL. An SCDS can be allocated the same way as any normal partitioned data set. The allocation of space and directory blocks for this data set depends on your plans for installing and maintaining functions. For more information about allocating the SMPSCDS data set, see *SMP/E Reference*.

How to dynamically allocate data sets to be used during SMP/E processing

The processing of SMP/E commands requires a variety of data sets. You can either provide the DD statements for these data sets (such as in a cataloged procedure) or have SMP/E allocate the data sets dynamically. Dynamic allocation has the advantage that data sets are allocated only as they are needed; DD statements must successfully allocate all data sets, regardless of whether they are needed for the command being processed.

There are some drawbacks to using DD statements. For example, all the data sets defined by DD statements must be successfully allocated, regardless of whether they are needed for the command being processed. In addition, if you are running several SMP/E commands, you must be careful to use the correct DD statements

for each command. If you are processing zones that are in different CSI data sets, you must make sure to provide a DD statement that points to each of those zones and their associated CSIs.

With dynamic allocation, you do not have these problems. Subsequent sections describe the sources from which SMP/E can get the information it needs to allocate data sets dynamically and how it chooses which of these sources to use.

Sources of information for dynamic allocation

SMP/E can use several sources of information to allocate data sets dynamically:

- DDDEF entries
- SMPPARM member GIMDDALC
- Standard defaults

DDDEF entries

You can use DDDEF entries to provide SMP/E with information it needs to allocate any of the following:

- Permanent data sets, such as target libraries, distribution libraries, and SMP/E data sets
- Temporary data sets
- SYSOUT data sets
- Work data sets
- Pathnames for elements and load modules residing in a UNIX file system

Note: A member of a partitioned data set cannot be specified using a DDDEF entry.

The name of the DDDEF entry must match the ddname of the data set it describes and the entry must exist in the zone that uses the data set. DDDEF entries provide more flexibility than DD statements; they enable different zones to use different data sets for the same ddname and they use resources more efficiently because they allow SMP/E to allocate only the data sets it needs.

DDDEF entries can include the following information:

- Data set name
- Unit type
- Volume serial number
- Initial data set status: NEW, OLD, MOD, or SHR
- Final data set status: KEEP, DELETE, or CATALOG
- How the data set is to be allocated: blocks, cylinders, or tracks
- Primary and secondary values for space allocation
- Whether the data set should be RACF-protected
- Whether the data set is SMS-managed
- Directory information used to allocate the pathname for an element or load module residing in a UNIX file system.

For more information about DDDEF entries, see the *SMP/E Reference* manual.

SMPPARM member GIMDDALC

Another way to provide SMP/E with information about data sets is through GIMDDALC control statements in SMPPARM member GIMDDALC. For more information about GIMDDALC, see the chapter on SMPPARM members in the *SMP/E Reference* manual.

Allocating and initializing data sets

Standard defaults: SMPOUT and SYSPRINT are critical for SMP/E to operate properly. Therefore, in case they are not defined, SMP/E has built-in defaults for them.

- SMPOUT is allocated either as SYSOUT (for background processing) or to the terminal (for foreground processing).
- SYSPRINT is allocated as SYSOUT.

How dynamic allocation works

Once SMP/E has determined which data sets are needed for the command it is processing, SMP/E checks whether DD statements have been provided for any of those data sets. SMP/E uses information from those DD statements in allocating the data sets to which they apply. If any data sets lack DD statements, SMP/E must allocate them dynamically. To get the information it needs to do this, SMP/E checks the following sources in the order shown.

1. **DDDEF entries.** If the zone specified on the SET command contains a DDDEF entry for the required data set, SMP/E uses that entry to allocate the data set. Otherwise, it checks the next source.
2. **SMPPARM member GIMDDALC.** If a GIMDDALC control statement has been defined in SMPPARM member GIMDDALC, SMP/E uses that information to allocate the data set. Otherwise, it checks the next source.
3. **Standard defaults.** If the data set is for SMPOUT or SYSPRINT, SMP/E uses the standard default to allocate the data set. Otherwise, data set allocation fails.

Notes:

1. When a data set is part of a concatenation (such as the SYSLIB concatenation), SMP/E does not do the previously described checking. All data sets in a concatenation must be defined the same way. For example, if a DDDEF entry specifies a concatenation, all the specified entries must also be defined by DDDEF entries.
2. For the cross-zone phase of APPLY and RESTORE processing, a DD statement cannot be used to allocate the SYSLIB for a cross-zone load module. This library can be allocated only through a DDDEF entry in the cross-zone containing the LMOD entry for the cross-zone load module.
3. The DD name **SMPDUMMY** is always allocated as a DUMMY data set. SMP/E ignores any allocation information specified for SMPDUMMY by a DDDEF entry or GIMDDALC member. If SMPDUMMY was previously allocated outside of SMP/E, SMP/E frees the SMPDUMMY DD and then reallocates it as a DUMMY data set.

Defining utility programs and associated parameters to SMP/E

SMP/E calls utility programs to install SYSMODs in the target and distribution libraries. These utilities must reside in either the LNKLIST concatenation or the link pack area (LPA), as defined in SYS1.PARMLIB. SMP/E uses default utility programs unless you define OPTIONS entries and UTILITY entries specifying other utilities and parameters.

- OPTIONS entries point to the specific UTILITY entry to be used for each type of utility. These are the types of utilities you can point to:
 - Access methods services
 - Assembler
 - Compress
 - Copy
 - Link-edit
 - Retry after x37 abends

- Update
- Superzap
- Each UTILITY entry defines the information to be used when invoking a specific type of utility:
 - The name of the utility program
 - The maximum utility return code that SMP/E should consider to be successful
 - The ddname to be used for utility output
 - Parameters to be passed to the utility

Using default values for utility programs

If you do not define UTILITY entries and OPTIONS entries to specify which utility programs to use, SMP/E uses default utility programs, as well as its own default values, for return codes, print values, and the parameters to be passed. Table 4 lists the default values for the various types of utility programs.

Table 4. Default values for UTILITY entries

Utility	NAME	RC	PRINT	PARM
Access method services	IDCAMS	0	SYSPRINT	
Assembler	ASMA90	4	SYSPRINT	XREF, NOOBJECT, DECK
Compress	IEBCOPY	0	SYSPRINT	
Copy	IEBCOPY	0	SYSPRINT	SPCLCMOD and CMWA=256K (for program elements and copied load modules)
Hierarchical file system copy	BPXCOPY	0	SYSPRINT (see note 3)	
Link-edit utility	IEWBLINK or IEWL (see note 1)	8	SYSPRINT	LET, LIST, NCAL, XREF (see note 2)
Retry after x37 abends	IEBCOPY	0	SYSPRINT	
Update	IEBUPDTE	0	SYSPRINT	Determined by SMP/E during processing
Superzap	IMASPZAP	4	SYSPRINT	

Defining utility programs

Table 4. Default values for UTILITY entries (continued)

Utility	NAME	RC	PRINT	PARM
Notes:				
1. If you replace a default utility program, the replacement utility program must be compatible with the default utility it replaces, both in the way it processes any control statements and execution parameters generated by SMP/E and in the return codes that it returns to SMP/E.				
2. When the DFP level supports the binder, IEWBLINK is the default link-edit utility. When the DFP level does not support the binder, IEWL is the default.				
3. When the load module being link-edited contains a CALLLIBS subentry list, SMP/E does not always use NCAL by default. In this case, SMP/E uses CALL for the link to the actual target library or NCAL for the link to the SMPLTS library. SMP/E always uses NCAL for ACCEPT processing.				
4. If SYSTSPRT is specified as the PRINT value, it is ignored and the default of SYSPRINT is used instead.				

Defining values for utility programs

If you want to use utility programs other than the defaults, or if you want to specify different parameters for the default utility programs, you need to identify the programs to SMP/E by defining UTILITY entries and OPTIONS entries. For example, the installation information for a particular product you are about to install may direct you to use a specific link-edit utility and may indicate that the maximum successful return code from the utility is 4, not 8.

Figure 31 on page 67 shows how OPTIONS entries, UTILITY entries, zone definition entries, and the SET command are related.

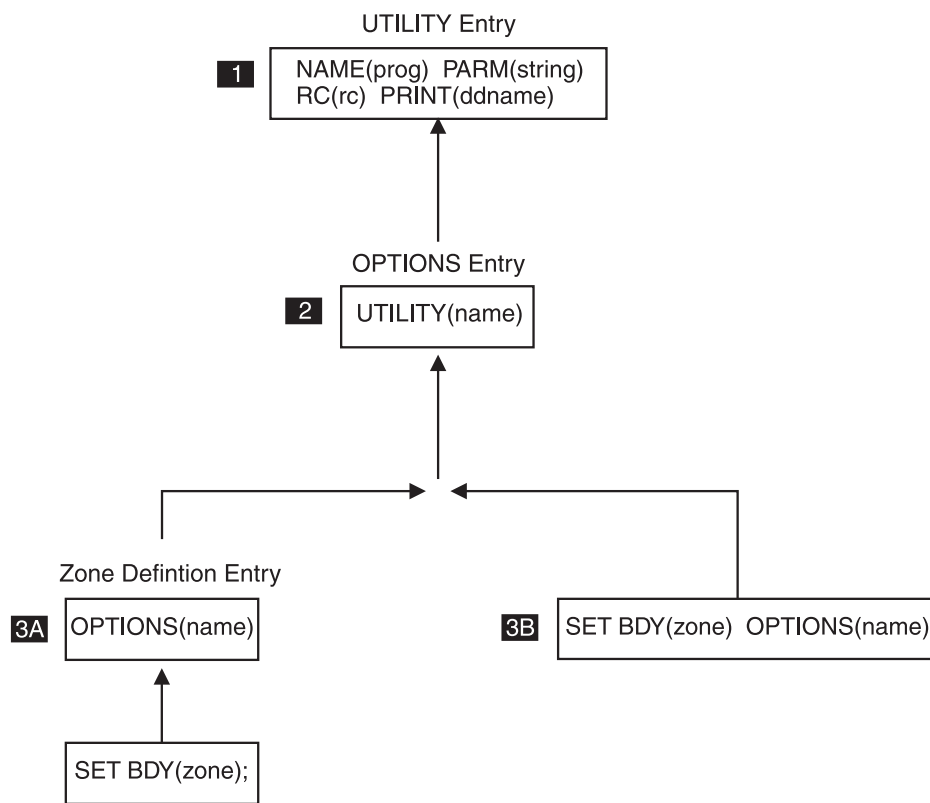


Figure 31. Relationships of OPTIONS, UTILITY, zone definition entries and the SET command

These are the basic steps you follow:

- 1** Define the desired utility name and parameters in a UTILITY entry.
- 2** Define an OPTIONS entry that points to that UTILITY entry.
- 3** Put the OPTIONS entry into effect by doing one of the following:
 - A** If the information should be the default for processing a particular zone, update the associated zone definition entry to point to the desired OPTIONS entry. The default OPTIONS ENTRY is always used for processing that zone, unless you override the OPTIONS entry with the SET command.
 - B** Otherwise, use the SET command to indicate which OPTIONS entry to use when processing the zone specified on the SET command. The information in the specified OPTIONS entry overrides the default OPTIONS entry defined for the zone.

For examples of these steps, see “Example: How to request the desired utility processing” on page 68. For more detailed information, see OPTIONS Entry, UTILITY Entry, GLOBALZONE Entry, DLIBZONE Entry, and TARGETZONE Entry in *SMP/E Reference*, and the SET command in *SMP/E Commands*.

Note: You can specify which utility programs SMP/E can call by using the PROGRAM class of the z/OS Security Server (RACF). Refer to *z/OS Security Server RACF Security Administrator's Guide*, SA22-7683 for more information about how to use this function.

Example: How to request the desired utility processing

Table 5 describes the steps you need to follow in order to get the desired utility processing. For details on syntax and coding considerations, see the UTILITY Entry (Global Zone) section in *SMP/E Reference*.

Table 5. How to request the desired utility processing

Steps	Sample scenario
1 Define the desired utility name and parameters in a UTILITY entry.	<p>You want SMP/E to call a user routine, USERRCVR, rather than IEBCOPY, to recover from x37 abends. This is the processing you need:</p> <ul style="list-style-type: none"> The program must receive parameter TYPE=FAST. The output should go to X37PRINT rather than SYSPRINT. A return code of 4 or less is acceptable. You want to suppress the listing of member names during retry processing done by your program. <p>The following UCL defines the desired UTILITY entry for your program:</p> <pre> SET BDY(GLOBAL) /* Set to global zone. */ UCLIN /* */ ADD UTILITY(MYX37) /* Retry/recovery program. */ NAME(USERRCVR) /* Program name. */ PARM(TYPE=FAST) /* PARM value. */ PRINT(X37PRINT) /* SYSPRINT ddname. */ RC(4) /* Highest acceptable */ /* return code. */ LIST(NO) /* No list of member names */ /* */ ENDUCL /* */ </pre>
2 Connect the UTILITY entry to an OPTIONS entry.	<p>Once you have created the desired UTILITY entry, you need to point to it from an OPTIONS entry. The following UCL defines an OPTIONS entry (MYOPT1) that points to UTILITY entry MYX37:</p> <pre> SET BDY(GLOBAL) /* Set to global zone. */ UCLIN /* */ ADD OPTIONS(MYOPT1) /* New OPTIONS entry. */ RETRY(MYX37) /* Connect to retry. */ /* */ ENDUCL /* */ </pre>
3A Use the zone definition entry to specify your OPTIONS entry as the default OPTIONS entry.	<p>You might want your OPTIONS entry to be the default for processing target zone TGT1. In this case, the TARGETZONE entry for TGT1 must point to your OPTIONS entry. The following UCL updates the existing TARGETZONE entry for TGT1 so it points to OPTIONS entry MYOPT1:</p> <pre> SET BDY(TGT1) /* Set to target zone, TGT1 */ UCLIN /* */ REP TARGETZONE /* Update zone definition. */ OPTIONS(MYOPT1) /* OPTIONS entry to be used */ /* */ ENDUCL /* */ </pre>
3B Use the SET command to have your OPTIONS entry override the default OPTIONS entry for the zone.	<p>Instead of changing the default OPTIONS entry, you might want to override whatever the default might be and use OPTIONS entry (MYOPT1) for processing particular commands or SYSMODs. In this case, the SET command preceding the commands you want to process must point to your OPTIONS entry. The following UCL points the SET command to OPTIONS entry MYOPT1:</p> <pre> SET BDY(TGT1) /* Set to target zone, TGT1 */ OPTIONS(MYOPT1) /* OPTIONS entry used. */ : : </pre>

Recovering after errors from utility processing

To complete as many updates as possible to your product libraries, SMP/E tries to recover from errors that occur during processing by the utilities it invokes. The type of recovery SMP/E attempts for such errors depends on the type of error that occurred and the type of utility that was called.

- **Batched updates, no out-of-space problems.** Items to be processed by the link-edit utility or the copy utility are often batched. If an error other than an x37 abend occurs during such a utility call, SMP/E debatches the items and reinvokes the utility to attempt updates for individual members. This recovery is attempted automatically by SMP/E; no user intervention is required.
- **Out-of-space errors (x37 abends).** If a list of data sets is specified by the user, SMP/E attempts “retry” processing for data sets that have run out of space. During retry processing, the data set that ran out of space is compressed, and the utility is called again to retry the updates.

If retry processing does not reclaim sufficient space and input to the utility was batched (copy or link-edit utility only), SMP/E debatches the input and retries the utility for each member separately. If this final attempt fails, the resulting x37 abend is treated as an unacceptable utility return code, and processing continues for other eligible updates.

This section explains what you need to define in order to have SMP/E attempt retry processing for x37 abends.

Overview of your input to retry processing

Your input to retry processing is through subentries in the OPTIONS entry, an optional retry exit routine, and the RETRY command operand.

- **OPTIONS entry.** The RETRYDDN and EXRTYDD subentries in the OPTIONS entry indicate which libraries are eligible for retry processing.
The RETRYDDN subentry specifies which libraries should be included in retry processing. Without this list of libraries, SMP/E does not attempt retry processing.
The EXRTYDD subentry specifies which libraries should be excluded from retry processing. This makes it easier for you to include all but a few specific libraries in retry processing.
- **Exit routine.** The retry exit routine enables you to control retry processing when an x37 abend occurs, instead of having SMP/E compress the out-of-space data set and reinvoke the failing utility.
If SMP/E determines that a retry can be attempted, it cancels the abend dump and calls the retry exit routine. The routine can then either cancel retry processing or perform some other method of recovery.
- **RETRY operand.** The RETRY operand tells SMP/E whether to attempt retry processing for the specific SMP/E command that is being processed. RETRY can be specified on the ACCEPT, APPLY, LINK LMODS, LINK MODULE, and RESTORE commands.
You do not need to specify this operand in order to request retry processing, because the default is RETRY(YES). However, you can explicitly specify RETRY(YES) if you want to.
To prevent retry processing for a specific command, specify RETRY(NO) instead of using RETRY(YES).

Example: How to request the desired retry processing

Table 6 describes the steps you need to follow in order to get the desired retry processing. For details on syntax and coding considerations, see *SMP/E Reference*.

Table 6. How to request the desired retry processing

Steps	Sample scenario
1 Decide which data sets should be included in or excluded from retry processing.	You want retry processing for all libraries except LINKLIB, MIGLIB, and NUCLEUS.
2 Define the necessary subentries in the OPTIONS entries that you plan to use.	<p>You already have been using OPTIONS entry OPT1 for all your ACCEPT, APPLY, LINK LMODS, LINK MODULE, and RESTORE commands. You need to add RETRYDDN and EXRTYDD values to specify the libraries that are eligible for retry processing.</p> <pre> SET BDY (GLOBAL) . UCLIN . ADD OPTIONS (OPT1) RETRYDDN (ALL) EXRTYDD (LINKLIB, MIGLIB, NUCLEUS) . ENDUCL . </pre>
3 Decide whether to use the default RETRY UTILITY entry, or to point to and define a RETRY UTILITY entry that specifies the desired information.	You will use the defaults for the retry utility as shown in Table 4 on page 65.
4 If desired, define an exit routine for retry processing. The Retry Exit Routine section in <i>SMP/E Reference</i> provides all the information you need about the interface for this routine and what SMP/E expects the routine to do.	You will use SMP/E's retry processing instead of writing a retry exit routine.
5 Make sure the desired OPTIONS entry is in effect for the zone you are processing. The methods you can use are shown in Figure 31 on page 67.	<p>As indicated in step 2, you have been using OPTIONS entry OPT1. Instead of specifying it on the SET command, you have defined TZONE entry (TGT1) and DZONE entry (DLIB1), which specify OPT1 as the OPTIONS entry to be used. (These zones are already defined in the global zone by ZONEINDEX subentries.)</p> <pre> SET BDY (TGT1) . UCLIN . ADD TARGETZONE (TGT1) OPTIONS (OPT1) SREL (Z038) RELATED (DLIB1) . ENDUCL . SET BDY (DLIB1) . UCLIN . ADD DLIBZONE (DLIB1) OPTIONS (OPT1) SREL (Z038) RELATED (TGT1) . ENDUCL . </pre>

Table 6. How to request the desired retry processing (continued)

Steps	Sample scenario
<p>6 Use RETRY(YES) on the commands you want retry processing to be done for (RETRY can be specified on the ACCEPT, APPLY, LINK LMODS, LINK MODULE, and RESTORE commands.).</p> <p>Note: To prevent retry processing for a specific command, specify RETRY(NO) instead.</p>	<p>You are installing product HYY2102 and the related service, and you want SMP/E to attempt retry processing. You choose to use RETRY(YES) as the default instead of specifying it explicitly.</p> <pre> SET BDY(TGT1) . APPLY FORFMID(HYY2102) FUNCTIONS PTFS GROUPEXTEND . </pre>

Connecting SMP/E dialogs to ISPF

The SMP/E dialogs run under ISPF. Therefore, if you plan to use the dialogs, you must connect them to ISPF. Follow these steps:

1. Make sure you have the required programs on your system.
2. If you have the TSO/VS2 programming control facility (PCF), add the necessary dialog modules to the PCF command table.
3. Concatenate the dialog libraries in a logon procedure or a command list (CLIST).
4. Connect the dialogs to ISPF.
5. Customize the dialogs, if desired.

These steps are described in the sections that follow.

Check for required programs

Make sure the following programs are on your system:

- ISPF (Version 4 Release 2, or later)
- ISPF/PDF (Version 2 Release 3, or later)
- TSO/E (Version 2 Release 5, or later)

The SMP/E dialogs use the TSO OUTPUT, SUBMIT, and STATUS commands. Therefore, to support these commands, you must provide a TSO IKJEFF53 user installation exit routine that does not restrict the TSO OUTPUT and STATUS commands to job names beginning with the user's user ID. For details, see *z/OS TSO/E Customization*.

Add dialog modules to the PCF command table

If you have the TSO/VS2 programming control facility (PCF), add the following modules to the PCF command table:

```

GIMPSBTP
GIMISID1
GIMISID2
GIMISID3
GIMISID4
GIMISID5

```

Concatenate the dialog libraries

Table 7 lists the SMP/E dialog libraries needed to concatenate with ISPF libraries. To use the dialogs, concatenate these libraries in a TSO logon procedure or in a CLIST. Here are some recommendations for concatenating the libraries:

- There are two sets of dialog libraries for SMP/E: one for English and one for Japanese. You can include the libraries for only **one** of these features in a given logon procedure or CLIST. If you want to be able to use both features on the same system, you need a logon procedure or CLIST for each feature. To switch from one feature to the other, you have to exit ISPF, run the procedure or CLIST for the other feature, and get back into ISPF.
- Do not use the ISPF LIBDEF service to concatenate the following libraries. Instead, use either the TSO ALLOCATE command or DD statements and JCL.
 - Dialog CLISTs (GIM.SGIMCLS0): If you use LIBDEF, the CLISTs and EXECs in the data set cannot be executed.
 - Dialog load module library (GIM.SGIMLMD0): If LIBDEF is used to concatenate the load module libraries, the SMP/E dialogs cannot find required load modules.

Table 7. ISPF libraries and related SMP/E target libraries

DDNAME	SMP/E library	Contents
SYSPROC	GIM.SGIMCLS0	Dialog CLISTs
ISPLLIB	GIM.SGIMLMD0	Dialog load modules
ISPLMLIB	GIM.SGIMMENU	Dialog messages
ISPLLIB	GIM.SGIMPENU	Dialog panels
ISPSLIB	GIM.SGIMSENU	Skeleton JCL procedures
ISPTLIB	GIM.SGIMTENU (see Note 1)	Table input library
ISPCTL1	(see Note 2)	Generated JCL
ISPCTL2	(see Note 2)	Generated JCL
SMPTABL	A user-defined name (see Note 3)	SMP/E table library

Notes:

1. Include GIM.SGIMTENU and the SMPTABL data set in the ISPTLIB concatenation.
2. Use the ISPCTL1 and ISPCTL2 files to generate JCL for submitted SMP/E jobs. The SMP/E job submit facility lets you browse and edit this JCL. You can omit these files from your logon procedure and let ISPF automatically allocate them as needed.

To save the input JCL generated by the dialogs, either:

- Use EDIT CREATE while in the generated JCL to save it in another (permanent) data set, or
 - Allocate a permanent sequential data set to ISPCTL1 (LRECL=80, RECFM=FB) **before** you enter the SMP/E dialogs.
3. Allocate a single, installation-wide table data set to the ISPTLIB and SMPTABL DD statements.
 - SMP/E uses this table data set to save process status information for the SYSMOD management dialogs.

- The data set must be a partitioned data set (LRECL=80, RECFM=FB). Because the data set is also in the concatenation of ISPTLIB, make the block size compatible with the block size of the corresponding ISPF data sets.
- For more information about the SMPTABL data set, see “SMPTABL space allocation.”

SMPTABL space allocation

The amount of space required for SMPTABL depends on the number of concurrent processes you want to support for the SMP/E SYSMOD management dialog and on the amount of data that is saved for each process. Use Table 8 as a guide.

Table 8. SMPTABL data set allocations

Number of processes	BLKSIZE	Number of blocks	Directory blocks
16	8800	60	4
32	8800	120	8

Sample logon procedure

Figure 32 is an example of a logon procedure that concatenates the libraries for the SMP/E dialogs.

Note: Depending on the system you are connecting the dialogs to, you may need to change your logon procedure, a CLIST, or both. It is common practice to have a logon procedure call a CLIST every time a user logs on. This is normally done so that minor changes to concatenations do not require changes to the logon procedure, or so users with the same logon procedure can have the CLIST perform different allocations from the ones performed for other users.

If you make changes **only** to your logon procedure and the procedure calls a CLIST that changes a concatenation, you may end up missing changes you made in your logon procedure. In this case, instead of (or in addition to) updating the concatenations in your logon procedure, you should update the concatenations in the CLIST that is called.

```
//SMPE      EXEC PGM=IKJEFT01
//SYSPROC DD DSN=GIM.SGIMCLS0,DISP=SHR      /* SMP/E CLISTS. */
//          DD DSN=ISP.SISPCLIB,DISP=SHR
//SYSHELP DD DSN=SYS1.HELP,DISP=SHR
//SYSPRINT DD TERM=TS
//SYSIN DD TERM=TS
//*****
//*
//* ISPF temporary data sets (no ISPCTL1 or ISPCTL2)
//*
//*****
//ISPLST1 DD DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//          DCB=(LRECL=121,BLKSIZE=0,RECFM=FBA)
//ISPLST2 DD DISP=NEW,UNIT=SYSALLDA,SPACE=(CYL,(1,1)),
//          DCB=(LRECL=121,BLKSIZE=0,RECFM=FBA)
//*****
//*
//* ISPF/SMPE load modules, panels, skeletons, messages,
//*      tables
//*      NOTE: SMPTABL is a single installation-wide
//*            ISPF table data set shared by all SMP/E
//*            users. It is initially allocated as an empty PDS
//*            LRECL=80, RECFM=FB, BLKSIZE= (compatible with
//*            ISP.V2R3M0.ISRTLIB).
//*
//*****
//ISPLLIB DD DSN=GIM.SGIMLMD0,DISP=SHR      /* SMP/E LMODs. */
//ISPLIB DD DSN=GIM.SGIMPENU,DISP=SHR      /* SMP/E panels. */
//          DD DSN=ISP.SISPPENU,DISP=SHR
//ISPSLIB DD DSN=GIM.SGIMSENU,DISP=SHR      /* SMP/E skeletons.*/
//          DD DSN=ISP.SISPSENU,DISP=SHR
//ISPLMLIB DD DSN=GIM.SGIMMENU,DISP=SHR      /* SMP/E messages. */
//          DD DSN=ISP.SISPMENU,DISP=SHR
//ISPTLIB DD DSN=GIM.SGIMTENU,DISP=SHR      /* SMP/E tables. */
//          DD DSN=ISP.SISPTENU,DISP=SHR
//          DD DSN=user-defined name,DISP=SHR /* SMP/E tables.*/
//SMPTABL DD DSN=user-defined name,DISP=SHR /* SMP/E tables.*/
```

Figure 32. Sample logon procedure that concatenates SMP/E and ISPF libraries

Connect the dialogs to ISPF

You can get to the SMP/E dialogs from the SMP/E primary option menu. To provide access to that menu, you must connect the dialogs to ISPF. Sample ISPF panels are provided with z/OS to enable panels for most z/OS elements, including SMP/E. These panels are in the SISPPENU data set after APPLY processing. The panels supplied are:

- ISR@390** This is an ISPF Primary Options Menu. It is identical to the ISR@PRIM Primary Options Menu, except that it includes the additional options 12 and 13, which point to the next two panels.
- ISR@390S** This is a secondary panel, with options used by system programmers and administrators, including SMP/E.
- ISR@390U** This is a secondary menu panel, including the options used by most ISPF users.

Use one of the methods documented in the *Program Directory* for this level of SMP/E to use ISR@390 instead of ISR@PRIM. The SMP/E dialogs will then be accessible through panel ISR@390S.

Customize the SMP/E dialogs

After you install the SMP/E dialogs, you can change the default values they use.

When you select option 0 (SETTINGS) on the SMP/E Primary Option Menu, SMP/E displays panel GIM@PARM, which allows you to

- Modify the values for allocating temporary SMP/E utility (SYSUT n) and SMP/E work (SMPWRK n) data sets. The options you specify are saved permanently in the ISPF profile pool for use later by other SMP/E dialog processes.
- Specify a data set name to be used by SMP/E for the SMPPARM data set during background execution. The SMPPARM data set is used to define exit routines and specify allocation information used by SMP/E processing. If a data set name is specified on panel GIM@PARM, SMP/E generates an SMPPARM DD statement in all JCL jobs created by the SMP/E dialogs that invoke SMP/E.

```
GIM@PARM                                SMP/E DIALOG SETTINGS
====>

Reset to use SMP/E's default settings? ===> NO  (Yes or No)

Enter or verify the information below used to allocate temporary data sets.
These temporary data sets contain generated JCL jobs, output for jobs which
have completed execution, and MCS entries for viewing:

UNIT   ===> SYSALLDA
VOLUME ===>

Enter or verify the information below used to create DD statements in
generated JCL jobs:

Space for SMP/E Utility Work data sets (SYSUTn):
      Block Size  Primary  Secondary
SYSUT1    3120      380      760
SYSUT2    3120      380      760
SYSUT3    3120      380      760
SYSUT4    3120       38      100

Space for SMP/E Work data sets (SMPWRKn):
      Block Size  Primary  Secondary  Directory Blocks
SMPWRK1    3120      364      380           500
SMPWRK2    3120      364      380           500
SMPWRK3    3120      364      380           500
SMPWRK4    3120      364      380           500
SMPWRK6    3120      364      380           500

Unit for SYSUTn and SMPWRKn data sets:
UNIT ===> SYSDA

Data set name to use for SMPPARM.  If a name is specified, an SMPPARM DD
statement will be generated.
DSN   ===>

Enter or verify the information below used to allocate permanent SMPWRK3
data sets created and used by the SYSMOD Management dialogs:

UNIT   ===>
VOLUME ===>
PREFIX ===>          (TSO Prefix is used if no prefix is specified)

To save the changes, press ENTER .
To ignore the changes, enter END .
```


JOB statement customization

If you have never entered a JOB statement on panels GIMCGSUB, GIMRCSUB, or GIMSB01, then SMP/E primes those panels with the following default JOB statement:

```
//useridA JOB (ACCOUNT), 'NAME'  
//*  
//*  
//*
```

This initial default JOB statement is not customizable, but when you enter a JOB statement on panels GIMCGSUB, GIMRCSUB, or GIMSB01, the statement you enter is saved in your ISPF profile pool and will be used as the new default when you use those panels again.

Setting up SMP/E for easier operation

SMP/E provides several optional facilities that you can use to make SMP/E operations easier and more efficient. To take advantage of these facilities, you must set up a few SMP/E options. Normally, these set up procedures need only be done once.

The major tasks are:

- Specifying SMP/E OPTIONS entry
- Specifying link edit utility output DDDEF entries
- Specifying automatic cross-zone requisite checking

Recommended values for OPTIONS entry

IBM recommends the following OPTIONS entry values:

Recommended value	Purpose
MSGFILTER(YES)	MSGFILTER(YES) causes SMP/E to filter the messages it writes to SMPOUT during APPLY, ACCEPT, and RESTORE command processing. When SMP/E filters messages, most non-critical informational messages are not written to SMPOUT. The result is less output to read through when it is necessary to investigate an SMP/E operation. MSGFILTER(NO) is the default.
MSGWIDTH(80)	MSGWIDTH(80) causes SMP/E to format its messages to an 80 character width. This makes online viewing simpler by eliminating the need to scroll right to view the entire message text. MSGWIDTH(120) is the default.
RECZGRP	Often the RECEIVE command will receive a PTF that has already been accepted and purged from the global zone and SMPPTS data set. There is no need to receive such PTFs and they only add to the space used by the SMPPTS. To prevent RECEIVE from receiving such PTFs, you need to tell SMP/E what dlib zones to check when determining if a PTF has already been accepted. You can specify the list of dlib zones using the RECEIVE Zone Group (RECZGRP) subentry in an OPTIONS entry.

The RECZGRP subentry allows you to set a policy and specify the list of zones once. This list is then used for all future RECEIVE operations whenever the OPTIONS entry is active. With the list of dlib zones set, during RECEIVE processing, SMP/E will check each of the zones specified first before receiving a PTF. If that PTF is accepted in any of the specified zones, the PTF will not be received again.

RETRYDDN(ALL)

RETRYDDN(ALL) causes SMP/E to compress out-of-space libraries and retry processing after an x37 abend. When you use this option, make sure you are **not** updating production data sets.

Note: Do not specify a PEMAX value. Allow SMP/E to use its default value of 25,000.

Sample UCLIN job

Here is a sample UCLIN job to build an OPTIONS entry with the recommended values:

```
//job      JOB accounting info...
//step      EXEC PGM=GIMSMP
//SMPCSI    DD DSN=smp.global.csi,DISP=SHR
//SMPCNTL   DD *
SET BDY(GLOBAL).
UCLIN.
ADD OPTIONS(OPTENT)
MSGFILTER(YES)
MSGWIDTH(80)
RETRYDDN(ALL)
RECZGRP( zosdlib
         os390dlib
         jes2dlib
         jes3dlib
         cicsdlib
         db2dlib
         imsdlib ).
ENDUCL.
/*
```

Activating the OPTIONS entry

After the OPTIONS entry has been defined, IBM recommends that you make it active by defining it as the default OPTIONS entry for the global, target, and DLIB zones. Otherwise, you must specify it on the SET command before using any other SMP/E command.

Recommended link edit utility output DDDEF entries

To exploit utility multi-tasking in SMP/E, ensure the ddname that is to contain the link edit utility output is defined with a DDDEF entry that identifies a SYSOUT class. SMP/E's default ddname for utility output is SYSPRINT, but can be changed using the PRINT subentry of the LKED UTILITY entry. When multi-tasking, SMP/E will invoke multiple instances of the link edit utility at the same time, thus decreasing the total time required to complete an APPLY, ACCEPT, or RESTORE command. If you do not define the print ddname using a DDDEF entry, or if the DDDEF identifies something other than a SYSOUT class, SMP/E will not multi-task link edit utility operations.

Specifying automatic cross-zone requisite checking

The installation of software service often requires the synchronization of service levels across multiple SMP/E zones. For example, service for software in the MVS zone may require related service for the JES2, CICS, DB2, and other zones to permit all software within the system image to operate properly. To help ensure proper synchronization across zones, you can tell SMP/E to automatically check for cross-zone requisites during APPLY, ACCEPT, and RESTORE command processing.

To enable automatic cross-zone requisite checking, you must tell SMP/E which zones contain software to be checked for requisites. The set of zones identified for cross-zone requisite checking is called the *zone group*. SMP/E provides two methods to identify the zones within the zone group:

1. Define a default zone group
2. Specify the zones directly on the APPLY, ACCEPT, or RESTORE command.

Defining a default zone group

You can define a default zone group by creating a ZONESET entry that contains the XZREQCHK(YES) subentry and the list of zones to be included in the default zone group. SMP/E will use this default zone group to determine which zones to check for requisites whenever the APPLY, ACCEPT, or RESTORE commands process a zone named in this ZONESET. To create such a ZONESET, use the SMP/E Administration Dialogs or use the UCLIN command, as in this example:

```
//job      JOBaccounting info...
//step      EXEC PGM=GIMSMP
//SMPCSI    DD DSN=smp.global.csi,DISP=SHR
//SMPCNTL   DD *
            SET BDY(GLOBAL).
            UCLIN.
            ADD ZONESET(ZONEGRP)
              XZREQCHK(YES)
/* use this ZONESET for cross-zone req checking */
              ZONE(zostgt  zosdlib
                  os390tgt os390dlib
                  jes2tgt  jes2dlib
                  jes3tgt  jes3dlib
                  cicstgt  cicsdlib
                  db2tgt   db2dlib
                  imstgt   imsdlib).
            ENDUCL.
/*
```

The ZONESET should contain the names of all the zones to be checked for cross-zone requisites. Once the ZONESET is created and the XZREQCHK(YES) subentry is set, the zones defined in the ZONESET are used as the default zone group any time the APPLY, ACCEPT, or RESTORE commands process any zone found in the ZONESET. For example, if an APPLY command is initiated for the *cicstgt* zone, all zones found in the ZONESET entry named ZONEGRP are used for the zone group.

Specifying the zone group on a command

If you don't have a default zone group defined, or you want to use a different set of zones for the zone group, you can specify the zones on the APPLY, ACCEPT, or RESTORE command using the XZGROUP operand. This is simply a matter of specifying the zones to be checked for cross-zone requisites, as shown in this example:

```
//job      JOB accounting info...
//step      EXEC PGM=GIMSMP
//SMPCSI    DD DSN=smp.global.csi,DISP=SHR
//SMPCNTL   DD *
            SET BDY(zostgt).
            APPLY SOURCEID(HIPER)
            CHECK
            XZGROUP(os390tgt,jes2tgt,jes3tgt,cicstgt,db2tgt,imstgt)
            BYPASS(HOLDSYS).
/*
```

Define a ZONEINDEX for each zone

Each of the zones specified in a ZONESET or on the XZGROUP operand must be defined by a ZONEINDEX in the current global zone, even if the zones are already defined in another global zone (more than one global zone may contain a ZONEINDEX for the same target or dlib zone). This allows the APPLY, ACCEPT, and RESTORE commands initiated from the current global zone to access the specified zones. To add ZONEINDEX subentries for each of the zones, use the SMP/E Administration Dialogs or use the UCLIN command, as in this example:

```
//job      JOB accounting info...
//step      EXEC PGM=GIMSMP
//SMPCSI    DD DSN=smp.global.csi,DISP=SHR
//SMPCNTL   DD *
            SET BDY(GLOBAL).
            UCLIN.
            ADD GLOBALZONE ZONEINDEX(
                (zostgt,zos.target.csi,TARGET)
                (zosdlib,zos.dlib.csi,DLIB)
                (os390tgt,os390.target.csi,TARGET)
                (os390dlib,os390.dlib.csi,DLIB)
                (jes2tgt,jes2.target.csi,TARGET)
                (jes2dlib,jes2.dlib.csi,DLIB)
                (jes3tgt,jes3.target.csi,TARGET)
                (jes3dlib,jes3.dlib.csi,DLIB)
                (cicstgt,cics.target.csi,TARGET)
                (cicsdlib,cics.dlib.csi,DLIB)
                (db2tgt,db2.target.csi,TARGET)
                (db2dlib,db2.dlib.csi,DLIB)
                (imstgt,ims.target.csi,TARGET)
                (imsdlib,ims.dlib.csi,DLIB)
            ).
            ENDUCL.
/*
```

Cross-zone requisite checking

Whether you define a default zone group or specify a zone group on the APPLY, ACCEPT, and RESTORE command, SMP/E will determine during command processing whether any cross-zone requisites are unsatisfied. Cross-zone requisites are caused by ++IF statements, where a SYSMOD containing a ++IF statement resides in one zone and the function identified on the ++IF resides in another zone. If the requisite identified on the ++IF statement does not reside in the same zone as the identified function, then the condition is not satisfied.

Unsatisfied cross-zone requisite conditions will cause APPLY, ACCEPT, and RESTORE command processing to fail for the SYSMOD containing the ++IF statement. Processing will continue to fail until the requisite is satisfied in the other zone, unless the BYPASS(XZIFREQ) operand is specified on the command.

Bypassing unsatisfied cross-zone requisites

The BYPASS(XZIFREQ) operand on the APPLY, ACCEPT, and RESTORE commands tells SMP/E to continue processing the command even if missing cross-zone requisites are detected. SMP/E warning messages will be issued to identify the missing cross-zone requisites.

```
//job      JOB accounting info...
//step     EXEC PGM=GIMSMP
//SMPCSI   DD DSN=smp.global.csi,DISP=SHR
//SMPCNTL  DD *
           SET BDY(zostgt).
           APPLY SOURCEID(HIPER)
             CHECK
             BYPASS(HOLDSYS
                 XZIFREQ) .
/*
```

Note: This example assumes a default zone group has been defined and will therefore be used during APPLY command processing.

You can be broad or very granular in the specification of what cross-zone requisites to bypass. You can indicate all cross-zone requisites are to be bypassed (as in the previous example), you can indicate that specific cross-zone requisite SYSMODs are to be bypassed, or you can indicate that only specific cross-zone requisite SYSMODs from specific zones are to be bypassed. Details of the BYPASS(XZIFREQ) operand and processing can be found in *SMP/E Commands*.

Resolving cross-zone requisites

If cross-zone requisites are bypassed and therefore cause unsatisfied cross-zone requisites, you must resolve those unsatisfied requisites. To do this, you need to APPLY or ACCEPT those requisites to the appropriate zones. To aid in this task, SMP/E provides a method to identify missing cross-zone requisite SYSMODs and make them candidates for APPLY and ACCEPT processing to resolve missing cross-zone requisites.

In order to select cross-zone requisite SYSMODs to be installed in a particular zone, the XZREQ operand can be used on the APPLY and ACCEPT commands. The XZREQ operand causes SMP/E to search the zones in the zone group for unsatisfied cross-zone requisites. If any are found which can be satisfied by installing a requisite SYSMOD to the current zone, those SYSMODs are made candidates for the APPLY and ACCEPT commands. Here is an example:

```
//job      JOB accounting info...
//step     EXEC PGM=GIMSMP
//SMPCSI   DD DSN=smp.global.csi,DISP=SHR
//SMPCNTL  DD *
           SET BDY(cicstgt).
           APPLY CHECK
             BYPASS(HOLDSYS)
             XZREQ.
/*
```

Note: This example assumes a default zone group has been defined and will therefore be used during APPLY command processing.

Using the XZREQ operand identifies and installs the needed cross-zone requisites. You can also use the REPORT CROSSZONE command to identify the needed cross-zone requisites. See The REPORT CROSSZONE Command in *SMP/E Commands* for details.

Defining the information needed to invoke SMP/E

There are several ways to call SMP/E after it has been installed:

- Use the SMP/E dialogs.
- Submit a background job that calls GIMSMP, the program name for SMP/E. This job can call SMP/E either directly or in a cataloged procedure.

This section describes the types of information you need to provide if you use a cataloged procedure to invoke SMP/E. It discusses the following:

- Required JCL statements
- A sample cataloged procedure for SMP/E

Required JCL statements

Unless you are using the SMP/E dialogs, you must provide the following JCL statements to invoke SMP/E:

- A JOB statement
- An EXEC statement
- DD (data definition) statements

JOB statement

The **JOB statement** describes your installation-dependent parameters. The JOB statement (or the EXEC statement, or both) can also include the REGION parameter to set the size of the region in which SMP/E runs. For details, see *z/OS MVS JCL User's Guide*, SA22-7598 or *z/OS MVS JCL Reference*, SA22-7597.

Note: To enable the SMP/E job step to get the maximum space above 16 megabytes, you can specify REGION=0M. Or, if you prefer, you can specify a more specific region size.

EXEC statement

The **EXEC statement** must specify PGM=GIMSMP or the name of your cataloged procedure for calling SMP/E. (For an example of a cataloged procedure, see "Sample cataloged procedure for SMP/E" on page 82.) The following can be specified in the EXEC statement PARM parameter:

CSI= *dsname*

where *dsname* is the name of the CSI data set containing the global zone. (This data set is also known as the *master CSI*.) This parameter is used to enable SMP/E to allocate the master CSI data set dynamically.

Note: If there is an SMPCSI DD statement, the **CSI=***dsname* operand is not allowed. If both are specified, SMP/E does **not** run.

DATE= *date*

where *date* can be one of the following:

U or IPL To use the IPL date of the system.

REPLY To request the date from the operator. As a result, SMP/E issues message GIM399I.

yyddd To specify a specific date, where *yy* is the year and *ddd* is the day of the year (the Julian date).

If **DATE** is not specified, the IPL date of the system is used.

PROCESS=WAIT or

Required JCL statements

PROCESS=END

The PROCESS parameter is used to control how long a job should wait if a CSI or PTS data set is not immediately available because it is currently being used either by another job or by a dialog.

- WAIT causes the job to wait until the data set is available. A message is issued to the system operator every 30 minutes while the job is waiting.
- END causes the job to wait for 10 minutes. If the data set is still not available after the 10-minute wait, the command requiring the data set is stopped.

If **PROCESS** is not specified, the default is PROCESS=WAIT.

For more information on obtaining and sharing CSI data sets, see “Sharing SMP/E Data Sets” in *SMP/E Commands*.

Processing of the PTS data set is also affected by the WAITFORDSN value specified in its DDDEF entry. WAITFORDSN determines whether SMP/E should wait to allocate a data set that is not immediately available. If the DDDEF entry specifies WAITFORDSN=NO (or lets this value default to NO) and the data set is not available, allocation of the data set fails, regardless of the PROCESS value specified on the EXEC statement. If WAITFORDSN=NO, SMP/E does not wait to retry allocation of the data set.

For example, suppose a PTS with a disposition of OLD is already being used by a job, and a second job tries to access the same PTS data set by allocating it through a DDDEF entry. The DDDEF entry used by the second job for the PTS specifies WAITFORDSN=NO. As a result, allocation of the PTS fails for the second job.

DD statements

DD statements define the data sets that can be used in SMP/E processing. For information about the data sets required for each command, see the chapters on individual SMP/E commands in *SMP/E Commands*.

Note: You can use DDDEF entries, rather than DD statements, to allocate many of the necessary data sets. For more information, see “How to dynamically allocate data sets to be used during SMP/E processing” on page 62.

Sample cataloged procedure for SMP/E

Figure 33 on page 84 is a sample cataloged procedure, SMPPROC, that can be used to run SMP/E. The numbers to the left of the statements correspond to the notes that follow the example. When you write a cataloged procedure for SMP/E, remember the following:

- Tailor your own cataloged procedure to fit your system and processing requirements.
- You may want to use a single procedure for all SMP/E processing, or you may want to define multiple procedures for specific SMP/E commands and include in each one just those DD statements required for that command. For example, a special procedure for RECEIVE might include the SMPPTFIN DD statement but no DD statements for the target and distribution libraries.

Note: The SYSLIB concatenations for APPLY and ACCEPT should point to different libraries.

- Most of the data sets in the cataloged procedure can be allocated without DD statements. If you use the methods described for the data sets listed below, you may not need a cataloged procedure.

- **Master CSI data set.** The master CSI data set can be specified on the CSI= parameter of the EXEC statement for GIMSMP, rather than on the SMPCSI DD statement. For more information about parameters you can specify on the EXEC statement, see “Required JCL statements” on page 81.
- **Target and distribution zones.** CSI data sets for target and distribution zones are normally dynamically allocated with zone indexes in the global zone. If you want to use the batch local shared resources (BLSR) subsystem, you must supply your own JCL statements. For examples of defining zone indexes and of specifying JCL for BLSR, see the SMPCSI section in *SMP/E Reference*.
- **Other data sets.** Other data sets in the cataloged procedure can be defined with DDDEF entries. When you use DDDEF entries, only the data sets SMP/E needs for a particular run are allocated.
 When you use DD statements, all the data sets defined must be online and allocated. Therefore, you might want to use a combination of DDDEF entries and a cataloged procedure shorter than the one in Figure 33 on page 84. For more information about DDDEF entries, see *SMP/E Reference*.
- Although they are not shown in the sample cataloged procedure, the following DD statements may also be required:
 - An SMP_CNTL DD statement, pointing to the commands that SMP/E processes, is required by all commands.
 - An SMPPTFIN DD statement, pointing to the source of the SYSMODs that are processed, is required by the RECEIVE command.
 - An SMPHOLD DD statement, pointing to the source of the HOLDDATA that is processed, is required by the RECEIVE command.
 - An SMPPTS DD statement should be coded with **DISP=SHR**. This allows concurrent jobs to share the PTS as much as possible. For more information on how SMP/E shares data sets, see Sharing SMP/E Data Sets in *SMP/E Commands*.
 - The SMPLTS data set is required when processing load modules with CALLLIBS.
 - An SMPMTS DD statement is required for changes to macros that do not reside in a target library.
 - An SMPSTS DD statement is required for changes to source code that does not reside in a target library.
 - If any of the SYSMODs being installed contain elements packaged with the LKLIB operand, a DD statement for the ddname specified on that operand is required by the APPLY and ACCEPT commands.
 - If any of the SYSMODs being installed contain elements or JCLIN packaged with the TXLIB operand, a DD statement for the ddname specified on that operand is required by the APPLY and ACCEPT commands.
- If any of the required data sets (such as the SMPPTFIN) are not defined in the cataloged procedure or by DDDEF entries, they must be specified in the JCL used to call SMP/E.
- For more information about the data sets required by each SMP/E command, see *SMP/E Commands*.

```

//SMPPROC  PROC
//SMP      EXEC PGM=GIMSMP
//* ----- SYSOUT data sets -----
//SMPOUT   DD SYSOUT=A
//SMPRPT   DD SYSOUT=A
//SMPLIST  DD SYSOUT=A
//SMPSNAP  DD SYSOUT=A
//SMPDEBUG DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
1 //SMPPUNCH DD SYSOUT=B
//* ----- SMP/E data sets -----
//SMPLOG   DD DSN=SYS1.SMPLOG,DISP=MOD
//SMPLOGA  DD DSN=SYS1.SMPLOGA,DISP=MOD
2 //* ----- Master CSI -----
//SMPCSI   DD DSN=SMPE.SMPCSI.CSI,DISP=SHR
//SMPDATA1 DD DSN=MVSTGT1.SMPDATA1,DISP=MOD
//SMPDATA2 DD DSN=MVSTGT1.SMPDATA2,DISP=MOD
3 //* ----- SMP/E temporary data sets-----
//SMPWRK1  DD UNIT=SYSDA,SPACE=(CYL,(2,1,5)),DISP=(,DELETE),
//          DCB=BLKSIZE=6160
//SMPWRK2  DD UNIT=SYSDA,SPACE=(CYL,(2,1,5)),DISP=(,DELETE),
//          DCB=BLKSIZE=6160
4 //SMPWRK3 DD DSN=data set name,
//          UNIT=SYSDA,SPACE=(CYL,(2,1,5)),DISP=(,CATALOG),
//          DCB=BLKSIZE=3120
//SMPWRK4  DD UNIT=SYSDA,SPACE=(CYL,(2,1,5)),DISP=(,DELETE),
//          DCB=BLKSIZE=3120
//SMPWRK6  DD UNIT=SYSDA,SPACE=(CYL,(2,1,5)),DISP=(,DELETE),
//          DCB=BLKSIZE=6160
//* ----- Utility data sets -----
//SYSUT1   DD UNIT=SYSDA,SPACE=(CYL,(2,1)),DISP=(,DELETE)
//SYSUT2   DD UNIT=SYSDA,SPACE=(CYL,(2,1)),DISP=(,DELETE)
//SYSUT3   DD UNIT=SYSDA,SPACE=(CYL,(2,1)),DISP=(,DELETE)
//SYSUT4   DD UNIT=SYSDA,SPACE=(TRK,(2,1)),DISP=(,DELETE)
//* ----- Assembler SYSLIB data set -----
5 //SYSLIB  DD DSN=data set name,DISP=SHR
//          . . .
//* ----- Target libraries -----
//LINKLIB  DD DSN=SYS1.LINKLIB,DISP=OLD
//          . . .
//* ----- Distribution libraries -----
//AOSC5    DD DSN=SYS1.AOSC5,DISP=OLD
//          . . .
//          PEND

```

Figure 33. Sample SMP/E cataloged procedure

- 1 **SMPPUNCH** is required for the GENERATE, REPORT, and UNLOAD commands. Because it may have a high level of output, SMPPUNCH should be directed to disk or tape.
- 2 **SMPCSI** DD statements should be coded with **DISP=SHR**. This allows SMP/E to share the CSI data sets as much as possible. If **DISP=OLD** is specified, no data-set sharing is attempted. For more information on how SMP/E shares data sets, see Sharing SMP/E Data Sets in *SMP/E Commands*.
- 3 **SMPWRK1–SMPWRK6** show only sample sizes for the data sets. The actual size required depends on the number of SYSMODs being processed and the number of elements within those SYSMODs.
- 4 **SMPWRK3** can be permanently allocated in order to reuse assemblies. For more information, see the description of the REUSE operand in The APPLY Command in *SMP/E Commands*.
- 5 **SYSLIB** concatenation depends on how you intend to use the distribution

libraries. For details on which data sets to include and in what order, see “How to determine the appropriate SYSLIB concatenation.”

If you use a different SYSLIB concatenation for APPLY and ACCEPT and prefer to use a SYSLIB DD statement, you should have at least two procedures. If you use DDDEFs to point to the different library concatenations, you can use one procedure. You can modify the examples to use the appropriate procedure.

The following job uses the cataloged procedure in Figure 33 on page 84 to call SMP/E.

```
//SMPJOB   JOB 'accounting info',MSGLEVEL=(1,1)
//SMPSTEP  EXEC SMPPROC
//SMPPTFIN DD ... points to the file or data set that contains
/*          the SYSMODs to be received
//SMPHOLD  DD ... points to the file or data set that contains
/*          the HOLDDATA to be received
//SMPTLIB  DD UNIT=3380,VOL=SER=TLIB01
//SMPCNTL  DD *
SET        BDY(GLOBAL)          /* Set to global zone      */.
RECEIVE    SYSMOD                /* receive SYSMODS and */.
           HOLDDATA              /* HOLDDATA             */.
           SOURCEID(MYPTFS)      /* Assign a source ID  */.
/*                                     */.
LIST       MCS                   /* List the cover letters */.
           SOURCEID(MYPTFS)      /* for the SYSMODs      */.
/*                                     */.
SET        BDY(TARGET1)          /* Set to target zone   */.
APPLY      SOURCEID(MYPTFS)      /* Apply the SYSMODs    */.
/*                                     */.
LIST       LOG                   /* List the target zone log */.
/*
```

How to determine the appropriate SYSLIB concatenation

The recommended method for determining the appropriate SYSLIB concatenation treats the distribution libraries as totally separate from the target libraries.

Note: The example shown is for processing a zone for SREL Z038 containing the z/OS base control program (BCP). For other zones, follow the recommendations for the products residing in those zones.

Treating the distribution libraries as totally separate from the target libraries ensures that only the latest tested version of a macro is used during an assembly. Thus, the SYSLIB concatenation at ACCEPT is different from that at APPLY.

The SMPMTS data set contains macros from SYSMODs that are applied. Therefore, the proper SYSLIB concatenation for APPLY processing includes the SMPMTS data set, as is shown in Figure 34 on page 86.

Sample cataloged procedure

```
/* ----- Include SMPMTS first
/* ----- followed by all macro target libraries
/* ----- followed by all distribution
/*          libraries
//SYSLIB DD DSN=SYS1.SMPMTS,DISP=OLD
//          DD DSN=SYS1.MACLIB,DISP=OLD
//          DD DSN=SYS1.MODGEN,DISP=OLD
/* ----- IF YOU NEED TO ASSEMBLE JES SOURCE MODULES:
/* ----- either HASPSRC (JES2) or JES3MAC (JES3)
//          DD DSN=SYS1.HASPSRC,DISP=OLD
//          DD DSN=SYS1.SISTMAC1,DISP=OLD
//          DD DSN=SYS1.ATSOMAC,DISP=OLD
//          DD      •
//          DD      • other macro target libraries
//          DD      •
//          DD      •
//          DD      • any macro distribution libraries needed
//          DD      •
```

Figure 34. APPLY SYSLIB concatenation: APPLY different from ACCEPT

During ACCEPT processing, the macros in the SMPMTS and in the target macro libraries are not considered to have been tested. The SMPMTS is, therefore, not concatenated. Figure 35 shows the proper SYSLIB concatenation for ACCEPT.

```
/* ----- Include only macro distribution
/*          libraries
//          DD DSN=SYS1.AMACLIB,DISP=OLD
//SYSLIB DD DSN=SYS1.AMODGEN,DISP=OLD
/* ----- IF YOU NEED TO ASSEMBLE JES SOURCE MODULES:
/* ----- either HASPSRC (JES2) or JES3MAC (JES3)
//          DD DSN=SYS1.HASPSRC,DISP=OLD
//          DD DSN=SYS1.AISTMAC1,DISP=OLD
//          DD DSN=SYS1.ATSOMAC,DISP=OLD
//          DD      •
//          DD      • other macro distribution libraries
//          DD      •
```

Figure 35. ACCEPT SYSLIB concatenation: APPLY different from ACCEPT

Defining exit routines

There are two types of exit routines you can define to tailor SMP/E processing:

- The **RECEIVE exit routine** enables you to scan statements in the SMPPTFIN data set during RECEIVE processing.
- The **retry exit routine** enables you to control retry processing when a data set runs out of space during RETRY can be specified on the ACCEPT, APPLY, LINK LMODS, LINK MODULE, and RESTORE commands. processing. (In retry processing, the data set is compressed and the utility that failed is called again.)

For more details, see the “SMP/E Exit Routines” chapter, in *SMP/E Reference*.

Chapter 4. Preparing to use internet service retrieval

You can use Internet Service Retrieval to submit requests for PTFs and HOLDDATA to a remote IBM server and automatically download the packages that result when those requests are fulfilled. Use the RECEIVE ORDER command to submit an Internet Service Retrieval request to the IBM Automated Delivery Request server. SMP/E uses the hypertext transfer protocol and Secure Sockets Layer (HTTPS) to communicate with the server and FTP to download the packages. To support the HTTPS communication infrastructure, SMP/E uses the capabilities of Java and x.509 certificates to identify you to the server and perform SSL authentication. To use both Java and x.509 certificates, you need to perform some one-time configuration steps before you can actually use the SMP/E RECEIVE ORDER command.

This chapter gives you an overview of using x.509 certificates to establish identity and authenticity for client-server communications and also defines the steps you need to take to:

- Obtain a user certificate
- Set up the z/OS Security Server to work with certificates and install the user certificate
- Define the ORDERSERVER input for the RECEIVE ORDER command
- Define the CLIENT input for the RECEIVE ORDER command, including information necessary to allow SMP/E to use Java.

Identity and authentication overview

SMP/E communicates with the remote IBM Automated Delivery Request server using the HTTP protocol, and all HTTP communications with the server are performed using Secure Sockets Layer (SSL). Both the client (SMP/E) and the server use x.509 certificates to secure communications when using SSL. When initializing an SSL connection with a server, the client requests the server's x.509 certificate to authenticate the server. The server's certificate identifies the server to the client and provides the server's public key.

SSL server authentication allows a client application to confirm the identity of the server application. The client application through SSL uses standard public-key cryptography to verify that the server's certificate and public key are valid and that the certificate has been signed by a trusted Certificate Authority (CA) that is known to the client application. The client and the server then use the negotiated session keys and begin encrypted communications.

One of the most important pieces of the SSL server authentication scheme is the trusted Certificate Authority (CA). Certificate Authorities are trusted organizations that verify information about servers and then issue digital certificates that may be accepted by applications as authentication of server identities when used in a secure handshaking protocol such as SSL. Trusting a certificate issued by a Certificate Authority is analogous to accepting a passport issued by a national passport agency as proof of identity. We trust that the agency has taken proper measures to verify the identity of the bearer of the passport. In a similar manner, applications may accept certificates signed by a Certificate Authority.

Two types of certificates are of interest to SMP/E processing:

User certificate

A certificate that is associated with a z/OS user ID and is used to authenticate the user's identity. Such a certificate may also be known as a Personal, or Client certificate.

Certificate-authority certificate

A certificate that is associated with a Certificate Authority and is used to verify signatures in other certificates. Such a certificate may also be known as a root certificate. GeoTrust is an example of a Certificate Authority that provides a Certificate Authority certificate.

Obtaining a user certificate

Before you can use the RECEIVE ORDER command, you must register to use IBM's server and obtain a certificate that identifies you to the server. You must use ShopzSeries to register, and the registration process generates a user certificate for you. You need to register and obtain a certificate only once, because the certificate that is generated for you can be used for many PTF and HOLDDATA orders.

ShopzSeries can be found here:

www14.software.ibm.com/webapp/ShopzSeries/ShopzSeries.jsp.

1. If you are not yet a ShopzSeries user, register to become one.
2. If you are, or have become a registered ShopzSeries user, logon and create a new order.
3. Select a Package category of "Automated delivery certificates."
4. On the next screen, enter an encryption pass phrase. ShopzSeries uses this pass phrase to encrypt the PKCS12 package that contains your certificate and its associated private key. Remember this pass phrase because you will need to specify it again later when decrypting the package.

Note: A PKCS12 package contains both a certificate and the associated private key of the certificate. Because a private key is sensitive and considered secret, the package must be encrypted to protect it. To encrypt the package, a one-time encryption key must be used. That encryption key is also known as the pass phrase. You specify a pass phrase (any phrase you will remember) in ShopzSeries when you request a certificate to be generated for you.

5. Download to your workstation the generated PKCS12 certificate file as directed by ShopzSeries.

After downloading the certificate file to your workstation, you need to upload it to your z/OS system and add the certificate to your security product data base. SMP/E obtains the certificate from your security product data base and uses it during communications with IBM's Automated Delivery Request server.

Uploading the user certificate to z/OS

After you have downloaded the certificate file to your workstation, you must upload it to your z/OS system. There are many ways to transfer files from your workstation to your z/OS system. For example, you can upload the certificate file with Personal Communications 3270 or you can use TCP/IP FTP. The important things to remember are the certificate file must be uploaded to z/OS as binary data, the certificate file must be stored in a sequential data set, and the sequential data set must have RECFM=VB and LRECL=256 or greater.

Setting up z/OS security server RACF

Before you can begin making changes to your security product data base, you must ensure your userid is authorized to manipulate certificates and keyrings. Consult your system's RACF administrator and refer to *z/OS Security Server RACF Security Administrator's Guide* before modifying the security characteristics for your system.

Note: SMP/E requires either the z/OS Security Server (RACF) or an equivalent security product on z/OS to store and manage x.509 certificates. The remainder of this chapter assumes you are using RACF. If you are using an equivalent security product, you should refer to that product's documentation to understand the equivalent actions. See Setting up alternate security products for further information.

Access to the RACDCERT command

First, you need to define the necessary FACILITY class profiles to permit you access to use the RACDCERT commands. RACF's control levels in increasing strength are NONE, READ, UPDATE, CONTROL, and ALTER. To use the RACDCERT command, the command issuer requires appropriate permission to the IRR.DIGTCERT.function profile under the FACILITY class. In general, READ access is required to manipulate your own certificates and keyrings, UPDATE access is required to manipulate them for other users, and CONTROL access is required to manipulate CERTAUTH (Certificate Authority) certificates. Therefore, you can use the following sample RACF RDEFINE and PERMIT commands to define necessary FACILITY class profiles and to permit you access to use the RACDCERT commands:

```
RDEFINE FACILITY IRR.DIGTCERT.ADD      UACC(NONE)
RDEFINE FACILITY IRR.DIGTCERT.ADDRING  UACC(NONE)
RDEFINE FACILITY IRR.DIGTCERT.ALTER    UACC(NONE)
RDEFINE FACILITY IRR.DIGTCERT.CONNECT  UACC(NONE)
RDEFINE FACILITY IRR.DIGTCERT.LIST     UACC(NONE)
RDEFINE FACILITY IRR.DIGTCERT.LISTRING UACC(NONE)

PERMIT IRR.DIGTCERT.ADD      CLASS(FACILITY) ID(userid) ACCESS(CONTROL)
PERMIT IRR.DIGTCERT.ADDRING  CLASS(FACILITY) ID(userid) ACCESS(READ)
PERMIT IRR.DIGTCERT.ALTER    CLASS(FACILITY) ID(userid) ACCESS(READ)
PERMIT IRR.DIGTCERT.CONNECT  CLASS(FACILITY) ID(userid) ACCESS(UPDATE)
PERMIT IRR.DIGTCERT.LIST     CLASS(FACILITY) ID(userid) ACCESS(READ)
PERMIT IRR.DIGTCERT.LISTRING CLASS(FACILITY) ID(userid) ACCESS(READ)
```

Notes:

1. CONTROL access is required to the IRR.DIGTCERT.ADD profile in the FACILITY class only if you are using z/OS Release 4 or 5 and need to add a Certificate Authority (CA) certificate. Otherwise READ access is sufficient. See "Enabling CA certificates on z/OS release 4 or release 5" on page 90 for details of CA certificates.
2. UPDATE access is required to the IRR.DIGTCERT.CONNECT profile in the FACILITY class in order to connect a Certificate Authority (CA) certificate to your keyring. See "Enabling certificate authority certificates" on page 90 for details of CA certificates.
3. To use the SMP/E RECEIVE ORDER command, access is required only to the IRR.DIGTCERT.LIST and IRR.DIGTCERT.LISTRING profiles. Access to the other profiles is required to create and manipulate keyrings and certificates.

When your userid has the proper authorization, continue with "Creating keyrings" on page 90.

Creating keyrings

A keyring is a named collection of certificates associated with a specific user. A certificate is identified by its label as well as the keyring it is connected to. A keyring must be created using a RACF command like the following:

```
RACDCERT ID(userid) ADDRING(keyringname)
```

Where *keyringname* is a name you choose for the keyring.

Enabling certificate authority certificates

A Certificate Authority (CA) certificate is used to verify signatures in other certificates such as the server and user certificates. The IBM Automated Delivery Request server uses a server certificate signed by the GeoTrust Certificate Authority. Therefore, the GeoTrust CA certificate must be accessible in the RACF data base during RECEIVE ORDER command processing so the server certificate can be verified.

Enabling the CA Certificate varies depending on the release of z/OS you are using.

Enabling CA certificates on z/OS release 6 or higher

With z/OS Release 6 and higher, the GeoTrust CA certificates are supplied by default in RACF. However, by default the supplied certificates are not trusted. Use the following RACF command to trust the GeoTrust CA certificate:

```
RACDCERT CERTAUTH +  
ALTER(LABEL('Equifax Secure CA')) TRUST
```

Note: Equifax was acquired by GeoTrust, and the server's certificate was signed by Equifax before the company's acquisition. Hence the misleading certificate name.

Connect the GeoTrust CA certificate to the user's keyring using the following RACF command:

```
RACDCERT ID(userid) CONNECT( CERTAUTH RING(keyringname) +  
LABEL('Equifax Secure CA') USAGE(CERTAUTH) )
```

Where *keyringname* is the name for the keyring you choose in "Creating keyrings."

Enabling CA certificates on z/OS release 4 or release 5

Before z/OS Release 6, the GeoTrust CA certificate must be obtained from the GeoTrust Web site at http://www.geotrust.com/resources/root_certificates/index.htm.

1. Download to your workstation the DER encoded form of the Equifax Secure Certificate Authority root CA certificate from the GeoTrust Web site.

Note: There are several different CA certificates to choose from on the GeoTrust Web site. Make sure you request the Equifax Secure Certificate Authority root CA certificate.

2. Upload the CA certificate to your z/OS system. There are many ways to transfer files from your workstation to your z/OS system. For example, you can upload the certificate file with Personal Communications 3270 or use TCP/IP FTP. The important things to remember are the certificate file must be uploaded to z/OS as binary data, the certificate file must be stored in a sequential data set, and the sequential data set must have RECFM=VB and LRECL=256 or greater.

3. After you have stored the certificate in a sequential data set, add it to your RACF database using the following RACF command:

```
RACDCERT CERTAUTH ADD('ca-cert.dataset.name') +  
WITHLABEL('Equifax Secure CA') TRUST
```

Where *ca-cert.dataset.name* is the data set name used to store the certificate received from the GeoTrust Web site.

4. Connect the GeoTrust CA certificate to the user's keyring using the following RACF command:

```
RACDCERT ID(userid) CONNECT( CERTAUTH RING(keyringname) +  
LABEL('Equifax Secure CA') USAGE(CERTAUTH) )
```

Where *keyringname* is the name for the keyring you chose in "Creating keyrings" on page 90.

Adding the user certificate to your RACF data base

A user certificate will be used by the SMP/E RECEIVE ORDER command to uniquely identify you to the IBM Automated Delivery Request server. As described above, the user certificate was generated for you by ShopzSeries, downloaded to your workstation, transferred to your z/OS system as binary data, and stored as a sequential data set. From the sequential data set, the certificate can be stored in the RACF data base using the following RACF command:

```
RACDCERT ID(userid) ADD('user.certificate.dataset.name') +  
WITHLABEL('SMPE Client Certificate') PASSWORD('pass phrase') TRUST
```

Where *user.certificate.dataset.name* is the data set name used to store the PKCS12 certificate package obtained from ShopzSeries, *SMPE Client Certificate* is the label you choose to identify this certificate (32 characters or less), and *pass phrase* is the encryption pass phrase you specify when generating the PKCS12 certificate package on ShopzSeries.

Note: After you issue the above RACDCERT command, RACF should return this message: "Certificate Authority not defined to RACF. Certificate added with TRUST status." This is the expected response and is acceptable.

After you add the certificate to the RACF data base, you must connect it to the keyring:

```
RACDCERT ID(userid) CONNECT(LABEL('SMPE Client Certificate') +  
RING(keyringname)) USAGE(CERTAUTH))
```

Where *SMPE Client Certificate* is the label you choose in the previous step to identify this certificate, and *keyringname* is the name of the keyring you choose in "Creating keyrings" on page 90.

Note: To enable the user certificate to be easily shared by other userids without requiring unnecessarily high levels of access for those other userids, the user certificate must be connected to the keyring as a Certificate Authority (CA) certificate (USAGE of CERTAUTH). This allows the user certificate to be shared without requiring other userids to access the certificate's associated private key.

Sharing a user certificate among multiple userids

It is possible for multiple users to share a single user certificate obtained from ShopzSeries. To do so, you must first create a keyring, enable the CA certificate, and add the user certificate to your RACF data base as explained in the preceding

topics. Assume userid USER1 is associated with the keyring and is the owner of the user certificate. In order to allow userid USER2 to share the user certificate, you must give USER2 permission to read other users' keyrings and certificates. You can use the following RACF commands:

```
PERMIT IRR.DIGTCERT.LIST CLASS(FACILITY) ID(USER2) ACCESS(READ)
PERMIT IRR.DIGTCERT.LISTRING CLASS(FACILITY) ID(USER2) ACCESS(UPDATE)
```

Permitting USER2 UPDATE access to the IRR.DIGTCERT.LISTRING FACILITY class is not a security exposure. It is true that USER2 will have the ability to read anyone's keyring. However, that only allows the ability to extract and use the certificates from the keyring. It does not allow use of the private keys associated with those certificates. Therefore, USER2 cannot masquerade as another userid.

After USER2 has the appropriate permission, in order for USER2 to use the certificate for the SMP/E RECEIVE ORDER command, you must ensure SMP/E finds the certificate in the correct keyring when running the command. To do this, USER2 must specify not only the keyring name, but also the userid associated with the keyring, USER1, on the *keyring* attribute in the ORDERSERVER data set for the RECEIVE ORDER command as follows:

```
keyring="USER1/keyringname"
```

See "Define the ORDERSERVER input for RECEIVE ORDER" for further information about the *keyring* attribute and the ORDERSERVER data set.

Refreshing RACF Classes

After you have performed the RACF updates to add certificates and keyrings, you need to refresh the in-storage RACF profiles. That is, if you have RACLISTed the DIGTCERT or DIGTRING classes, then you need to refresh the in-storage profiles before the updates can take affect. You can use the following RACF command:

```
SETOPTS RACLIST(DIGTCERT DIGTRING) REFRESH
```

Setting up alternate security products

SMP/E requires either the z/OS Security Server (RACF) or an equivalent security product on z/OS to store and manage x.509 certificates. This chapter assumes you are using RACF. If you are using an equivalent security product, you should refer to that product's documentation to understand the equivalent actions.

eTrust® CA-ACF2 security for z/OS users

Computer Associates™ has created a Hyper Notification, QI73845, to address the setup requirements associated with SMP/E Internet Service Retrieval for its eTrust CA-ACF2 Security for z/OS customers. Its purpose is to provide detailed instructions equivalent to the RACF instructions found herein. Refer to this Hyper Notification for details.

Define the ORDERSERVER input for RECEIVE ORDER

The ORDERSERVER data set is used by the SMP/E RECEIVE ORDER command to provide necessary information about the IBM Automated Delivery Request server. The information is described using the <ORDERSERVER> tag and attributes that are defined in detail in *SMP/E Commands*. Here is an example and brief explanations:


```

<ORDERSERVER
  url=https://eccgw01.boulder.ibm.com/services/projects/ecc/ws
  keyring="SMPEKeyring"
  certificate="SMPE Client Certificate">
</ORDERSERVER>

```

url specifies the Uniform Resource Locator (URL) for the order server. The actual urls for the IBM Automated Delivery Request server are https://eccgw01.boulder.ibm.com/services/projects/ecc/ws and https://eccgw02.rochester.ibm.com/services/projects/ecc/ws

keyring identifies the RACF keyring that contains the user certificate required for access to the order server. If the keyring is owned by a userid other than that used to run SMP/E, then the keyring name must be prefixed with the associated userid. The userid and keyring name must be separated by a forward slash. For example, keyring="USER1/SMPEKeyring".

certificate specifies the label to identify the user certificate used for access to the order server. This is the certificate obtained from ShopzSeries and added to your security product data base.

Define the CLIENT Input for RECEIVE ORDER

The CLIENT data set is used by the SMP/E RECEIVE ORDER command to provide information about the local z/OS system and network. The information is described using the <CLIENT> tag and attributes that are defined in detail in *SMP/E Commands*. Here is an example:

```

<CLIENT
  javahome="/usr/lpp/java/J1.4"
  classpath="/usr/lpp/smp/classes"
  javadebugoptions="-Dcom.ibm.smp.debug=severe -showversion">
<HTTPPROXY host="local.httpproxy.com">
</HTTPPROXY>
</FIREWALL>
  <SERVER host="local.ftpproxy.com"> </SERVER>
  <FIRECMD>&REMOTE_USER;@&REMOTE_HOST;</FIRECMD>
  <FIRECMD>&REMOTE_PW;</FIRECMD>
</FIREWALL>
</CLIENT>

```

Not all tags and attributes shown in the example above will be required for every user, but are explained below. The options of the CLIENT data set can be grouped into three categories: options that affect Java, options that affect HTTPS, and options that affect FTP.

Options that affect Java

To support the HTTPS communications with the IBM Automated Delivery Request server, SMP/E uses the capabilities of Java. Specifically, SMP/E requires IBM Software Development Kit (SDK) for z/OS, Java 2 Technology Edition, Version 1.4 (5655-I56) with PTF UK04987 (level 1.4.2) or its logical successor. SMP/E supplies several Java application classes, which after SMP/E is installed, reside in the /usr/lpp/smp/classes directory in the UNIX file system on the z/OS system. In order for SMP/E to use these application classes, they and the Java runtime must be available in the execution environment for SMP/E. Because neither can be accessed using a STEPLIB DD statement, you specify the locations for the Java runtime and the SMP/E application classes using the javahome and classpath attributes in the

CLIENT data set. The *javahome* attribute is used to specify the directory where the Java runtime resides, and the *classpath* attribute is used to specify the search path for Java application classes. For example:

```
javahome="/usr/lpp/java/J1.4"
classpath="/usr/lpp/smp/classes"
```

Note: Support for the *javahome* attribute was added to SMP/E V3.4 in APAR IO01770.

If the SMP/E Java application classes are not installed on the driving z/OS system's UNIX file system, you can use appropriate mountpoints and directory structure to point to a target system's directories where SMP/E is installed. This is useful if you use STEPLIB to access a target system's base SMP/E programs in order to ensure the base SMP/E programs and the application classes are at the same service level. For example:

```
classpath="/TGTSYS/usr/lpp/smp/classes"
```

As an alternative to the *javahome* and *classpath* attributes in the CLIENT data set, you can also use the SMPJHOME and SMPCPATH DD statements or DDDEF entries to specify the location of the Java runtime and the SMP/E application classes. If specified, the SMPJHOME and SMPCPATH DD statements override any values specified on the *javahome* and *classpath* attributes. For example:

```
//SMPJHOME DD PATH='/usr/lpp/java/J1.4'
//SMPCPATH DD PATH='/usr/lpp/smp/classes'
```

Note: Support for the SMPJHOME and SMPCPATH ddnames was added to SMP/E V3.4 in APAR IO03469.

The *javadebugoptions* attribute is used to specify any Java command line parameters, including debug and trace options. Such options determine what debug and trace information should be produced when SMP/E invokes its Java application classes. The debug and trace information is written to the PRINT file for the HFSCOPY utility (SYSPRINT is the default). Although it is not necessary all of the time, it is a good idea when first using the RECEIVE ORDER command, to specify the following value to ensure basic debug and trace information is produced for reference:

```
javadebugoptions="-Dcom.ibm.smp.debug=severe -showversion"
```

Although it is not necessary, it is also possible to specify other Java command line parameters that affect the operation of the Java Virtual Machine (JVM). For example, if you encounter a Java error that indicates there is insufficient space in the Javaheap, you can specify an option to override the default maximum Java heap size:

```
javadebugoptions="-Xmx128m"
```

Options that affect HTTPS operations

SMP/E communicates with the IBM Automated Delivery Request server using the HTTP 1.1 protocol using Secure Sockets Layer (SSL), also known as HTTPS. All communications with the server are performed using the well known HTTPS port of 443.

Optional tags are available in the CLIENT data set for the RECEIVE ORDER command to describe local HTTP or SOCKS proxy servers. A proxy server redirects HTTP requests to the IBM Automated Delivery Request server on the Internet. The <HTTPPROXY> tag is used to identify a local HTTP proxy server, and the <HTTPSOCKSPROXY> tag is used to identify a local SOCKS proxy server. For example:

```
<HTTPPROXY host="local.httpproxy.com"> </HTTPPROXY>
```

The <HTTPPROXY> and <HTTPSOCKSPROXY> tags are optional, and should be specified only if the HTTP requests to the Internet from your z/OS system are required to pass through a specific HTTP or SOCKS proxy server. For example, if you must specify a proxy server in your Internet browser configuration to allow you access to websites on the Internet, then you may need to specify the <HTTPPROXY> or <HTTPSOCKSPROXY> tag in the CLIENT data set. If your HTTP or SOCKS proxy server requires authentication, the *user* and *pw* attributes can be used to specify the proxy server userid and password. Also, if your HTTP or SOCKS proxy server listens on a port other than the well known ports 80 and 1080 respectively, the *port* attribute can be used to specify an alternate port value. For example:

```
<HTTPPROXY host="local.httpproxy.com"
            user="userid" pw="password" port="8080"> </HTTPPROXY>
```

See the *SMP/E Commands* for complete details of the <HTTPPROXY> and <HTTPSOCKSPROXY> tags and attributes, and **consult your network administrator** for help determining what, if anything, you must specify for an HTTP or SOCKS proxy server.

Options that affect FTP operations

SMP/E uses HTTP to communicate with the IBM Automated Delivery Request server, and it uses FTP to download package files containing PTFs and HOLDDATA from an IBM FTP server to your local z/OS system. After the package files are staged to the IBM FTP server, the IBM Automated Delivery Request server provides SMP/E with the information it needs to login to the FTP server and download the package files. Specifically, it provides SMP/E with the FTP server host name, and a userid and password for that FTP server which are unique for the specific package to be downloaded.

In order for SMP/E to login to the IBM FTP server, it may be necessary to navigate a local FTP firewall server. If so, optional tags are available in the CLIENT data set to describe information necessary to navigate a local FTP firewall server.

Note: SMP/E's use of FTP is the same for the RECEIVE ORDER and RECEIVE FROMNETWORK commands. Therefore, if you already use the RECEIVE FROMNETWORK command successfully, you should use the same FTP options in your CLIENT data set for the RECEIVE ORDER command.

The <SERVER> tag is used to identify the FTP firewall server. You can also specify a userid and password if your firewall server requires authentication. The <FIRECMD> tags are used to identify the commands necessary to navigate your firewall server. The commands you specify in the <FIRECMD> tags should be the same as those you use with the z/OS Communications Server FTP client (PGM=FTP). The behavior of firewall servers differ, therefore, the best method to determine what you should specify in the <FIRECMD> tags is to login to an external FTP server using the z/OS Communications Server FTP client in a JCL job, and then specify the same commands in the <FIRECMD> tags. For example:

```
//jobname JOB ...
//FTP      EXEC PGM=FTP,PARM='testcase.boulder.ibm.com'
//OUTPUT   DD SYSOUT=*
//INPUT    DD *
anonymous ; userid for remote FTP server
```

```

email_address ; password for remote FTP server
cd mvs/toibm  ; simple change directory command
quit          ; done, so log off
/*

```

This sample job logs into the IBM Testcase FTP server, and assumes there are no special commands or login procedures required to navigate a local firewall server. If such a job works for you, then no firewall server information needs to be specified in your CLIENT data set for the RECEIVE ORDER command. However, if you have a local firewall server that requires such commands or login procedures, you will need to account for them. For example, if your working FTP job is like this:

```

//jobname JOB ...
//FTP      EXEC PGM=FTP,PARM='local.ftpproxy.com'
//OUTPUT   DD SYSOUT=*
//INPUT    DD *
anonymous@testcase.boulder.ibm.com
email_address ; password for remote FTP server
cd mvs/toibm  ; simple change directory command
quit          ; done, so log off
/*

```

Then your CLIENT data set for the RECEIVE ORDER command should include the following:

```

<FIREWALL>
  <SERVER host="local.ftpproxy.com"> </SERVER>
  <FIRECMD>&REMOTE_USER;@&REMOTE_HOST;</FIRECMD>
  <FIRECMD>&REMOTE_PW;</FIRECMD>
</FIREWALL>

```

The substitution variables &REMOTE_HOST;, &REMOTE_USER;, and &REMOTE_PW; will be replaced automatically by SMP/E during RECEIVE ORDER command processing with the specific values for the FTP server host name, userid, and password that are correct for your order. The FTP server information is returned to SMP/E automatically during the RECEIVE ORDER command from the IBM Automated Delivery Request server. SMP/E then uses the specified commands to log into the FTP server.

Refer to the *SMP/E Commands* for complete details of the <FIREWALL>, <SERVER>, and <FIRECMD> tags, as well as a list of the substitution variables that can be used within the firewall commands, and **consult your network administrator** for help determining what, if anything, you must specify to navigate your local FTP firewall server.

Network configuration notes

SMP/E assumes you have network connectivity from your z/OS system to the IBM servers through the Internet. Consult your network administrator and the *z/OS Communications Server: IP Configuration Guide* for information about how to setup your z/OS system's network configuration properly.

The HTTP and FTP operations performed by SMP/E require host name to IP address resolution. This is usually accomplished using a Domain Name System (DNS) name server. A name server is defined using the NSINTERADDR or NAMESERVER statement within a resolver configuration file (TCPIP.DATA information). There are several different locations where a resolver configuration file can be found when using an application such as SMP/E. Because SMP/E uses a UNIX process for its HTTP and FTP operations, the z/OS UNIX search order is

used to find the resolver configuration file. See the sections titled “Resolver configuration files” and “Search orders used in the z/OS UNIX environment” in *the z/OS Communications Server: IP Configuration Guide* for details on specifying the location of the resolver configuration file. However, because of the asynchronous UNIX process used by SMP/E for its HTTP and FTP operations, there are two exceptions to the documented search order: neither the SYSTCPD DD statement, nor the RESOLVER_CONFIG environment variable can be used to define the location of the resolver configuration file.

You can verify your name server setup by using the following sample job to invoke the NSLOOKUP command:

```
//jobname JOB ...
//NSLOOKUP EXEC PGM=BPXBATCH,
//          PARM='PGM /bin/nslookup eccgw01.boulder.ibm.com'
//STDOUT DD PATH='/tmp/&SYSUID..bpxbatch.stdout',
//          PATHOPTS=(OWRONLY,OCREAT,OTRUNC),PATHMODE=SIRWXU
//OUTSTEP EXEC PGM=IKJEFT01
//SYSTSPRT DD SYSOUT=*
//INPUT DD PATH='/tmp/&SYSUID..bpxbatch.stdout',
//          PATHOPTS=(ORDONLY),PATHDISP=DELETE
//OUTPUT DD SYSOUT=*,DCB=(RECFM=V,LRECL=256)
//SYSTSIN DD *
//          OCOPY INDD(INPUT) OUTDD(OUTPUT)
//          /*
```

Note: Although the NSLOOKUP command may be run simply from the OMVS shell, this sample job runs the command in an environment similar to that in which SMP/E runs.

If your name server is setup properly, the nslookup command will return the IP address for the server. The output of the command will be similar to the following:

```
Defaulting to nslookup version 4
Starting nslookup version 4
Server: local.dns.com
Address: 9.0.2.1

Non-authoritative answer:
Name: eccgw01.boulder.ibm.com
Address: 207.25.252.197
```

If an IP address for the eccgw01.boulder.ibm.com server is not returned, then verify your name server setup and resolver configuration file are proper. See the section titled “Diagnosing resolver problems” in *z/OS Communications Server: IP Diagnosis Guide* for details about using the Trace Resolver debug facility.

Summary

The steps described in this chapter help you to configure your system to enable the SMP/E RECEIVE ORDER command. After you perform the described tasks, you can run the RECEIVE ORDER command to order and download PTFs and HOLDDATA from the IBM Automated Service Delivery server. Here is a summary of the steps:

1. Obtain a user certificate:
 - a. Go to ShopzSeries to generate a user certificate and download the certificate file to your workstation.
 - b. Transfer the certificate file to your z/OS system as binary data and store as a sequential data set with RECFM=VB and LRECL=256 or greater.
2. Set up z/OS security server (RACF):

- a. Ensure your userid has appropriate RACF access to create keyrings and add certificates.
 - b. Create a RACF keyring.
 - c. Alter the GeoTrust CA certificate to mark it trusted.
 - d. Connect the GeoTrust CA certificate to your keyring.
 - e. Add the user certificate to the RACF data base.
 - f. Connect the user certificate to your keyring.
3. Setup for using Java:
 - a. Ensure IBM SDK for z/OS, Java 2 Technology Edition, Version 1.4 with PTF UK04987 is installed on your z/OS system (level 1.4.2).
 - b. Specify the Java runtime directory on the javahome attribute in the CLIENT data set for the RECEIVE ORDER command.
 - c. Specify the SMP/E Java application classes directory on the classpath attribute in the CLIENT data set for the RECEIVE ORDER command.
 4. Setup for network configuration:
 - a. If necessary, identify your HTTP proxy server in the CLIENT data set for the RECEIVE ORDER command.
 - b. If necessary, identify your FTP firewall server and navigation commands in the CLIENT data set for the RECEIVE ORDER command.

Example

After you complete the necessary steps to configure your system to enable the SMP/E RECEIVE ORDER command, you can run an SMP/E RECEIVE ORDER job like the following:

```
//jobname JOB ...,REGION=0M
//RECEIVE EXEC PGM=GIMSMP
//SMPCSI DD DSN=smpe.global.csi,DISP=SHR
//SMPNTS DD PATH='/u/smpe/smpnts/',PATHDISP=KEEP
//SMPOUT DD SYSOUT=*
//SMPRPT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SMPCNTL DD *
  SET BDY(GLOBAL).
  RECEIVE SYSMODS HOLDDATA
    ORDER(ORDERSERVER(ORDSRVR)
      CLIENT(MYCLIENT)
      CONTENT(RECOMMENDED))
  DELETEPKG.
/*
//ORDSRVR DD *
  <ORDERSERVER
    url="https://eccgw01.boulder.ibm.com/services/projects/ecc/ws/"
    keyring="keyringname"
    certificate="SMPE Client Certificate">
  </ORDERSERVER>
/*
//MYCLIENT DD *
  <CLIENT
    javahome="/usr/lpp/java/J1.4"
    classpath="/usr/lpp/smp/classes">
    javadebugoptions="-Dcom.ibm.smp.debug=severe -showversion">
    <HTTPPROXY host="local.httpproxy.com">
  </HTTPPROXY>
  <FIREWALL>
    <SERVER host="local.ftpproxy.com"> </SERVER>
    <FIRECMD>&REMOTE_USER;&REMOTE_HOST;</FIRECMD>
```

```
|          <FIRECMD>&REMOTE_PW;</FIRECMD>  
|          <FIREWALL>  
|          </CLIENT>  
|        /*
```

| **Note:** An alternative url for the IBM Automated Delivery Request server is
| <https://eccgw02.rochester.ibm.com/services/projects/ecc/ws/>.

| This sample job instructs SMP/E to order and then download all recommended
| (RSU) PTFs that are applicable to the target zones defined in your global zone. See
| the RECEIVE chapter of the *SMP/E Commands*, SA22-7771 for details of the
| RECEIVE ORDER command.

Chapter 5. Installing a new function

This chapter discusses the method you use to install a new function. It describes:

- Sources of new functions and sources of installation information
- An example of installing a function

Introduction

The primary purpose of SMP/E is to help you install SYSMODs in your target and distribution libraries. To do this, SMP/E provides three basic commands: RECEIVE, APPLY, and ACCEPT.

This chapter summarizes the general steps you follow to install a function. You should look at the installation materials that arrive with a function to find out about special requirements and procedures for installing the function. Table 9 lists sources of new functions and places where you can find information for installing the new functions.

Table 9. Sources for functions and their installation information

Product delivery vehicle	Products and service you get	Installation materials you can use
CBPDO	Products and service (not integrated) on a single logical tape	Sample jobs to receive products and service Program directories for the products you ordered Installation manuals for the products you ordered
Independent product	Product tape	Program directory for the product Installation manual for the product (if one is provided)

RECEIVE-APPLY-ACCEPT method

RECEIVE-APPLY-ACCEPT is the **standard** installation method. It uses SMP/E RECEIVE, APPLY, and ACCEPT commands to install functions onto a subsystem. Usually, you do not have to do any special processing outside SMP/E to install your functions. The JCLIN needed to set up the load modules for the function is sent along with the function.

In this method of installation, you:

1. Use the RECEIVE command to get the SYSMODs from the input data set and put them in the SMP/E data sets (the PTS and global zone within the CSI).
2. Use the APPLY command to install the SYSMODs in the target system libraries; then test them as required.
3. Use the ACCEPT command to install the SYSMODs into the distribution libraries.

Using the standard RECEIVE-APPLY-ACCEPT method

This section describes the standard process for using the RECEIVE, APPLY, and ACCEPT commands to install a function.

Note: You can use either the SMP/E dialogs or JCL jobs to receive, apply, and accept functions. The basic steps to follow are the same. If you have access to the SMP/E dialogs, you should use them. Otherwise, you can use the steps described in this chapter as examples.

Preparing your system

Before you start doing any operations on the product function or service tape you have received, there is work you should do to your system to make sure it is ready and to be certain you can recover in case of a serious failure during installation.

Following are some of these steps:

1. **Read the documentation** for your new product. This includes the program directory and, if provided, an installation guide. Also check the IBM Preventive Service Planning (PSP) files for the latest information about the product. This is important because there may be a PTF for the product that is not included in an ESO, or one of the PTFs may contain an error you should know about.
2. When you order a product, you should **update the FMID list** in the global zone with the FMIDs of the products you will be receiving. (Check the program directory for this information.) This enables you to receive any preventive service shipped between the time you order the product and the time you install it.
3. **Read the program directory.** It tells you which libraries are affected, whether any existing libraries must be expanded and by how much, and whether any new libraries are required.
4. **Prepare the target and distribution libraries.** If these libraries are properly prepared before you apply or accept a SYSMOD, very little time is lost if an error occurs.

List the VTOC of the target and distribution packs. This shows you which data sets are into their secondary extents, or are too full to contain additional elements that may be applied or accepted. If you are unsure how large a data set will grow, you may want to check full data sets against the SYSMODs you will be processing.

Partitioned data sets with a high percentage of their space used can be compressed by use of IEBCOPY. If it looks as if more space may be needed even after the compression, allocate a larger data set and copy the nearly full data set into it; then delete the old data set. Rename the new one properly and, if it has had to be allocated on a different pack, update any procedure necessary with the new VOLUME data.

This preparation is time-consuming but takes less time and work than recovering from an out-of-space abend (E37, B37, and so on).

SMP/E command operands can also help you handle out-of-space abends.

- The COMPRESS operand tells SMP/E to compress the data sets **before** they are updated; this can help you avoid an x37 ABEND. For more information about the COMPRESS operand, see the *SMP/E Commands* manual.
- The RETRY(YES) operand tells SMP/E to attempt recovery **after** an x37 ABEND occurs by compressing the affected data sets and retrying the failing utility. If you still need space after SMP/E's initial retry attempt and input to the utility was batched (copy or link-edit utility only), SMP/E debatches the

input and retries the utility separately for each member. For information about this retry processing, see “Recovering after errors from utility processing” on page 69.

5. **Allocate any new libraries required.** Determine where they are to be allocated and then allocate them. Remember that the program directory ordinarily shows how much space will be used—not how much space to allocate for the libraries. Libraries should be allocated with more space than required to allow for later modifications. Usually, twice the required space is recommended to allow for the replacement of every element in the library without running out of space.

Remember to add the appropriate DDDEF entries to the target zones and DLIB zones into which you will be installing this function.

6. **Check the SMP/E data sets to make sure they have enough space.** If necessary, compress or expand the partitioned data sets. A data set that is easily overlooked in this process is the SMPSTS, which fills very rapidly when you are receiving source updates (JES2 and JES3, for example). Reorganize or expand (if necessary) the CSI data set (using access method services EXPORT and IMPORT).
7. **Create a backup for the volumes affected.** This is a very important step that should not be overlooked. Without a current backup copy, a serious system failure during installation means not only redoing the installation in process but also means going to the last backup level and redoing all the work done since then.
8. **Estimate the time required for APPLY and ACCEPT processing.** Make sure enough time is available to allow these jobs to run to completion.
The program directory or installation guide may contain information to help you estimate the time required.

Staging the SYSMODs: The RECEIVE process

When you get a new function as part of a CBPDO, you get one logical tape that contains the function and the unintegrated service. If there is no preventive service for the function, it is not included in your order.

The first step in installing the new function is the RECEIVE process, which reads in the SYSMODs so they can be installed later:

- If you have access to the SMP/E dialogs, you can use the RECEIVE dialog to receive the function and any related service and HOLDDATA.
- You can use the RIMLIB job included on the CBPDO tape to receive the function, service, and HOLDDATA shipped on the CBPDO. For more information, see *z/OS and z/OS.e Planning for Installation* and the documentation that was included with the CBPDO.

Receiving the function SYSMOD

Function SYSMODs obtained from IBM are packaged in RELFILE format. Before any actual processing takes place, SMP/E must first determine if the SYSMODs packaged in RELFILE format are to be received from tape or DASD. If the SMPPTFIN data set is located on tape, SMP/E assumes that the RELFILES are on tape. If the SMPPTFIN data set is located on DASD, SMP/E assumes the RELFILES are on DASD and are cataloged.

During RECEIVE processing, the contents of the RELFILES are placed into the SMPTLIBs, which are used as temporary storage. SMPTLIBs that are uncataloged

Installing functions

are automatically cataloged by SMP/E. When the RELFILEs are on DASD, SMP/E checks to ensure that the RELFILE and SMPTLIB names are not the same. If they are, RECEIVE processing stops.

Note: Do not delete the SMPTLIBs after the RECEIVE step; they must be retained until after the function is applied and accepted.

Updating the target libraries: The APPLY process

After preparing your target and distribution libraries and receiving the function and any related service and HOLDDATA, the next step is to update your target libraries. Review the program directory for the products you are installing.

When installing a new function, you are concerned with three groups of SYSMODs:

- The function itself
- All PTFs applicable to the function
- All PTFs applicable to other functions that are specified as requisites of the function or service applicable to the function

You may be able to apply all the required SYSMODs with one APPLY command. This method has several advantages:

- It eliminates the need to run the APPLY command several times in order to install the complete set of SYSMODs required.
- You replace elements in the target libraries less often; therefore, there is less risk of running out of space.
- Because the SMP/E overhead and the number of invocations of the system utilities are reduced, overall processing time is decreased.

Therefore, although SMP/E supports the separate installation of a new function and its service, the common installation method is preferred unless the product program directory for other unique installation requirements directs otherwise. This is the method illustrated in subsequent examples. For more information about the APPLY command operands, see The APPLY Command in *SMP/E Commands*.

When you are updating the target libraries, there are actually three distinct SMP/E jobs to be run:

- **Receive additional HOLDDATA.** Before starting the APPLY, you should contact the IBM Support Center to get additional HOLDDATA from the product PSP file or the CORPE PSP file. Obtaining and receiving additional HOLDDATA is covered under “Processing HOLDDATA from PSP files” on page 143. The other two steps are covered in more detail in the following sections.
- **Run the APPLY CHECK job.** This is a nonupdating mode of APPLY. Its purpose is to help resolve any problems that may prevent the APPLY from completing processing successfully.
- **Apply the SYSMOD updates.** This installs the new function and service into the target libraries.

Checking the update: The APPLY CHECK process

The purpose of this step is to determine:

- Whether any errors will occur while the new function is being applied (except for errors that occur as a direct result of an update, such as a target library running out of space). This includes missing DDDEF entries.
- Whether any requisite SYSMODs are missing.

- The target libraries that will be updated.
- The SYSMODs, if any, that will be regressed.

Use the SMP/E dialogs or the following sample job to do an APPLY CHECK for the function and related SYSMODs:

```
//APPLY      JOB 'accounting info',MSGLEVEL=(1,1)
//APPLYCHK   EXEC SMPPROC
//SMPCNTL    DD *
SET          BDY(ZOSTGT1)      /* Set to target zone.      */.
APPLY        FORFMID(HXX1200)  /* Apply for this FMID     */
              FUNCTIONS        /* the function itself     */
              PTFS              /* and all its PTFS.      */
              GROUPEXTEND       /* Also all requisite PTFS */
              CHECK             /* But do not update libs. */
              BYPASS(HOLDSYSTEM /* Bypass options         */
                    HOLDCLASS(UCLREL,ERREL)
                    )
/*
```

Researching the APPLY CHECK reports: As a result of running the APPLY CHECK job, SMP/E produces various messages and reports that you should now use to do further research. Here are some of the errors that may have been detected:

- Some DD statements may be missing. Check the program directory or the *SMP/E Reference* manual to determine why they are required and how they should be specified.
- Some APAR fixes or USERMODs may be regressed. If so, you must determine why. For APAR fixes, you have to get the version of the APAR fix applicable to the new product. For USERMODs, you have to rework the modification to make it applicable to the new function, or eliminate the modification if the product being installed provides the same function. When doing the actual APPLY operation, you may need to specify the BYPASS operand to inform SMP/E that you have resolved these problems.
- Some prerequisite or requisite PTFSs may be missing. If so, you should determine whether they can be obtained. Some may already be on an ESO tape you have in-house but have not received; others may not have been shipped, in which case you have to get an early copy of them by contacting the IBM Support Center. Although you can also avoid these conditions by using the BYPASS operand, you are advised not to do this because the regressions have not been resolved.

Note: Obtaining a product in a CBPDO greatly reduces the amount of work needed to find requisite PTFSs, because CBPDOs include all the service for products applicable to the selected SREL.

- Some elements may not have been selected for installation. For each such element, if the current functional owner (that is, FMID) is an IBM product, there may not be a problem; this condition is common and occurs because there are multiple functions with common elements. Check the program directory or installation guide for the product you are installing to determine whether this condition is normal or if it indicates a problem.

If the FMID is not one for an IBM product, further research is necessary. Contact the current owner of the element to determine how that product is related to the one you are installing.

- Some of the PTFSs may not have been selected for installation because of exception SYSMOD conditions identified by the ++HOLD MCSs. When

Installing functions

installing a new function, you may want to research these PTFs further. You can use the reason ID and the comments specified in the ++HOLD MCS to determine which of the following actions is most appropriate:

- Bypass the condition using the BYPASS(HOLDERR) operand
- Do not install the PTF
- Obtain a fix for the APAR

Getting additional SYSMODs: After doing the research step, you may decide that additional SYSMODs are needed. If so:

1. Obtain the additional SYSMODs by using CBPDO, ESO, IBMLINK, or the IBM Support Center.
2. Receive the additional SYSMODs, using the same source ID value as used when processing the CBPDO tape.
3. Rerun the APPLY CHECK job.

Repeat this process until no new errors are reported.

Updating the target library: The APPLY process

After you have done the APPLY CHECK and the associated research and the other necessary preparation, the APPLY job itself should be fairly simple. The APPLY job does the same checking as the APPLY CHECK and then continues by calling the appropriate system utilities to get all the elements installed.

Note: If a product deletes another product, you cannot use the RESTORE command to back off the applied product and bring back the deleted one.

Use the SMP/E dialogs or the following sample job to apply the function and any related SYSMODs:

```
//APPLY      JOB 'accounting info',MSGLEVEL=(1,1)
//APPLY      EXEC SMPPROC
//SMPCNTL    DD *
SET          BDY(Z0STGT1)          /* Set to target zone.      */
APPLY        FORFMID(HXX1200)      /* Apply for this FMID     */
              FUNCTIONS            /* the function itself     */
              PTFS                  /* and all its PTFs.       */
              GROUPEXTEND           /* Also all requisite PTFs */
              /* No check this time. */
              BYPASS(HOLDCLASS(UCLREL,ERREL)/*Bypass options.*/
                    HOLDSYS(reason-id,...) .
/*
```

If you have obtained additional APAR fixes or USERMODs, you should either specify each of these SYSMODs in the SELECT operand, or if **all** applicable APARs and USERMODs are to be applied, specify the APARS and USERMODS operands.

Note: For most products, you do not have to do any additional processing to get the elements into executable format. However, some products may require you to run additional utilities or to perform extra steps after applying the SYSMODs. See your product documentation for more information.

Testing the new function

After installing the new function, you should perform two operations:

1. Create a backup of the updated data sets, including any SMP/E data sets affected, in case something happens to the data sets during the next phase.

Note: If you are doing the installation on a clone of your original system, you already have a backup—your original system.

2. Do some testing before putting the new function into production. This testing should include some of the following:
 - If the product has supplied installation verification procedures (IVPs), they should be run.
 - If your installation has a test job stream, the tests should be run.
 - If the new function could at all affect your ability to IPL the system, try an IPL at this time.

Only after verifying the new function on a noncritical test system should you put it into production. You should not consider the test phase completed until you have run the new function in production mode for some period (as determined by your installation requirements). Only then, if no errors are found, are you ready to go to the next step, updating your distribution libraries.

Updating the distribution libraries: The ACCEPT process

The last major phase of installing a new function is to update the distribution libraries, using the SMP/E ACCEPT command. This is a very critical step: Once the function and its service have been accepted, there is no SMP/E method for removing it from either the target or distribution libraries.

When you are ready to update your distribution libraries, you have the same set of considerations and SMP/E support as described under “Updating the target libraries: The APPLY process” on page 104, and the same three-phase operation:

1. **Receive additional data.** Before starting the ACCEPT process, you should obtain any additional HOLDDATA for the function you are installing by using CBPDO, ESO, IBMLINK, or the IBM Support Center. See “Processing HOLDDATA from PSP files” on page 143 for additional information.

Note: If there is a significant time between the APPLY process and ACCEPT process, additional problems may have been reported for which ++HOLD statements have been created. If this new data is not obtained, SMP/E may install PE PTFs into the distribution libraries.

2. **Run the ACCEPT CHECK job.** This is a nonupdating mode of ACCEPT. Its purpose is to help resolve any problems that may prevent the ACCEPT from completing processing successfully.
3. **Accept the SYSMOD update.** This installs the new function and service into the distribution library.

Checking the update: The ACCEPT CHECK process

The ACCEPT CHECK job provides the same function for the distribution libraries that the APPLY CHECK job provides for the target libraries. See “Checking the update: The APPLY CHECK process” on page 104.

Use the SMP/E dialogs or the following sample job to do an ACCEPT CHECK for the function and related SYSMODs:

```
//ACCEPT JOB 'accounting info',MSGLEVEL=(1,1)
//ACCEPTCK EXEC SMPPROC
//SMPCNTL DD *
SET      BDY(DLIB1)          /* Set to DLIB zone.          */.
ACCEPT   FORFMID(HXX1200)    /* Accept for this FMID      */.
          FUNCTIONS          /* the function itself       */.
          PTFS               /* and all its PTFs.         */.
          GROUPEXTEND        /* Also all requisite PTFs.  */.
          CHECK              /* But do not update libs.   */.
          BYPASS(HOLDSYSTEM) /* Bypass options            */.
```

Installing functions

```
        HOLDCLASS(UCLREL,ERREL)
    )
/*
```

Researching the ACCEPT CHECK reports: The ACCEPT CHECK reports should be researched in the same manner as the APPLY CHECK reports (see “Researching the APPLY CHECK reports” on page 105).

Getting additional SYSMODs: The process of getting additional SYSMODs or APAR fixes for those PTFs being accepted is the same as during the APPLY process (see “Getting additional SYSMODs” on page 106).

Updating the distribution library: The ACCEPT process

The ACCEPT process updates the distribution libraries. Use the SMP/E dialogs or the following sample job to accept the function and any related SYSMODs:

```
//ACCEPT JOB 'accounting info',MSGLEVEL=(1,1)
//ACCEPT EXEC SMPPROC
//SMPCNTL DD *
SET      BDY(DLIB1)           /* Set to DLIB zone.          */
ACCEPT   FORFMID(HXX1200)     /* Accept for this FMID      */
          FUNCTIONS           /* the function itself       */
          PTFs                /* and all its PTFs.        */
          GROUPEXTEND          /* Also all requisite PTFs.  */
                                /* No check this time.      */
          BYPASS(HOLDCLASS(UCLREL,ERREL)/*Bypass options */
                HOLDSYS(reason-id,...) .
/*
```

Note: If you have obtained additional APAR fixes or USERMODs, you should either specify each of these SYSMODs in the SELECT operand or, if **all** applicable APARs and USERMODs are to be installed, specify the APARS and USERMODS operands.

Checking other zones for requisites: REPORT CROSSZONE

After installing a function, you may need to check other zones for conditional requisites. A conditional requisite is software (such as service) that must be installed for a given function if another function is also installed. To help automate the research for conditional requisites, the installation logic (SMP/E modification control statements) for a function uses ++IF statements to identify the requisites.

Conditional requisites may be for functions that are installed in different zones. If you have set up automatic cross-zone requisite checking, as described in “Specifying automatic cross-zone requisite checking” on page 78, SMP/E will enforce cross-zone requisites during APPLY or ACCEPT processing. Otherwise, you must use the SMP/E REPORT CROSSZONE command after a function and the related service has been installed to manually identify cross-zone requisites defined in the installation logic. To help you install the identified requisites, REPORT CROSSZONE can also write APPLY and ACCEPT commands to the SMPPUNCH data set. So, if you have **not** specified automatic cross-zone requisite checking, and the function you have installed (or any related service) specifies conditional requisites, you should run the REPORT CROSSZONE command against the target and DLIB zones containing that product, as well as against the zones containing the functions identified on the ++IF statements. For more information about the REPORT CROSSZONE command, see Chapter 13, “Identifying cross-zone requisites: The REPORT CROSSZONE command,” on page 159.

Chapter 6. Installing preventive service

This chapter describes the steps for installing preventive service. After an introduction to preventive service and a summary of the preventive service process, it discusses the following topics:

- Preparing your system
- Staging the SYSMODs with the RECEIVE command
- Requesting preventive service with the RECEIVE ORDER command
- Updating the target libraries with the APPLY command
- Testing the new service level
- Updating the distribution libraries with the ACCEPT command

Introduction

You install preventive service through the use of the SMP/E preventive service process. The process uses:

- The preventive service SYSMODS received as either a CBPDO tape, an expanded service options (ESO) tape, or a package downloaded from the IBM Server as a result of a RECEIVE ORDER request.
- A well-defined set of steps that you should follow to install each service level in order to bring your system up to the current service level.

ESOs are used as input to the software manufacturing database for the service to be included in CBPDOs. As a result, there are many similarities between these two offerings.

If you receive service and HOLDDATA from both CBPDO and ESO tapes, make sure you install them in service level order (for example, service level 0301, followed by service level 0302, and so on). Each PTF that is currently available on a service level has a corresponding source ID. After you have received PTFs from one of these service offerings (ESO or CBPDO), do not try to receive them again from the other.

CBPDO tapes

CBPDO tapes can be ordered periodically, as you decide to update your system. A CBPDO tape contains the PTFs, HOLDDATA, and PSP upgrade files to bring your system up to a service level that you select. A CBPDO is ordered for a particular feature (CICS, database system, MVS, or NCP). These features correspond to the SRELs to which products are applicable.

You have two options when ordering a CBPDO: you can get products plus service, or service only. (If you are interested just in installing preventive service, order a service-only CBPDO.) With both of these options, you automatically receive service for products for which you are already licensed under a single customer number for a single feature.

The amount of service you receive in your CBPDO depends on your selection of a service level and whether this is your first CBPDO order.

- If you select a service level, you get all service from that level to the current level.

Preventive service

- If you do not select a service level and this is your first CBPDO order, you get all the service shown on the order checklist.
- If you do not select a service level and you have ordered a CBPDO before, you get service following the service level that was shipped in your previous CBPDO.

The CBPDO tape is a standard label (SL) tape, with files arranged as shown in Table 10.

Table 10. Format of a CBPDO tape

File number	Processed by SMP/E	Contents
1	No	Documents
2	No	Installation RIMs
3	Yes	HOLDDATA for exception SYSMODs
4	No	Program directories and PSP information
5	Yes	SMPMCS file (MCS statements for SYSMODs on the tape), PTFs, and cover letters
6– <i>n</i>	Yes	RELFILES for products on the tape

ESO tapes

As an IBM customer, you may periodically receive a customized ESO tape based on your IBM software distribution profile. This tape has the PTFs, HOLDDATA, ++ASSIGN statements, and UCLIN data needed to bring your system up to the current service level.

Service levels are identified according to when they were available correctively. For example:

Service level	When available correctively
0308	August 2003
0401	January 2004
0411	November 2004

The ESO tape is a nonlabeled (NL) tape, with files arranged as shown in Table 11 on page 110.

Table 11. Format of an ESO

File number	Processed by SMP/E	Contents
1	Yes	++ASSIGN statements PTFs within the requested service level range PTFs that resolve PE PTFs contained in ESO
2	No	Installation and usage instructions
3	No	Softcopy of packing list for all PTFs
4	Yes	HOLDDATA for exception SYSMODs
5	Optional	UCLIN file

A RECEIVE ORDER request

You may order all currently available PTFs that meet your selection criteria. The PTF package that results from such an order is tailored to your SMP/E environment and contains all currently available PTFs that match your selection criteria and are not already present in your environment. There are three selection options:

Critical

Critical service includes all available PTFs that resolve high impact pervasive (HIPER) problems or PTFs in error (PEs).

Recommended

Recommended service includes all available PTFs identified with a Recommended Service Update SOURCEID (RSUyymm) and all available PTFs that resolve a critical problem (HIPER or PE). Recommended service includes PTFs through the most current RSU level.

All All service includes all available PTFs.

The package also contains the last 2-years of Enhanced HOLDDATA for the entire z/OS software platform.

Preventive service process: Summary

The preventive service process has five phases:

1. Prepare your system.
2. Stage the preventive service.
3. Update the target libraries.
4. Test the system.
5. Update the distribution libraries.

The preventive service phases are the same as those defined in Chapter 7, "Installing corrective service," on page 123, although the steps within each phase differ. These phases are the basic SMP/E operations to install any SYSMOD.

Each of these phases consists of a series of steps (SMP/E jobs, research, or invocations of system utilities) that must be done to make sure the preventive service is installed correctly and to ensure the integrity of your system libraries.

The steps defined are the normal steps for the installation of most PTFs. Any PTF that requires special processing will contain instructions for installing it.

Generally, you should first attempt to install all the normal PTFs that you have received and then to install those having special requirements. The intention is to install the maximum number of preventive fixes on your system as soon as possible.

Note: You should let SMP/E manage PE PTFs (PTFs discovered to be in error), rather than researching and resolving them yourself.

The following sections describe, in detail, the steps necessary for each of the preventive service phases.

Note: You can use either the SMP/E dialogs or JCL jobs to receive, apply, and accept preventive service. The basic steps are the same. If you have access to the SMP/E dialogs, you should use them. Otherwise, you can use the steps described in this chapter as examples.

Preparing your system

Before you start installing preventive service, you should do the following to make sure that your system is ready and that you can recover in case of a serious failure during installation:

- Get the latest HOLDDATA from IBMLINK or the IBM Support Center. You process this HOLDDATA during the next phase.

As described in Chapter 9, “Managing exception SYSMODs,” on page 135, an ESO may contain PTFs that were discovered to be in error (called PE PTFs) after they were shipped to an IBM software distribution center. You can find out about PE PTFs from IBMLINK or the IBM Support Center and build the corresponding ++HOLD/++RELEASE statements necessary to prevent introducing problems by processing PTFs with known errors.

If you used the RECEIVE ORDER command to request a preventive service package, it contains the last 2-year’s HOLDDATA for the z/OS software platform, so you can skip this step.

- Make sure you have the publications you need.
- Estimate the time you need for APPLY and ACCEPT processing. Make sure there is time for these jobs to run to completion.
- Back up your disk packs.

Staging the SYSMODs: The RECEIVE process

After you prepare your target and distribution libraries, receive the preventive service SYSMODs (PTFs) and the HOLDDATA (including data on the CBPDO or ESO and any obtained from the IBM Support Center) into the SMP/E database (the global zone and the SMPPTS).

- If the service was obtained from a CBPDO, you can use SMP/E dialogs or the RIMLIB job included on the CBPDO tape to receive the service and HOLDDATA shipped on the CBPDO. For more information, see the documentation that was included with your tape.
- If the service was obtained from an ESO, you can use the SMP/E dialogs or the following sample job to receive the service and HOLDDATA.
- If you used the RECEIVE ORDER command to request a preventive service package and did not specify TRANSFERONLY, the process downloaded the SYSMODs directly into the SMP/E database (the global zone and SMPPTS), so you can skip this step.

```
//RECESO EXEC SMPPROC
//SMPHOLD DD DSN=HOLDDATA,
//          UNIT=TAPE,
//          VOL=(PRIVATE,RETAIN,SER=tape1),
//          LABEL=(4,NL),
//          DCB=(LRECL=80,BLKSIZE=7200,RECFM=FB),
//          DISP=(SHR,PASS)
//SMPPTFIN DD DSN=SMPPTFIN,
//          UNIT=AFF=SMPHOLD,
//          VOL=(PRIVATE,RETAIN,SER=tape1),
//          LABEL=(1,NL),
//          DCB=(LRECL=80,BLKSIZE=7200,RECFM=FB),
//          DISP=(OLD,PASS)
//SMPCNTL DD *
SET      BDY(GLOBAL)      /* Set to global zone.      */
RECEIVE  SYSMODS           /* Receive all SYSMODs.    */
          HOLDDATA        /* Receive HOLDDATA.      */
          SOURCEID(       /* Optional: Assign SOURCEID */
            xxxxxxxx)     /* (SOURCEIDs are included */
                          /* on all ESO tapes)      */
```

Note: If multiple ESO service tapes are being RECEIVED, the additional tape volumes must be concatenated under the SMPPTFIN DD card. See File 2 of an ESO tape for further information.

In CBPDO and ESO tapes, PTFs are assigned SOURCEID values by ++ASSIGN statements. You can assign an additional value by specifying it on the RECEIVE command. The SOURCEID operand is used with the MCS operand on the LIST command to list the PTF cover letters. This is used rather than the LIST operand on the RECEIVE command because the output is in a more usable format.

- For ESO tapes, you should substitute a meaningful value for xxxxxxxx in each command shown above. The value should be unique and easily tied to an ESO.
- For CBPDO tapes, the recommended format is PDOyyww, where yy is the year and ww the week of the CBPDO tape.

The DCB values shown for SMPHOLD and SMPPTFIN are those used for preventive service when this publication was written. If these values change, use the ones defined for the ESO.

For both CBPDO and ESO tapes, you should call the IBM Support Center to obtain additional HOLDDATA (unless you just received your tape). For additional information, see “Processing HOLDDATA from PSP files” on page 143. You can use the SMP/E dialogs or the following sample job to process the data set with the HOLDDATA obtained from the IBM Support Center.

```
//RECEIVE JOB 'accounting info',MSGLEVEL=(1,1)
//RECESM EXEC SMPPROC
//SMPHOLD DD ...data describing your data set
//*      ...must be RECFM=FB, LRECL=80
//SMPCNTL DD *
SET      BDY(GLOBAL) /* Set to global zone. */.
RECEIVE  HOLDDATA /* Receive HOLDDATA. */.
/*
```

The HOLDDATA you obtain from the IBM Support Center should be in SMP/E format. If not, or if you are creating your own HOLDDATA, see the *SMP/E Reference* manual to review the syntax for the ++HOLD statements.

Updating the target libraries: The APPLY process

After you prepare your target and distribution libraries and receive all the necessary PTFs and HOLDDATA, update the target libraries. Though most PTFs can be installed directly into the target libraries, some require special processing, such as a fix that must be concurrently installed on all processors in a network.

These PTFs contain a ++HOLD statement that automatically places them into HOLD for SYSTEM action status; that is, SMP/E does not allow them to be installed unless you take some direct action, such as specifying BYPASS(HOLDSYS) on the APPLY command. These PTFs should not be processed immediately; you should attempt to install all PTFs not requiring such actions and then return to process these. For additional information about these PTFs, see “Installing PTFs that need special processing” on page 118.

When installing preventive service, you are concerned with two groups of PTFs:

- All PTFs from the CBPDO, ESO, or requested service package you are installing
- Any other PTFs that are required to install these PTFs

SMP/E provides operands (SOURCEID and GROUP or GROUPEXTEND) on the APPLY command that facilitate the installation of all required PTFs by use of one APPLY command. Installing all PTFs with one APPLY command provides several advantages:

- It eliminates the need to run the APPLY command several times in order to install the complete set of PTFs required.
- It reduces the risk of running out of space, because you are replacing elements in the target libraries less often.
- It decreases overall processing time, because there is less SMP/E overhead and the system utilities are invoked less often.

When you update the target libraries, there are three distinct SMP/E jobs to be run:

1. **Receive additional HOLDDATA.** Before starting the APPLY, you should contact the IBM Support Center to obtain any additional HOLDDATA for the CBPDO or ESO you are installing. This step is required if:
 - a. You did not obtain the additional HOLDDATA from the IBM Support Center during the staging phase.
 - b. There has been a delay between the RECEIVE and APPLY staging phase and the target update phase.

We will not discuss this first step further here. If you need to perform this step, see “Staging the SYSMODs: The RECEIVE process” on page 112.

2. **Run the APPLY CHECK job.** This second step is a nonupdating mode of APPLY, referred to as the *APPLY CHECK run*. Its purpose is to assist in resolving any problems that prevent the APPLY itself from completing processing successfully.
3. **Run the APPLY job.** This third step is the updating mode of APPLY, in which the preventive service is installed into the target libraries.

The following sections describe the last two steps as well as the processing of PTFs that require special processing.

Checking the update (APPLY CHECK)

The purpose of this step is to determine:

- Whether any errors will occur when you apply a SYSMOD (except for those error conditions that occur as a direct result of an update, such as a target library running out of space)
- Whether any requisite PTFs are missing
- The target system libraries that will be updated during APPLY
- The PTFs or APARs, if any, that will be regressed during APPLY

The GROUP and GROUPEXTEND operands allow SMP/E to include any PTF that may be required to install PTFs on the current service level (PUT0303 in the example that follows). Some of the PTFs on previous tapes may not have been installed, because they were in hold status (PE PTFs) at the time the ESO containing the service level was installed. The current service level may contain fixes for the APARs that caused the original PTFs to be held. These PTFs, because they have module intersections with the PE PTF, must either be prerequisite to the old PTFs or must supersede them so SMP/E can automatically include the old PTFs when the fixing PTF is installed.

The following sample job shows how to do an APPLY CHECK for preventive service:

```
//APPLY    JOB 'accounting info',MSGLEVEL=(1,1)
//APPLYCHK EXEC SMPPROC
//SMPCNTL DD *
SET      BDY(TGT1)          /* Set to target zone.      */.
APPLY    SOURCEID(PUT0303) /* Apply this service level */
        GROUPEXTEND        /* and all requisite PTFs, */
        CHECK              /* but do not update libs. */
        SELECT(sysmod-id,...) /* Select additional      */
        /* service if required. */
        BYPASS(HOLDCLASS(ERREL,UCLREL)
                HOLDSYSTEM) .
/*
```

You may be able to improve SMP/E performance by including the source IDs for previous service levels within the SOURCEID operand. The following job provides an example of an APPLY CHECK job for PTFs in service level 0303:

```
//APPLY    JOB 'accounting info',MSGLEVEL=(1,1)
//APPLYCHK EXEC SMPPROC
//SMPCNTL DD *
SET      BDY(TGT1)          /* Set to target zone.      */.
APPLY    SOURCEID(PUT0303 /* Apply this service level */
                PUT0302 /* and back-level tapes */
                PUT0301) /* back to some reasonable */
        /* level. */
        GROUPEXTEND        /* And all requisite PTFs. */
        CHECK              /* But do not update libs. */
        SELECT(sysmod-id,...) /* Select additional      */
        /* service if required. */
        BYPASS(HOLDCLASS(ERREL,UCLREL)
                HOLDSYSTEM) .
/*
```

Note: This form of the SOURCEID operand can also be used to group service levels initially in one APPLY command.

If you want to install preventive service only on selected functional areas of the system, you can also specify the FORFMID operand on the APPLY command, specifying either specific function identifiers (FMIDs) or the name of one or more FMIDSETs.

Researching the APPLY CHECK reports

As a result of running the APPLY CHECK job, SMP/E produces various messages and reports you should now use to perform further research. Here are some of the errors that may be detected:

- Some DD statements may be missing. Check the *SMP/E Reference* manual to determine why they are required and how they should be specified.
- Some APARs or USERMODs may be regressed. If so, you must determine why. For APARs, obtain the version of the APAR fix applicable to the service level. For USERMODs, rework the modification to be applicable to the new service level. When performing the actual APPLY operation, you most likely need to specify the BYPASS operand in order to inform SMP/E that you have resolved these problems.
- Some requisite PTFs may be missing. If so, you should determine how they can be obtained. Some may be on service levels you have not received; others may not have been shipped, in which case you have to obtain an early copy of them

Preventive service

by contacting the IBM Support Center. Although you can get around these conditions by using the BYPASS operand, you are advised not to do this because the regressions have not been resolved.

- Some of the PTFs are not installed because of exception SYSMOD conditions identified by the ++HOLD statements. You should ignore these PTFs until a fixing PTF is delivered in a subsequent service level.

Note: Depending on your requirement to install such PTFs, you can use the reason ID and the comments specified in the ++HOLD statement to determine which of the following actions is most appropriate:

- Bypass the condition using the BYPASS(HOLDERR) operand
- Do not install the PTF
- Obtain a fix for the APAR

A common cause of regression is user modification. When USERMODs are applied to your system, the service level information (RMID or UMID) is altered to reflect these additions. The APPLY CHECK may have flagged a SYSMOD as one that would cause regression.

This regression-handling procedure works under the assumption that you have applied, but not yet accepted, a USERMOD. This means that the USERMOD has applied service to the target libraries, but the service in your distribution library is that which the SYSMOD should be applied against.

You can follow these steps for handling regression:

1. Restore the module from the distribution library back into the target system to back off the USERMOD.
2. Apply the SYSMOD in question to the target system in order to keep SMP/E's information about the target system up to date.
3. Accept the SYSMOD into the distribution libraries.

When USERMODs are applied on a system, it is up to you to ensure that they are at the proper level.

If you reapply your USERMOD at this point, remember to exclude it when accepting the preventive service if you want to be able to restore your system to the level assumed by the next preventive service update.

The following steps describe regression handling.

1. **Restore APARs or USERMODs, if necessary.** Use the RESTORE command to remove the APAR or USERMOD from the target libraries. This places into the target library the versions of the elements that currently exist in the distribution library.

Use the SMP/E dialogs or the following sample job to restore the SYSMODs:

```
//SMPRESTR JOB 'accounting info',MSGLEVEL=(1,1)
//RESTORE EXEC SMPPROC
//SMPCTL DD *
SET      BDY(TGT1)          /* Set to target zone.      */.
RESTORE                                /* Put DLIB data into      */.
                                /* target libraries.      */.
                                /* Must be SELECT or GROUP, */.
                                /* NOT by source ID.      */.
SELECT(AZ00001,
        AZ00002)
/*
```

2. **Repeat the APPLY CHECK.** This gives you an updated status report to determine that all regression conditions have been addressed.

3. If a **USERMOD** or **APAR** is necessary, compare the PTF just flagged by **APPLY CHECK** with the **APAR** or **USERMOD** that caused the regression. You may need microfiche or a dump of the module. If any changes are needed, follow the steps below. Otherwise, continue with the **APPLY** step.

- Do one of the following:
 - For a **USERMOD**, add the **REWORK** operand to the **++USERMOD MCS**. The **REWORK** operand allows the updated **SYSMOD** to be automatically rereceived, as long as it is more recent than the version that has already been received. This takes the place of rejecting the **SYSMOD** and receiving it.
 - For an **APAR** or **USERMOD**, reject the prior copy from the **SMPPTS**. The **SMP/E REJECT** job removes the **USERMOD** or **APAR** from the **SMPPTS**. This prevents the prior copy from being applied again.

A sample **REJECT** job follows:

```
//SMPREJ JOB 'accounting info',MSGLEVEL=(1,1)
//REJECT EXEC SMPPROC
//SMPCTL DD *
SET      BDY(GLOBAL)      /* Set to global zone. */.
REJECT                                /* Remove these two */.
                                /* SYSMODS from the */.
                                /* PTS and global zone. */.
                                /* */.
                                /* */.
                                /* */.
/*
```

- **Receive the USERMODs or APARs.** This loads the **SYSMODs** into the **SMPPTS**.

Getting additional SYSMODs

After doing the research step, you may decide that additional **SYSMODs** are needed. These should be obtained from the IBM Support Center and then received into the **SMPPTS**.

At this time, you should modify the **APPLY** command to add a **SELECT** operand specifying each of the PTFs obtained from the IBM Support Center. An alternative is to assign all such PTFs the same source ID value as the service level, or to assign them a unique value and then add that value to the **SOURCEID** operand.

This process should continue until no new errors are reported.

Updating the target library (APPLY)

If the suggested preparation and all phases of the **APPLY CHECK** are completed, the **APPLY** job itself should be fairly simple. The **APPLY** job performs the same checking as the **APPLY CHECK** and then calls the appropriate system utilities to install all the elements.

Use the **SMP/E** dialogs or the following sample job to apply the preventive service:

```
//APPLY JOB 'accounting info',MSGLEVEL=(1,1)
//APPLY EXEC SMPPROC
//SMPCTL DD *
SET      BDY(TGT1)          /* Set to target zone. */.
APPLY    SOURCEID(PUT0303)   /* Apply this service level */.
          GROUPEXTEND        /* and all requisite PTFs, */.
          SELECT(UZ00001)    /* Plus two other PTFs. */.
          UZ00002            /* */.
          AZ12345            /* Plus two APAR fixes. */.
          AZ12346            /* */.
          /* */.
```

Preventive service

- ```
/* No check this time. */
BYPASS(HOLDCLASS(ERREL,UCLREL)
 HOLDSYSTEM) .
/*
```
- If you have obtained additional APAR fixes or USERMODs, you should either specify each of these SYSMODs in the SELECT operand or, if **all** applicable APARs and USERMODs are to be installed, specify the APARS and USERMODS operands.
  - If any of the SYSMODs specified in the SELECT list have already been applied and you want to reinstall them, you must also specify the REDO operand on the APPLY command.
  - If you want to install preventive service only on selected functional areas of the system, you can also specify the FORFMID operand on the APPLY command, specifying either specific function identifiers (FMIDs) or the name of one or more FMIDSETs.

## Installing PTFs that need special processing

There are so many reasons a PTF may require special processing that it is impossible to document how you should handle each case. Any PTF requiring special processing should contain a ++HOLD statement (after all the ++VER statements and before the first element MCS). That ++HOLD statement should be as follows:

```
++HOLD(sysmod-id) /* Originating SYSMOD ID. */
SYSTEM /* Special processing info. */
FMID(sysmod-id) /* Functional owner. */
REASON(reason-id)
COMMENT(....
 any amount of comment text

)
```

See *SMP/E Reference* for a detailed description of the ++HOLD statement syntax. The comment text within the ++HOLD statement, or in the PTF cover letter, contains a description of all the special processing necessary to install this PTF.

---

## Testing the new service level

After having installed the new service, you should perform two operations:

1. Create a backup of the updated data sets, including the SMP/E data sets affected. This ensures that if something happens to the data sets during the next phase, you do not have to repeat all the processing done in previous steps.
2. Perform some testing before putting the service into production. This testing should include some of the following:
  - Run selected product IVP jobs.
  - Run test job streams, if your installation has them.
  - Attempt an IPL.

Only after verifying the service on a noncritical test system should you put that service into production. The test phase should not be considered complete until you have run the service in production mode for some period (as determined by the requirements for your installation). If no errors are found, you are ready to proceed to the next step: updating your distribution libraries.

## Updating the distribution libraries: The ACCEPT process

The last major phase of installing preventive service is updating the distribution libraries with the SMP/E ACCEPT command. This is a very critical step. Once the service is accepted, there is no SMP/E method to remove it from either the target or distribution libraries.

When you are ready to update your distribution libraries, you have the same set of considerations and SMP/E support as described under “Updating the target libraries: The APPLY process” on page 113, and the same three-phase operation:

1. **Receive additional HOLDDATA.** Before starting the ACCEPT, you should obtain any additional HOLDDATA for the service level you are installing. This step is required if:
  - You did not obtain the additional HOLDDATA from the IBM Support Center during the staging phase.
  - There has been a delay between the RECEIVE staging phase and the ACCEPT DLIB update phase.

2.

### Notes:

- a. If there is a significant time between the APPLY and ACCEPT, additional problems may have been reported for which ++HOLD statements have been created. If this new data is not obtained, SMP/E may install PE PTFs into the distribution libraries.
- b. You may want to run the REPORT ERRSYSMODS command to see whether any SYSMODs that are applied are now in error. For more information, see Chapter 14, “Identifying installed SYSMODs affected by error holds: The REPORT ERRSYSMODS command,” on page 163.
3. **Run the ACCEPT CHECK job.** The second job is a nonupdating mode of ACCEPT, referred to as the *ACCEPT CHECK run*. Its purpose is to help resolve any problems that prevent the ACCEPT itself from successfully completing processing.
4. **Run the ACCEPT update.** The third job is the updating mode of ACCEPT, in which the preventive service is installed into the distribution libraries.

**Note:** Special processing may be required during the ACCEPT process. PTFs requiring this processing should be handled in the same manner as during the APPLY process.

## Checking the update (ACCEPT CHECK)

The ACCEPT CHECK job provides the same function for the distribution libraries that the APPLY CHECK job provided for the target libraries. See “Checking the update (APPLY CHECK)” on page 114.

Use the SMP/E dialogs or the following sample job to do an ACCEPT CHECK for preventive service. This example is an ACCEPT CHECK job for PTFs in service level 0303:

```
//ACCEPT JOB 'accounting info',MSGLEVEL=(1,1)
//ACCEPTCK EXEC SMPPROC
//SMPCTL DD *
SET BDY(DLIB1) /* Set to DLIB zone. */.
ACCEPT SOURCEID(PUT0303) /* Accept this service level*/
 GROUPEXTEND(/* Include requisite PTFs */
 NOAPARS /* Don't include APARS or */
 NOUSERMODS) /* USERMODs */.
```

## Preventive service

```
CHECK /* but do not update libs. */
SELECT(sysmod-id,...) /* Select additional */
 /* service if required. */
BYPASS(HOLDCLASS(ERREL,UCLREL)
 HOLDSYSTEM) .
/*
```

**Note:** This example can be used for PTFs from either a CBPDO or an ESO.

If you want to install preventive service only on selected functional areas of the system, you can also specify the FORFMID operand on the ACCEPT command, specifying either specific function identifiers (FMIDs) or the name of one or more FMIDSETs.

### Researching the ACCEPT CHECK reports

The ACCEPT CHECK reports should be researched in the same manner as the APPLY CHECK reports (see “Researching the APPLY CHECK reports” on page 115).

### Getting additional SYSMODs

The procedure for getting additional SYSMODs or APAR fixes from those PTFs being accepted is the same as that followed during the APPLY process (see “Getting additional SYSMODs” on page 117).

If you obtain additional SYSMODs during the ACCEPT phase, you should process these through the APPLY phase before accepting them.

## Updating the distribution library (ACCEPT)

The ACCEPT command causes SMP/E to update the distribution libraries. You can use the SMP/E dialogs or the following sample job to accept the preventive service:

```
//ACCEPT JOB 'accounting info',MSGLEVEL=(1,1)
//ACCEPT EXEC SMPPROC
//SMPCTL DD *
SET BDY(DLIB1) /* Set to DLIB zone. */.
ACCEPT SOURCEID(PUT0303) /* Accept this service level*/
 GROUPEXTEND(/* Include requisite PTFs */
 NOAPARS /* Don't include APARs or */
 NOUSERMODS) /* USERMODs */
 /* No check this time. */
 SELECT(sysmod-id,...) /* Select additional */
 /* service if required. */
 BYPASS(HOLDCLASS(ERREL,UCLREL)
 HOLDSYSTEM) .
/*
```

#### Notes:

1. If you have obtained additional APAR fixes or USERMODs, you should either specify each of these SYSMODs in the SELECT operand or, if **all** applicable APARs and USERMODs are to be installed, specify the APARS and USERMODS operands.
2. If you want to install preventive service only on selected functional areas of the system, you can also specify the FORFMID operand on the ACCEPT command, specifying either specific function identifiers (FMIDs) or the name of one or more FMIDSETs.

## **Installing PTFs that need special processing**

During the ACCEPT process, the considerations for special processing are the same as for the APPLY process (see “Installing PTFs that need special processing” on page 118).



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## Chapter 7. Installing corrective service

This chapter describes the steps for installing corrective service. It discusses these topics:

- An introduction to corrective service
- Building and checking a corrective service fix
- Preparing your system
- Staging the SYSMODs with the RECEIVE command
- Requesting corrective service with the RECEIVE ORDER command
- Updating the target libraries with the APPLY command
- Testing the corrective service
- Updating the distribution libraries with the ACCEPT command

---

### Introduction

Corrective service is the process of installing a SYSMOD to resolve a specific problem in your system. The problem has usually been brought to your attention because the system has not functioned as expected (for example, an abend has occurred, or jobs are not running as expected).

The first task is to investigate the problem, so that the failing component and module can be identified. *SMP/E Messages, Codes, and Diagnosis* provides helpful information on diagnosing and handling SMP/E problems. This can be done in conjunction with the IBM Support Center. SMP/E can help you work with the IBM Support Center to isolate and obtain a fix for the problem. Useful information includes:

- The function and service level of the module involved
- The service level of your system—that is, the specific SYSMODs that have been installed
- Any USERMODs involved
- The affected load modules

After determining the cause of the error, you want a fix for the problem. There are several possibilities:

1. The problem has already been reported, and a PTF has been created to fix the module. That PTF may not have been shipped on an ESO. If it has been shipped, you should have it in your shop (already received). If not, the IBM Support Center can help you get a copy of it, or you can use ShopzSeries and the RECEIVE ORDER command to order the PTF from the Automated Service Delivery server.
2. The PTF identified by the Support Center may have been received but not yet applied. Use the LIST command or the SMP/E Query dialog to check the status of the PTF.
3. The problem has been previously reported. No PTF has been created, but an APAR fix is available either to fix or to bypass the problem.
4. The problem is a new one, and no fix is available. In this case, you have to work with the IBM Support Center to construct a fix for your system.

No matter where you obtain the fix, the installation of that fix is said to be in corrective mode.

**Note:** You can use either the SMP/E dialogs or JCL jobs to build, receive, apply, and accept corrective service. The basic steps to follow are the same. If you have access to the SMP/E dialogs, you should use them. Otherwise, you can use the steps described in this chapter as examples.

## Building or checking the fix

If the fix is a PTF, either from a CBPDO, an ESO, the IBM Support Center, or the Automated Service Delivery server, you can assume that the construction of that fix is accurate and the material in this section is not applicable.

If the fix obtained is not a PTF, you should make sure it was constructed accurately. This is true even if the fix obtained from the IBM Support Center is already in SMP/E format (that is, you received a ++APAR type SYSMOD).

If you have to build the fix yourself, see *z/OS Packaging Rules* for rules for constructing APAR SYSMODs and *SMP/E Reference* for details on MCS syntax. (To get started, you might find Chapter 17, “Building a user modification,” on page 169 helpful.) The general format of all ++APAR fixes is:

```

++APAR(xxxxxxx) /* APAR identifier */.
++VER (srel) /* System identifier */.
 FMID(aaaaaaa) /* Functional area */.
 PRE (/* PRE some SYSMODs. */.
 bbbbbbb /* PRE RMID of element */.
 ccccccc ccccccc /* and any UMIDs present. */.
 ccccccc ccccccc /* */.
) /* */.
 SUP (/* SUP some SYSMODs. */.
 ddddddd ddddddd /* Fixes incorporated into */.
 ddddddd ddddddd /* this fix */.
) /* */.
++ZAP (modname) /* */.
 DISTLIB(eeeeeeee) /* DLIB name */.
... Some superzap cards here
or
++MACUPD (macname) /* */.
 DISTLIB(eeeeeeee) /* DLIB name */.
... Some IEBUPDTE cards here
or
++SRCUPD (srcname) /* */.
 DISTLIB(eeeeeeee) /* DLIB name */.
... Some IEBUPDTE cards here

```

You should perform the following checks to ensure the accuracy of the fix:

1. Make sure the value *xxxxxxx* in the ++APAR statement is equal to the APAR number associated with the problem you are fixing.
2. Make sure the system release value (SREL) in the ++VER statement matches one of those defined as an SREL subentry in the TARGETZONE entry for your target zone.
3. Make sure the FMID value *aaaaaaa* in the ++VER statement matches the FMID value in the appropriate element entry in your target zone. You can determine this value by listing the appropriate entry.
4. If the element entry in your target zone has an RMID value different from its FMID value, make sure it is a prerequisite of the APAR fix (that is, make sure the *bbbbbbb* value is accurate). If the RMID and FMID values are equal, the *bbbbbbb* value need not be specified.



5. If the element entry in your target zone has any UMID values, you should first make sure the fix itself was constructed so that it works correctly in that environment.

You should then make sure each of the UMID values is specified in the PRE operand in place of the *cccccc* values shown in the example. This is not absolutely required, but if it is not done, SMP/E issues warning messages during installation indicating that these SYSMODs may have an intersection with the one you are installing, and therefore may be regressed. Putting the UMID values in the PRE list suppresses these messages.

6. If this SYSMOD is to fix multiple problems, each of the additional APARs that are being fixed should be specified in the SUP operand (*dddddd* values in the example).
7. Make sure the name in the ++ZAP, ++MACUPD, or ++SRCUPD statement is correct.
8. Make sure the value *eeeeeee* specified in the DISTLIB operand matches the DISTLIB value in the target zone entry.

**Note:** The DISTLIB value is optional, but it is a good idea to specify it to make sure there is no mistake about which element you are dealing with.

Once you have made sure the SYSMOD is accurate, you are ready to start the actual installation process.

---

## Preparing your system

Corrective service is very different from the installation of a new function or preventive service.

- It usually affects a very limited area of the system.
- It is usually done because a severe problem is affecting the system.
- There is a need for an **immediate** fix.
- The fix usually takes little time to install.

Thus, there is usually no need or time to prepare the system by backing up packs, compressing libraries, and so on. If possible, it is a good idea to have a backup system available in case a problem does occur.

---

## Staging the SYSMODs: the RECEIVE process

After verifying that the corrective SYSMOD is syntactically correct and specifies the proper set of functions and PTFs, receive that SYSMOD (APAR or PTF) into the SMP/E database so you can install it into the target libraries.

Because corrective service requires a very small number of SYSMODs—often only one—the job of receiving it is very simple. You can use the SMP/E dialogs or the following sample job:

```
//RECEIVE JOB 'accounting info',MSGLEVEL=(1,1)
//RECEIVE EXEC SMPPROC
//SMPPTFIN DD ...points to input with SYSMOD
/* If you put the SYSMOD in a data set
/* refer to that data set.
/* If the SYSMOD is in card format
/* use "DD *" followed by the cards.
//SMPCTL DD *
SET BDY(GLOBAL) /* Set to global zone. */
RECEIVE SELECT(/* Receive selected SYSMODs.*/
 xxxxxx /* Specify SYSMOD number. */

```

## Corrective service

```
)
 SYSMODS
/*
/* Only process SMPPTFIN -
do not look at SMPHOLD. */
/*
```

**Note:** No source ID was assigned. This is because the SYSMOD is installed selectively in the APPLY step. If you want to assign a common value or tag the SYSMOD with some sort of identifier (such as programmer initials), you can use the SOURCEID operand.

If the input data set contains only the SYSMODs you are installing for this corrective service problem, you can omit the SELECT operand. SMP/E then attempts to process all the SYSMODs in the SMPPTFIN input data set.

---

## Generating a service request using the RECEIVE ORDER Command

You may order specific PTFs by name and you may order PTFs that resolve specific APARs. The package that results from such an order is tailored to your SMP/E environment and contains the PTFs you requested, plus any requisite PTFs if those requisites are not already present in your environment.

You can use the SMP/E dialogs or the following sample job:

```
//jobname JOB ...
//RECEIVE EXEC PGM=GIMSMP
//SMPCSI DD DSN=SMPE.GLOBAL.CSI,DISP=SHR
//SMPNTS DD PATH='/u/smpe/smpnts/',PATHDISP=KEEP
//SMPDOUT DD SYSOUT=*
//SMPRPT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SMPCNTL DD *
 SET BOUNDARY(GLOBAL).
 RECEIVE SYSMODS HOLDDATA
 ORDER(
 ORDERSERVER(ORDRSVR)
 CONTENT(
 PTFS(UQ12345,UQ98765)
)
 FORTGTZONES(ZOS14)
).
/*
//ORDRSVR DD *
<ORDERSERVER
 url="https://eccgw01.boulder.ibm.com/services/projects/ecc/ws/"
 keyring="MRWKYRNG"
 certificate="SMPE Client Certificate">
</ORDERSERVER>
/*
```

**Note:** An alternative url for the IBM Automated Delivery Request server is <https://eccgw02.rochester.ibm.com/services/projects/ecc/ws/>.

---

## Updating the target libraries: the APPLY process

After receiving the corrective service, you are ready to install it into the target libraries. You should not attempt to install the SYSMODs without first verifying them. If you have done all the proper checking before this time, the SYSMODs should be installed correctly. However, if you have overlooked something, the direct installation may cause unexpected results.

## Checking the update (APPLY CHECK)

The purpose of this job is to verify that the SYSMOD(s) can be installed correctly and that you understand what libraries and load modules in the system are affected. You can use the SMP/E dialogs or the following sample job to do an APPLY CHECK for corrective service:

```
//APPLY JOB 'accounting info',MSGLEVEL=(1,1)
//APPLYCHK EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */
APPLY SELECT(/* Install selected SYSMOD. */
 xxxxxxxx /* Specify SYSMOD name here.*/
) /* */
CHECK /* In check mode only. */
```

## Researching the APPLY CHECK reports

Review the reports from the check, looking for the following types of information:

- Were any error messages produced? If so, determine the cause and fix the problem.
- Will any SYSMODs be regressed? If so, determine how to resolve the problems.
- Are any other areas of the system affected?

**Using HOLDDATA to assist in identifying fixes:** If the SYSMOD you are installing is a PTF (obtained from a CBPDO, an ESO, or directly from the IBM Support Center), SMP/E may have some HOLDDATA stored applying to that PTF. If so, the reports will indicate all the reason IDs preventing PTF installation. You should use these reason IDs to determine what the errors are. This can be done by:

1. Listing the SYSMOD and MCS entries for the PTF.
2. Looking at the ++HOLD statements that are listed.
3. Using the COMMENT field in the ++HOLD statement to determine the cause of the error. If the COMMENT field is not present or does not describe the problem adequately, ask the IBM Support Center for further information.
4. Determining whether the error in the PTF is critical enough to stop it from being installed. Remember that you are trying to fix an existing problem; you may decide to install the PTF to fix that problem because the exposure is minimal.
5. If necessary, contact the IBM Support Center to obtain a corrective fix for the PTF. If, in the preceding step, you decided that the PTF should be installed immediately to fix your problem, you should perform this step at some later date.

## Getting additional SYSMODs

If the research of the APPLY CHECK reports discloses that additional SYSMODs are required, these should be obtained in the same manner as the original corrective SYSMOD.

## Updating the target library (APPLY)

Once the APPLY CHECK has run to your satisfaction, you are ready to install the fix using the SMP/E dialogs or the following sample job to apply the corrective service:

```
//APPLY JOB 'accounting info',MSGLEVEL=(1,1)
//APPLY EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */
APPLY SELECT(/* Install selected SYSMOD. */
```

```
 XXXXXXXX /* Specify SYSMOD name here.*/
) /* */
 /* Note no check operand. */.
```

---

## Testing the corrective service

The testing needed after you install a corrective fix depends on the type of problem you encountered. It may range from no testing to running the job in which the error was detected.

---

## Updating the distribution libraries: the ACCEPT process

Once you have installed the corrective service into the target libraries, you must decide whether you want to update the distribution libraries. You should base this decision on the products involved and on your processing requirements.

The following is a consideration for **not** accepting corrective service:

Corrective service has not been tested and, therefore, may be found to be in error at some later date. Once you have accepted the SYSMODs, there is no RESTORE capability.

The following are some of the considerations for **accepting** corrective service:

- If you do not accept the SYSMOD and you perform a system generation, all that service is lost and must be reinstalled.
- If you must restore a SYSMOD, the work required increases with the number of SYSMODs that have been applied but not accepted. All intersecting SYSMODs must be restored, and then all but the desired SYSMOD must be reapplied. This is especially true for source-modified products.

The following sections describe the steps you should use, assuming you have decided to accept some corrective service.

## Checking the update (ACCEPT CHECK)

The ACCEPT CHECK job provides the same function for the distribution libraries that the APPLY CHECK job provided for the target libraries. It is important because the function and service level of the modules in the distribution libraries may be different from that in the target libraries. You can use the SMP/E dialogs or the following sample job to do an ACCEPT CHECK for corrective service:

```
//ACCEPT JOB 'accounting info',MSGLEVEL=(1,1)
//ACCEPTCK EXEC SMPPROC
//SMPCNTL DD *
SET BDY(DLIB1) /* Set to DLIB zone. */.
ACCEPT SELECT(/* Install selected SYSMOD. */
 XXXXXXXX /* Specify SYSMOD name here.*/
) /* */
CHECK /* In check mode only. */.
```

## Researching the ACCEPT CHECK reports

You should research the ACCEPT CHECK reports in the same way as for the APPLY process (see “Researching the APPLY CHECK reports” on page 127).

**Using HOLDDATA to assist in identifying fixes:** If SMP/E reported any exception SYSMOD data during the APPLY CHECK process, you should expect to see the same information during the ACCEPT CHECK process. If you have

processed any HOLDDATA between the APPLY and ACCEPT, additional information may be reported. This information should be handled in the same manner as the APPLY information.

### Getting additional SYSMODs

If additional SYSMODs are required to ACCEPT the corrective service, you should obtain them in the same manner as the original corrective service SYSMOD.

**Note:** If you obtain additional SYSMODs, make sure you process them through the APPLY and test phases before accepting them.

## Updating the distribution library (ACCEPT)

Once the ACCEPT CHECK runs to your satisfaction, you are ready to accept the fix. Use the SMP/E dialogs or the following sample job to accept the corrective service:

```
//ACCEPT JOB 'accounting info',MSGLEVEL=(1,1)
//ACCEPT EXEC SMPPROC
//SMPCNTL DD *
SET BDY(DLIB1) /* Set to DLIB zone. */.
ACCEPT SELECT(/* Install selected SYSMOD.*/
 xxxxxxx /* Specify SYSMOD name here.*/
) /* */.
/* Note no check operand. */.
```

## Corrective service

---

## Chapter 8. Installing a user modification

This chapter describes the steps for installing a user modification (USERMOD). After an introduction to USERMODs, it describes the following processes:

- Preparing your system
- Staging the USERMOD with the RECEIVE command
- Updating the target libraries with the APPLY command
- Testing the USERMOD
- Updating the distribution libraries with the ACCEPT command

---

### Introduction

A USERMOD is a SYSMOD used to make a modification to some IBM-supplied software element (module, macro, source, or data element) to implement a new function or to provide a hook into a user program that provides that function.

A USERMOD should not be confused with an APAR SYSMOD (corrective fix), even if you built the initial version of that fix to fix a problem immediately. For a description of how to construct USERMODs, see Chapter 17, “Building a user modification,” on page 169. For details on the syntax of the MCS statements used in constructing USERMODs, see the *SMP/E Reference* manual. The *z/OS Packaging Rules* contains additional information on when a USERMOD should be used. The rest of this chapter assumes that you have properly constructed the USERMOD and are now ready to install it.

**Note:** You can use either the SMP/E dialogs or JCL jobs to receive, apply, and accept USERMODs. The basic steps to follow are the same. If you have access to the SMP/E dialogs, you should use them. Otherwise, you can use the steps described in this chapter as examples.

---

### Preparing your system

You must determine the amount of system preparation necessary for your USERMOD. If it is extensive and affects critical components of the system, you should perform the same tasks as defined under “Preparing your system” on page 102 or “Preparing your system” on page 112. If it is a minor change, affecting very few modules and not critical to the operation of the system, no preparation is needed.

---

### Staging the SYSMODs: The RECEIVE process

Because a USERMOD is generally processed as a single SYSMOD, processing is very similar to that for corrective service; that is, it is received by use of the SELECT option. Use the SMP/E dialogs or the following sample job to receive the USERMOD:

```
//RECEIVE JOB 'accounting info',MSGLEVEL=(1,1)
//RECEIVE EXEC SMPPROC
//SMPPTFIN DD ...points to input with your USERMOD
//* If you put the USERMOD in a data set
//* refer to that data set.
//* If the USERMOD is in card format
//* use "DD *" followed by the cards.
//* Create your data set in LRECL=80,
//* FB format.
```

## Installing USERMODs

```
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
RECEIVE SELECT(/* Receive selected SYSMODs.*/
 XXXXXXXX /* Specify USERMOD number. */
) /* */.
 SYSMODS /* Only process SMPPTFIN -
 do not look at SMPHOLD. */.
/*
```

**Note:** No source ID was assigned, because the SYSMOD is installed selectively in the APPLY step. If you want to assign a common value to all the USERMODs or tag each of them with some sort of identifier (such as programmer initials), you can use the SOURCEID operand.

If the input data set contains only USERMODs that you want to receive now, you can omit the SELECT operand. SMP/E then attempts to process all SYSMODs in the SMPPTFIN input data set.

---

## Updating the target libraries: The APPLY process

After receiving the USERMOD, you are ready to install it into the target libraries. You may be tempted to install the SYSMODs without first performing the verification pass. If you have constructed your USERMOD correctly, it should install correctly. However, if you have overlooked something, the direct installation may cause unexpected results. Thus, it is advisable to perform the verification pass.

### Checking the update (APPLY CHECK)

The purpose of this job is to verify that the SYSMODs are installed correctly and that you understand which libraries and load modules in the system are affected. Use the SMP/E dialogs or the following sample job to do an APPLY CHECK for the USERMOD:

```
//APPLY JOB 'accounting info',MSGLEVEL=(1,1)
//APPLYCHK EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */.
APPLY SELECT(/* Install selected SYSMOD.*/
 XXXXXXXX /* Specify SYSMOD name here.*/
) /* */.
 CHECK /* In check mode only. */.
/*
```

**Note:** At times, it may be necessary to reinstall a USERMOD—for example, after the installation of a PTF. If you are reinstalling it, the APPLY REDO operand is necessary. You may also have to specify one of the BYPASS operands; that depends on the relationship between your USERMOD and the PTF that was installed.

### Researching the APPLY CHECK reports

Review the reports from the APPLY CHECK process, looking at the following types of information:

- Were any error messages produced? If so, determine the cause and fix the problem.

A common error here is that the FMID specified on the ++VER modification control statement did not match the FMID value in the element entry; therefore, SMP/E does not select the element to be installed. This condition does not stop the USERMOD from being installed. However, messages are issued to say which elements were not selected.



- Will any SYSMODs be regressed? If so, determine how to resolve the problems.

## Updating the target library (APPLY)

Once the APPLY CHECK runs to your satisfaction, you are ready to install the USERMOD. Use the SMP/E dialogs or the following sample job to apply it:

```
//APPLY JOB 'accounting info',MSGLEVEL=(1,1)
//APPLY EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */
APPLY SELECT(/* Install selected SYSMOD.*/
 xxxxxxxx /* Specify SYSMOD name here.*/
) /* Note no check operand. */
/* Note no check operand. */
```

---

## Testing the USERMOD

The amount of testing needed after the installation of a USERMOD depends on the changes you are making. You may want to review the recommendations found under “Testing the new function” on page 106 and “Testing the new service level” on page 118.

When originally constructing your USERMOD, you may want to provide a document similar to a program directory, containing some of the following information:

- The elements affected.
- The areas within each element.
- Externals of the change.
- An IVP job that can be used to ensure that the USERMOD is working correctly. This can be used after subsequent preventive service is applied or if the USERMOD must be reinstalled because a new release of the IBM product is installed.

This information may be helpful to the next system programmer responsible for installing and maintaining your USERMOD.

---

## Updating the distribution libraries: The ACCEPT process

Once you have installed the USERMOD into the target libraries, you must decide whether you want to update the distribution libraries. While this decision is up to you, IBM generally does **not** recommend the accepting USERMODs, because if a problem is encountered in the modified modules, you may be asked to re-create the problem using an unmodified version. If you have accepted the USERMOD, you cannot create an unmodified version of the module unless you are also maintaining a separate set of distribution libraries without the USERMODs.

**Note:** You can use ++HOLD statements to prevent USERMODs from being accepted. For each USERMOD that you want to keep from being accepted, follow these steps after applying the USERMOD:

1. Create a ++HOLD statement with a user reason ID that you plan to use only for USERMODs that are not supposed to be accepted. Here is an example:

```
++HOLD(usermod) USER
REASON(NOUSERM)
COMMENT(do not accept this usermod).
```

## Installing USERMODs

2. Run the SMP/E RECEIVE command to read in the ++HOLD statement. Use the SMPHOLD DD statement to point to the file or data set containing the ++HOLD statement.

Because of the user hold, this USERMOD can be accepted only if you bypass the specific user reason ID. The SYSMOD will not be automatically accepted if you specify USERMOD or the specific SYSMOD ID on the ACCEPT command without bypassing the user reason ID.

Be aware that if you receive the ++HOLD statement before applying the USERMOD, you must bypass the user hold reason ID in order to apply the USERMOD.

---

## Chapter 9. Managing exception SYSMODs

This chapter explains how SMP/E manages SYSMODs that require special processing. It discusses these topics:

- An introduction to exception SYSMODs
- What SMP/E does with HOLDDATA
- Sources of HOLDDATA
- Steps for processing the data

---

### Introduction

Most SYSMODs you receive from IBM can be installed without additional considerations; you can simply receive, apply, and then accept them. For some SYSMODs, however, this is not possible. Examples of such SYSMODs are:

- SYSMODs that were sent out to correct a problem but that either have not fixed the problem or have introduced a new problem. These are called *PTFs in error*, or *PE PTFs*.
- SYSMODs that require special installation processing, such as a fix that must be concurrently installed on all processors in a network.
- SYSMODs that introduce changes into the system that you should be made aware of, such as changes to operator messages or critical documentation changes.

In SMP/E terms, these SYSMODs are called *exception SYSMODs*. SMP/E supplies a function to automate the management of exception SYSMODs. SMP/E supports three categories of exception SYSMODs:

- **Error.** PTFs in error (PE PTFs).
- **System.** SYSMODs identified by IBM as requiring special processing or notification.
- **User.** Any SYSMODs that you identify as requiring special processing.

Two MCSs are used to manage exception SYSMODs:

- ++HOLD puts a SYSMOD into exception status.
- ++RELEASE removes a PE PTF from exception status when it has been determined that the PTF was held erroneously.

++HOLD statements for system holds are usually built as part of the held PTF. ++RELEASE statements and ++HOLD statements for error or user holds must be in SMPHOLD. ++HOLD and ++RELEASE statements provided by SMPHOLD (external holds) identify the following:

- The SYSMOD ID of the exception SYSMOD (that is, the SYSMOD being held).
- The exception SYSMOD category.
- The FMID to which that ++HOLD applies.
- The reason the SYSMOD is being put into or was in exception status. This is a 1-to 7-character alphanumeric string called the *reason ID*.
  - For **error**-category exception SYSMODs, SMP/E expects the reason ID to be the SYSMOD ID of the APAR reporting the problem.
  - For **system**-category exception SYSMODs, SMP/E expects the reason ID to be a short description of the action required.

## Exception SYSMODs

- For **user**-category exception SYSMODs, SMP/E makes no assumption about what the reason ID represents.

For more information about reason IDs, see the *SMP/E Reference* manual.

- Text describing why the SYSMOD is being put into exception status. This field is only for ++HOLD statements.
- An alternative way to release the exception SYSMOD. This field is only for ++HOLD statements.

Every ++HOLD statement specifies a HOLD category of ERROR, SYSTEM, or USER. In addition to one of these categories, a ++HOLD statement may include a HOLD CLASS, which is an alternative way to release a held SYSMOD. For example, an exception SYSMOD may fix a problem more severe than the problem it introduces. The ++HOLD statement for that SYSMOD would have an ERROR reason ID that matches an APAR ID and a CLASS of ERREL.

++HOLD statements provided within a SYSMOD identify the same information. However, even though these internal holds are effective against the containing SYSMOD, the SYSMOD ID specified on the hold may be different from that of the containing SYSMOD, as long as the SYSMOD ID specified on the hold is superseded by the containing SYSMOD.

SMP/E then manages exception SYSMODs by actually managing the resolution of the problems described by the reason ID specified on the ++HOLD statement.

Subsequent sections of this chapter describe how SMP/E uses HOLDDATA during the installation of a SYSMOD, where the exception SYSMOD statements come from, and how to process them. The chapters on the RECEIVE command, the APPLY command, and the ACCEPT command in *SMP/E Commands* contain a much more detailed explanation of the material covered here.

---

## What SMP/E does with the HOLDDATA

This section describes what SMP/E does with the HOLDDATA when processing the various commands associated with installing and removing SYSMODs.

**Note:** You must provide SMP/E with the most current HOLDDATA possible to get the most benefit from this support.

### Initial entry into staging data sets: RECEIVE

The RECEIVE command tells SMP/E to take the HOLDDATA from the input data set on which it was delivered and store it in the SMP/E database.

The two operands that control input processes are:

- **SYSMOD**, which tells SMP/E to process the SYSMODs from the data set specified by the SMPPTFIN DD statement
- **HOLDDATA**, which tells SMP/E to process the HOLDDATA (++HOLD and ++RELEASE statements) from the data set or file in a UNIX file system specified by the SMPHOLD DD statement

You can specify one or both operands on the RECEIVE command. If neither operand is specified, SMP/E attempts to receive the SYSMODs from SMPPTFIN, and HOLDDATA from SMPHOLD.

When receiving a SYSMOD, SMP/E creates two entries:

1. An MCS entry is created on the SMPPTS. This entry is a copy (possibly compacted) of the SYSMOD as it appeared in the SMPPTFIN data set.
2. A SYSMOD entry is created in the global zone. This entry contains information that describes the installation requirements and element content of the SYSMOD.

When receiving the HOLDDATA, SMP/E also creates (or modifies) two entries:

1. A HOLDDATA entry is created (or modified) in the global zone. This entry is an exact copy of the ++HOLD statements as they appeared in SMPHOLD. The name of the entry is the ID of the SYSMOD affected by this ++HOLD statement. The HOLDDATA entry for a single SYSMOD can contain multiple ++HOLD statements.

**Note:** When a ++RELEASE statement is processed, SMP/E removes the corresponding ++HOLD statement from the HOLDDATA entry. When all ++HOLD statements are removed, the HOLDDATA entry is automatically deleted.

2. A SYSMOD entry is created (or modified) in the global zone. This entry contains information that describes the exception SYSMOD conditions.

For each ++HOLD statement processed, SMP/E updates the global zone SYSMOD entry to add a HOLD reason ID subentry. There are three types of HOLD reason ID subentries, HOLDERROR, HOLDSYSTEM, and HOLDUSER, corresponding to the three categories of exception SYSMODs.

**Note:** When a ++RELEASE statement is processed, SMP/E removes the corresponding reason ID from the global zone SYSMOD entry. Do not use the ++RELEASE statement to install a SYSMOD with an unresolved reason ID. Use the appropriate BYPASS operand instead.

## Updating target libraries: APPLY

When SMP/E applies a SYSMOD, SMP/E checks to see if that SYSMOD is currently in exception SYSMOD status by seeing if there are any HOLD reason ID subentries in the global zone SYSMOD entry. If so, SMP/E makes sure each reason ID is resolved before allowing the SYSMOD to be installed.

For an error reason ID to be resolved, **at least one** of the following conditions must be met:

- The reason ID must be superseded by another SYSMOD being installed.
- The reason ID must already exist as a SYSMOD entry in the target zone.
- You must specify BYPASS(HOLDERROR) on the APPLY command to show that you are aware that an unresolved exception SYSMOD is being installed.
- If there is a HOLD CLASS associated with the reason ID, you can specify BYPASS(HOLDCLASS) on APPLY to indicate that you are using an alternative way to resolve the reason ID.

See the BYPASS operand in The APPLY Command in *SMP/E Commands* for additional information.

Internal holds are considered resolved if any of the following conditions are met:

- The SYSMOD ID specified on the ++HOLD defining the exception is found as a SYSMOD entry in the target zone
- The SYSMOD ID specified on the ++HOLD defining the exception is being superseded by a SYSMOD being applied concurrently

## Exception SYSMODs

- The applicable BYPASS operand is specified.

You can resolve external system and user reason IDs by specifying BYPASS(HOLDSYSTEM) or BYPASS(HOLDUSER) on the APPLY command. If there is a HOLD CLASS associated with the reason ID, you can specify BYPASS(HOLDCLASS) on APPLY to indicate that you are using an alternative way to resolve the reason ID.

If you choose to resolve a reason ID by using the BYPASS operand, you must do any required processing at the appropriate time. Otherwise, errors related to the undone processing may occur, even though the reason ID was considered resolved.

**Note:** You may use the ++RELEASE statement for user category reason IDs if you want to unconditionally release the SYSMOD for all systems. Remember that, unlike BYPASS, ++RELEASE actually deletes the ++HOLD statement. If you plan to use the user category ++HOLD statement, see the *SMP/E Reference* manual for more information on the naming conventions for reason IDs.

If all reason IDs are resolved, SMP/E allows the SYSMOD to be applied. If any remain unresolved, SMP/E prevents the SYSMOD, and any other SYSMODs dependent on this one, from being installed.

SMP/E leaves the reason IDs in the global zone SYSMOD entry when the SYSMOD is applied, so if the SYSMOD is applied on another system later, the same checking is done on that system. If the information had been deleted during the first APPLY, SMP/E would not recognize the problem when the SYSMOD is applied to subsequent systems. Therefore, the ++RELEASE statement **should not be used** to install an exception SYSMOD with an unresolved reason ID. The appropriate BYPASS operand should be used instead.

In summary, SMP/E ensures that no known problems are introduced into your system by managing those problems at the level of the individual problem, rather than the SYSMOD level. It is, therefore, very important that SMP/E have the most current information on exception SYSMODs. For more information on the importance of having current HOLDDATA and what you **must do** to provide that information to SMP/E, see “How to process HOLDDATA” on page 140.

## Updating distribution libraries: ACCEPT

Exception SYSMOD processing is the same when accepting a SYSMOD as when applying one, except that the appropriate distribution zone is used to determine whether the fixes for the reason IDs have been installed.

## Removing HOLDDATA from SMP/E data sets

There are various ways to remove HOLDDATA from SMP/E data sets.

### After a successful ACCEPT

When accepting a SYSMOD, if SMP/E determines that the global zone SYSMOD entry and the SMPPTS MCS entry are to be deleted, SMP/E deletes any HOLDDATA associated with those SYSMODs. Once the SYSMOD and MCS entries for a SYSMOD have been deleted, you will probably not install that SYSMOD on any other systems, so you would not need the HOLDDATA again.

### During RESTORE processing

HOLDDATA is never deleted during RESTORE processing. The assumption is that you may later want to reapply the SYSMODs you are restoring.

### With the REJECT command

If you are using the SMPPTS as a history file of all SYSMODs, you may eventually want to purge some of those SYSMODs. To do this, use the REJECT command. You can use the HOLDDATA operand to have SMP/E delete not only the global zone SYSMOD and SMPPTS MCS entries, but also any associated HOLDDATA.

---

## Sources of HOLDDATA

Besides the data you create, these are the main sources of HOLDDATA provided by IBM:

- CBPDO tapes
- Expanded service options (ESO) tapes
- Preventive service planning (PSP) information
- IBM service web pages
- Automated Service Delivery server as a result of a RECEIVE ORDER command

This section describes these sources.

### CBPDO tapes

One of the primary means of obtaining HOLDDATA is CBPDO tapes. IBM custom-builds these tapes to provide the products and service you request, taking into consideration whether this is your first CBPDO order.

- If you select a particular service level, you get HOLDDATA for all service from that level to the current level.
- If you do not select a service level and this is your first CBPDO order, you get HOLDDATA for all the service shown on the order checklist.
- If you do not select a service level and you have ordered a CBPDO before, you get HOLDDATA for service following the last service level that was shipped in your previous CBPDO.

The HOLDDATA on a CBPDO tape has been customized to your product set. That is, it contains only data applicable to PTFs for those products **within a given feature** for which you are licensed under a single customer number. However, it does not reflect the contents of any specific system within the establishment defined by that customer number.

The HOLDDATA on the CBPDO tape should be processed immediately on receipt of the tape. You can use either the SMP/E dialogs or the RIMLIB jobs provided with the CBPDO tape to receive the HOLDDATA. For more information, see the documentation that came with the CBPDO tape.

### ESO tapes

Another way to obtain HOLDDATA is through ESO tapes. IBM regularly creates the service levels shipped on these tapes, then custom-builds ESOs for users and makes the tapes available through either subscription orders or special request orders.

The HOLDDATA on an ESO tape has been customized to your product set. That is, it contains only data applicable to PTFs for those products **within a given feature**



## Exception SYSMODs

for which you are licensed under a single customer number. However, it does not reflect the contents of any specific system within the establishment defined by that customer number.

The HOLDDATA on the ESO should be processed immediately on receipt of the tape. For more information on processing the ESO, see “Processing HOLDDATA from an ESO” on page 142 and “Example of processing HOLDDATA” on page 144.

## PSP information

Once a service level has been created, there is no further opportunity to change the HOLDDATA on that tape, even though new errors are reported. It is, however, important that you have this error information when you are about to install a CBPDO or an ESO. Otherwise, you may direct SMP/E to install a PE PTF, thus introducing a problem while fixing one. To solve this problem, PSP files have been set up to hold this additional HOLDDATA. Within each SREL, there is one PSP file for each service level.

When a service level is created, a PSP file is also created. As problems (APARs) are reported, appropriate ++HOLD statements are added to the applicable PSP files. IBM determines the applicable PSP files as follows:

1. Determine the PTF that introduced the APAR.
2. If the PTF is not yet assigned a monthly service level, add a ++HOLD statement to the CORPE PSP file as well as the most current monthly bucket.

**Note:** The CORPE PSP file is for PE PTFs available correctively, but not yet assigned to a monthly service level. The current monthly bucket will contain ++HOLD statements for corrective service PTFs as well as those assigned to a monthly service level.

3. If the PTF is available on a service level, determine the service level on which that PTF was first shipped.
4. Add a ++HOLD statement to the PSP file corresponding to that service level.
5. Add a ++HOLD statement to each PSP file corresponding to any service levels shipped after the one determined in the previous step, up to the current service level.
6. Add a ++HOLD statement for the next service level.
7. No further PSP files are updated.

Before installing a CBPDO tape, an ESO tape, or PTFs in corrective mode, use IBMLINK or contact the IBM Support Center to get the information in the applicable PSP file. For more information on how to use the PSP information, see “Processing HOLDDATA from PSP files” on page 143 and “Example of processing HOLDDATA” on page 144.

## Automated service delivery package

Another method of obtaining HOLDDATA is from an Automated Service Delivery server by issuing a RECEIVE ORDER command. Whether you use the RECEIVE ORDER command to obtain preventive service or corrective service, you automatically receive the last 2-years of Enhanced HOLDDATA for the entire z/OS software platform.

## How to process HOLDDATA

The management of exception SYSMODs is a very important part of SMP/E. SMP/E's ability to manage exception SYSMODs, however, is limited by the quality



and timeliness of the HOLDDATA made available to it. To gain the full advantage of this function, you must understand how SMP/E expects the three HOLDDATA input sources to be used and the times during which SMP/E expects them to be used.

The following steps summarize the process for managing exception SYSMOD data:

1. Receive all new products as you get them, or use UCLIN to add the FMIDs of the new products to the global zone. This allows you to process exception SYSMODs for them. Then receive any associated HOLDDATA shipped with the product.
2. Receive HOLDDATA from subsequent CBPDO or ESO tapes **in service level order**. Remember to do the following:
  - Receive all new products as you get them so you can process exception SYSMODs for them.
  - Receive HOLDDATA as soon as you get your CBPDO or ESO tapes.
3. Before doing preventive service, do the following:
  - a. Get the PSP file associated with the last service level for which you processed HOLDDATA, and receive this additional HOLDDATA for your products.
  - b. Get the CORPE PSP file. This contains PE PTFs that are available correctively, but are not yet available in a service level.
  - c. List and review HOLDDATA for SYSTEM HOLDS and, if possible, handle the required special conditions. Then apply and accept these processed SYSMODs by specifying BYPASS(HOLDSYS) and listing the individual SYSMOD IDs on the SELECT operand. This helps make sure all available service is installed when you do preventive service.

Be sure to review “Example of processing HOLDDATA” on page 144. This example shows why you should follow the procedures defined.

### Processing HOLDDATA from a CBPDO tape

When you receive a CBPDO tape, the HOLDDATA it contains is based on the service level you selected and on whether this is your first CBPDO. This HOLDDATA pertains both to the PTFs actually on that tape and to PTFs shipped on previous tapes. Follow these steps to process the HOLDDATA:

1. Receive the HOLDDATA from the CBPDO tape **as soon as you get the tape**. Use the SMP/E dialogs or the RIMLIB job provided with the CBPDO tape.  
By receiving the HOLDDATA as soon as possible, you make sure SMP/E has the most current information available. Therefore, if you try to install any PTF in response to a problem on your system and that PTF is in error, SMP/E knows this and warns you so you can weigh the effect of installing the known problem against the effect of fixing the problem you have encountered.
2. Receive the SYSMODs from the CBPDO tape **as soon as you get the tape**. Use the SMP/E dialogs or the RIMLIB job provided with the CBPDO tape.  
This makes sure that all available PTFs are ready to be installed. If you find a problem in your system and determine that a PTF must be installed in corrective mode, you have a better chance of having that PTF and all its requisites readily available on the SMPPTS.

**Note:** You can receive the SYSMODs and HOLDDATA separately or in the same job.

## Exception SYSMODs

By following these procedures, you are essentially making a trade-off: system resources as increased DASD space for the SMPPTS against the time the system programmer would spend on searching for the service level with the required PTF and on fixing problems caused by installing PE PTFs.

One important part of this procedure is that the HOLDDATA on each CBPDO and ESO **must be received in chronological order**. SMP/E processes the ++HOLD and ++RELEASE statements in the order in which they are encountered. Therefore, there can be an exposure if you receive the data out of sequence. For instance, the tapes may be set up so that one contains a ++HOLD for a PTF and a subsequent one contains a ++RELEASE for the same PTF. If the tapes are processed in the wrong order, the RELEASE statement is processed first, and then the HOLD statement. As a result, the PTF remains held.

### Processing HOLDDATA from an ESO

When you receive your expanded service options (ESO) tape, the HOLDDATA it contains pertains both to the PTFs actually on that tape and to PTFs shipped in previous service levels. SMP/E and exception SYSMOD support have been designed to work most efficiently and effectively if you adhere to the following processing guides:

1. Receive the HOLDDATA file of the ESO **as soon as you get the tape** using the SMP/E dialogs or the following sample job:

```
//RECHOLD JOB 'accounting info',MSGLEVEL=(1,1)
//RECEIVE EXEC SMPPROC
//SMPHOLD DD ...data describing exception file
//SMPCTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
RECEIVE HOLDDATA /* Receive only exception
 SYSMOD data. */.

/*
```

By receiving the HOLDDATA as soon as possible, you make sure SMP/E has the most current information available. Therefore, if you try to install any PTF in response to a problem on your system and that PTF is in error, SMP/E knows this and warns you so you can balance the effect of installing the known problem against the effect of fixing the problem you have encountered.

2. Receive the SYSMOD file of the ESO **as soon as you get the tape** using the SMP/E dialogs or the following sample job:

```
//RECPTFS JOB 'accounting info',MSGLEVEL=(1,1)
//RECEIVE EXEC SMPPROC
//SMPPTFIN DD ...data describing sysmods file
//SMPCTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
RECEIVE SYSMODS /* Receive only SYSMODs. */.
 SOURCEID(MYESO) /* Specify user-defined
 source ID value. */.
LIST SYSMODS /* Now list the SYSMODs */.
 MCS /* including SMP MCS */.
 SOURCEID(MYESO) /* for those SYSMODs just
 received. */.

/*
```

This makes sure that all available PTFs are ready to be installed. If you find a problem in your system and determine that a PTF must be installed in corrective mode, you have a better chance of having that PTF and all its requisites readily available on the SMPPTS.

**Note:** The SOURCEID operand is optional. All PTFs in an ESO are assigned SOURCEID values by ++ASSIGN statements.

Although the procedures for receiving the SYSMOD and the HOLDDATA file are shown as separate jobs, they can be done in one RECEIVE command by specifying both the SYSMODS and HOLDDATA operands. In fact, this is the preferred method and is the default if neither operand is specified.

By following these procedures, you are essentially making a trade-off: system resources as increased DASD space for the SMPPTS against the time the system programmer would spend on searching for the service level with the required PTF and on fixing problems caused by installing PE PTFs.

One important part of this procedure is that the HOLDDATA on each ESO and CBPDO **must be received in chronological order**. SMP/E processes the ++HOLD and ++RELEASE statements in the order in which they are encountered. Therefore, there can be an exposure if you receive the data out of sequence. For instance, the tapes may be set up so that one contains a ++HOLD for a PTF and a subsequent one contains a ++RELEASE for the same PTF. If the tapes are processed in the wrong order, the RELEASE statement is processed first, and then the HOLD statement. As a result, the PTF remains held.

### Processing HOLDDATA from PSP files

Another source of exception SYSMOD data is the PSP file, available through IBMLINK or from the IBM Support Center. For each service level that is applicable to a specific environment, there is a PSP file containing additional HOLDDATA. This file contains all the ++HOLD and ++RELEASE statements applicable to PTFs on either that service level or earlier ones. You should process this PSP file before you install an ESO or before you install a CBPDO tape that includes PTFs from that service level.

When you are ready to install a CBPDO or ESO, you must do the following:

1. Make sure you have received the HOLDDATA from, at minimum, all the CBPDOs and ESOs up to the service level of the tape you are installing. You should receive the HOLDDATA from **all the available tapes** to reduce the amount of data that you have to get from PSP.
2. Use IBMLINK or contact the IBM Support Center to get the latest CORPE PSP file, as well as the PSP file associated with the **latest service level for which you have received HOLDDATA** (not the PSP file for the service level that you are installing).
3. Create a data set containing the ++HOLD statements obtained from IBMLINK or the IBM Support Center.
4. Receive that data set using the SMP/E dialogs or the following sample job.

```
//RECHOLD JOB 'accounting info',MSGLEVEL=(1,1)
//RECEIVE EXEC SMPPROC
//SMPHOLD DD ...data describing your data set
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
RECEIVE HOLDDATA /* Receive only exception
 SYSMOD data. */.
/*
```

You should also use IBMLINK or contact the IBM Support Center to get PSP information whenever you are installing corrective service. Before installing a PTF in corrective mode, determine the service level on which it was initially shipped. Then contact the IBM Support Center to get the PSP data associated with that service level to determine whether there are any ++HOLD statements for that PTF. If so, process them and install the PTF.

**Example of processing HOLDDATA**

Assume you are ready to actually install a CBPDO or ESO. The following example may help you understand the reasons behind the recommendations made in this chapter. In this example:

1. Table 12 on page 144 shows information on exception SYSMODs. The PTFs and PSP files are as follows:
  - a. Column 1 lists the three service levels involved in this example.
  - b. Column 2 lists the five SYSMODs in each service level.
  - c. Column 3 lists the ++HOLD statements contained on the CBPDO or ESO.  
For simplicity, there are no PE PTFs before the first service level in the example (PUT0301). The exact syntax and APAR numbers for the ++HOLD are not significant for this example.
  - d. Column 4 lists the ++HOLD statements contained in the PSP file associated with each of the service levels. The exact syntax and APAR numbers for the ++HOLD are not significant for this example.
2. The SYSMODs have been marked PE as follows:
  - As of the 0301 service level, there were no PTFs in error.
  - Between the 0301 and the 0302 service levels, PTFs UR00002 and UR00003 were marked as PE.
  - Between the 0302 and the 0303 service levels, PTF UR00005 was marked PE.
  - At the 0303 service level, PTF UR00001 was marked as PE.
3. Table 12 shows the contents of each of the files at some time after the creation of the 0303 service level.

*Table 12. CBPDO/service level/PSP HOLDDATA example*

| Service level | PTFs per Service level                              | PTFs with HOLDDATA | HOLDDATA in PSP File for the source ID Service level |
|---------------|-----------------------------------------------------|--------------------|------------------------------------------------------|
| PUT0301       | UR00001<br>UR00002<br>UR00003<br>UR00004<br>UR00005 |                    | UR00001<br>UR00002<br>UR00003<br>UR00005             |
| PUT0302       | UR00006<br>UR00007<br>UR00008<br>UR00009<br>UR00010 | UR00002<br>UR00003 | UR00001<br>UR00005                                   |
| PUT0303       | UR00011<br>UR00012<br>UR00013<br>UR00014<br>UR00015 | UR00005            | UR00001                                              |

4. You are now trying to install PTFs at service level 0301. The amount of processing you have to do before installing 0301 service level PTFs depends on what you did with PTFs in 0302 and 0303 service levels.
  - If you have received the HOLDDATA for service levels 0301, 0302, and 0303, you have to process only the one ++HOLD statement for PTF UR00001 from the PSP file for service level 0303.

- If you have received only the HOLDDATA for service level 0302, you have to process the two ++HOLD statements for PTFs UR00001 and UR00005 from the PSP file for service level 0302.
- If you decided not to process any data for particular service levels until you are actually ready to install them (that is, if you did nothing with service level 0302 or 0303), you have to process the four ++HOLD statements for PTFs UR00001, UR00002, UR00003, and UR00005 from the PSP file for service level 0301.

**Note:** In each case, you used the PSP file associated with the last service level for which you received the HOLDDATA, but if you had kept current in processing the exception SYSMOD files from the service levels, you would have had less information to obtain from the IBM Support Center.

In this example, the number of PTFs and HOLDDATA was small and, thus, the data seems manageable. However, with a real service level with hundreds of PTFs, the amount of manual work involved in getting the ++HOLD statements from IBMLINK or the IBM Support Center, and then keying them into a data set and receiving them could be very time-consuming. So, the cost of the increased DASD space necessary to store the HOLDDATA each month is commonly paid back in increased programmer productivity when the service level is to be installed.

## Exception SYSMODs

---

## Chapter 10. Creating cross-product, cross-zone load modules: The LINK MODULE command

This chapter discusses the LINK MODULE command, with an emphasis on when and how to use it.

---

### When to use LINK MODULE

Products sometimes contain modules from other products. For example, a product may need to:

- Include another product's modules in its load modules. In this case, as long as the two products are in the same zone, SMP/E can automatically include the required modules in the load modules that need them (if the modules reside in the target library as single-CSECT load modules). SMP/E also tracks the inclusion of these cross-product modules in the load modules.
- Update another product's load module with one of its modules. In this case, as long as the two products are in the same zone, SMP/E can automatically relink the load module and include the supplied module. SMP/E also tracks the inclusion of the modules in the cross-product load module.

However, when such products reside in different zones, SMP/E cannot automatically perform the cross-zone link-edits. The LINK MODULE command can be used to perform these cross-zone link-edits as postinstallation steps within SMP/E control. The LINK MODULE command causes the required load modules in one zone to be linked with modules residing in another zone, and tracks this inclusion so that subsequent APPLY and RESTORE processing can automatically maintain the affected load modules.

#### Notes:

1. When SMP/E processes the LINK MODULE command, it assumes that adding the desired modules to the load modules does not require any changes to the load module definition (that is, the linkage editor control statements or linkage editor attributes). If any such changes are needed, make them through JCLIN before using the LINK MODULE command.
2. For the LINK MODULE command, the SET BOUNDARY command must specify the target zone that contains the LMOD entries for the load modules to be link-edited.
3. There are times when the LINK MODULE command is **not** appropriate to use—generally, for products that are written in a high-level language and, as a result, include modules from libraries (such as compiler libraries) owned by a different product. Your options for installing such a product depend on how the product was packaged.
  - SYSLIB DD statements are used in link-edit steps in order to implicitly include the necessary modules.

In this case, when you install the product, the implicitly-included modules are automatically linked into the load modules. If the libraries containing those modules are updated, you can use the LINK LMODS command to rebuild the affected load modules. For more information, see the LINK LMODS chapter in *SMP/E Commands*.



- No SYSLIB DD statements are used in link-edit steps in order to implicitly include the necessary modules. In this case, you must use postinstallation link-edit steps outside of SMP/E.

---

## How to use LINK MODULE

Assume you have installed GDDM and CICS, and some of the GDDM modules must be linked into CICS load modules. GDDM resides in zone GDDTZN, and the zone controlling CICS is CICTZN. Because GDDM and CICS are controlled by different zones, SMP/E does not automatically link the GDDM modules into the CICS load modules when GDDM is installed. The LINK MODULE command can be used instead.

In this example, GDDM module ADMABCD needs to be linked into CICS load module DFHWXYZ. Module ADMABCD is installed in a target library as a single-CSECT load module when GDDM is installed. Therefore, SMP/E can use the target library version of ADMABCD to update CICS load module DFHWXYZ. (If a module does not reside in a target library as a single-CSECT load module, SMP/E uses the related distribution zone copy of the module to update the load module.)

The following commands can be used to have SMP/E install and track the installation of GDDM module ADMABCD in the CICS load module:

```
SET BDY(CICTZN) /* Target zone for CICS. */.
LINK MODULE(ADMABCD) /* Link module ADMABCD */.
 FROMZONE(GDDTZN) /* residing in zone GDDTZN */.
 INTOLMOD(DFHWXYZ) /* into load module DFHWXYZ. */.
```

These commands cause GDDM module ADMABCD to be linked into CICS load module DFHWXYZ. SMP/E also adds cross-zone subentries to the affected entries:

- An XZLMOD subentry is added to the ADMABCD MOD entry in target zone GDDTZN so that if ADMABCD is updated, it can be automatically replaced in the CICS load module.

**Note:** The CICS load module is automatically updated **only** if the XZLINK subentry was previously set to AUTOMATIC in the TZONE entry for zone CICTZN. Here is an example of the commands that can be used to do this:

```
SET BDY(CICTZN) /* Target zone for CICS. */.
UCLIN.
ADD TZONE(CICTZN) /* Update TZONE entry */.
 XZLINK(AUTOMATIC). /* to do automatic links. */.
ENDUCL.
```

- An XZMOD subentry is added to the CICS DFHWXYZ LMOD entry in target zone CICTZN to indicate that:
  - DFHWXYZ now contains ADMABCD.
  - Any updates for ADMABCD should be accepted **only** from zone GDDTZN.
- TIEDTO subentries are added to the TZONE entries for CICTZN and GDDTZN to indicate that there is a relationship between modules and load modules in these zones.

For more information on the LINK MODULE command and cross-zone updating during APPLY and RESTORE processing, see the LINK MODULE chapter in *SMP/E Commands*.



---

## Chapter 11. Displaying the data managed by SMP/E: The LIST command

This chapter discusses the LIST command. After an introduction, it discusses these topics:

- Listing all the SMP/E data
- Listing by specific entry type
- Listing specific entries
- Listing by FMID or FMIDSET
- Listing to compare two zones

---

### Introduction

The SMP/E database contains much information that is useful to you at certain times. For instance, when a problem is encountered in your system:

- You need to know the functional and service level of the module with the error.
- You may also want to know when that module was last changed: a recent change may have caused the problem.
- After reporting the problem, you can start working with the IBM Support Center to debug the problem. They may want to know the status of other specific PTFs: have you installed them; are they available on your system; is anything stopping them from being installed?
- After identifying the problem in the module, you may want to know whether any other parts of the system are affected by that module.

All of this information is available in the SMP/E database. You can obtain the information by using the SMP/E dialogs as you debug the problem. You can also use the SMP/E LIST command to create hardcopy listings of the information.

With the LIST command, you can display all entries of a specified type or specific entries. The following sections demonstrate the flexibility of the LIST command. For a complete description of all the LIST command operands, see The LIST Command in *SMP/E Commands*.

---

### Listing all the SMP/E data

If you encounter a problem with your system, the SMP/E data describing that system can be very important in diagnosing the problem. This information can be obtained by using the SMP/E dialogs during the debugging process. However, if the system is not running, the information is not available unless you have periodically listed the SMP/E data for the system.

Therefore, it is advisable to list all the data for each of your systems and save the hardcopy listing. The data can be listed by individual zone. The following is an example of a job for listing all the entries in zone TGT01.

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT01) /* Set to desired zone. */
LIST /* List all entries */
```

## LIST command

```

XREF /* with XREF option to show
 additional relationships
 between entries. */.
/*
```

Because the global zone contains data used to process each of the target zones and distribution zones, you may want to list that data more often. The following job lists all the data in the global zone, including the SYSMOD entries and the MCS entries:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
LIST /* List all entries. */.
/*
```

If you do not require a listing of the SYSMOD and MCS entries, you can use the LIST operands that enable you to list only specific entry types. For additional information, see “Listing by specific entry type.”

SMP/E also provides support to list all the entries for all the zones defined in the GLOBALZONE entry. This enables you to display all data for all systems with one SMP/E command. Here is an example of this option:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
LIST /* List all entries */.
 ALLZONES /* for all zones. */.
/*
```

### Notes:

1. The ALLZONES operand should be used with caution; it may produce a large amount of output.
2. This function can also be qualified by other LIST operands to limit the entries listed from each zone. For example, the following job will list only the SYSMOD entries from all zones:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
LIST SYSMOD /* List the SYSMOD entries */.
 ALLZONES /* for all zones. */.
/*
```

---

## Listing by specific entry type

At times, you may need to have a listing of all entries of a certain type. For example:

- You may want to display all the DDDEF entries for a particular target zone or distribution zone.
- You may want to list all the OPTIONS and UTILITY entries in the global zone so you do not duplicate an existing entry.
- You may want to list all ORDER entries in the global zone.

SMP/E supports various operands on the LIST command that you can use to list all the entries for one or more entry types. The following job shows how to use the DDDEF, OPTIONS, UTILITY, and ORDER operands on the LIST command to do this:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone */.
LIST DDDEF /* List all DDDEF entries. */.
/* */.
SET BDY(DLIB1) /* Set to DLIB zone */.
LIST DDDEF /* List all DDDEF entries. */.
/* */.
SET BDY(GLOBAL) /* Set to global zone. */.
LIST OPTIONS /* List all options */.
 UTILITY /* and utility entries. */.
 ORDER(ORD000034,ORD000035) /* List details for orders */.
/* */.
/* */.
/* */.
```

For a complete list of all the operands corresponding to the various entry types, see The LIST Command in *SMP/E Commands*.

**Note:** Not all entry types are valid for each zone type. For example, requesting a listing of the OPTIONS entries in a target zone results in an error, because OPTIONS entries exist only in the global zone. For a summary of the types of entries contained in each type of zone, see Table 2 on page 59 and Table 3 on page 60.

Sometimes, the various entry-type operands can be further qualified to process only a subset of all existing entries. The most common type for which this can be done is the SYSMOD entries. There are numerous operands to qualify SYSMOD entries. The LIST Command in *SMP/E Commands* describes all of them in detail.

One of the most common uses of this function is to determine the functions (or FMIDs) that have been installed. The following job can be used to list:

- The function SYSMODs installed on TGT1
- Those PTFs that have been applied to TGT1 but not yet accepted to DLIB1

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */.
LIST SYSMOD /* List the SYSMOD entries */.
 FUNCTIONS /* for function SYSMODs. */.
/* */.
LIST SYSMOD /* List the SYSMOD entries */.
 PTFS /* for PTF type SYSMODs */.
 NOACCEPT(DLIB1) /* not yet accepted. */.
/* */.
/* */.
```

## Listing specific entries

When you encounter a problem in your system and contact the IBM Support Center to resolve the problem, you may be asked to provide very specific information. For example:

- What is the service level of the module in which the problem was reported?
- Are there any USERMODs for the module?

## LIST command

- Do you have a specific PTF installed?

If you have a complete, current listing of all the entries in your system, you can get this information from that listing. You can also get it through the SMP/E dialogs while you are talking to the IBM Support Center.

SMP/E also provides additional LIST functions that you can use to display only specified entries. This is done by allowing you to specify a list of entry names (in parentheses) after each of the entry-type operands. For example, assume that you need to know the function and service level for modules GIMMPDRV and GIMMPIO and if SYSMOD UR12345 has been installed. The following job can be used:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */.
LIST MOD(GIMMPDRV /* List these two modules */
 GIMMPIO) /* */.
 SYSMOD(UR12345) /* and this SYSMOD. */.
/*
```

You receive a listing of the required information for the two modules. If SYSMOD UR12345 was installed, it should be listed; otherwise, you receive a message saying that the entry was not found (meaning it has not been installed).

Another common use for this function is to list the cover letters for specific PTFs. The following job shows an example of a job for listing the cover letters for PTFs UR00001, UR00002, and UR00003:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
LIST MCS(/* List cover letters */
 UR00001 /* for these three PTFs. */
 UR00002
 UR00003
)
/*
```

---

## Listing by FMID or FMIDSET

Frequently, you deal with one area of the system at a time and would like to see all the information relating to that one area. You can use the FORFMID operand in conjunction with the various entry-type operands to limit the entries processed. Here is an example listing:

- All the entries associated with function HXY1100
- All the MAC entries associated with function HXZ2100
- All the SYSMOD and module entries associated with either function JXY1123 or JXY1124

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone. */.
LIST FORFMID(HXY1100) /* List all entries */
/* /* for this FMID. */.
/* /* */.
LIST MAC /* List only the macros */.
```

```

FORFMID(HXZ2100) /* for this FMID. */
/* */
LIST SYSMOD /* List SYSMOD entries */
MOD /* and MOD entries */
FORFMID(JXY1123 /* for this FMID */
JXY1124) /* or this FMID. */
/* */
/*

```

**Note:** The names within the FORFMID operand can be names of FMIDSET entries. In this case, SMP/E lists all the entries associated with any of the FMIDs defined in the FMIDSET entry.

---

## Listing to compare two zones

If you have multiple zones, you may sometimes want to determine the functional and service differences between them. The LIST command provides you with this capability.

**Note:** You can also use the REPORT SYSMODS command to compare the SYSMOD content of two zones. Besides telling you which SYSMODs are installed in one zone but not in a second, REPORT SYSMODS also indicates which of the uninstalled SYSMODs are applicable to the second zone and generates commands you can run to install the SYSMODs in the second zone. For more information, see Chapter 16, “Comparing the SYSMODs installed in two zones: The REPORT SYSMODS command,” on page 167.

One possibility might be that you have two products at different service levels. The product at the lower service level works, and the product at the higher service level does not work. You might use LIST to compare the zones for the two systems and to determine what is causing the problem.

This example compares two target zones, TGT1 and TGT2. The commands in the following example perform the comparison for you:

```

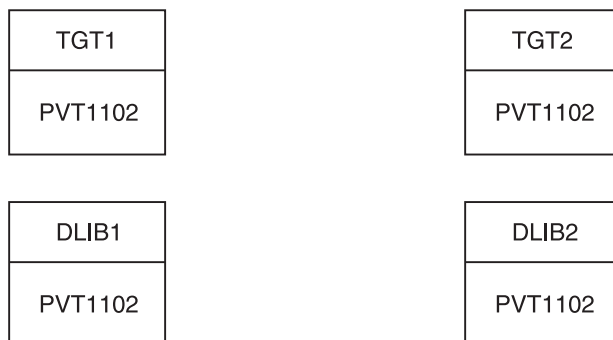
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(TGT1) /* Set to target zone TGT1. */
LIST SYSMODS /* List the SYSMODs */
/* in zone TGT1 */
NOAPPLY(TGT2) /* that have not been */
/* applied to TGT2. */
/* */
SET BDY(TGT2) /* Set to target zone TGT2. */
LIST SYSMODS /* List the SYSMODs */
/* in zone TGT2 */
NOAPPLY(TGT1) /* that have not been */
/* applied to TGT1. */
/* */
/*

```

By comparing the two resulting listings, you can see the differences between the two zones.

In this second example, the same product is installed in different zones. You want to compare the service to make sure both copies of the product are at the same level. For example, assume that product PVT1102 is installed in two target zones and two distribution zones:

## LIST command



You want to make sure that PVT1102 is at the same service level in all the zones. To do this, you can use the LIST command and compare which SYSMODs are installed in which zones.

To compare the service levels of product PVT1102 in the two distribution zones, you can use the commands in the following example:

```
//LIST JOB 'accounting info',MSGLEVEL=(1,1)
//LIST EXEC SMPPROC
//SMPCNTL DD *
SET BDY(DLIB1) /* Set to DLIB1. */
LIST SYSMOD /* List SYSMODs */
 FORFMID (PVT1102) /* for PVT1102 */
 NOACCEPT (DLIB2) /* in DLIB1, not DLIB2. */
SET BDY(DLIB2) /* Set to DLIB2. */
LIST SYSMOD /* List SYSMODs */
 FORFMID (PVT1102) /* for PVT1102 */
 NOACCEPT (DLIB1) /* in DLIB2, not DLIB1. */
```

Similarly, to compare the service records for the target zone copies of PVT1102, you can use LIST with the NOAPPLY operand.

---

## Summary

The LIST command enables you to:

- Compare two target zones using the NOAPPLY operand.
- Compare two distribution zones using the NOACCEPT operand in place of the NOAPPLY operand.
- Compare a target zone and a distribution zone using both the NOAPPLY and NOACCEPT operands.

This gives you the ability to compare all combinations of zone types, keeping in mind that the zone for the NOAPPLY operand must be a target zone, and that the zone for the NOACCEPT operand must be a distribution zone.

---

## Chapter 12. Changing the data SMP/E manages: The UCLIN command

This chapter discusses the UCLIN command, with an emphasis on how and when to use it.

---

### Introduction

The SMP/CSI and associated data sets contain basically two types of information:

- Information added as a result of installing SYSMODs. Generally, this type is managed completely by SMP/E; that is, appropriate entries are added, changed, or deleted as SYSMODs are installed. You need not make any modification to the database to record this information. You may, however, need to make changes to do the following:
  - Record changes made outside SMP/E
  - Delete information no longer required
  - Recover from an SMP/E or system error
- Information added by you to control the installation of SYSMODs. You must manually add this information to the database before processing any SYSMODs. You may later need to modify the information to reflect new processing information.

The UCLIN command helps you to make these changes.

To use UCLIN effectively, you should have a detailed understanding of how it works and what it can do. The UCLIN Command in *SMP/E Commands* and SMP/E data-set entries in the *SMP/E Reference* manual provide that level of detail. Read those chapters before trying to run any UCLIN commands. The following sections describe, at a very high level, what UCLIN is.

---

### When to use UCLIN

UCLIN is a very powerful function that must be used with **extreme caution**. You can use UCLIN to modify almost all the data in the SMP/E database. When you are modifying an entry, SMP/E makes sure the data within that one entry is consistent—that is, that the result could have occurred during normal SMP/E processing. However, no checking is done to make sure the resulting entry is consistent with other related entries in the database.

For example, you can use UCLIN to delete a UTILITY entry in the global zone without SMP/E detecting any error condition. However, if there is an OPTIONS entry within the global zone that refers to the deleted UTILITY entry, an error occurs when you attempt to use that OPTIONS entry. This is a very simple example of inconsistent data across entries that does not result in a serious error. UCLIN modifications to other entries, such as element, LMOD, or SYSMOD, may not be detected as error conditions during processing, but may cause incorrect processing, such as failing to link a module, updating the wrong library, or installing a SYSMOD that should not be installed.

In general, consider the following before making the UCLIN update:

1. Determine whether there is a better method of obtaining the same result. Table 13 on page 156 shows where to find more information about alternatives

## UCLIN command

to UCLIN.

Table 13. Alternatives to UCLIN

| To do this without UCLIN:                                                                                       | Look here for more information:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Change a common subentry in several DDDEF or UTILITY entries in the same zone                                   | The ZONEEDIT Command in <i>SMP/E Commands</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Update the cross-zone subentries of the MOD, LMOD, and TARGETZONE entry                                         | The ZONEEDIT Command in <i>SMP/E Commands</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Add, rename, or delete a zone                                                                                   | <i>SMP/E Commands</i> : Chapters on the following commands: <ul style="list-style-type: none"><li>• <b>Adding a zone:</b> To add a zone, you can use the following commands, depending on the particular situation:<br/>ZONECOPY and ZONERENAME<br/>ZONEEXPORT, UCLIN for the ZONEINDEX, and ZONEIMPORT</li><li>• <b>Renaming a zone:</b> To rename a zone, you must use the following command:<br/>ZONERENAME</li><li>• <b>Deleting a zone:</b> To delete a zone, you can use the following commands, depending on the particular situation:<br/>ZONEDELETE or ZONEEXPORT</li></ul> |
| Change the structure of your system<br>(For example, to add, delete, move, or rename elements or their aliases) | <i>z/OS Packaging Rules</i> : Section on how to avoid UCLIN by using the appropriate MCSs and operands                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

2. If you are not the originator of the UCLIN, make sure you understand **exactly** what is being done and why. If you are not sure, find out before making the update.
3. Make sure the UCLIN is being done in the correct sequence in the process—before or after the installation of the SYSMOD.
4. Make sure all the data is correct.
5. List the entry before changing it. This makes sure you know what the original entry looked like in case an error is reported during the UCLIN or the modification causes an error.
6. After you have done all of these steps, if you have been given directions for installing the UCLIN (for example, in the PTF cover letter or in the program directory for a new function), follow those directions.

---

## How to use UCLIN

UCLIN is used to update the entries in the SMP/E database, just as the SPZAP utility is used to update the system libraries. That is, it enables you to:

- Add new information
- Delete existing information
- Replace existing information with new information

Some UCLIN functions will not work for certain entries or data sets. The chapters on the UCLIN command in *SMP/E Commands* and SMP/E data-set entries in



*SMP/E Reference* provide detailed information on which entries may be modified for each data set, what data within each entry may be modified, and the exact syntax for each entry and data item.

The general format for UCLIN statements is:

```
SET BDY(XXXXXX) /* Set to correct zone. */
UCLIN /* Marks start of UCLIN. */
... /* UCL */
UCL statements /* statements */
... /* to make modifications. */
ENDUCL /* Marks end of UCLIN. */
```

The general format of each UCL statement is as follows:

```
ADD|REP|DEL /* Type modification */
type(name) /* Entry type and name */
operand /* */
operand /* Optional */
operand /* operands */
operand /* */
/* End of one UCL statement */
```

Where:

#### **ADD|REP|DEL**

specifies the action to be taken on the entry or operands specified.

In general, ADD means add the entry or operand only if it is not already present; REP means replace the operand if it is already present, otherwise add it; and DEL means delete the entry or operand if it exists. For a more detailed description of the functions provided by ADD, REP, and DEL, see the chapter on the UCLIN command in the *SMP/E Commands* manual.

#### *type(name)*

specifies the entry type (such as MOD, MAC, ORDER, SRC, data element type, SYSMOD) and name of the entry (such as GIMMPDRV, HELP, ORD000034, MYSRCMOD, MYCLIST, UR12345).

#### *operand*

specifies the individual data items in the entry that are to be modified.

The data items can be:

- Single operands, such as RENT or REUS or COPY
- Single value subentries, such as DISTLIB(AOS12), where only one value can be placed within the parentheses
- Multiple value subentries, such as LMOD(LMOD01,LMOD02,LMOD3) or MAC(MAC01,MAC02), where more than one value can be specified within the parentheses

## UCLIN command

---

## Chapter 13. Identifying cross-zone requisites: The REPORT CROSSZONE command

This chapter contains information about using the REPORT CROSSZONE command to check for requisites between zones. It discusses these topics:

- How to define a ZONESET
- How to run the REPORT CROSSZONE command
- How to install the SYSMODs, using the output from the REPORT CROSSZONE command

---

### Introduction

Your system may contain products that are packaged and installed separately, but which have service level or interface dependencies. For example, an interface error in one product may require a change to another product that used the interface. When this happens, a unique PTF is generated for each product. The relationship between the PTFs can be specified in a conditional requisite (++IF) modification control statement in the PTFs. If you have completed the steps listed in “Specifying automatic cross-zone requisite checking” on page 78, SMP/E automatically checks the requisites during APPLY, ACCEPT, and RESTORE processing, whether the products are in the same zone or in separate zones. However, if you have **not** completed these steps and the products are in separate zones, the requisites are not automatically checked in any other zones. In this case, to make sure these requisites are installed where they are needed, you must:

1. Define a set of zones to be checked for conditional requisites. This is done with the ZONESET entry in the global zone.

**Note:** All the zones in the ZONESET must be defined by ZONEINDEX subentries in the same global zone as the ZONESET entry.

2. Run the REPORT CROSSZONE command to get a list of the SYSMODs that must be installed and the zones where they are needed.
3. Install the SYSMODs in the indicated zones.

**Note:** If you just want to check service levels for products, you should use the REPORT SYSMODS command or the LIST command. See Chapter 16, “Comparing the SYSMODs installed in two zones: The REPORT SYSMODS command,” on page 167 and “Listing to compare two zones” on page 153 for more information.

---

### Defining a ZONESET

To tell SMP/E which zones it should check for missing requisites, you must define a global zone ZONESET entry. You may have one or more ZONESETs to describe groups of products that might have dependencies on each other.

For example, assume you have a system that supports two products, ABC and AYZ, that have dependencies on one another. You might have one zone, BASEABC, for the base ABC function, and another zone, PRODABC, for a dependent function. Likewise, you might have a zone BASEXYZ for the base XYZ function, and another zone, PRODXYZ, for a dependent function. The dependent functions are

## REPORT CROSSZONE command

different versions of the same product, and they must be synchronized with each other and with their base functions. You can set up two ZONESETs to help keep these products at the same service level.

These are the commands you can use to define the ZONESETs:

```
//UCL JOB 'accounting info',MSGLEVEL=(1,1)
//UCL EXEC SMPPROC
//SMPCTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
UCLIN /* */.
ADD ZONESET(ZONEA) /* Create ZONESET ZONEA. */
 ZONE(BASEABC, /* Include these zones. */
 PRODABC, /* */
 PRODXYZ) /* */

 .
ADD ZONESET(ZONEX) /* Create ZONESET ZONEX. */
 ZONE(BASEXYZ, /* Include these zones. */
 PRODXYZ, /* */
 PRODABC) /* */

 .
ENDUCL /* */.
/*
```

When you define a ZONESET, remember:

- Each zone in a ZONESET must also be defined in the global zone.
- Each zone in a ZONESET must be defined in the same global zone. They cannot be defined in global zones that are in different CSI data sets.
- A zone can be part of more than one ZONESET.
- A ZONESET can contain both target and distribution zones.

For more information on defining the ZONESET entry, see *SMP/E Reference*.

---

## Running the REPORT CROSSZONE command

After you have defined the appropriate ZONESET, you can run the REPORT CROSSZONE command to get a list of all the SYSMODs that must be installed and which zones in the ZONESET need them. This list is the Cross-Zone Requisite SYSMOD report. It identifies which of the needed SYSMODs must be received and which SYSMODs caused the needed SYSMODs to be listed. Besides the report, SMP/E writes commands to the SMP/PUNCH data set. You can use them to install the SYSMODs in the appropriate zones.

If all the zones in a ZONESET are of the same type, SMP/E determines the type of report to be generated. For example, a ZONESET containing only target zones results in a Cross-Zone Requisite SYSMOD report for APPLY processing. On the other hand, your ZONESET can be mixed; that is, it may contain both target and distribution zones. If this is the case, you need to specify which type of Cross-Zone report you want generated.

You can limit which SYSMODs SMP/E reports on by specifying any combination of these operands on the REPORT CROSSZONE command:

- **FORZONE:** to list only SYSMODs needed in specific zones in the ZONESET
- **FORFMID:** to list only SYSMODs needed for specific FMIDs in the ZONESET zones
- **DLIBZONE** or **TARGETZONE:** to tell SMP/E which zones you want a report on (if the zones contained in the zone set specified by ZONESET are mixed)

**Note:** DLIBZONE and TARGETZONE are mutually exclusive operands.

For more information on the REPORT CROSSZONE command, see the *SMP/E Reference* manual.

To continue the example for this chapter, assume you applied a number of SYSMODs to the zones in ZONESET ZONEA. Some of these SYSMODs named conditional requisites. To find out which zones are affected by these requisites, you can use the following commands:

```
//REPORT JOB 'accounting info',MSGLEVEL=(1,1)
//REPORT EXEC SMPPROC
//SMPCNTL DD *
SET BDY(GLOBAL) /* Set to global zone. */.
REPORT CROSSZONE /* Report on */.
ZONESET(ZONEA) /* ZONESET ZONEA. */.
/*
```

---

## Installing the SYSMODs

Once you have the Cross-Zone Requisite SYSMOD report, you can install the missing SYSMODs in the zones where they are needed. Follow these steps:

1. Receive any SYSMODs that have not yet been received.
2. Install the SYSMODs in the zones where they are needed. If you have the SMPPUNCH output from the REPORT CROSSZONE command, you can use that.
3. Rerun the REPORT command using the same ZONESET to check the results of installing the new SYSMODs.
4. Receive and install any additional SYSMODs that are needed.

For the example in this chapter, follow these steps for ZONESET ZONEA and ZONESET ZONEX, because both contain zone PRODXYZ. You can continue to run the REPORT CROSSZONE command and install SYSMODs until all the needed SYSMODs have been installed in both ZONESETs.



---

## Chapter 14. Identifying installed SYSMODs affected by error holds: The REPORT ERRSYSMODS command

This chapter contains information about using the REPORT ERRSYSMODS command to check for installed SYSMODs affected by error holds that were subsequently received. It discusses these topics:

- How to run the REPORT ERRSYSMODS command
- How to use output from the REPORT ERRSYSMODS command for installing the SYSMODs

---

### Introduction

In the course of maintaining your system, you can apply or accept service and later receive HOLDDATA that affects that service. If any of that HOLDDATA was for an error reason ID, you should install a resolving SYSMOD so that the error does not occur on your system. However, SMP/E does not automatically write any reports during RECEIVE processing to help you do this. To see if any installed SYSMODs are affected by error holds that were subsequently received, you must:

1. Run the REPORT ERRSYSMODS command to get a list of the SYSMODs that must be installed and the zones where they are needed.
2. Install the resolving SYSMODs in the indicated zones.
3. Determine whether any resolving SYSMODs are available for held SYSMODs.

---

### Running the REPORT ERRSYSMODS command

After you have received HOLDDATA, you can run the REPORT ERRSYSMODS command to get a list of all the SYSMODs that are affected by any unresolved error holds. This list is the Exception SYSMOD report, which also tells whether any resolving SYSMODs have been received for these holds and whether any of the resolving SYSMODs have error holds against them. Besides the report, SMP/E writes commands to the SMPPUNCH data set. You can use them to install the resolving SYSMODs in the appropriate zones.

You can limit which HOLDDATA SMP/E reports on by specifying any combination of these operands on the REPORT ERRSYSMODS command:

- **BEGINDATE:** to check HOLDDATA entries for error reason IDs that were received by SMP/E on or after the specified date
- **ENDDATE:** to check HOLDDATA entries for error reason IDs that were received by SMP/E on or before the specified date
- **FORFMID:** to list only SYSMODs owned by specific FMIDs

For more information on the REPORT ERRSYSMODS command, see *SMP/E Commands*.

Here is an example of when you might want to use the REPORT ERRSYSMODS command. Assume that you have just received some HOLDDATA, and you need to know whether it affects any of the SYSMODs you have already accepted into distribution zone DZONE1. You can use the following commands:

## REPORT ERRSYSMODS command

```
//REPORT JOB 'accounting info',MSGLEVEL=(1,1)
//REPORT EXEC SMPPROC
//SMPCNTL DD *
SET BDY(GLOBAL) /* process global zone */.
REPORT ERRSYSMODS /* report on exception */.
ZONES(DZONE1) /* SYSMODs in this zone */.
BEGINDATE(01 01 03) /* for HOLDDATA received */.
ENDDATE(02 01 03) /* between these dates */.
```

---

## Installing the SYSMODs

Once you have the Exception SYSMOD report, you can install the resolving SYSMODs in the zones where they are needed. Follow these steps:

1. If any resolving SYSMODs are held, run REPORT ERRSYSMODS, specifying the global zone, to see if any SYSMODs have been received that resolve the additional holds for the resolving SYSMODs.
2. If the Exception SYSMOD report for the global zone shows resolving SYSMODs for the additional holds, edit the SMPPUNCH output to add the new resolving SYSMODs and to update the selection list so the held resolving SYSMODs will be processed.
3. Use the SMPPUNCH output to install the resolving SYSMODs in DZONE1.



---

## Chapter 15. Listing the source IDs in a zone: The REPORT SOURCEID command

This chapter contains information about using the REPORT SOURCEID command to list the source IDs assigned to SYSMODs in a given zone or ZONESET. It discusses these topics:

- How to run the REPORT SOURCEID command
- How to list SYSMODs using the output from the REPORT SOURCEID command

---

### Introduction

In the course of maintaining your system, you may need to find out which source IDs are assigned to SYSMODs in a given zone. For example, assume you install service using CBPDOs, which assign source IDs to the service SYSMODs they contain. You can use the REPORT SOURCEID command to determine the latest service level you have installed in a particular zone. To determine the service level based on source IDs, follow these steps:

1. Run the REPORT SOURCEID command to get a list of which source IDs are assigned to SYSMODs in a given zone.
2. If desired, list the SYSMOD entries for the SYSMODs with those source IDs.

---

### Running the REPORT SOURCEID command

You can use the REPORT SOURCEID command to get a list of all the source IDs assigned to SYSMODs in a given zone. This list is the SOURCEID report, which may also indicate which SYSMODs these source IDs are assigned to. Besides the report, SMP/E writes commands to the SMPPUNCH data set, which you can use to list the SYSMODs. For details on the REPORT SOURCEID command, see *SMP/E Commands*.

Here is an example of when you might want to use the REPORT SOURCEID command. Assume you want to find out which source IDs are associated with SYSMODs in target zone TGT1, and you want to know which SYSMODs each source ID is assigned to. You can use the following commands:

```
SET BDY(GLOBAL).
REPORT SOURCEID
 ZONES(TGT1)
 SYSMODIDS.
```

---

### Listing the SYSMODs

If you want more information about the SYSMODs that are assigned the source IDs shown in the SOURCEID report, you can list the related SYSMOD entries. The SMPPUNCH output produced by the REPORT SOURCEID command contains the LIST SYSMOD SOURCEID(...) commands needed to list the SYSMODs for the source IDs in the SOURCEID report. You can tailor the SMPPUNCH output to list the SYSMODs in which you are interested, and run the commands to list the desired SYSMODs.



---

## Chapter 16. Comparing the SYSMODs installed in two zones: The REPORT SYSMODS command

This chapter contains information about using the REPORT SYSMODS command to check if SYSMODs installed in one zone are applicable to and installed in a second zone. It discusses these topics:

- How to run the REPORT SYSMODS command
- How to install SYSMODs using the output from the REPORT SYSMODS command

---

### Introduction

In the course of maintaining your system, you may need to compare the function and service level of two zones. For example, if you have installed the same products in different zones, you may want to make sure that both copies of these products are at the same level. SMP/E does not do this kind of checking automatically. To compare the SYSMODs installed in two zones, you must:

1. Run the REPORT SYSMODS command to get a list of the SYSMODs that are installed in the first zone and that are applicable to the second zone but are not yet installed there.
2. Install the applicable SYSMODs in the second zone.

---

### Running the REPORT SYSMODS command

You can run the REPORT SYSMODS command to get a list of all the SYSMODs that are installed in one zone and not in a second. This list is the SYSMOD Comparison report, which also tells which of these SYSMODs are applicable to the second zone, shows if the SYSMODs have been received, and lists any source IDs associated with the SYSMODs. Besides the report, SMP/E writes commands to the SMPPUNCH data set, which you can use to install the SYSMODs. For details on the REPORT SYSMODS command, see *SMP/E Commands*.

Here is an example of when you might want to use the REPORT SYSMODS command. Assume you have two z/OS systems. The target zones that control these systems are TGZONE1 and TGZONE2, and they are serviced from the same global zone. You want to determine which SYSMODs are installed in TGZONE1 and are not installed in, but are applicable to, TGZONE2. You can use the following commands:

```
SET BDY(GLOBAL) /* process global zone */
REPORT SYSMODS /* report on SYSMODs */
 INZONE(TGZONE1) /* input zone TGZONE1 */
 COMPAREDT0(TGZONE2) /* comparison zone TGZONE2 */
```

---

### Installing the SYSMODs

Once you have the SYSMOD Comparison report, you can install the applicable SYSMODs in the zone where they are needed. Follow these steps:

1. Research the report to determine which of the identified SYSMODs you want to install into the comparison zone.

## REPORT SYSMODS Command

2. Find and receive any applicable SYSMODs that were not available and that you want to install. The source ID in the report identifies some possible sources for obtaining the SYSMODs.
3. Tailor the SMPPUNCH output to install the set of SYSMODs that you deem appropriate; then run the commands to install the desired SYSMODs.

---

## Chapter 17. Building a user modification

This chapter discusses steps and considerations for building a user modification (USERMOD). It provides the following information:

- How to choose between building a SYSMOD as a USERMOD and building it as a function
- How to create modification control statements
- Examples of USERMODs

---

### Choosing between a USERMOD and a function SYSMOD

Software products available from IBM provide you with many functions. However, these functions may not always exactly meet your processing requirements. Many of these products provide interfaces, such as user exit routines or dummy modules, that you can use to customize the functions to your needs. Sometimes, however, you may need to change a function substantially. You can do this by either:

- Constructing a user modification as USERMODs to an existing function
- Constructing an additional function SYSMOD

Although you might be able to make these changes without SMP/E, there are advantages to creating them either as USERMODs or as function SYSMODs so that SMP/E can install them.

When SMP/E installs the changes, it does the following:

- Keeps a record of the changes
- Reports any intersections with SYSMODs provided by IBM
- Ensures that the changes are not regressed
- Ensures that the changes are installed properly in the correct libraries
- Lets you remove the changes if there are problems

Before creating your changes, you must decide whether to build a USERMOD type SYSMOD or a function SYSMOD. Table 14 lists considerations that will help you make this decision.

*Table 14. Comparison of USERMODs and function SYSMODs*

| USERMOD                                                                                                                | Function SYSMOD                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Provides changes for elements owned by an existing function.<br><br>May provide new elements for an existing function. | Provides new elements or new element versions for a new function.                                                                          |
| SMP/E reports on changes attempted by PTFs, APARs, or USERMODs.                                                        | SMP/E does not report on changes attempted by PTFs, APARs, or USERMODs.                                                                    |
| Other SYSMODs for the same function can update the elements.                                                           | Because the SYSMOD owns the element, SYSMODs for other functions cannot update the element without also changing the owner of the element. |
| Better for small changes that affect only a few elements.                                                              | Better for major additions to the system.                                                                                                  |

## Creating the MCSs

This section describes some of the considerations for building the MCSs for a USERMOD SYSMOD. See *z/OS Packaging Rules* for guidelines on when to use USERMODs and SMP/E Modification Control Statements in *SMP/E Reference* for more information on MCS syntax.

### The ++USERMOD MCS

The ++USERMOD statement identifies this SYSMOD as a USERMOD and assigns a 7-character identifier to the SYSMOD.

The format of the ++USERMOD statement is:

```
++USERMOD(sysmod_id) /* */.
```

### The ++VER MCS

The ++VER statement is necessary in all SYSMODs. It describes the environment necessary for installing the SYSMOD.

The general format of the ++VER statement follows:

```
++VER /* Environment MCS */
 (srel) /* System and release ID */
 FMID(aaaaaa) /* Functional area */
 PRE (/* */
 bbbbbbb bbbbbbb /* Prerequisite PTFs */
 bbbbbbb bbbbbbb /* */
) /* */
 REQ (/* */
 cccccc cccccc /* Other related USERMODs */
 cccccc cccccc /* */
) /* */
 SUP (/* */
 ddddddd ddddddd /* Other USERMODs incorp- */
 ddddddd ddddddd /* orated into this one */
) /* */.
```

### Specifying the proper system release

The SREL value (*srel*) must be one of those defined as an SREL subentry in the TARGETZONE entry. If the USERMOD is a change to an IBM product, the SREL should correspond to the SREL value specified in the IBM product that currently owns the elements within this SYSMOD.

### Specifying the FMID value

If any element is owned by an FMID different from that specified in the ++VER statement, that element is not selected for installation during APPLY or ACCEPT processing, and message GIM45401W is issued. This condition is a SYSMOD construction error. SMP/E supports a SYSMOD construction that assumes that this condition occurs regularly and that the SYSMOD contains an ++IF statement specifying another SYSMOD that supplies the proper functional version of the element.

**Note:** As was explained earlier, it is a good idea to construct a USERMOD so that each SYSMOD contains only one element. This construction method eliminates this problem.

### Specifying the proper requisites

When you specify requisite SYSMODs, you are defining two kinds of relationships:

- The relationship of your SYSMOD to previous versions of the element

- The relationship of your SYSMOD to other SYSMODs currently on the system

The following text describes how you can define these relationships.

#### Relationships to earlier versions of the elements:

1. If the element entry in your target zone has an RMID value different from its FMID value, ensure it is a prerequisite of the USERMOD fix; that is, make sure the *bbbbbbb* value shown in the example is accurate. If the RMID and FMID values are equal, the *bbbbbbb* value need not be specified.
2. If the element entry in your target zone has any UMID values, you should first check to make sure the USERMOD itself was constructed so it works correctly in that environment. You should then make sure each of the UMID values is specified in the PRE operand in place of the *ccccccc* values shown in the example. This is not an absolute requirement, but if it is omitted, SMP/E issues warning messages during installation identifying that these SYSMODs may have an intersection with the one you are installing and, therefore, may be regressed. Putting the UMID values in the PRE list suppresses these messages.
3. If you do not specify the requisites that previously replaced an element, SMP/E does not allow your USERMODs to be installed unless you specify BYPASS(ID) on the APPLY or ACCEPT commands.
4. If you want this SYSMOD installed without any warning or error messages, you must specify all the current UMID values of each element in the SYSMOD in the PRE operand. This indicates to SMP/E that the SYSMOD was designed to be installed on the current function and service level of the element, including update level.

If you do not specify the requisites that previously updated an element, the following occurs:

- If your SYSMOD contains an element replacement, SMP/E does not allow the SYSMOD to be installed unless BYPASS(ID) is specified on the APPLY and ACCEPT command.
- If your SYSMOD contained an element update, SMP/E allows the SYSMOD to be installed, but issues a warning message for each requisite not specified in the PRE list.

This means SMP/E is unable to determine if there is an intersection between your update and those already on the element. It assumes that there is none, and you should investigate both updates to verify this.

**Relationships to Other SYSMODs:** Your SYSMOD may depend on another USERMOD or IBM PTF being installed, because you depend on the function provided by that SYSMOD. You may want to indicate that this SYSMOD is part of a set of USERMODs designed to provide some user function. Because each SYSMOD contains only one element, you want to tell SMP/E that they should all be installed together. This is done with the REQ operand (the *ccccccc* values in the example).

#### Specifying superseded SYSMODs

If this SYSMOD is to fix multiple problems, each of the additional APARs that are being fixed should be specified in the SUP operand (*ddddddd* values in the example). This notifies SMP/E that it is not necessary to install those SYSMODs after the current SYSMOD is installed.

### The ++JCLIN MCS

The ++JCLIN statement is necessary in all SYSMODs that add new modules or change the link-edit characteristics or link-edit control cards for existing load modules. The data following the ++JCLIN statement consists of the jobs necessary for installing the new module or link-editing the affected load modules, as if that JCL were actually going to build the load modules from scratch from members of libraries.

The general format of the ++JCLIN statement is:

```
++JCLIN /* Installation data */.
```

### ++MOD and ++ZAP MCSs

The ++MOD and ++ZAP statements are used to identify a replacement and update to a module in the distribution library and associated load modules.

The data following the ++MOD statement is an object deck. The general format of the ++MOD statement is:

```
++MOD(modname) /* Distribution name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Object deck for module
...
```

The data following the ++ZAP statement is a set of superzap control statements. The general format of the ++ZAP statement is:

```
++ZAP(modname) /* Distribution name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Superzap control statement
...
```

The superzap control statements are the same as you would use if you were calling the superzap utility. The only exception is that on the NAME statement, you should specify only the CSECT name within the distribution library module, rather than the load module name and the CSECT name. When SMP/E installs the SYSMOD, it determines all the load modules into which this distribution module was link-edited and then calls the superzap utility for each of these load modules, modifying the NAME statement as appropriate.

### ++MAC and ++MACUPD MCSs

The ++MAC and ++MACUPD statements are used to identify a replacement and update to a macro in the distribution library and associated target libraries.

The data following the ++MAC statement is the macro replacement. The general format of the ++MAC statement is:

```
++MAC(macname) /* Macro name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Macro replacement
...
```

The data following the ++MACUPD statement is the control statements that would have been used if you called the IEBUPDTE utility. The general format of the ++MACUPD statement is:



```

++MACUPD(macname) /* Macro name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Update control statements
...

```

The following restrictions are enforced by SMP/E:

1. The first statement must be the “./ *change name=macname*” control statement.
2. The name specified on the change statement must be the same as on the ++MACUPD statement.
3. No insert or delete statement can be used. Inserting must be done by manually assigning each line a number. Deleting must be done by commenting out the line. This restriction enables SMP/E to merge the update control statement when multiple SYSMODs modify the same macro.

## ++SRC and ++SRCUPD MCSs

The ++SRC and ++SRCUPD statements are used to identify a replacement and update to source in the distribution library and associated target libraries. The format of the MCSs and the data format and restrictions are similar to those for macros.

## The ++PROGRAM MCS

The ++PROGRAM statement is used to define replacements for program elements, which are pre-built load modules or program objects. (For a complete description of program elements, see the chapter on MCSs in *SMP/E Reference*.) You can add a program element by packaging it in a USERMOD.

The ++PROGRAM MCS is immediately followed by the load module or program object. The general format of the ++PROGRAM MCS is:

```

++PROGRAM(name) /* Data element type, name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Program element replacement
...

```

To be packaged inline, a program element must be unloaded along with its aliases into a sequential data set and then transformed with GIMDTS into the required fixed-block-80 record format before it is packaged. Later, when SMP/E installs the element, it is changed back to its original format. For more information about using GIMDTS, see *SMP/E Reference*.

## Data element MCSs

Data element MCSs are used to define replacements for data elements, which are elements other than macros, modules, program elements, and source code. These include TSO CLISTs, help panels, ISPF dialog panels, and online publications libraries. (For a complete description of data elements, see *SMP/E Modification Control Statements* in *SMP/E Reference*.) You can add a data element by packaging it in a USERMOD.

The data element MCS is immediately followed by the data element itself. The general format of the data element MCS is:

## Building a USERMOD

```
++element(name) /* Data element type, name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Data element replacement
...
```

To be packaged inline, a data element must contain fixed-block 80 records. If the original format of the element is not fixed-block 80 records, you can use GIMDTS, a service routine provided with SMP/E, to transform the element into the required format before packaging it. Later, when SMP/E installs the element, it is reconverted to its original format. For more information about using GIMDTS, see *SMP/E Reference*.

## Hierarchical file system element MCSs

The hierarchical file system element MCSs are used to define a replacement for an element residing in a UNIX file system. You can add a hierarchical file system element by packaging it in a USERMOD.

The hierarchical file system element MCS is immediately followed by the hierarchical file system element itself. The general format of a hierarchical file system element MCS is:

```
++hfs_element(hfsname) /* HFS name */
 DISTLIB(dlibname) /* DLIB ddname */
...
... Hierarchical file system element replacement
...
```

To be packaged inline, a hierarchical file system element must contain fixed-block 80 records. If the original format of the element is not fixed-block 80 records, you can use GIMDTS, a service routine provided with SMP/E, to transform the element into the required format before packaging it. Later, when SMP/E installs the element, it is reconverted to its original format. For more information about using GIMDTS, see *SMP/E Reference*.

---

## Examples of USERMODs

This section contains examples of USERMODs that:

- Update a module
- Replace a module
- Add new modules
- Replace a macro or source code
- Update a macro or source code
- Add new source code
- Add source code that uses an IBM-supplied macro
- Add a module that uses an IBM-supplied macro

### Example 1: Updating a module

This is an example of a USERMOD that updates module MODULEA.

```

++USERMOD(USMP001) /* SYSMOD ID of USERMOD. */
++VER(Z038) /* SREL for MVS. */
 FMID(HMP1E00) /* Applicable to SMPE. */
 . /* */
++ZAP(MODULEA) /* Name of module. */
 DISTLIB(AOS12) /* ddname of DLIB. */
 /* */
 NAME MODULEA
* Verify existing ddname.
 VER 0050 404040404040404000
* Verify existing SYSOUT class.
 VER 0058 40
* Verify existing terminal assignment.
 VER 0059 00
* Replace with new data.
* M Y P R I N T = ddname
 REP 0050 D4E8D7D9C9D5E3
* A = SYSOUT class
 REP 0058 C1

```

**Notes:**

1. You should verify each location that you are going to update.
2. You can specify only one name in the NAME statement.
3. The changes made by the REP statements are explained by the preceding comment lines.

**Example 2: Replacing a module**

This is an example of a USERMOD that replaces module MODULEB. After writing and assembling MODULEB, package it in a USERMOD, as shown below:

```

++USERMOD(USMP002) /* SYSMOD is for USERMOD. */
++VER(Z038) /* SREL for MVS. */
 FMID(HMP1E00) /* Applicable to SMPE. */
 . /* */
++MOD(MODULEB) /* Name of module. */
 DISTLIB(AOS12) /* ddname of DLIB. */
 /* */
...
... object module for MODULEB
...

```

**Note:** There are no PRE operands on the ++VER statement, because this module has not been modified since its initial installation. Therefore, only the ++VER FMID operand is required.

**Example 3: Adding new modules**

This is an example of a USERMOD that adds new modules to create a new load module. In this example, the new modules are SMPMOD01, SMPMOD02, and SMPMOD03. These modules are link-edited to create load module SMPEXT01, whose entry point is SMPMOD01. The target library for SMPEXT01 is SYS1.LINKLIB. The following example shows how the new modules and load modules can be packaged in a USERMOD.

## Building a USERMOD

```
++USERMOD(USMP003) /* SYSMOD ID of USERMOD. */.
++VER(Z038) /* SREL for MVS. */
 FMID(HMP1E00) /* Applicable to SMPE. */
 /* */.
++JCLIN /* JCLIN to install routine.*/.
//JOB1 JOB 'accounting info',MSGLEVEL=(1,1)
//STEP1 EXEC PGM=IEWL
//PVTDLIB1 DD DSN=SYS1.PVTDLIB1,DISP=OLD
//SYSLMOD DD DSN=SYS1.LINKLIB,DISP=OLD
//SYSPRINT DD SYSOUT=A
//SYSLIN DD *
 INCLUDE PVTDLIB1(SMPMOD01)
 INCLUDE PVTDLIB1(SMPMOD02,SMPMOD03)
 ENTRY SMPMOD01
 NAME SMPEXT01(R)
/*
++MOD(SMPMOD01) /* Customized exit routine. */
 DISTLIB(PVTDLIB1) /* ddname of DLIB. */
 /* */.

...
... object module for SMPMOD01
...
++MOD(SMPMOD02) /* Customized exit routine. */
 DISTLIB(PVTDLIB1) /* ddname of DLIB. */
 /* */.

...
... object module for SMPMOD02
...
++MOD(SMPMOD03) /* Customized exit routine. */
 DISTLIB(PVTDLIB1) /* ddname of DLIB. */
 /* */.

...
... object module for SMPMOD03
...
```

### Notes:

1. The ++JCLIN statement is required because the SYSMOD provides new modules and a new load module.
2. This SYSMOD could have been packaged as a ++FUNCTION, because each of the modules is user-written.
3. This SYSMOD could have been packaged as three separate SYSMODs, each containing one module. In that case, each SYSMOD would then need to specify the ++VER REQ operand so the SYSMODs would be installed as a set.

## Example 4: Replacing a macro or source code

This is an example of a USERMOD that adds a new macro. In this example, the macro is installed in a target and a distribution library. In addition, source code element USRSRC01 is to be assembled when the macro is installed.

```
++USERMOD(UJES004) /* SYSMOD ID of USERMOD. */.
++VER(Z038) /* SREL for MVS. */
 FMID(HJE2102) /* Applicable to JES. */
 /* */.
++MAC(USRMAC01) /* Name of new macro. */
 DISTLIB(USRMACLB) /* ddname of DLIB. */
 SYSLIB (MACLIB) /* ddname of system MACLIB. */
 ASSEM (USRSRC01) /* Reassemble this source. */
 /* */.

...
... macro replacement
...
```

**Notes:**

1. No JCLIN is required to install a new macro; all necessary information can be specified on the ++MAC statement.
2. You can follow this example to add new source code, with the following exceptions:
  - The ASSEM operand is not required for source code. If SMP/E understands where source code is to be installed, it automatically tries to assemble the new version of the source code after replacing the old version.
  - To define how the source code should be installed, you should include a ++JCLIN statement followed by JCLIN data. The JCLIN data should be similar to that in the example of adding a new module.

**Example 5: Updating a macro or source code**

The following is an example of a USERMOD to update a macro that was added by a previous USERMOD.

```

++USERMOD(UJES005) /* SYSMOD ID of USERMOD. */.
++VER(Z038) /* SREL for MVS. */.
 FMID(HJE2102) /* Applicable to JES. */.
 PRE (UJES004) /* Previous replacement. */.
 /* */.
++MACUPD(USRMAC01) /* Update customized macro.*/.
 DISTLIB(USRMACLB) /* ddname of DLIB. */.
 /* SMPE knows SYSLIB. */.
 ASSEM(USRSRC01) /* Reassemble this source.*/.
 /* */.
./ CHANGE NAME=USRMAC01
...
... macro changed lines here with
... sequence numbers in columns 73–80
...

```

**Notes:**

1. The ++VER PRE operand specifies the previous SYSMOD that replaced the macro.
2. You can follow this example to update source code, with the following exceptions:
  - The ASSEM operand is not used for source code.
  - Because the SYSMOD adding the source code defined how the module should be installed, there is no need to repeat that information on a ++JCLIN statement in the USERMOD.

**Example 6: Adding new source code**

Assume that you have written new source code to be added to an existing product. It is a member in one of your partitioned data sets. To be installed, it must be assembled, then copied as a single-module load module into its target library. Table 15 shows the information you need to specify and where to specify it.

Table 15. Information needed to add new source code

| Information to provide:                           | Where to specify it:                                                                                        |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>1</b> Name of source code element:<br>IFBSRC01 | <ul style="list-style-type: none"> <li>• Element name on ++SRC MCS:<br/> <b>++SRC(IFBSRC01)</b> </li> </ul> |

## Building a USERMOD

Table 15. Information needed to add new source code (continued)

| Information to provide:                                                                        | Where to specify it:                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>2</b> Name of object module produced by assembly:<br>IFBSRC01 (same as source code element) | <ul style="list-style-type: none"> <li>JCLIN data, M= value on COPY SELECT statement:<br/> <b>COPY SELECT M=(IFBSRC01)</b></li> </ul>                                                                                                                                                                                                                      |
| <b>3</b> Where input source code is provided:<br>PDS member                                    | <ul style="list-style-type: none"> <li>TXLIB value on ++SRC MCS:<br/> <b>++SRC(IFBSRC01) TXLIB(REPLACE)</b></li> <li>DDDEF entry or DD statement for APPLY and ACCEPT processing:<br/> <b>REPLACE DD DSN=...</b></li> </ul>                                                                                                                                |
| <b>4</b> Target library for source:<br>SYS1.IFBSRC                                             | <ul style="list-style-type: none"> <li>SYSLIB value on ++SRC MCS:<br/> <b>++SRC(IFBSRC01) SYSLIB(IFBSRC)</b></li> <li>JCLIN data, OUTDD value on COPY statement:<br/> <b>COPY INDD=inddval,OUTDD=IFBSRC TYPE=SRC</b></li> <li>DDDEF entry or DD statement for APPLY processing:<br/> <b>IFBSRC DD DSN=SYS1.IFBSRC</b></li> </ul>                           |
| <b>5</b> Target library for load module:<br>SYS1.LPALIB                                        | <ul style="list-style-type: none"> <li>JCLIN data, OUTDD value on COPY statement:<br/> <b>COPY INDD=inddval,OUTDD=LPALIB TYPE=MOD</b></li> <li>DD statement in JCLIN data and in SMP/E job for APPLY processing:<br/> <b>LPALIB DD DSN=SYS1.LPALIB</b></li> </ul>                                                                                          |
| <b>6</b> Distribution library for source code:<br>SYS1.AIFBSRC                                 | <ul style="list-style-type: none"> <li>DISTLIB value on ++SRC MCS:<br/> <b>++SRC(IFBSRC01) DISTLIB(AIFBSRC)</b></li> <li>JCLIN data, INDD value on COPY statement:<br/> <b>COPY INDD=AIFBSRC,OUTDD=IFBSRC TYPE=SRC</b></li> <li>DD statement or DDDEF entry for ACCEPT processing:<br/> <b>AIFBSRC DD DSN=SYS1.AIFBSRC</b></li> </ul>                      |
| <b>7</b> Distribution library for assembled object module:<br>SYS1.AOS23                       | <ul style="list-style-type: none"> <li>DISTMOD value on ++SRC MCS:<br/> <b>++SRC(IFBSRC01) DISTMOD(AOS23)</b></li> <li>JCLIN data, INDD value on COPY statement:<br/> <b>COPY INDD=AOS23,OUTDD=LPALIB TYPE=MOD</b></li> <li>DD statement in JCLIN data and in SMP/E job during APPLY and ACCEPT processing:<br/> <b>AOS23 DD DSN=SYS1.AOS23</b></li> </ul> |

Table 15. Information needed to add new source code (continued)

| Information to provide:                                         | Where to specify it:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>8</b> How to install the source code:<br>Assemble, then copy | <ul style="list-style-type: none"> <li>++SRC MCS automatically notifies SMP/E to assemble the module.</li> <li>JCLIN data, COPY steps:               <pre>//JOB1    JOB ... //STEP1   EXEC PGM=IEBCOPY //AIFBSRC DD DSN=SYS1.AIFBSRC,... //IFBSRC  DD DSN=SYS1.IFBSRC,... //AOS23   DD DSN=SYS1.AOS23,... //LPALIB  DD DSN=SYS1.LPALIB,... //SYSIN   DD *           COPY INDD=AIFBSRC,OUTDD=IFBSRC  TYPE=SRC           SELECT M=(IFBSRC01)           COPY INDD=AOS23,OUTDD=LPALIB  TYPE=MOD           SELECT M=(IFBSRC01) /*</pre> </li> <li>The OPTIONS and UTILITY entries in effect for the APPLY or ACCEPT command being processed specify the names of the assembler and copy utilities to use and parameters to be passed to them.</li> </ul> |

The following is a sample USERMOD that can be used to package the source code. The numbers associate items in the SYSMOD with the information listed in Table 15 on page 177.

```

 8 ++USERMOD(USR0001) /* My USERMOD. */
 ++VER(Z038) FMID(MYFMID1). /* For my function. */
 ++JCLIN. /* Link object module. */
 //JOB1 JOB ...
 //STEP1 EXEC PGM=IEBCOPY
 6 //AIFBSRC DD DSN=SYS1.AIFBSRC,DISP=SHR
 4 //IFBSRC DD DSN=SYS1.IFBSRC,DISP=SHR
 7 //AOS23 DD DSN=SYS1.AOS23,DISP=SHR
 5 //LPALIB DD DSN=SYS1.LPALIB,DISP=SHR
 //SYSIN DD *
 4, 6 COPY INDD=AIFBSRC,OUTDD=IFBSRC TYPE=SRC
 2 SELECT M=(IFBSRC01)
 5, 7 COPY INDD=AOS23,OUTDD=LPALIB TYPE=MOD
 2 SELECT M=(IFBSRC01)
 /*
 1, 2, 8 ++SRC(IFBSRC01) /* My source module. */
 3 TXLIB(REPLACE) /* Where source is. */
 6 DISTLIB(AIFBSRC) /* DISTLIB for source. */
 7 DISTMOD(AOS23) /* DISTLIB for object. */
 4 SYSLIB(IFBSRC) /* SYSLIB for source. */

```

## Example 7: Adding new source code that uses an IBM-supplied macro

Assume you are packaging one of your user-written routines as a USERMOD (UMOD001). Your USERMOD includes assembler source (SRCPART), which is to be included in load module LOADMOD1 and is packaged as a SRC element with a ++SRC statement, as described in previous USERMOD examples. SRCPART refers to an IBM-supplied macro (IBMMAC), which was packaged in its owning product with a ++MAC statement. You want SRCPART to be automatically reassembled every time IBMMAC is updated or replaced with service. To accomplish this, your USERMOD must contain a JCLIN assembly step in addition to the necessary SMP/E MCS statements. (This means you need to supply the

## Building a USERMOD

same SRCPART definition as part of the JCLIN input, as well as after the ++SRC statement.) Your USERMOD might look something like this:

```
++USERMOD(UMOD001).
++VER(srel) FMID(fmid).
++JCLIN.
//STEP1 EXEC PGM=IEUASM
//SYSPUNCH DD DSN=&&PUNCH(SRCPART),DISP=(PASS);
//SYSIN DD *
SRCPART CSECT
 IBMMAC
 BR 14
 END
//LINK EXEC PGM=IEWL
//SYSLMOD DD DSN=SYS1.LINKLIB,DISP=SHR
//SYSLIN DD *
 INCLUDE SYSPUNCH(SRCPART)
 NAME LOADMOD1
/*
++SRC(SRCPART) SYSLIB(tgllib) DISTLIB(dlib).
SRCPART CSECT
 IBMMAC
 BR 14
 END
```

When the assembly step in the JCLIN is processed, a GENASM subentry is added to the MAC entry for IBMMAC indicating SRCPART is to be assembled whenever IBMMAC is updated. So, if you install a SYSMOD that updates IBMMAC, SMP/E automatically reassembles SRCPART and link-edits the new copy into LOADMOD1.

**Note:** Remember, when a link-edit step contains a SYSLMOD DD statement, SMP/E uses the low-level qualifier of the data set name to determine the ddname of the load module's target library (and, by extension, the name of the DDDEF entry to use when allocating this library). In this USERMOD, for example, SMP/E looks for a DDDEF entry named LINKLIB in order to allocate the SYSLMOD data set.

### Example 8: Adding a new module that uses an IBM-Supplied macro

Assume you are packaging one of your user-written routines as a USERMOD (UMOD001). Your USERMOD includes an object module (SRCPART), which is to be included in load module LOADMOD1 and is packaged as a MOD element with a ++MOD statement, as described in previous USERMOD examples. SRCPART refers to an IBM-supplied macro (IBMMAC), which was packaged in its owning product with a ++MAC statement. You want to be notified whenever IBMMAC is updated or replaced with service so you can update your module and reapply your USERMOD. To accomplish this, your USERMOD must include the macro, and must specify the last SYSMOD that replaced the macro (the RMID value in the MAC entry) and all the SYSMODs that have updated the macro (the UMID values in the MAC entry) as prerequisites. Your USERMOD might look something like this:



```

++USERMOD(UMOD001).
++VER(srel) FMID(fmid) PRE(macrmid).
++JCLIN.
//LINK EXEC PGM=IEWL
//SYSLMOD DD DSN=SYS1.LINKLIB,DISP=SHR
//SYSLIN DD *
 INCLUDE DLIB1(SRCPART)
 NAME LOADMOD1
/*
++MAC(IBMMAC).
...
macro source
...
++MOD(SRCPART) DISTLIB(dlib).
...
module object deck
...

```

Because you specified the macro's RMID and UMIDs, when IBMMAC is serviced, the APPLY will get a MODID error for the USERMOD. You will have to restore the USERMOD to successfully apply the service. Then you can rework the USERMOD and apply it again.

**Note:** Remember, when a link-edit step contains a SYSLMOD DD statement, SMP/E uses the low-level qualifier of the data set name to determine the ddname of the load module's target library (and, by extension, the name of the DDDEF entry to use when allocating this library). In this USERMOD, for example, SMP/E looks for a DDDEF entry named LINKLIB in order to allocate the SYSLMOD data set.



---

## Chapter 18. Determining which SYSMODs led others to fail: The causer SYSMOD summary report

This chapter describes root cause analysis and provides examples of how to use the causer SYSMOD information in the Causer SYSMOD Summary report and the SYSMOD Status report to determine the cause of SYSMOD failure.

---

### Introduction

A *causer SYSMOD* is a SYSMOD whose failure led to the failure of other SYSMODs. To identify causer SYSMODs, SMP/E performs root cause analysis for the ACCEPT, APPLY, and RESTORE commands. The types of errors SMP/E analyzes to determine causer SYSMODs include the following:

- Held SYSMODs
- Missing requisite SYSMODs
- Utility program failures: copy, update, assembler, link, zap
- Out-of-space conditions: x37 ABENDs
- Missing DD statements and other allocation errors
- ID errors (a SYSMOD does not supersede or specify as a prerequisite an RMID or a UMID of an element)
- JCLIN errors (syntax errors)

The results of SMP/E's root cause analysis are presented in two reports:

- SYSMOD Status report

This report summarizes the processing done for each eligible SYSMOD. For SYSMODs that failed, the report lists the causer SYSMODs.

After you check the SYSMOD Status report to determine the results of processing, use the Causer SYSMOD Summary report to determine which errors need to be corrected.

- Causer SYSMOD Summary report

This report lists the causer SYSMODs along with a brief summary of the related messages, descriptions of the errors that caused the SYSMODs to fail, and, when feasible, some causes for those errors.

---

### Using causer SYSMOD information

How you use the causer SYSMOD information provided by the Causer SYSMOD Summary report and the SYSMOD Status report depends on what you need to install—all the SYSMODs specified on the command you are processing, or only specific ones. This section describes some general scenarios and includes an example of using these reports.

#### Resolving errors for all SYSMODs that failed

Suppose you are installing a CBPDO, but the reports show that several of the SYSMODs failed. You want to resolve all the reported errors and install all the SYSMODs in the CBPDO.

1. Go to the Causer SYSMOD Summary report to identify the causer SYSMODs and determine how to resolve the errors.

## Causer SYSMOD Summary Report

2. Resolve the errors.
3. Rerun the command that failed. If you find more errors on this pass, repeat the process.

### Resolving errors for a single SYSMOD that failed

Suppose you are installing a group of SYSMODs, but the reports show that several of them have failed. You want to resolve the errors for one specific SYSMOD and install it.

1. Use the SYSMOD Status report to determine the causer SYSMOD for the SYSMOD that you need to install.
2. Go to the Causer SYSMOD Summary report and determine how to resolve the errors for the causer SYSMOD.
3. Resolve the errors.
4. Rerun the command to install the SYSMOD that previously failed. If you find more errors on this pass, repeat the process.

### Example

Suppose you ran the following command:

**APPLY S(UR00001) GEXT CHECK.**

and the SYSMOD Status report included the results shown in Figure 36.

Page nnnn - NOW SET TO TARGET ZONE nnnnnnn DATE mm/dd/yy TIME hh:mm:ss SMP/E 34.nn SMPRPT OUTPUT

SYSMOD STATUS REPORT FOR APPLY PROCESSING      SYSMODS APPLIED - 0

NOTE: '-' INDICATES THE REQUISITE SYSMOD OR HOLD CONDITION IS NOT SATISFIED  
'\*' INDICATES THE NON SATISFIED REQUISITE SYSMOD OR HOLD CONDITION IS BYPASSED  
'#' INDICATES THE SUPERSEDING SYSMOD WAS NOT PROCESSED

| SYSMOD  | STATUS | TYPE | FMID    | REQUISITE SYSMODS, SUPBY SYSMODS, HOLD REASON-IDS, AND CAUSER SYSMODS |                |
|---------|--------|------|---------|-----------------------------------------------------------------------|----------------|
| AR00001 | NOGO   |      |         | SUPBY #UR00002                                                        |                |
| UR00001 | HELD   | PTF  | HR00TC1 | HOLDE -AR00001                                                        | CAUSER UR00002 |
| UR00002 | HELD   | PTF  | HR00TC1 | HOLDE -AR00003                                                        | CAUSER UR00002 |

Figure 36. SYSMOD Status Report: Sample Report for APPLY

In this case, the report indicates that APPLY processing failed for SYSMODs UR00001 and UR00002 because of unresolved error holds. The causer SYSMOD for both PTFs is UR00002. Next, you look up UR00002 in the Causer SYSMOD Summary report, shown in Figure 37 on page 185.

## Causer SYSMOD Summary Report

Page *nnnn* - NOW SET TO TARGET ZONE *nnnnnnnn* DATE *mm/dd/yy* TIME *hh:mm:ss* SMP/E 34.*nn* SMPRPT OUTPUT

CAUSER SYSMOD SUMMARY REPORT FOR APPLY PROCESSING

| CAUSER  | FMID    | MESSAGE ID | PAGE | ERROR DESCRIPTION AND POSSIBLE CAUSES |
|---------|---------|------------|------|---------------------------------------|
| UR00002 | HR00TC1 | GIM35901I  | 2    | ERROR HOLD AR00003 WAS NOT RESOLVED.  |

*Figure 37. Causer SYSMOD summary report: sample report for APPLY*

That report shows that APPLY processing failed because error hold AR00003 was not resolved for SYSMOD UR00002. By resolving this hold, you will fix the errors listed in the SYSMOD Status report.



---

## Chapter 19. Java archive update exploiter's guide

This chapter is a guide to packaging Java Archive files (JAR files) and updates for JAR files in SMP/E. The intended audience for this section is anyone who will be exploiting this function, including product packagers and service teams. This guide provides information and examples about packaging a product release using the ++JAR MCS and building subsequent PTFs to service that release using the ++JARUPD MCS.

---

### JAR replacements in FMIDs

Suppose your product has a simple TicTacToe applet. The complete TicTacToe applet (or Java application) is composed of a class file and audio and image files, and is stored in a directory structure as follows:

```
/u/pezk/TicTacToe/TicTacToe.class
 /audio/beep.au
 /ding.au
 /yahoo.au
 /images/cross.gif
 /not.gif
```

To build a JAR file element for the complete TicTacToe applet, you would first make your working directory the TicTacToe directory where the applet files reside, and then run the following jar command:

```
cd /u/pezk/TicTacToe/
jar cvf ABCTTT.jar *
```

Specified in this way, the jar command takes all files in the working directory (/u/pezk/TicTacToe), and all files within subdirectories of the working directory, and creates a JAR file named ABCTTT.jar.

Your product release, or FMID, can then contain this single JAR file, which is the complete TicTacToe applet. You can do this using the ++JAR MCS as seen in the following example:

```
++JAR(ABCTTT) DISTLIB(AABCBIN) SYSLIB(SABCBIN) RELFILE(2)
 PARM(PATHMODE(0,6,4,4))
 LINK('../TicTacToe.jar')
 SYMLINK('../usr/lib/TicTacToe.jar')
 SYMPATH('../usr/lpp/abc/bin/TicTacToe.jar').
```

---

### JAR updates in PTFs

Suppose some time after your FMID has been made available and is being used, a defect is discovered (an APAR). The TicTacToe applet requires a change because of the APAR. Specifically, you need to add another image file (images/new.gif), and replace the class file (TicTacToe.class) with an updated copy of the class file. Further, suppose the change team has placed the new image file and updated class file in directories, as follows:

```
/u/apars/ow12345/TicTacToe/TicTacToe.class
/images/new.gif
```

You can instruct SMP/E to add new files to a JAR file, and replace files in an existing JAR file by using the ++JARUPD MCS. If files TicTacToe.class and new.gif were to be packaged and archived together in a JAR file of their own, then that

## JAR Updates

file, in SMP/E terms, would be considered a JAR update file. For example, given the directory structure above for the new and updated files, the jar command could be used to create the JAR update file as follows:

```
cd /u/apars/ow12345/TicTacToe/
jar cvf ABCTTT.jarupd *
```

The resultant JAR file ABCTTT.jarupd would be packaged as a ++JARUPD in a PTF as in the following example:

```
++PTF(UW12345).
++VER(Z038) FMID(fmid).
++JARUPD(ABCTTT)
 PARM(PATHMODE(0,6,4,4)) JARPARM(0M)
 LINK('../TicTacToe.jar')
 SYMLINK('../../../../usr/lib/TicTacToe.jar')
 SYMPATH('../../usr/lpp/abc/bin/TicTacToe.jar').
```

Suppose now another defect (APAR) is discovered against the TicTacToe applet, and you must update the /audio/beep.au file within the archive. Again, you can use the ++JARUPD MCS to describe an update to the archive. Assuming the replacement audio file resides in a directory as follows:

```
/u/apars/ow54321/TicTacToe/audio/beep.au
```

The following jar command could create the necessary JAR update:

```
cd /u/apars/ow54321/TicTacToe/
jar cvf ABCTTT.jarupd *
```

The resulting JAR file ABCTTT.jarupd would be packaged as a ++JARUPD in a PTF as in the following example:

```
++PTF(UW54321).
++VER(Z038) FMID(fmid) PRE(UW12345).
++JARUPD(ABCTTT)
 PARM(PATHMODE(0,6,4,4)) JARPARM(0M)
 LINK('../TicTacToe.jar')
 SYMLINK('../../../../usr/lib/TicTacToe.jar')
 SYMPATH('../../usr/lpp/abc/bin/TicTacToe.jar').
```

Notice the second PTF has a prerequisite for the first PTF. Such a relationship is required by SMP/E because both PTFs update the same JAR file.

---

## JAR replacements in PTFs

Just as replacements for JAR files can be delivered in an FMID, so can JAR file replacements be delivered in PTFs. Suppose you decide to create a "level-set" PTF, which incorporates the updates from several previous APARs and PTFs. In this case, you want to replace the entire TicTacToe applet JAR file, rather than add or replace files within the archive.

You create the JAR file for the applet using the jar command as discussed earlier and then package it as a ++JAR element in a PTF, as in the following example:

```
++PTF(UW87654).
++VER(Z038) FMID(fmid) SUP(UW12345 UW54321).
++JAR(ABCTTT) DISTLIB(AABCBIN) SYSLIB(SABCBIN)
 PARM(PATHMODE(0,6,4,4)) JARPARM(0M)
 LINK('../TicTacToe.jar')
 SYMLINK('../../../../usr/lib/TicTacToe.jar')
 SYMPATH('../../usr/lpp/abc/bin/TicTacToe.jar').
```



Notice this PTF supersedes both PTFs that supplied updates for the JAR file. Again, such relationships (either supersede or prerequisite) are required by SMP/E, because both PTFs provided updates for the JAR file contained in the current PTF.



---

## Appendix A. Migration

---

### Migration overview

Your plan for migrating to the new level of SMP/E should include information from a variety of sources. These sources of information describe topics such as coexistence, service, migration procedures, and interface changes.

The following documentation, which is supplied with your product order, provides information about installing your z/OS system. In addition to specific information about SMP/E, this documentation contains information about all of the z/OS elements.

- *z/OS and z/OS.e Planning for Installation*

This book describes the installation requirements for z/OS at a system and element level. It includes hardware, software, and service requirements for both the driving and target systems. It also describes any coexistence considerations and actions.

- *SMP/E Program Directory*

This document, which is provided with your SMP/E product order, leads you through the specific installation steps for SMP/E.

- *ServerPac Installing Your Order*

This is the order-customized installation book for using the ServerPac installation method. Be sure to review “Appendix A. Product Information”, which describes data sets supplied, jobs or procedures that have been completed for you, and product status. IBM may have run jobs or made updates to PARMLIB or other system control data sets. These updates could affect your migration.

Within this book, you can find information about the specific updates and considerations that apply to this release of SMP/E.

- “SMP/E V3R4 overview” on page 193

This section describes the specific updates that were made to SMP/E for the current release. For each item, this section provides an overview of the change, a description of any migration and coexistence tasks that may be considered, and where you can find more detailed information in the SMP/E library or other element libraries.

- “Summary of interface changes” on page 213

This section provides a summary of the changes that are made to z/OS user and programming interfaces.

### Terms you need to know

This section describes some terms you may need to know as you use this section.

**Migration** Activities that relate to the installation of a new version or release of a program to replace an earlier level. Completion of these activities ensures that the applications and resources on your system will function correctly at the new level.

**Coexistence** Two or more systems at different levels (for example, software, service, or operational levels) that share resources. Coexistence includes the ability of a system to respond in the following ways to

a new function that was introduced on another system with which it shares resources: ignore a new function, terminate gracefully, support a new function.

New releases of SMP/E generally add to or enhance the information stored in SMP/E data sets. This new or enhanced data is not always compatible with previous releases of SMP/E. Results are unpredictable when a prior release of SMP/E encounters data introduced by a later release. Therefore, IBM provides toleration PTFs that allow selected prior releases to ignore changes introduced by a later release. In some cases, a compatibility PTF or small programming enhancement (SPE) is available to add a new function to selected prior releases. *z/OS and z/OS.e Planning for Installation*, GA22-7504, provides a list of the required toleration and compatibility PTFs for each prior release of SMP/E.

## SMP/E release levels

The SMP/E element of z/OS is usually not updated with every release of z/OS. For example, the level of SMP/E that was shipped with z/OS Release 1 is identical to that shipped with OS/390 V2R7.

## Developing a migration strategy

The recommended steps for migrating to a new release of SMP/E are:

1. Become familiar with the supporting migration and installation documentation for the release.

You should determine what updates are needed for products that are supplied by IBM, system libraries, and non-IBM products. Review *z/OS and z/OS.e Planning for Installation* and *z/OS Introduction and Release Guide* for information about SMP/E and other z/OS elements.

2. Develop a migration plan for your installation.

When planning to migrate to a new release of SMP/E, you must consider high-level support requirements, such as machine and programming restrictions, migration paths, and program compatibility.

3. Obtain and install any required program temporary fixes (PTFs) or updated versions of the operating system.

Call the IBM Software Support Center to obtain the preventive service planning (PSP) upgrade for SMP/E, which provides the most current information about PTFs for SMP/E. Check RETAIN again just before testing SMP/E. For information about how to request the PSP upgrade, refer to the *SMP/E Program Directory*. Although the *SMP/E Program Directory* contains a list of the required PTFs, the most current information is available from the IBM Software Support Center.

4. Install the product using the *SMP/E Program Directory* or the *ServerPac Installing Your Order* documentation.
5. Verify that any application programs that use the SMP/E API will continue to run and, if necessary, make changes to ensure compatibility with the new release.
6. Use the new release before initializing major new function.
7. If necessary, customize the new function for your installation.
8. Exercise the new functions.

## Reviewing changes to SMP/E processing

As you define your installation's migration plan, consider how the new and changed SMP/E functions might affect the following areas of SMP/E processing. For each item described in "SMP/E V3R4 overview," you should review the "Migration procedures" section to determine how, or if, the change affects the tasks that are performed at your installation.

### Customization

You can customize some SMP/E functions to take advantage of new support after the product is installed. For example, you can tailor SMP/E through the use of installation exit routines or SMPPARM options. This section lists changes to SMP/E that might require you to tailor SMP/E to ensure that it runs as before.

### Operations

The new SMP/E release might introduce changes to its operating characteristics, such as changed commands, new or changed messages, or in the methods of implementing new functions. This book identifies those changes for which you should provide user education before using this release of SMP/E.

### Programming

To ensure that existing programs run as before, programmers who develop programs that use the GIMAPI, library change file records, or UNIX shell scripts must be aware of any changes to those interfaces introduced in a new release of SMP/E.

## Reviewing changes to SMP/E interfaces

When defining your installation's migration plan, also consider that SMP/E interfaces may also be affected by the new or changed functions that are introduced in this release. These interfaces include:

- Commands
- Exits
- Macros
- Messages
- Panels
- SYS1.SAMPLIB members

"Summary of interface changes" on page 213 provides a summary of the changes that affect these interfaces for the release. This information is also listed in the "What this change affects" section that is provided for each release enhancement in "SMP/E V3R4 overview."

---

## SMP/E V3R4 overview

The following sections describe the new and changed SMP/E functions that are introduced for SMP/E V3R4. The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## Enhancement to the RECEIVE command

To support Internet Service Retrieval, the RECEIVE command has been enhanced to enable you to request HOLDDATA or PTF orders directly from the IBM Automated Delivery Request server, automatically download the resulting service package and receive the HOLDDATA and PTFs contained in the service package.

Using the RECEIVE command with the new ORDER operand, you can request a new HOLDDATA or PTF order based on the content criteria you specify. SMP/E waits for the server to fulfill the order request. The order request is fulfilled by building a package of PTFs and/or HOLDDATA that meets your content criteria. When the resultant package is ready, SMP/E downloads the package to the local z/OS host and performs traditional RECEIVE command operations on the contents of the package.

In addition to submitting new orders, the RECEIVE ORDER command can also be used to download orders that are in a pending state. If a requested PTF service order cannot be fulfilled within the allowed time, the RECEIVE command processing stops and SMP/E considers the order to be in the pending state. The server continues fulfilling the order, however. You can use the RECEIVE ORDER command to check on the status of the service package, and retrieve the package when it is ready to be downloaded.

### ORDERSERVER data set

The new ORDERSERVER data set provides the necessary information about the server that will fulfill an SMP/E HOLDDATA or PTF order request.

### CLIENT data set

The CLIENT data set has been changed to include information about the local z/OS client system used for RECEIVE FROMNETWORK and RECEIVE ORDER command processing, such as navigating an FTP firewall and an HTTP proxy server.

### Coexistence considerations

RECEIVE ORDER processing requires a new ORDERSERVER data set and new operands on the RECEIVE command. SMP/E releases prior to SMP/E V3R4 cannot process the new ORDERSERVER data set and do not recognize the new RECEIVE command operands.

## Impacts to SMP/E zone entries

This release introduces a new entry type, ORDER, as well as a new subentry type for OPTIONS entries, ORDERRET.

### ORDER entry in the global zone

The ORDER entry is a new entry in the global zone to describe a HOLDDATA or PTF order initiated with the RECEIVE ORDER command. An ORDER entry is created in the global zone when SMP/E sends an order request to the IBM Automated Delivery Request server and the order is accepted by the server. This ORDER entry is used to record information about the order so SMP/E can query the server for status of orders that have not yet been completed.

### ORDER RETENTION subentry on the OPTIONS entry

Indicates the retention period, in days, ORDER entries will be kept in the global zone before being deleted. During RECEIVE ORDER command processing, the

ORDER entry will be deleted from the global zone if the ORDER entry has a status of either DOWNLOADED or ERROR and the ORDER RETENTION subentry value has been exceeded.

### **Coexistence considerations**

SMP/E releases prior to SMP/E V3R4 cannot process the new ORDER entry or the new ORDERRET subentry of the OPTIONS entry. A toleration PTF provides:

- LIST, GZONEMERGE, GIMAPI and Query Dialog support for the ORDERRET subentry and causes SMP/E to ignore the subentry in all other instances.
- GZONEMERGE, GIMAPI and Query Dialog support for the ORDER entry and causes SMP/E to issue a warning message if ORDER entries exist in the zone when the LIST command is requested. The ORDER entry will be ignored in all other instances.

## **ICSF not required for GIMZIP and RECEIVE FROMNETWORK**

The z/OS Integrated Cryptographic Services Facility (ICSF) is used by SMP/E to calculate SHA-1 hash values. These hash values are calculated for files within a GIMZIP package to verify the integrity of the data within the package. SMP/E has been enhanced to use an alternate method to calculate SHA-1 hash values if ICSF is not available for use.

Although ICSF is the preferred method, SMP/E no longer requires it for use by the GIMZIP and GIMUNZIP service routines, nor for the RECEIVE FROMNETWORK or RECEIVE FROMNTS command. If SMP/E detects that ICSF is not available, SMP/E automatically uses an SMP/E Java application class to calculate SHA-1 hash values as an alternative. See “Options that affect Java” on page 93 for the details of the required setup to allow SMP/E to use the Java application class.

## **Improved load module build processing**

The load module build phase of the APPLY, RESTORE and LINK LMODS commands has been enhanced to be more tolerant of allocation errors for the distribution libraries. This accommodates distribution libraries which may be offline. In this case, SMP/E continues its search for a usable copy of the module instead of immediately failing because of the error allocating the module’s distribution library.

## **SMP/E administration dialog**

The new ORDER Management dialog allows you to manage ORDER entries in the global zone. ORDER entries are created by using the RECEIVE ORDER command to request orders of HOLDDATA and PTFs from an IBM server. The ORDER Management dialog allows you to

- See the status of all orders at a glance.
- View the details of individual orders.
- Delete the ORDER entry for selected orders.

## **SMP/E query dialog**

Existing panel GIMQU1PO now allows you to specify the ORDER entry.

---

## SMP/E V3R3 overview

The following sections describe the new and changed SMP/E functions that are introduced for SMP/E V3R3. The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

### GIMGTPKG service routine

The new GIMGTPKG service routine can be used to get GIMZIP packages from a remote FTP server in a TCP/IP network and store the package on a local z/OS host. GIMGTPKG performs the functions of the SMP/E RECEIVE FROMNETWORK TRANSFERONLY command, but does so independently of SMP/E. It uses FTP to transport the files of a GIMZIP package from a remote FTP server to a local host, thus providing:

- Industry standard FTP protocol.
- Secure transmission using the capabilities of the z/OS FTP client.
- Ensured integrity of the transported files.

### Enhancements to GIMZIP and GIMUNZIP service routines

Formerly GIMZIP could create and GIMUNZIP could process packages that contained only sequential and partitioned data sets. Also, GIMUNZIP would only extract data from an archive file into a new data set allocated directly by GIMUNZIP. These service routines have been enhanced for SMP/E V3R3, as follows:

- Packages may now contain VSAM data sets and UNIX files and directories.
- You may assign a unique id to an archive during GIMZIP processing and then use that id to identify the archive that is to be unzipped during GIMUNZIP processing.
- GIMUNZIP now allows GIMUNZIP operations into existing data sets. GIMUNZIP determines if the data set specified on the <ARCHDEF> tag already exists. If the data set already exists, GIMUNZIP copies the archive file into the existing data set. If the data set does not already exist, GIMUNZIP allocates a new data set and then copies the archive file into that new data set.

### RECEIVE FROMNETWORK FTP interface enhancements

RECEIVE FROMNETWORK has been enhanced to:

- Allow user credentials and file data transferred between an FTP client and server to be secured with respect to encryption, authentication, and data integrity using the Transport Layer Security (TLS) enablement for FTP.
- Allow the z/OS FTP client to connect to FTP servers that reside beyond a firewall that runs a SOCKS server.
- Make IPv6 connectivity possible for both the FTP client and server.
- Use the FTP.DATA configuration data set to allow the client to specify local site parameters. The FTP.DATA configuration data set is optional, but must be used by the client to specify the parameters for TLS security and SOCKS firewall support.



## Migration tasks

1. SMP/E will now use the FTP.DATA configuration data set to allow the client to specify local site parameters. Two of the values specified in the FTP.DATA data set are *FWFriendly* and *FTPKEEPALIVE*. These values correspond to the *pasv* and *keepalive* attributes in the CLIENT data set. Therefore, these attributes should no longer be specified in the CLIENT data set. If the *pasv* and *keepalive* attributes are specified in the CLIENT data set, they will be ignored. If required, these values must be specified in the FTP.DATA data set. Refer to *z/OS Communications Server: IP User's Guide and Commands* for more information about the statements that can be coded in the FTP.DATA data set.
2. To enable TLS security, SOCKS firewall support, and IPv6 addressing, ensure that z/OS Communications Server V1R2 (or higher) is installed.
3. If you previously specified FTP commands to navigate your local firewall using the <FIRECMD> tag of the CLIENT data set, then you may need to update them. Specifically, subcommands such as USER, PASS, and ACCT should no longer be specified in <FIRECMD>. The commands you specify in the <FIRECMD> tags should be the same as those you use with the z/OS Communications Server FTP client, and should contain only the actual values (or the appropriate substitution variables) for userid, password, and account.

## REJECT CHECK command

A CHECK function has been added to the REJECT command. CHECK indicates whether SMP/E should do a trial run of a command without actually updating any libraries. This is a way to test for errors that might occur during actual processing and to receive reports on the changes that would be made.

## Extended RECEIVE SOURCEID processing

The RECEIVE command will now assign the source ID specified on the SOURCEID operand of the command to SYSMODs found in the SMPPTFIN input stream, even if the SYSMOD is already received.

## SPCLCMOD and CMWA

SMP/E passes new default parameters (SPCLCMOD and CMWA=256K) to the copy utility when copying modules, load modules, or programs.

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## SMP/E V3R2 overview

The following sections describe the new and changed SMP/E functions that are introduced for SMP/E V3R2. The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## LINK LMODS command

The new LINK LMODS command can be used to refresh the callable services for all load modules within a particular target zone. The LINK LMODS command can also be used to refresh the callable services only for those load modules that have a dependency on a particular set of CALLLIBS. The LINK LMODS command

replaces the REPORT CALLLIBS command, which has been removed from SMP/E V3R2. For more information about the LINK LMODS command, refer to *SMP/E Commands*.

## REPORT CALLLIBS command removal

The REPORT CALLLIBS command has been removed from SMP/E V3R2. It has been replaced by the LINK LMODS command.

## UPGRADE command

New releases of SMP/E must sometimes make changes to SMP/E data sets that cannot be properly processed by prior SMP/E releases. SMP/E usually makes incompatible changes only when necessary to provide new and improved capabilities. For example, a new type of element requires a new entry type in SMPCSI data sets and these new entry types are typically not understood or processed correctly by SMP/E levels that have not been specifically updated to do so.

The UPGRADE command allows you to specify when SMP/E is permitted to make incompatible changes to SMP/E data sets. This, in turn, allows you to make the trade-off between exploiting new SMP/E functions and preserving compatibility with prior SMP/E releases. For more information about the UPGRADE command, refer to *SMP/E Commands*.

### Coexistence considerations

A toleration PTF will enable OS/390 V2R7 SMP/E, z/OS V1R2 SMP/E, and SMP/E V3R1 to automatically check for incompatible changes made by a higher level of SMP/E. A toleration PTF will also provide a warning message should a user try to issue an UPGRADE command on a release of SMP/E prior to V3R2.

## GIMXSID service routine

The GIMXSID service routine is used as part of the ShopzSeries offering. GIMXSID creates a single data source required by ShopzSeries to place customized software product and service orders. The data source created by GIMXSID, the software inventory data, is a composite of three kinds of information as follows:

1. A list of FEATURES found in the SMPCSI data sets. The Feature List is used by ShopzSeries to perform product requisite checking and also to prime the order checklist when ordering a ServerPac.
2. A list of the FMIDs found in the SMPCSI data sets. The FMID List is used by ShopzSeries to scope service orders to the PTFs applicable solely to the user's desired configuration of target and global zones.
3. A bitmap representation of the PTFs found in the specified target zones and global zones. The PTF Bitmap is used by ShopzSeries (CCSS) to produce service packages that do not contain PTFs that are already present in the user's configuration.

## GIMZIP: Archive segmentation

The GIMZIP service routine has been enhanced with a new SEGMENT option to allow you to specify the maximum size for the network transportable objects produced by GIMZIP. Very large objects will be divided into archive segments that are within the specified size. The GIMUNZIP service routine and the RECEIVE FROMNETWORK and RECEIVE FROMNTS commands will now accept network packages that contain archive segments as input. For more information about the

GIMZIP and GIMUNZIP service routines, refer to *SMP/E Reference*. For more information about the RECEIVE commands, refer to *SMP/E Commands*.

Also, you can now use the SMPWKDIR DD statement to specify a location for temporary files produced during GIMZIP processing.

### **Coexistence considerations**

SMP/E releases prior to SMP/E V3R2 cannot process GIMZIP output that contains segmented archive files. A toleration PTF will issue an error message should a user try to process GIMZIP output that contains segmented archive files on a release of SMP/E prior to V3R2.

## **GIMZIP: User defined subdirectories**

Users of GIMZIP may now specify subdirectories in which to store documentation, samples, readme files, and other files. This is done with the new **subdir** attribute of the <FILEDEF> tag of the GIMZIP package control statement. The subdirectory is created in a UNIX file system, within the parent directory pointed to by the SMPDIR DD statement in the JCL used to invoke GIMZIP.

### **Coexistence considerations**

Unless the required PTF is installed, SMP/E releases prior to SMP/E V3R2 cannot process GIMZIP packages that exploit user-defined subdirectories.

## **Java archive files**

Many z/OS software products developed with Java use Java Archive (JAR) files as the packaging format for Java application files. To better accommodate such products, SMP/E V3R2 is introducing JAR file update support. For SMP/E, there will be two forms of JAR files; JAR replacement files and JAR update files. JAR replacement files are complete replacements for a JAR file and are treated simply as files in the UNIX file system. SMP/E will copy replacement JAR files into the UNIX file system, just as is done for hierarchical file system elements. JAR update files are archive files themselves, but do not contain all of the component files that make up the complete JAR file. A JAR update file contains only the new and changed component files. These new and changed component files are archived into a JAR file. SMP/E uses the JAR command and the contents of a JAR update file to update an existing JAR file.

For information about the JAR command and JAR files, refer to the “Java Developer Connection, Using JAR Files: The Basics”, at <http://developer.java.sun.com/developer/Books/JAR/basics/index.html>

### **Coexistence considerations**

SMP/E releases prior to SMP/E V3R2 cannot process JAR replacement files or JAR update files, nor can they process the data entries for these elements. A toleration PTF will cause SMP/E to issue an error message if it encounters an unsupported JAR element or data entry.

## **Smaller SMPLTS data set**

The SMPLTS data set is used by SMP/E to save the base version of a product’s load modules that use callable services. To reduce SMPLTS space requirements, SMP/E now saves a base version of a load module in the SMPLTS data set only if it contains both CALLLIBS and XZMOD subentries. If a load module contains CALLLIBS subentries, but no XZMOD subentries, this load module is not saved in the SMPLTS.

For more detailed information about these command changes, refer to *SMP/E Commands*.

### Coexistence considerations

The SMPLTS data set used by SMP/E V3R2 may not contain the base version of load modules with CALLLIBS subentries. Because of this, once the SMPLTS has been modified by SMP/E V3R2, you cannot use certain commands from older levels of SMP/E that depend on the base version of a load module being in the SMPLTS data set. Specifically, if any of the following updates were made to a zone with load modules containing CALLLIBS but no XZMOD subentries, the target zone is marked:

- CLEANUP command is run against the zone
- GENERATE command is run against the zone
- APPLY or RESTORE command is run and the base version of the load module is deleted from the SMPLTS

A toleration PTF against older releases of SMP/E allows certain commands to be processed against a target zone that has been marked to indicate that the SMPLTS data set can not be used. These commands do not depend on the base version of load modules existing in the SMPLTS:

- APPLY
- BUILD MCS
- CLEANUP
- DEBUG
- GENERATE
- JCLIN
- LIST
- LOG
- RESET RC
- SET
- UCLIN
- UNLOAD
- ZONE COPY
- ZONE DELETE
- ZONE EDIT
- ZONE EXPORT
- ZONE IMPORT
- ZONE MERGE

The toleration PTF also prohibits the RESTORE or LINK MODULE command from being run against a target zone that has been marked.

### DUMMY data set for SYSDEFSD

The SYSDEFSD DD statement defines the location for the binder to write IMPORT statements for all exported entries of a DLL load module. Whenever entries are to be exported, the binder expects the SYSDEFSD data set and, if it is not present, will issue a warning message to indicate the missing data set. Product developers who supply DLLs do not always want or need the IMPORT statements associated with a DLL retained. In these instances, the SYSDEFSD would be better defined as either a temporary or DUMMY data set.

SMP/E is defining a new ddname called SMPDUMMY, which will always be allocated as 'DD DUMMY'. Product packagers may now specify the SYSDEFSD DD statement in the JCLIN input stream as any of the following:

- //SYSDEFSD DD DSN=SMPDUMMY,DISP=xxx

- //SYSDEFSD DD DSN=NULLFILE
- //SYSDEFSD DD DUMMY

In each case, the SIDE DECK LIBRARY subentry of the LMOD entry will be set to SMPDUMMY. When needed for processing, SMPDUMMY will be dynamically allocated by SMP/E as a DUMMY data set.

### Coexistence considerations

Unless the required PTF is installed, SMP/E releases prior to SMP/E V3R2 cannot process SYSMOD input that uses the SYSDEFSD DUMMY enhancement, nor can they process the data entries for these elements.

For more information about SYSDEFSD DUMMY, refer to *SMP/E Reference*.

## SMP/E dialog customization

A new option, Option 0, has been added to the SMP/E Primary Option Menu GIM@PRIM to implement the current SMP/E customization options. This new option allows you to enter or change the values for the customization options that were previously found in panel GIM@UPRM. When you select option 0 from the GIM@PRIM panel, the panel GIM@PARM will appear. The options you then specify are saved permanently in the ISPF profile pool for later use by other SMP/E dialog processes.

### Migration tasks

All dialog customization formerly specified on panel GIM@UPRM must now be specified using Option 0 on the SMP/E Primary Option Menu. When you move to a new release of SMP/E and continue to use the same ISPF profile data set, no migration actions are required to use the options previously entered and saved.

For more information about SMP/E dialog customization, refer to the tutorial panels that accompany the SMP/E dialogs.

## GIMUTTBL removal

Module GIMUTTBL and load module GIMUTTBL are no longer supplied as part of SMP/E. Macro GIMDFUT, which was used to replace the IBM-supplied copy of GIMUTTBL, is also no longer supplied. GIMUTTBL was formerly used to specify which utility programs SMP/E can call.

### Migration tasks

You can specify which utility programs SMP/E can call by using the PROGRAM class of the z/OS Security Server (RACF). Refer to *z/OS Security Server RACF Security Administrator's Guide*, SA22-7683 for more information about how to use this function.

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## SMP/E V3R1 overview

The following sections describe the new and changed SMP/E functions that are introduced for SMP/E V3R1. The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## Defining exit routines using SMPPARM member GIMEXITS

SMP/E V3R1 allows you to define exit routines that are to be given control during SMP/E processing by specifying new GIMEXITS control statements in SMPPARM member GIMEXITS. This replaces the previous method of updating module GIMMPUXD. Putting the exit routine information in an SMPPARM member means that the information is persistent and that you do not need to update module GIMMPUXD every time a new release of SMP/E is installed.

### Migration tasks

If you have existing exit routines defined in GIMMPUXD or wish to create new exit routines, you must define them in a GIMEXITS member. Any exit routines defined in GIMMPUXD will be ignored by SMP/E

For more detailed information about this change, refer to *SMP/E Reference*.

## Dynamic allocation using SMPPARM member GIMDDALC

SMP/E V3R1 allows you to define data sets to be dynamically allocated by SMP/E by specifying new GIMDDALC control statements in SMPPARM member GIMDDALC, as well as by using DDDEF entries. This replaces the previous method of updating module GIMMPDFT. Putting the dynamic allocation information in an SMPPARM member means that the information is persistent and that you do not need to update module GIMMPDFT every time a new release of SMP/E is installed.

### Migration tasks

If you have used GIMMPDFT to define data sets for dynamic allocation, you must create new definitions in GIMDDALC. SMP/E will ignore any definitions in GIMMPDFT.

For more information about this change, refer to *SMP/E Reference*.

## Enhanced link name values

SMP/E V3R1 has increased the maximum length allowed for a hierarchical file system element LINK value from 64 characters to 1023 characters. SMP/E has also increased the maximum length allowed for the alias values on ALIAS link-edit control statements from 64 characters to 1023 characters.

### Coexistence considerations

Unless the required PTF is installed, SMP/E releases prior to SMP/E V3R1 cannot process a SYSMOD containing a hierarchical file system element MCS that specifies a LINK value longer than 64 characters, nor can they process a hierarchical file system element entry containing a LINK subentry, or an LMOD entry containing an LMODALIAS subentry, created by SMP/E V3R1, or higher. If installed, the PTF will update the SMP/E Query dialogs and the GIMAPI to retrieve and display information about LINK or LMODALIAS subentries created by SMP/E V3R1, or higher. For all other SMP/E processing, the PTF will cause SMP/E to issue an error message if it encounters an unsupported LINK value or LINK or LMODALIAS subentry.

### Migration tasks

An application program that uses the SMP/E Alias Record Type 0 (A0) library change record may need to be updated to handle alias and link values of up to 1023 characters to avoid truncating data. For more information about this change, refer to the chapter on Library Change File Records in *SMP/E Reference*.



An application program that uses the GIMAPI to query the LINK subentry of a hierarchical file system element entry or the LMODALIAS subentry of an LMOD entry may need to be updated to allow for the longer length of these subentries. For more information about this change, refer to the description of these subentries in the GIMAPI chapter of *SMP/E Reference*.

## Removal of function to create backup IEANUC01 load modules

The ability to save the target system's nucleus load module (IEANUC01) during APPLY, LINK, and RESTORE command processing has been removed from z/OS V1R2 SMP/E. The NUCID operand of the APPLY command and the NUCID subentry are no longer supported and will be ignored by SMP/E if specified.

### Migration tasks

An application program that uses the GIMAPI to query the NUCID subentry of an OPTIONS entry must be updated because this subentry no longer exists. For more information about the GIMAPI, refer to the GIMAPI chapter of *SMP/E Reference*.

## Conditional JCLIN processing

SMP/E V3R1 allows a packager to use special JCL comments in the JCLIN input to cause SMP/E to skip over parts of the JCLIN input based on the installation environment. The parts of the JCLIN input that are skipped are not processed by the JCLIN command and do not contribute to the structure information derived from JCLIN processing.

For more information about this change, refer to the section on "Conditional JCLIN Comment Statements" in *SMP/E Commands*, SA22-7771.

### Coexistence considerations

Unless the required PTF is installed, SMP/E releases prior to SMP/E V3R1 cannot process JCLIN input that contains the special JCL comments used to skip over parts of the JCLIN input. If installed, the PTF will cause SMP/E to issue an error message if the unsupported JCL comments are encountered.

## Network delivery of SMP/E input

SMP/E V3R1 can receive input from a network server, in addition to tape and DASD. This enables the delivery of SMP/E-installable products and service over the internet or an intranet. By installing software directly from a network source, SMP/E enables a more seamless integration of electronic software delivery and installation. This reduces the tasks and time required to install software delivered electronically.

SMP/E also provides the GIMZIP and GIMUNZIP service routines to construct, and then later unwrap, network transportable packages of software. This allows you to create your own packages of SMP/E installable software, and then distribute them within your own enterprise, or to other enterprises. Specifically, the GIMZIP service routine will accept partitioned or sequential data sets as input and will create a network transportable package as output. For more information on the GIMZIP and GIMUNZIP service routines, see *SMP/E Reference*, SA22-7772.

Once a package is made accessible on an FTP server, you can use the SMP/E RECEIVE command to transfer the package through a TCP/IP network directly into an SMP/E environment. The RECEIVE command has been extended with new DELETEPKG, FROMNETWORK, and FROMNTS operands to process these

network transportable packages. For more information on the RECEIVE command changes, see *SMP/E Commands*, SA22-7771.

New CLIENT and SERVER data sets and SMPDIR and SMPNTS directories have been created to support this new processing. For more information on CLIENT, SERVER, SMPDIR, and SMPNTS, see *SMP/E Reference*, SA22-7772.

### **Coexistence considerations**

Network delivery of SMP/E input requires a new packaging format for that input and new operands on the RECEIVE command. SMP/E releases prior to z/OS SMP/E cannot process this new packaging format and do not recognize the new RECEIVE command operands.

## **AMODE=64 and COMPAT=PM4 link edit parameters**

SMP/E V3R1 recognizes and saves the AMODE=64 and COMPAT=PM4 link edit parameters.

The AMODE option assigns the addressing mode for all of the entry points into a program module (the main entry point, its true aliases, and all of the alternate entry points). AMODE=64 instructs the binder to create AMODE 31/64 executables with 8-byte adcons.

The COMPAT option identifies the compatibility level of the binder. COMPAT=PM4 allows the user to specify a compatibility level appropriate for AMODE=64 executables.

## **Selected SMP/E data sets may now reside in a UNIX file system**

SMP/E V3R1 allows the following data sets to reside in a UNIX file system:

- SMP\_CNTL
- SMP\_DEBUG
- SMP\_HOLD
- SMP\_JCLIN
- SMP\_LIST
- SMP\_OUT
- SMP\_PTFIN
- SMP\_PUNCH
- SMP\_RPT

For more information about this change, refer to the description of each of these data sets in *SMP/E Reference*.

## **HFS data set identification**

SMP/E V3R1 has enhanced the SMP/E File Allocation Report and SMP/E library change file records to identify the physical HFS data sets where files in a UNIX file system reside.

## **SMPPTS spill data sets**

SMP/E RECEIVE processing can use SMPPTS spill data sets, if defined, to store SYSMODs when the primary SMPPTS data set is full. Up to 99 spill data sets, named SMPPTS1 through SMPPTS99, can be defined with DD statements or



DDDEFs. By eliminating the tasks involved when recovering from an overflowing SMPPTS data set, the use of SMPPTS spill data sets can reduce the amount of manual intervention and data set management required to install software service.

## **HOLDDATA summary reports**

SMP/E V3R1 now provides additional HOLDDATA reports for APPLY and ACCEPT processing. The new reports provide you with ++HOLD information in the context of the APPLY or ACCEPT processing output. This frees you from having to manually collect this information, thus saving you significant research time.

## **SMP/E load modules and service routines moved to SYS1.MIGLIB**

The SMP/E load modules, service routines, and other SMP/E components that formerly resided in the SYS1.LINKLIB library have been moved to SYS1.MIGLIB. Putting SMP/E into SYS1.MIGLIB enables a driving system to STEPLIB to SMP/E while ensuring that the STEPLIB does not expose the driving system to other executables that are not at the correct level for the driving system.

## **GIMXTRX service routine**

GIMXTRX is intended for use as part of an offering called ShopzSeries. It provides two basic functions:

1. Generate a list of target zone names associated with a given GLOBAL zone SMPCSI data set name.
2. Generate a BITMAP representation of FUNCTION and PTF SYSMODs found in a given list of target zone names associated with a given GLOBAL zone SMPCSI data set name.

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## **OS/390 version 2 release 7 SMP/E overview**

The following sections describe the new and changed SMP/E functions that are introduced for OS/390 Version 2 Release 7 (V2R7). (This level of SMP/E was also supplied with OS/390 Version 2, Releases 8, 9, and 10.) The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## **SMP/E planning and migration assistant**

OS/390 V2R7 (or later) SMP/E provided a Planning and Migration Assistant to assist users in managing their existing system and planning to migrate to a new OS/390 system.

## **Data element reformatting**

SMP/E can install data elements during APPLY, ACCEPT, RESTORE, and GENERATE into the output data sets based on their physical attributes.

### **Coexistence considerations**

Releases of SMP/E prior to OS/390 Version 2 Release 7 cannot process the DEIINST and HFSINST jobs created by the GENERATE command of SMP/E V3R1 or z/OS SMP/E. Also, an HFSINST job created by the GENERATE command from a release of SMP/E prior to OS/390 Release 7 cannot be processed by z/OS SMP/E or by OS/390 V2R7 (or later) SMP/E.

Rerun the GENERATE job using the SMP/E release that will be used to process the resulting JCL.

## **Description for a SYSMOD**

OS/390 V2R7 (or later) SMP/E enabled product developers and packagers to include additional descriptive information in a SYSMOD header MCS (that is, in a ++APAR, ++FUNCTION, ++PTF, or ++USERMOD statement).

## **Improved protection for UNIX file system files**

Before manipulating files in a UNIX file system, SMP/E temporarily switches the SMP/E user to superuser authority (UID=0) when manipulating files in the UNIX file system and restores the user to the previous level of authority when the SMP/E updates are done. This means that SMP/E users do not need to have UID=0 (superuser) authority all the time, which reduces the chance of such users accidentally erasing or damaging files in a UNIX file system while performing non-SMP/E work.

### **Coexistence considerations**

The SMP/E user must be defined to the security class BPX.SUPERUSER for this process to work properly.

## **Pre-built load module support**

The ++PROGRAM MCS can be used to add, replace, or delete pre-built load modules and program objects in PDS and PDSE data sets as complete entities in functions and PTFs.

## **Product data**

The ++PRODUCT and ++FEATURE MCS can be used to add, replace, or delete additional product and feature data.

## **Sequential data set support**

SMP/E can now install a data element into a sequential data set.

### **Coexistence considerations**

Releases of SMP/E prior to OS/390 Version 2 Release 7 cannot process the DEIINST and HFSINST jobs created by the GENERATE command of SMP/E V3R1 or z/OS SMP/E. Also, an HFSINST job created by the GENERATE command from a release of SMP/E prior to OS/390 Version 2 Release 7 cannot be processed by z/OS SMP/E or by OS/390 V2R7 (or later) SMP/E.

Rerun the GENERATE job using the SMP/E release that will be used to process the resulting JCL.

## **Shell script support**

OS/390 V2R7 (or later) SMP/E enabled the execution of UNIX shell scripts during SMP/E installation of code into the OS/390 UNIX Services environment. SMP/E

provides a generic interface to enable a packager to deliver a shell script that can be executed during SMP/E installation, thus reducing the pre-install and post-install requirements of OS/390 UNIX Services application programs.

## Symbolic link support

Symbolic links can be specified on hierarchical file system MCS.

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## OS/390 version 2 release 5 SMP/E overview

The following sections describe the new and changed SMP/E functions that are introduced for OS/390 Version 2 Release 5 (V2R5). (This level of SMP/E was also supplied with OS/390 Version 2 Release 6.) The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## CBIPO dialogs

The CBIPO installation dialogs formerly included with SMP/E were removed from SMP/E in OS/390 V2R5 SMP/E. Customers wishing to install a CBIPO on an OS/390 system may still do so using bootstrap dialogs provided with the CBIPO.

## Client code installation

OS/390 V2R5 (or later) SMP/E provides facilities to simplify the installation of cooperative or client/server products (such as OS/2). This is done with a common SMP/E packaging structure, a common S/390 server repository for client components, and a server repository accessible from any client platform. These facilities allow, for example, storing the client parts in a UNIX file system and thereby allowing them to be packaged and installed along with the host parts, rather than separately.

### Coexistence considerations

Enhanced hierarchical file system element MCS cannot be used by SMP/E releases prior to OS/390 V2R5 SMP/E, unless the required PTF is installed.

## Global zone merge

OS/390 V2R5 (or later) SMP/E provides a method to merge information from one global zone into another global zone, which customers can use to reduce the number of global zones that they must manage. The merged information includes:

- SYSMOD and HOLDDATA entries,
- SYSMOD members in the SMPPTS data set,
- OPTIONS, UTILITY, DDDEF, ZONESET, and FMIDSET entries
- Global zone entry information, such as zone indexes, FMID list, and SRELs.

This facility is useful to customers who use ServerPac.

## Library change interface

OS/390 V2R5 (or later) SMP/E provides a programming interface that can be used to obtain a synopsis of SMP/E APPLY and RESTORE processing at the library or

member level. Customers can use this interface to propagate the libraries and members modified by SMP/E APPLY and RESTORE processing to other systems requiring the changes, thereby facilitating the integration of SMP/E-managed information in multisystem environments.

### **Coexistence considerations**

OPTIONS entries that contain the CHANGEFILE subentry cannot be used by SMP/E releases prior to OS/390 V2R5 SMP/E, unless the required PTF is installed.

## **Improved load module build processing**

OS/390 V2R5 (or later) SMP/E will not build a load module if SMP/E cannot include all of the load module's component modules that have been installed or are being installed. If such a load module can not be completely built, SMP/E terminates APPLY processing for all affected SYSMODs. In addition, OS/390 V2R5 (or later) SMP/E reduces the likelihood of termination owing to incomplete load modules by expanding its search for the component modules to include copies of modules from within previously installed SYSMODs in the SMPPTS data set.

## **Load module return code**

OS/390 V2R5 (or later) SMP/E allows product packagers to provide information in the JCLIN to identify the highest return code allowable for each load module. IBM will provide toleration PTFs for this function for prior releases of OS/390 and currently supported releases of SMP/E.

### **Coexistence considerations**

LMOD entries that contain the RETURN CODE subentry cannot be used by SMP/E releases prior to OS/390 V2R5 SMP/E, unless the required PTF is installed.

## **Performance improvements**

OS/390 V2R5 (or later) SMP/E provides for multitasking of link-edit operations during APPLY, ACCEPT, and RESTORE processing.

## **PTF compaction in SMPPTS data set**

OS/390 V2R5 (or later) SMP/E compacts the SYSMOD (PTF) data within the SMPPTS data set to reduce its size. This ability to compact PTF data prior to release by IBM also allows IBM to shrink the size of the OS/390 service stream, thus reducing the amount of physical media (tapes) required to distribute service, as well as shrink the size of service distributed through various electronic mediums.

### **Coexistence considerations**

- Compacted SMPPTS data created by OS/390 V2R5 (or later) SMP/E cannot be used by releases prior to OS/390 V2R5 SMP/E, unless the required PTF is installed.
- OPTIONS entries that contain the COMPACT subentry cannot be used by SMP/E releases prior to OS/390 V2R5 SMP/E, unless the required PTF is installed.

## **Enhanced RECEIVE command processing**

OS/390 V2R5 (or later) SMP/E enables users to prevent the RECEIVE command from processing SYSMODs that are already applied or accepted. Users can specify

this with the OPTIONS entry, on the RECEIVE command, or both. This enhancement reduces the need for the user to manually manage the SMPPTS with REJECT commands.

### **Coexistence considerations**

OPTIONS entries that contain the RECZGRP and RECEXZGRP subentries cannot be used by SMP/E releases prior to OS/390 V2R5 SMP/E.

## **Reduced SMP/E message output**

OS/390 V2R5 (or later) SMP/E reduced the number of messages issued during APPLY, ACCEPT, and RESTORE processing for easier identification of potential problems. Also, users may specify that messages issued to SMPOUT be formatted to an 80 character width, instead of the previous 120 character width, to make the messages easier to view when displayed on a terminal screen.

### **Coexistence considerations**

OPTIONS entries that contain the MSGWIDTH and MSGFILTER subentries cannot be used by SMP/E releases prior to OS/390 V2R5 SMP/E.

## **GIMAPI: All entries and subentries support**

For OS/390 V2R5 (or later) SMP/E, an application program using the GIMAPI QUERY command may specify an asterisk (\*) on entry and subentry parameters to retrieve the Consolidated Software Inventory (CSI) data for all entry types, all subentries, or both.

## **GIMAPI: Version support**

OS/390 V2R5 (or later) SMP/E can supply to an application program the version of GIMAPI being executed to retrieve information from the CSI. This allows the application program to determine whether information stored in the CSI is supported with the level of the QUERY program that is being executed.

### **Coexistence considerations**

Application programs cannot use the VERSION command of the GIMAPI programming interface on releases of SMP/E prior to OS/390 V2R5 (or later) SMP/E, unless the required PTF is installed.

---

## **OS/390 version 1 release 3 SMP/E overview**

The following sections describe the new and changed SMP/E functions that are introduced for OS/390 Version 1 Release 3 (V1R3). (This level of SMP/E was also supplied with OS/390 Version 2 Release 4.) The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## **API for user access to the CSI**

A programming interface is provided for read only access to SMP/E's consolidated software inventory (CSI) data. The data in CSI can be used to further automate systems management tasks.

A program called GIMAPI is used to invoke the API. The function can be called from different languages. Examples are provided for C/370 and PL/I.

The following commands are used with the GIMAPI call:

- QUERY** Request data from the SMP/E CSI and return it to the calling program.
- FREE** Free storage allocated by invocations of the QUERY command.

## Enhanced cross-zone requisite checking

Cross-zone requisite checking is enhanced. Immediate feedback from the **APPLY**, **ACCEPT**, and **RESTORE** commands assists you in verifying that cross-zone requisites are installed and satisfied.

Optional parameters with these commands provide you the flexibility to:

- Override SMP/E's default method for determining which zones are checked for cross-zone requisites
- Install unsatisfied cross-zone requisites into the set-to zone
- Lessen the severity of a missing cross-zone requisite to a warning versus a terminating error

### Coexistence considerations

Releases of SMP/E prior to OS/390 V1R3 SMP/E cannot perform the cross-zone requisite checking requested by the XZREQCHK(YES) subentry of a ZONESET entry and will ignore the request.

## Enhanced exception SYSMOD report

The enhanced Exception SYSMOD Report, available as a small programming enhancement (SPE) for OS/390 V1R3 SMP/E, includes IBM OS/390 Enhanced HOLDDATA that is provided in ++HOLD statements. The report is reformatted so that it is ordered by FMID within each requested zone. (Previously, the report was ordered by SYSMOD within each zone.) A summary section is placed at the end of the report. The enhanced REPORT ERRSYSMODS command continues to work with legacy HOLDDATA.

The REPORT ERRSYSMODS command has also been enhanced by this SPE to handle held SYSMODs. Previously, a held, resolving SYSMOD was placed in the SMPPUNCH output, but was commented out. The customer had to rerun REPORT ERRSYSMODS command against the GLOBAL zone to determine if the held, resolving SYSMOD had an available resolving SYSMOD. REPORT ERRSYSMODS does this research for the customer and produces one SMPPUNCH output.

### Coexistence considerations

- The REPORT ERRSYSMODS command in SMP/E releases prior to OS/390 V1R3 cannot display IBM z/OS Enhanced HOLDDATA as intended. OS/390 V1R3 and V2R4 require the installation of the appropriate SPE.
- The format of the HOLDDATA provided by the SMARTMVS service in Europe or the Electronic HOLDDATA service in the U.S. is not compatible with z/OS Enhanced HOLDDATA and does not take advantage of the enhanced REPORT ERRSYSMODS command. Customers who currently use these services, and who wish to make full use of the REPORT ERRSYSMODS command, must refresh their CSI's HOLDDATA with z/OS Enhanced HOLDDATA.



## Enhanced ++IF FMID processing

z/OS SMP/E allows the ++IF MCS FMID operand to specify the same value as the value of the FMID operand of the previous ++VER MCS (if the SYSMOD is not a base function) or the name of the SYSMOD (if the SYSMOD is a base function).

## Enhanced internal HOLD SYS processing

Analysis of internal HOLD information when one SYSMOD supersedes another is simplified. When a SYSMOD has ++HOLD information and it is superseded by another SYSMOD, the ++HOLD can be brought forward unchanged. The SYSMOD ID on the ++HOLD need not change to that of the superseding SYSMOD. Even if the SYSMOD ID on the ++HOLD is not the same as the containing SYSMOD, the ++HOLD is effective only against the SYSMOD that contains it. If the SYSMOD ID on the ++HOLD is not the same as the containing SYSMOD, SMP/E can determine if internal HOLDS are satisfied during APPLY and ACCEPT processing and thereby eliminate manual analysis.

### Coexistence considerations

SYSMODs that contain a ++HOLD MCS that specifies a SYSMOD ID that is superseded on a preceding ++VER MCS cannot be processed by previous releases of SMP/E during RECEIVE processing, unless the appropriate PTF is installed for the prior release.

## Enhanced ZONEEDIT command

The ZONEEDIT command is enhanced to provide a simplified method of changing path names. A PATH subentry is included on the unconditional CHANGE statement of the ZONEEDIT DDDEF command.

An example of when you might want to use the PATH subentry on the CHANGE statement is to modify path names of DDDEFs during the z/OS UNIX service process.

## Enhancements to the binder utility in DFSMS/MVS

SMP/E can use enhancements to the binder utility in DFSMS/MVS. The enhancements to the binder include elimination of the LE/370 prelinker utility, and building dynamic load library (DLL) program objects. SMP/E's support includes:

- New link-edit parameters are recognized on the LEARM operand of the ++MOD MCS and in JCLIN used to define a load module. The new parameters are ALIASES, DYNAM, FILL, HOBSET, REUS(NONE|REFR|RENT|SERIAL), RMODE=SPLIT, and UPCASE(YES|NO). All of these new parameters can be specified in JCLIN and all except ALIASES and DYNAM can be specified on the LEARM operand.
- SMP/E supports the binder in dynamically building a definition side deck file for DLL program objects when those program objects are installed. The library to contain the definition side deck file is identified by a new side deck library (SIDEDECKLIB) subentry in the LMOD entry.
- Load modules that use DLLs can reference the definition side deck files associated with the DLLs. This is done by including the definition side deck files during a link-edit operation. The LMOD entry will contain a new utility input (UTIN) subentry list to record definition side deck files to be included during a link-edit operation.

### Coexistence considerations

Releases of SMP/E prior to OS/390 V1R3 SMP/E cannot:

- Correctly install products and service that were developed for installation using the INCLUDE statements in JCLIN that identify UTILITY INPUT for a load module, the SYSDEFSD DD statements in JCLIN that identify the definition side deck library for a load module, and the FILL, HOBSET, RMODE=SPLIT, and EXITS link edit attributes on the LEPARM operand on the ++MOD MCS and in JCLIN.
- Use target and distribution zones containing LMOD or MOD entries updated by OS/390 V1R3 (or later) with FILL, HOBSET, RMODE=SPLIT, EXITS, ALIASES, or DYNAM link edit parameters in the MOD and LMOD entries, the UTILITY INPUT subentry list, or the SIDE DECK LIBRARY subentry in the LMOD entries.

## System/390 service update facility

The System/390 Service Update Facility (SUF) available as a small programming enhancement (SPE) for OS/390 V1R3 SMP/E, provides, along with other System/390 products, provides a common tool across multiple platforms to help customers to maintain their systems with System/390 service facilities.

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## OS/390 version 1 release 2 SMP/E overview

The following sections describe the new and changed SMP/E functions that are introduced for OS/390 Version 1 Release 2 (V1R2). The information about each item includes:

- Description
- Summary of the SMP/E tasks or interfaces that might be affected
- Coexistence considerations, if any, that are associated with the item
- Migration procedures, if any, that are associated with the item
- References to other publications that contain additional detailed information

## BLOCKSIZE=8800 for SMP/E data sets

For the RELFILE data sets, target libraries, and distribution libraries containing z/OS SMP/E, data sets that are allocated with RECFM=FB and LRECL=80 are allocated with BLKSIZE=8800.

## BUILDMCS command

The BUILDMCS command provides a process for copying products from one pair of target and distribution zones and libraries, to another pair of target and distribution zones and libraries. This command generates the MCS and JCLIN required to reinstall the specified FMIDs.

### Coexistence considerations

SYSMOD input (modification control statements) created by the BUILDMCS command cannot be processed by SMP/E releases prior to OS/390 V1R2 SMP/E, unless the required PTF is installed.

## Bypassing system holds for specific SYSMODs

For APPLY and ACCEPT processing, you can bypass a particular system hold for specific SYSMODs, instead of for all SYSMODs held for that reason ID. For example, a number of SYSMODs might be held because they require you to take some required action before installing them. If you have completed the required



action for some (but not all) of the held SYSMODs, you can request SMP/E to bypass that hold reason ID only for the SYSMODs you specify. All other SYSMODs affected by that reason ID remain held.

## **FMIDSET selection**

SMP/E provides additional granularity of FMIDSET specification on the SELECT operand of the APPLY, ACCEPT, RESTORE, and RECEIVE commands to allow you to install sets of FMIDs.

## **Receiving relative file data sets created from PDSEs**

When allocating a new SMPTLIB data set during RECEIVE processing, SMP/E checks the format of the associated relative file (RELFILE) data set, then uses the appropriate data set type (LIBRARY or PDS) for the SMPTLIB data set. Here are some benefits of this change:

- When packaging SYSMODs, you can ship program objects in RELFILES, because SMP/E can load RELFILES that were created from PDSEs into SMPTLIB data sets that are PDSEs.
- When receiving SYSMODs, you do not have to preallocate SMPTLIB data sets with the appropriate data set type, because SMP/E can allocate the SMPTLIB data set as PDS or LIBRARY, based on the format of the corresponding RELFILE data set.

## **SMP/E dialogs: FIND command**

You can use the FIND primary command in the SMP/E dialogs. The FIND command makes it easier for you to quickly locate a specified character string in the table display section of panels in the following dialogs:

- SYSMOD Management
- Query
- Receive

Panels that allow the FIND command state that you can use the command. The help panels for these dialog panels explain how to use the FIND command.

## **SMP/E GIMOPCODE member moved from PARMLIB**

The GIMOPCODE member, which SMP/E optionally uses to determine valid OPCODES during the scanning of JCLIN, has been removed from PARMLIB. Instead, a ready-to-use default set of OPCODE definitions is contained within SMP/E.

You may optionally provide an SMPPARM data set, which may contain your own OPCODE member to override the defaults supplied with SMP/E. The user-provided OPCODE member is a text member that you store in a user-allocated PDS named SMPPARM. You are not required to allocate the SMPPARM data set, unless you want to supply your own OPCODE member. If you provide an OPCODE member, it is used instead of SMP/E's default set.

SMP/E also provides a sample text member, named GIMOPCODE, that you can use as a starting point for creating your own OPCODE member.

---

## **Summary of interface changes**

This section summarizes the new and changed interface components of z/OS SMP/E.

## Commands

Table 16 lists the changes to the SMP/E commands for this release. See *SMP/E Commands*, SA22-7771 for more detailed information about these commands.

Table 16. Summary of changed commands

| Command name    | Release    | Description                            | Related support                                                          |
|-----------------|------------|----------------------------------------|--------------------------------------------------------------------------|
| APPLY           | SMP/E V3R1 | <b>Changed:</b> NUCID operand removed  | “Removal of function to create backup IEANUC01 load modules” on page 203 |
| LINK LMODS      | SMP/E V3R2 | <b>New:</b> for load module management | “Smaller SMPLTS data set” on page 199                                    |
| RECEIVE         | SMP/E V3R1 | <b>Changed:</b> New operands           | “Network delivery of SMP/E input” on page 203                            |
| REJECT          | SMP/E V3R3 | <b>Changed:</b> New CHECK operand      | “REJECT CHECK command” on page 197                                       |
| REPORT CALLLIBS | SMP/E V3R2 | <b>Removed</b>                         | “Smaller SMPLTS data set” on page 199                                    |
| UPGRADE         | SMP/E V3R2 | <b>New:</b> for change control         | “UPGRADE command” on page 198                                            |

## Data sets and files

Table 17 lists the changes to the SMP/E data sets and files for this release. See *SMP/E Reference*, SA22-7772 for more detailed information about these data sets and files.

Table 17. Summary of changed data sets

| Data set | Release    | Description                                                                           | Related support                               |
|----------|------------|---------------------------------------------------------------------------------------|-----------------------------------------------|
| SMPCLNT  | SMP/E V3R3 | <b>New:</b> for GIMGTPKG service routine processing                                   | “GIMGTPKG service routine” on page 196        |
| SMPSRVR  | SMP/E V3R3 | <b>New:</b> for GIMGTPKG service routine processing                                   | “GIMGTPKG service routine” on page 196        |
| SMPWKDIR | SMP/E V3R2 | <b>New:</b> for GIMZIP, GIMUNZIP, RECEIVE FROMNETWORK, and RECEIVE FROMNTS processing | “GIMZIP: Archive segmentation” on page 198    |
| SYSDEFSD | SMP/E V3R2 | <b>Changed:</b> to allocate a DUMMY data set                                          | “DUMMY data set for SYSDEFSD” on page 200     |
| CLIENT   | SMP/E V3R1 | <b>New:</b> for RECEIVE FROMNETWORK processing                                        | “Network delivery of SMP/E input” on page 203 |
| SERVER   | SMP/E V3R1 | <b>New:</b> for RECEIVE FROMNETWORK processing                                        | “Network delivery of SMP/E input” on page 203 |
| SMPDIR   | SMP/E V3R1 | <b>New:</b> for GIMZIP and GIMUNZIP processing                                        | “Network delivery of SMP/E input” on page 203 |
| SMPNTS   | SMP/E V3R1 | <b>New:</b> for RECEIVE FROMNETWORK and RECEIVE FROMNTS processing                    | “Network delivery of SMP/E input” on page 203 |
| SMPPTS   | SMP/E V3R1 | <b>Changed:</b> Spill data sets may be defined                                        | “SMPPTS spill data sets” on page 204          |

Table 17. Summary of changed data sets (continued)

| Data set | Release    | Description                                                         | Related support                                                             |
|----------|------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------|
| various  | SMP/E V3R1 | <b>Changed:</b> Selected data sets may reside in a UNIX file system | "Selected SMP/E data sets may now reside in a UNIX file system" on page 204 |

## Exits

Although the methods by which SMP/E exits are invoked has changed (see the entry on GIMEXITS in Table 23 on page 218), no changes have been made to the SMP/E exits themselves. For more information on SMP/E exits, see *SMP/E Reference*.

## Macros

Table 18 lists the changes to the SMP/E macros for this release.

Table 18. Summary of Changed Macros

| Macro    | Release    | Description | Related support                                                    |
|----------|------------|-------------|--------------------------------------------------------------------|
| GIMDFUT  | SMP/E V3R2 | Deleted     | "SMP/E dialog customization" on page 201                           |
| GIMMPUXD | SMP/E V3R1 | Deleted     | "Defining exit routines using SMPPARM member GIMEXITS" on page 202 |

## Messages

This section describes the new and changed SMP/E messages. To determine if updates are required, compare the message identifiers and the corresponding message text with any automated operation procedures your installation uses.

See *SMP/E Messages, Codes, and Diagnosis*, GA22-7770 for detailed information about these SMP/E messages. For information about other z/OS message changes that may affect your installation, refer to *z/OS Summary of Message Changes*.

## Panels

Table 19 lists the new and changed SMP/E panels. Some panels may be updated by more than one release enhancement.

Table 19. Summary of new and changed panels

| Panel name | Release    | Description | Related support                          |
|------------|------------|-------------|------------------------------------------|
| GIM@PARM   | SMP/E V3R2 | New         | "SMP/E dialog customization" on page 201 |
| GIM@PRIM   | SMP/E V3R2 | Updated     | "SMP/E dialog customization" on page 201 |
| GIM@UPRM   | SMP/E V3R2 | Deleted     | "SMP/E dialog customization" on page 201 |
| GIMQIT28   | SMP/E V3R1 | Updated     | "Enhanced link name values" on page 202  |

Table 19. Summary of new and changed panels (continued)

| Panel name | Release    | Description | Related support                                                          |
|------------|------------|-------------|--------------------------------------------------------------------------|
| GIMCGRDI   | SMP/E V3R1 | Updated     | "Network delivery of SMP/E input" on page 203                            |
| GIMCGRVE   | SMP/E V3R1 | Updated     | "Network delivery of SMP/E input" on page 203                            |
| GIMCGAPA   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMDFOH    | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHCAP    | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHCNU    | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHIPB0   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHIPD1   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHIPN    | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHIP0P   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHOH0    | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHOO0    | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMHQ011   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |

Table 19. Summary of new and changed panels (continued)

| Panel name | Release    | Description | Related support                                                          |
|------------|------------|-------------|--------------------------------------------------------------------------|
| GIMHXA3B   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMISAPB   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMISAPD   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMQIT11   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| GIMQIX10   | SMP/E V3R1 | Updated     | "Removal of function to create backup IEANUC01 load modules" on page 203 |

## Programming interfaces

Table 20 identifies changes to the SMP/E programming interfaces.

Table 20. Summary of SMP/E programming interfaces

| Interface                   | Release    | Description                                                       | Related support                                                          |
|-----------------------------|------------|-------------------------------------------------------------------|--------------------------------------------------------------------------|
| GIMMPDFT                    | SMP/E V3R1 | Deleted                                                           | "Dynamic allocation using SMPARM member GIMDDALC" on page 202            |
| GIMMPUXD                    | SMP/E V3R1 | Deleted                                                           | "Defining exit routines using SMPARM member GIMEXITS" on page 202        |
| GIMUTTBL                    | SMP/E V3R2 | Deleted                                                           | "GIMUTTBL removal" on page 201                                           |
| GIMAPI                      | SMP/E V3R1 | <b>Changed:</b> length of the LINK and LMODALIAS subentries       | "Enhanced link name values" on page 202                                  |
| GIMAPI                      | SMP/E V3R1 | <b>Changed:</b> NUCID subentry deleted                            | "Removal of function to create backup IEANUC01 load modules" on page 203 |
| Library Change File Records | SMP/E V3R1 | <b>Changed:</b> length of alias and link values in A0 record      | "Enhanced link name values" on page 202                                  |
| Link Edit Parameters        | SMP/E V3R1 | <b>Changed:</b> additional values recognized for AMODE and COMPAT | "AMODE=64 and COMPAT=PM4 link edit parameters" on page 204               |

## Service routines

Table 21 on page 218 identifies changes to the SMP/E service routines.

Table 21. Summary of SMP/E service routines

| Interface | Release    | Description                                                                                | Related support                                   |
|-----------|------------|--------------------------------------------------------------------------------------------|---------------------------------------------------|
| GIMGTPKG  | SMP/E V3R3 | <b>New:</b> service routine to get GIMZIP packages                                         | "Network delivery of SMP/E input" on page 203     |
| GIMXSID   | SMP/E V3R2 | <b>New:</b> service routine for use with ShopzSeries                                       | "GIMXSID service routine" on page 198             |
| GIMZIP    | SMP/E V3R2 | <b>New:</b> <b>subdir</b> attribute on <FILEDEF> tag to create user-defined subdirectories | "GIMZIP: User defined subdirectories" on page 199 |
| GIMZIP    | SMP/E V3R2 | <b>New:</b> ARCHSEG tag to define an archive segment                                       | "GIMZIP: Archive segmentation" on page 198        |
| GIMZIP    | SMP/E V3R2 | <b>New:</b> SEGMENT option to define the size of archive segments                          | "GIMZIP: Archive segmentation" on page 198        |
| GIMUNZIP  | SMP/E V3R1 | <b>New:</b> service routine to unzip network packages                                      | "Network delivery of SMP/E input" on page 203     |
| GIMXTRX   | SMP/E V3R1 | <b>New:</b> service routine for use with ShopzSeries                                       | "GIMXTRX service routine" on page 205             |
| GIMZIP    | SMP/E V3R1 | <b>New:</b> service routine to create network packages                                     | "Network delivery of SMP/E input" on page 203     |

## SMPPARM members

Table 22 identifies changes to the SMPPARM members.

Table 22. Summary of SMP/E changes to SYS1.SAMPLIB

| Member name | Release    | Description                          | Related support                          |
|-------------|------------|--------------------------------------|------------------------------------------|
| GIMEXITS    | SMP/E V3R1 | <b>New:</b> Identifies exit routines | "SMP/E dialog customization" on page 201 |

## SYS1.SAMPLIB members

Table 23 identifies changes to the SMP/E members of SYS1.SAMPLIB.

Table 23. Summary of SMP/E changes to SYS1.SAMPLIB

| Member name | Release     | Description                                                 | Related support                                                    |
|-------------|-------------|-------------------------------------------------------------|--------------------------------------------------------------------|
| GIMASAMP    | OS/390 V1R3 | Contains sample GIMAPI assembler application program        | "API for user access to the CSI" on page 209                       |
| GIMCRSAM    | OS/390 V1R3 | Contains sample C/370 "clean-up FMIDs" program using GIMAPI |                                                                    |
| GIMCSAMP    | OS/390 V1R3 | Contains sample GIMAPI C/390 application program            | "API for user access to the CSI" on page 209                       |
| GIMDDALC    | SMP/E V3R1  | Contains sample statements for data set allocation          | "Dynamic allocation using SMPPARM member GIMDDALC" on page 202     |
| GIMEXITS    | SMP/E V3R1  | Contains sample statements for defining exit routines       | "Defining exit routines using SMPPARM member GIMEXITS" on page 202 |

Table 23. Summary of SMP/E changes to SYS1.SAMPLIB (continued)

| Member name | Release     | Description                                                                                                                                                                                     | Related support                                        |
|-------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| GIMOPCDE    | OS/390 V1R2 | Contains sample ODCDE statements                                                                                                                                                                | "SMP/E GIMOPCDE member moved from PARMLIB" on page 213 |
| GIMPRSAM    | OS/390 V1R3 | Contains sample PL/I "clean-up FMIDs" program using GIMAPI                                                                                                                                      |                                                        |
| GIMPSAMP    | OS/390 V1R3 | Contains sample GIMAPI PL/I application program                                                                                                                                                 | "API for user access to the CSI" on page 209           |
| GIMSAMPU    | pre-OS/390  | Contains sample UCLIN statements                                                                                                                                                                |                                                        |
| GIMSAMPU    | SMP/E V3R2  | <b>Updated:</b> Contains steps to allocate SMPCSI data sets and SMP/E operational data sets (such as SMPPTS and SMPLOG) and UCLIN statements to initialize the newly allocated SMPCSI data sets |                                                        |





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## Appendix B. Recommended service upgrade (RSU)

Recommended Service Upgrade (RSU) is a preventive service philosophy that applies to z/OS. RSU is intended to reduce the volume of PTFs customers must apply for preventive maintenance and to reduce the chance of encountering a PTF in error (PE), resulting in a more stable system.

IBM recommends that customers APPLY all RSU PTFs as preventive maintenance on their z/OS systems. However, customers must make the final decision as to what maintenance they will install.

The recommended service for the following products is tested in the Consolidated Service Test (CST) cycle:

- z/OS and OS/390
- CICS Transaction Server for OS/390
- DB2 UDB for OS/390
- IMS
- MQSeries for OS/390

Recommended Service Upgrades, with an SMP/E SOURCEID of RSUyymm, are available:

- Quarterly, with all PTFs that completed Consolidated Service Test (CST) testing during the prior quarter, including severity 1 through severity 4 APARs.
- Monthly, with high impact or pervasive (HIPER) PTFs, PTF-in-error (PE) PTFs, and other recommended PTFs (recommended because of new function, serviceability, installability, security, or integrity) that have been CST tested.

For information about the latest recommended level of service, see the CST and RSU web site:

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

Note that while all CST-tested PTFs become RSU PTFs, not all RSU PTFs are tested in CST. Only the following are included in CST testing: z/OS, z/OS.e, OS/390, CICS, DB2, IMS, and MQSeries.

RSU is provided for z/OS through ESO, CBPDO, and ServerPac.



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## Appendix C. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS™ enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

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### Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

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### Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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### z/OS information

z/OS information is accessible using screen readers with the BookServer/Library Server versions of z/OS books in the Internet library at:

[www.ibm.com/servers/eserver/zseries/zos/bkserv/](http://www.ibm.com/servers/eserver/zseries/zos/bkserv/)



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## Glossary

This glossary defines technical terms and abbreviations used in SMP/E documentation. If you do not find the term you are looking for, refer to the index of the appropriate SMP/E manual or view *IBM Glossary of Computing Terms*, located at:  
<http://www.ibm.com/networking/nsg/nsgmain.htm>

**Sequence of entries:** For clarity and consistency of style, this glossary arranges the entries alphabetically on a letter-by-letter basis. In other words, only the letters of the alphabet are used to determine sequence; special characters and spaces between words are ignored.

**Organization of entries:** Each entry consists of a single-word or multiple-word term or the abbreviation or acronym for a term, followed by a commentary. A commentary includes one or more items (definitions or references) and is organized as follows:

1. An item number, if the commentary contains two or more items.
2. A usage label, indicating the area of application of the term, for example, "In programming," or "In SMP/E." Absence of a usage label implies that the term is generally applicable to SMP/E, to IBM, or to data processing.
3. A descriptive phrase, stating the basic meaning of the term. The descriptive phrase is assumed to be preceded by "the term is defined as ..." The part of speech being defined is indicated by the opening words of the descriptive phrase: "To ..." indicates a verb, and "Pertaining to ..." indicates a modifier. Any other wording indicates a noun or noun phrase.
4. Annotative sentences, providing additional or explanatory information.
5. References, directing the reader to other entries or items in the dictionary.

**References:** The following cross-references are used in this glossary:

**Contrast with.** This refers to a term that has an opposed or substantively different meaning.

**Synonym for.** This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the glossary.

**Synonymous with.** This is a backward reference from a defined term to all other terms that have the same meaning.

**See.** This refers you to multiple-word terms that have the same last word.

**See also.** This refers the reader to related terms that have a related, but not synonymous, meaning.

**Deprecated term for or deprecated**

**abbreviation for.** This indicates that the term or abbreviation should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

**Selection of Terms:** A term is a word or group of words to be defined. In this glossary, the singular form of the noun and the infinitive form of the verb are the terms most often selected to be defined. If the term may be abbreviated, the abbreviation is given in parentheses immediately following the term. The abbreviation is also defined in its proper place in the glossary.

## A

**ACCEPT.** The SMP/E command used to install SYSMODs in the distribution libraries.

**accept.** In SMP/E, to install SYSMODs in the distribution libraries. This is done with the ACCEPT command.

**accepted SYSMOD.** A SYSMOD that has been successfully installed by the SMP/E ACCEPT command. Accepted SYSMODs do not have the ERROR flag set and are found as SYSMOD entries in the distribution zone.

**Access method services (AMS).** The system utility program used to support VSAM data sets.

**AMS.** Access method services.

**APAR.** Authorized program analysis report.

**APAR fix.** A temporary correction of a defect in an IBM system control program or licensed program that affects a specific user. An APAR fix is usually replaced later by a permanent correction called a PTF. APAR fixes are identified to SMP/E by the ++APAR statement.

## applied SYSMOD • conditional requisites

**applied SYSMOD.** A SYSMOD that has been successfully processed by the SMP/E APPLY command. Applied SYSMODs do not have the ERROR flag set and are found as SYSMOD entries in the target zone.

**APPLY.** The SMP/E command used to install SYSMODs in the target libraries.

**apply.** In SMP/E, to install SYSMODs in the target libraries. This is done with the APPLY command.

**archive.** An archive is a network transportable file containing two files; a file attribute file (FAF) and the data file that the FAF describes.

**ASSEM entry.** An SMP/E entry containing assembler statements that can be assembled to create an object module.

**authorized program analysis report (APAR).** A report of a problem caused by a suspected defect in a current unaltered release of a program. The correction is called an APAR fix.

## B

**BACKUP entries.** A collection of SMP/E target zone entries that are copied into the SMPSCDS data set during APPLY processing before they are updated by inline JCLIN, a ++MOVE MCS, or a ++RENAME MCS, or before they are deleted by an element MCS with the DELETE operand.

BACKUP entries consist of:

- A SYSMOD entry indicating what entries have been added, deleted, or updated
- ASSEM entries for updated target zone ASSEM entries
- LMOD entries for updated target zone LMOD entries
- MAC entries for updated or deleted target zone MAC entries
- MOD entries for updated or deleted target zone MOD entries
- SRC entries for updated or deleted target zone SRC entries
- Data element entries for deleted target zone data element entries
- DLIB entries for updated target zone DLIB entries

**BALR.** Branch and link register commands.

**base function.** A SYSMOD defining elements of the base system or other products that were not previously present in the target libraries. Base functions are identified to SMP/E by the ++FUNCTION statement. SMP/E is an example of a base function.

**base level system.** The level of the target system modules, macros, source, and DLIBs created by system generation, to which function and service modifications are applicable.

**base version of a load module.** Some load modules include modules both explicitly (through INCLUDE statements) and implicitly (through a SYSLIB allocation). The base version of such a load module includes only the explicitly-defined modules for the load module. It is maintained by SMP/E in the SMPLTS data set. The base version of a load module is used with the SYSLIB allocation as input to the link-edit utility in order to build the load module in its target libraries.

**binder.** A program that processes the output of language translators and compilers into an executable program (load module). It is part of the DFSMS/MVS element of z/OS.

**bypass.** In SMP/E, to circumvent errors that would otherwise cause SYSMOD processing to fail. This is done by using the BYPASS operand on an SMP/E command.

## C

**causer SYSMOD.** A SYSMOD identified by root cause analysis to be at the base of errors that caused other SYSMODs to fail. See *root cause analysis*.

**CBPDO.** MVS Custom-Built Product Delivery Offering.

**CICS.** Customer Information Control System.

**CLEANUP.** The SMP/E command used to delete entries from the SMPMTS, SMPSTS, and SMPSCDS data sets after a SYSMOD has been accepted into the related distribution zone.

**CNTL.** See *SMPCNTL*.

**coexisting functions.** Functions that meet these requirements: (1) they are for the same system or subsystem and have the same SREL value, (2) they do not delete or supersede each other and are not negative prerequisites, and (3) if they are base functions, they are for different products. See also *conditionally coexisting functions* and *unconditionally coexisting functions*.

**comment statements.** Special control statements that are coded as JCL comments and which are used to convey information to SMP/E during JCLIN processing.

**conditional requisites.** Requisites defined by an ++IF statement. These are requisites that must be installed if the functions specified on the ++IF statements are installed.

**conditionally coexisting functions.** Functions that coexist but do not have to be in the same zone.

**consolidated software inventory.** See *SMPCSI*.

**corequisite SYSMODs.** SYSMODs each of which can be installed properly only if the other is present. Corequisites are defined by the REQ operand on the ++VER statement.

**corrective service.** Any SYSMOD used to selectively fix a system problem. Generally, corrective service refers to APAR fixes.

**cross-zone.** (1) A target zone other than the set-to zone that defines a load module containing modules from set-to zone. Also called a *TIEDTO zone*. The modules were added to the load module through the SMP/E LINK command. The relationship between the cross-zone and the set-to zone is established through the TIEDTO subentry in their zone definition entries. See also *set-to zone* and *TIEDTO relationship*. (2) Pertaining to relationships between zones, especially as a result of conditional requisites (++IF statements) or LINK processing. See also *cross-zone requisite*, *cross-zone load module*, and *cross-zone module*.

**cross-zone load module.** A load module containing modules from a different zone as a result of LINK processing.

**cross-zone module.** A module included in a load module from a different zone as a result of LINK processing.

**cross-zone requisite.** A conditional requisite that must be installed in one zone because of another SYSMOD that is installed in a different zone. The REPORT command can be used to check information saved from ++IF statements and determine where any cross-zone requisites should be installed.

**CSI.** Consolidated software inventory data set. See *SMPCSI*.

## D

**data element.** An element that is not a macro, module, or source—for example, a dialog panel or sample code.

**DDDEF entry.** An SMP/E entry containing the information SMP/E needs in order to dynamically allocate a particular data set.

**DEBUG.** The SMP/E command used to obtain additional information for problem determination—for example, to trace messages or take dumps.

**debug.** In SMP/E, to obtain additional information for problem determination—for example, to trace messages or take dumps. This is done with the DEBUG command.

**definition side deck.** A file in a UNIX file system, a member of a partitioned data set, or a sequential data set that contains binder IMPORT control statements.

**deleted function.** In SMP/E, a function that was removed from the system when another function was installed. This is indicated by the DELBY subentry in the SYSMOD entry for the deleted function. See also *explicitly deleted function* and *implicitly deleted function*.

**deleting function.** A function that removes other functions from the system. This is done by specifying them on the DELETE operand of the ++VER statement.

**dependent function.** A function that introduces new elements or redefines elements of the base level system or other products. A dependent function cannot exist without a base function. Dependent functions are identified to SMP/E by the ++FUNCTION statement.

**dialog.** The interactive support provided by SMP/E through ISPF. Instead of entering specific commands and operands, you can use panels to specify the desired processing.

**distribution library (DLIB).** A library that contains the master copy of all the elements in a system. A distribution library can be used to create or back up a target library.

**distribution zone.** In SMP/E, a group of records in a CSI data set that describes the SYSMODs and elements in a distribution library.

**DLIB.** Distribution library.

**DLIB entry.** An SMP/E entry describing a distribution library that has been totally copied into a target library.

**DLIBZONE entry.** An SMP/E entry containing information used by SMP/E to process a specific distribution zone and the associated distribution libraries.

**DLL.** Dynamic link library

## E

**EC.** Engineering change.

**element.** In SMP/E, part of a product, such as a macro, module, dialog panel, or sample code.

**element MCS.** An MCS used to replace or update an element.

**element selection.** The process by which SMP/E chooses the appropriate changes for an element affected by several SYSMODs being installed at the same time.

**entry.** In SMP/E, a collection of records in a CSI data set. An entry can be created, updated, or deleted by use of UCL statements.

**environment.** The functions (FMIDs) installed on a particular system or subsystem (SREL).

**ERROR indicator.** In SMP/E, an indicator in a target or distribution zone SYSMOD entry that shows that SYSMOD processing failed. The ERROR indicator is set before SMP/E updates any libraries and is reset if processing is successful. If processing fails, it remains set to show that an error occurred.

**ESO.** Expanded service options.

**exception SYSMOD.** A SYSMOD that is in error or that requires special processing before it can be installed. ++HOLD and ++RELEASE statements identify exception SYSMODs.

**EXCP.** Execute channel programs.

**expanded service options (ESO).** A tape that includes preventive service PTFs. Where available, it replaces PUTs as the vehicle for delivering preventive service. An ESO contains PTFs and ++ASSIGN statements assigning source IDs for the PTFs. In the United States, this tape is available from the IBM Support Center and can be ordered either by subscription or as needed.

**explicitly deleted function.** A function deleted because it was specified on the DELETE operand of a ++VER statement in another SYSMOD.

**exported zone.** A zone copied into a sequential data set by use of the SMP/E ZONEEXPORT command.

**external HOLDDATA.** ++HOLD statements contained in SMPHOLD. Contrast with *internal HOLDDATA*.

## F

**FAF.** file attribute file.

**FE.** Field engineering.

**feature.** See *dependent function*.

**file attribute file.** A file attribute file (FAF) is a file containing control statements that describe the attributes of the file contained in an SMP/E network transportable archive. The FAF is contained within the archive information about how the file was created.

**File Transfer Protocol.** File Transfer Protocol (FTP) is a protocol that defines the interactions necessary between a client and server to facilitate the exchange of binary and textual data files.

**firewall.** A firewall is an intermediate server that functions to isolate a secure network from an insecure network.

**FTP.** File Transfer Protocol.

**FTP.DATA.** Configuration data set used to change local site default values for the z/OS FTP Client.

**FMID.** Function modification identifier.

**FMIDSET.** A group of FMIDs to be used in processing an SMP/E command—for example, to indicate that SYSMODs applicable to certain functions should be installed.

**FMIDSET entry.** An SMP/E entry defining an FMIDSET.

**function.** In SMP/E, a product (such as a system component or licensed program) that can be installed in a user's system if desired. Functions are identified to SMP/E by the ++FUNCTION statement. Each function must have a unique FMID.

**function modification identifier (FMID).** The SYSMOD ID of a function SYSMOD. It identifies the function that currently owns a given element.

**functionally higher SYSMOD.** A SYSMOD that uses the function contained in an earlier SYSMOD (called the *functionally lower SYSMOD*) and contains additional functions as well.

**functionally lower SYSMOD.** A SYSMOD whose function is also contained in a later SYSMOD (called the *functionally higher SYSMOD*).

## G

**GENASM.** A subentry in the MAC entry that lists the ASSEM or SRC entries that must be assembled if the macro is replaced or updated.

**GENERATE.** The SMP/E command used to create a job stream that builds a set of target libraries from a set of distribution libraries.

**generate.** In SMP/E, to create a job stream that builds a set of target libraries from a set of distribution libraries. This is done with the GENERATE command.

**GIMUNZIP.** An SMP/E service routine used to extract files contained in network transportable packages that were built using GIMZIP.

**GIMZIP.** An SMP/E service routine used to produce network transportable packages.

**global zone.** A group of records in a CSI data set used to record information about SYSMODs received for a particular system. The global zone also contains information that (1) enables SMP/E to access target and distribution zones in that system, and (2) enables you to tailor aspects of SMP/E processing.



**GLOBALZONE entry.** An SMP/E entry containing information that SMP/E uses to process the global zone, the associated target and distribution zones, and SMPPTS.

**GTF.** Generalized trace facility.

## H

**hashing.** An operation that uses a one-way (irreversible) function on data, usually to reduce the length of the data and to provide a verifiable authentication value (checksum) for the hashed data.

**header MCS.** An ++APAR, ++FUNCTION, ++PTF, or ++USERMOD statement. The header MCS indicates the type of SYSMOD.

**HFS.** Hierarchical file system.

**hierarchical file system element.** An element that has a UNIX file system as its “target library”.

**hierarchy.** In SMP/E, the top-down structure of function and service SYSMODs, in which each SYSMOD is dependent on the one above it.

**higher functional level.** An element version that contains all the functions of all other relevant versions of that element.

**HOLDDATA.** In SMP/E, MCSs used to indicate that certain SYSMODs contain errors or require special processing before they can be installed. ++HOLD and ++RELEASE statements are used to define HOLDDATA. SYSMODs affected by HOLDDATA are called *exception SYSMODs*.

**HOLDDATA entry.** An SMP/E entry containing ++HOLD statements that either were received from SMPHOLD (external HOLDDATA) or were within a SYSMOD that was received (internal HOLDDATA).

## I

**ICSF.** Integrated Cryptographic Service Facility.

**IFREQ.** A conditional requisite. Conditional requisites are specified on the REQ operand of the ++IF statement.

**IMASPZAP.** The system utility program used to install superzaps, which are changes for modules, load modules, or CSECTs within modules.

**implicitly deleted function.** A function deleted because of its dependency on an explicitly deleted function that is specified on the DELETE operand of the ++VER statement.

**imported zone.** A zone copied from a sequential data set into another zone by use of the SMP/E ZONEIMPORT command.

**IMS.** Information Management System.

**IMSGEN.** IMS generation.

**indicator.** See *subentry indicator*.

**in effect.** Having control over SMP/E processing. For example, an OPTIONS entry is in effect if (1) it is specified on the SET command or (2) it is defined as the default OPTIONS entry for the set-to zone.

**inline data.** Information (such as utility control statements or code for an element) that is packaged directly after the associated MCS, rather than in a separate file or data set.

**inline JCLIN.** The JCL statements associated with a ++JCLIN statement. Inline JCLIN may immediately follow the ++JCLIN statement, or it may be in the RELFILE or TXLIB data set pointed to by the ++JCLIN statement. Inline JCLIN is used to update the target zone when a SYSMOD is applied, or the distribution zone when a SYSMOD is accepted. Contrast with *JCLIN input*.

**inner macro.** A macro invoked by another macro. In particular, inner macros are those that SMP/E does not detect during JCLIN processing of assembler job steps.

**install.** In SMP/E, to apply a SYSMOD to the target libraries or to accept a SYSMOD into the distribution libraries.

**internal HOLDDATA.** ++HOLD statements contained within a SYSMOD. Contrast with *external HOLDDATA*.

**I/O.** Input or output.

**IOGEN.** Input/output device generation.

**IPL.** Initial program load.

**IPv6.** Internet Protocol Version 6.

**ISMD.** IBM Software Manufacturing and Delivery (formerly called *PID*).

**ISPF.** Interactive System Productivity Facility.

**ISPF/PDF.** Interactive System Productivity Facility/Program Development Facility.

**IVP.** Installation verification procedure.

## J

**JAR.** The SMP/E entry or MCS that describes a Java ARchive (JAR) file. Also, the abbreviation for Java ARchive (see *Java ARchive(JAR)*).

## JARUPD • modification identifier (MODID)

**JARUPD.** The SMP/E MCS used to describe an update to a JAR element.

**JCL.** Job control language.

**JCLIN.** (1) The SMP/E command used to process data from SMPJCLIN. (2) The ++JCLIN statement, which is associated with JCLIN data that is included in a SYSMOD. (3) SMPJCLIN. See *SMPJCLIN*.

See also *inline JCLIN* and *JCLIN data*.

**JCLIN data.** The JCL statements associated with the ++JCLIN statement or saved in the SMPJCLIN data set. They are used by SMP/E to update the target zone when the SYSMOD is applied. Optionally, SMP/E can use JCLIN data to update the distribution zone when the SYSMOD is accepted.

**JCLIN input.** The JCL statements contained in SMPJCLIN and used as input for the JCLIN command. Contrast with *inline JCLIN*.

**jar.** The Java command used to invoke the Java Archive Tool. The Java Archive Tool is used to perform operations on Java ARchive (JAR) files.

**Java ARchive (JAR).** An archive file format based on the ZIP file format. Used for aggregating many Java applet component files into one.

**job control language (JCL).** A problem-oriented language designed to express statements in a job that are used to identify the job or describe its requirements to an operating system.

## L

**licensed program.** A program that performs a function for the user, and usually interacts with and relies upon the system control program or some other IBM-provided control program. Generally, a licensed program is a software package that can be ordered from the program libraries, such as IBM Software Distribution (ISMD). IMS and CICS are examples of licensed programs.

**LINK LMODS.** The SMP/E command used to relink load modules that use CALLLIBS.

**LINK MODULE.** The SMP/E command used to link modules in one zone with load modules in another zone.

**link library (LKLIB).** A data set containing link-edited object modules.

**LIST.** The SMP/E command used to display entries in SMP/E data sets.

**list.** In SMP/E, to display entries in SMP/E data sets. This is done with the LIST command.

**LKLIB.** Link library.

**LMOD.** In SMP/E, an abbreviation for load module.

**LMOD entry.** An SMP/E entry containing all the information needed to replace or update a given load module.

**load module.** A computer program in a form suitable for loading into main storage for execution. It is usually the output of a link-edit utility.

**LOG.** (1) The SMP/E command used to write user-supplied information to the SMPLOG data set. (2) The SMPLOG data set. See *SMPLOG*.

**lower functional level.** An element version that is contained in a later element version.

## M

**MAC.** The SMP/E entry or MCS that describes a macro.

**macro.** An instruction in a source language that is to be replaced by a defined sequence of instructions in the same source language.

**MACUPD.** The SMP/E MCS used to update a macro.

**mass-mode processing.** In SMP/E, processing that includes all eligible SYSMODs, regardless of whether they were individually selected.

**master CSI.** The CSI data set that contains the global zone.

**MCS.** Modification control statement.

**MCS entry.** An SMP/E entry containing a copy of a SYSMOD exactly as it was received from SMPPTFIN. MCS entries are in SMPPTS, which is used to store SYSMODs.

**MOD.** The SMP/E entry or MCS that describes an object module or a single-module load module.

**MODID.** Modification identifier.

**modification.** In SMP/E, an alteration or correction to a system control program, licensed program, or user program. Synonymous with *system modification* (SYSMOD).

**modification control statement (MCS).** An SMP/E control statement used to package a SYSMOD. MCSs describe the elements of a program and the relationships that program has with other programs that may be installed on the same system.

**modification identifier (MODID).** A list of SYSMOD IDs, including the last SYSMOD that totally replaced the element (RMID), any subsequent partial updates to

the element (UMIDs), and the function that owns the element (FMID). MODIDs are contained in element entries.

**modification level.** A distribution of all temporary fixes that have been issued since the previous modification level. A change in modification level does not add new functions or change the programming support category of the release to which it applies. Contrast with *release* and *version*.

**Note:** Whenever a new release of a program is shipped, the modification level is set to 0. When the release is reshipped with the accumulated services changes incorporated, the modification level is incremented by 1.

**module.** Synonym for *object module* or *single-module load module*.

**MTS.** Macro temporary storage data set. See *SMPMTS*.

**MTSMAC entry.** An SMP/E entry that is a copy of a macro that resides only in a distribution library but is needed temporarily during APPLY processing. MTSMAC entries are in the SMPMTS data set.

**MVS.** Multiple Virtual Storage.

**MVS Custom-Built Product Delivery Offering (CBPDO).** A software delivery offering used to add products or service to an existing MVS, NCP, CICS, or IMS system.

## N

**NCP.** Network Control Program.

**negative prerequisite (NPRE).** In SMP/E, a function that is mutually exclusive with another function. It is defined by the NPRE operand on the ++VER statement.

**NPRE.** Negative prerequisite.

## O

**object deck.** Object module input to the link-edit utility that is placed in the input stream, in card format.

**object module.** A module that is the output from a language translator (such as a compiler or an assembler). An object module is in relocatable format with machine code that is not executable. Before an object module can be executed, it must be processed by the link-edit utility.

When an object module is link-edited, a load module is created. Several modules can be link-edited together to create one load module (for example, as part of SMP/E APPLY processing), or an object module can be link-edited by itself to create a single-module load

module (for example, to prepare the module for shipment in RELFILE format or in an LKLIB data set or as part of SMP/E ACCEPT processing).

**operating system.** In SMP/E, the system updated by APPLY and RESTORE processing. It consists of the target libraries. Also called the target system.

**OPTIONS entry.** An SMP/E entry defining processing options that are to be used by SMP/E.

## P

**package attribute file.** A package attribute file (PAF) is a file that contains control statements describing the contents of a network transportable package.

**packaging.** Adding the appropriate MCS statements to elements to create a SYSMOD, then putting the SYSMOD in the proper format on the distribution medium, such as a tape or direct access data sets.

**PAF.** package attribute file.

**partitioned data set extended (PDSE).** A system-managed data set containing an indexed directory and members that are similar to the directory and members of partitioned data sets. A PDSE can be used instead of a partitioned data set.

**PE.** See *program error PTF*.

**PE-PTF.** See *program error PTF*.

**PID.** The former name for ISD.

**PRE.** Prerequisite.

**prerequisite (PRE).** In SMP/E, a SYSMOD that must be installed before or along with another SYSMOD in order for that other SYSMOD to be successfully installed. It is defined by the PRE operand on the ++VER statement.

**preventive service.** (1) The mass installation of PTFs to avoid rediscoveries of the APARs fixed by those PTFs. (2) The SYSMODs delivered on the program update tape.

**preventive service planning (PSP).** Installation recommendations and HOLDDATA for a product or a service level. PSP information can be obtained through the IBM Support Center.

**product.** Generally, a software package, such as a licensed program or a user application. A product can contain one or more functions and can consist of one or more versions and releases.

**product version.** All the releases for a given version of a product.

## program error PTF (PE-PTF) • REPORT

**program error PTF (PE-PTF).** A PTF that has been found to contain an error. A PE-PTF is identified on a ++HOLD ERROR statement, along with the APAR that first reported the error.

**program object.** An executable program stored in a PDSE program library. It is similar to a load module, but has fewer restrictions. For SMP/E purposes, program objects are referred to as load modules.

**program packaging.** See *packaging*.

**program product.** The former term for licensed program.

**program temporary fix (PTF).** A temporary solution or bypass of a problem that may affect all users and that was diagnosed as the result of a defect in a current unaltered release of the program. In the absence of a new release of a system or component that incorporates the correction, the fix is not temporary but is the permanent and official correction mechanism. New elements can also be defined in a PTF. PTFs are identified to SMP/E by the ++PTF statement.

**program update tape (PUT).** The former vehicle for preventive service. See *expanded service options*.

**PSP.** Preventive service planning.

**PSW.** Program status word.

**PTF.** Program temporary fix.

**PTS.** PTF temporary store data set. See *SMPPTS*.

**PTFIN.** PTF input. See *SMPPTFIN*.

**PUT.** See *expanded service options*.

## R

**RACF.** Resource Access Control Facility.

**RECEIVE.** The SMP/E command used to read in SYSMODs and other data from SMPPTFIN and SMPHOLD.

**receive.** In SMP/E, to read SYSMODs and other data from SMPPTFIN and SMPHOLD and store them on the global zone for subsequent SMP/E processing. This is done with the RECEIVE command.

**regressed SYSMOD.** A SYSMOD one or more of whose elements are modified by subsequent SYSMODs that are not related to it.

**regressing SYSMOD.** A SYSMOD that causes regression of previous modifications when it is installed.

**regression.** In SMP/E, the condition that occurs when an element is changed by a SYSMOD that is not related to SYSMODs that previously modified the element.

**REJECT.** The SMP/E command used to remove SYSMODs from the global zone and SMPPTS.

**reject.** In SMP/E, to remove SYSMODs from the global zone and SMPPTS and delete any related SMPTLIB data sets. This is done with the REJECT command.

**related installation materials (RIMs).** In IBM custom-built offerings, task-oriented documentation, jobs, sample exit routines, procedures, parameters, and examples developed by IBM.

**related SYSMOD.** A SYSMOD associated with other SYSMODs by the FMID, PRE, REQ, or SUP operands.

**related zone.** The zone named in the RELATED subentry of a TARGETZONE or DLIBZONE entry. For a target zone, the related zone is generally the distribution zone for the libraries used to create the target libraries. For a distribution zone, the related zone is generally the target zone for the libraries built from the distribution libraries.

**relative file (RELFILE) format.** A SYSMOD packaging method where elements and JCLIN data are in separate relative files from the MCSs. When SYSMODs are packaged in relative file format there is a file of MCSs for one or more SYSMODs, and one or more relative files containing unloaded source-code data sets and unloaded link-edited data sets containing executable modules. The relative files can be either unloaded files in IEBCOPY format, or they can be partitioned data sets. Relative file format is the typical method used for packaging function SYSMODs.

**relative files (RELFILES).** Unloaded files containing modification text and JCL input data associated with a SYSMOD. These files are used to package a SYSMOD in relative file format.

**release.** A distribution of a new product or new function and APAR fixes for an existing product. Contrast with *modification level* and *version*.

**replacement modification identifier (RMID).** The SYSMOD ID of the last SYSMOD that completely replaced a given element.

**REPORT.** The SMP/E command used to obtain information about SYSMODs that have been installed. These are the types of REPORT commands:

- **REPORT CROSSZONE:** Lists conditional requisites that must be installed in certain zones because of SYSMODs installed in other zones.
- **REPORT ERRSYSMODS:** Determines whether any SYSMODs already installed are now exception SYSMODs.



- **REPORT SOURCEID:** Lists the source IDs associated with SYSMODs in the specified zones.
- **REPORT SYSMODS:** Compares the SYSMODs installed in two target or distribution zones.

**requisite.** A SYSMOD that must be installed before or at the same time as the SYSMOD being processed. There are several types of requisites:

- Prerequisites, which are specified by the PRE operand on the SYSMOD's ++VER statement
- Corequisites, which are specified by the REQ operand on the SYSMOD's ++VER statement
- Conditional requisites, which are specified by the REQ operand on the SYSMOD's associated ++IF statement

**requisite chain.** A sequence of SYSMODs that are directly or indirectly identified as requisites for a given SYSMOD, (A SYSMOD may identify other SYSMODs as requisites, which in turn may have requisites of their own. The requisite chain extends from the initial SYSMOD, through the hierarchy of requisites, until no more SYSMODs are found that have requisites.) See *requisite*.

**requisite set.** The set of all SYSMODs on the requisite chain for a particular SYS

**RESETRC.** The SMP/E command used to set the return codes for the previous commands to zero, so that SMP/E can process the current command.

**RESTORE.** The SMP/E command used to remove applied SYSMODs from the target libraries.

**restore.** In SMP/E, to remove applied SYSMODs from the target libraries by use of the RESTORE command.

**restore group.** All the SYSMODs that have a direct or indirect relationship with a SYSMOD being restored by use of the GROUP operand.

**RIM.** Related installation material.

**RMID.** Replacement modification identifier.

**RMF.** Resource measurement facility.

**root cause analysis.** Processing done by SMP/E for the ACCEPT, APPLY, and RESTORE commands to identify causer SYSMODs (SYSMODs whose failure has led to the failure of other SYSMODs). The types of errors SMP/E analyzes to determine causer SYSMODs include the following:

- Held SYSMODs
- Missing requisite SYSMODs
- Utility program failures: copy, update, assembler, link, zap
- Out-of-space conditions: x37 abends
- Missing DD statements and other allocation errors

- ID errors (a SYSMOD does not supersede or specify as a prerequisite an RMID or a UMID)
- JCLIN failures (syntax errors)

**RPL.** Request parameter list.

**RTM2WA.** Recovery termination manager 2 work area.

## S

**SCDS.** Save control data set. See *SMPSCDS*.

**SCP.** System control program.

**select-mode processing.** In SMP/E, processing that includes individually selected SYSMODs.

**service.** PTFs and APAR fixes.

**service level.** The FMID, RMID, and UMID values for an element. The service level identifies the owner of the element, the last SYSMOD to replace the element, and all the SYSMODs that have updated the element since it was last replaced.

**service order relationship.** A relationship among service SYSMODs that is determined by the PRE and SUP operands, and the type of SYSMOD.

**service SYSMOD.** Any SYSMOD identified by an ++APAR or ++PTF statement.

**service update.** The integration of available service into the current release of a function. Since this is not a new release of the function, it does not change the function's FMID.

**SET.** The SMP/E command used to indicate the zone to be processed.

**set.** In SMP/E, to indicate which zone should be processed by the subsequent commands. This is done with the SET command.

**set-to zone.** The zone that was specified on the previous SET command and that is currently being processed. Contrast with *cross-zone*.

**SHA-1.** Secure Hash Algorithm 1.

**side deck.** See *definition side deck*.

**single-module load module.** A load module created by link-editing a single object module by itself—for example, to prepare the module for shipment in RELFILE format or in an LKLIB data set or as part of SMP/E ACCEPT processing.

**SMP\_CNTL.** The SMP/E data set or file in a UNIX file system that contains the SMP/E commands to be processed.

**SMPCSI.** The SMP/E data set that contains information about the structure of a user's system as well as information needed to install the operating system on a user's system. The SMPCSI DD statement refers specifically to the CSI that contains the global zone. This is also called the *master CSI*.

**SMPDEBUG.** The SMP/E data set or file in a UNIX file system that contains a dump requested by the DEBUG command. Depending on the operands specified, it may contain (1) a dump of SMP/E control blocks and storage areas associated with the specified dump points or (2) a dump of the VSAM RPL control block for the specified SMP/E function.

**SMPDUMMY.** The SMP/E data set used to define a load module's definition side deck library as a DUMMY data set. SMPDUMMY is always allocated by SMP/E as a DUMMY data set.

**SMP/E.** A program product, or an element of OS/390 or z/OS, used to install software and software changes on z/OS systems. SMP/E consolidates installation data, allows more flexibility in selecting changes to be installed, provides a dialog interface, and supports dynamic allocation of data sets.

**SMP/E commands.** Commands defining the processing to be done by SMP/E, such as RECEIVE.

**SMP/E entry.** An entry in an SMP/E data set—for example, a MOD entry in a CSI data set.

**SMPHOLD.** SMPHOLD is the source for HOLDDATA (++HOLD and ++RELEASE statements) to be processed by the RECEIVE command. SMPHOLD may be a tape file, a data set, or one or more files in a UNIX file system.

**SMPJCLIN.** The SMP/E data set or file in a UNIX file system that contains a job stream of assembly, link-edit, and copy job steps. This data is typically the stage 1 output from the most recent full or partial system generation. However, it may also be other data in a similar format, such as the output of the GENERATE command. This job stream is used as input to the JCLIN command to update or create entries in a target zone.

**SMPLIST.** The SMP/E data set or file in a UNIX file system that contains the output of all LIST commands.

**SMPLOG.** The SMP/E data set that contains time-stamped records of SMP/E processing. The records in this data set can be written automatically by SMP/E or added by the user through the LOG command.

**SMPLOGA.** A secondary log data set for SMP/E processing. If SMPLOGA is defined, it is automatically used when the SMPLOG data set is full.

**SMPLTS.** The SMP/E data set used as a target load module library to maintain the base version of a load module that specifies a SYSLIB allocation in order to implicitly include modules.

**SMPMTS.** The SMP/E data set used as a target library for macros that exist only in a distribution library, such as macros in SYS1.AMODGEN. The SMPMTS enables the current version of these macros to be used for assemblies during APPLY processing.

**SMPNTS.** The SMPNTS is a directory structure and associated files contained in a UNIX file system used for temporary storage of network transported packages that were received during SMP/E RECEIVE processing.

**SMPOBJ.** The SMP/E data set used for source-maintained products. SMPOBJ contains preassembled modules that can be used to avoid reassembling those modules. These modules must be in load module format—that is, in the same format as modules residing in the distribution library.

**SMPOUT.** The SMP/E data set or file in a UNIX file system that contains messages issued during SMP/E processing. It may also contain a dump of the VSAM RPL, if a dump was taken. In addition, it may contain LIST output and reports if SMPLIST and SMPRPT are not defined.

**SMPPARM.** The data set that contains members to define parameters, such as macros, assembler operation codes, GIMDDALC control statements, and exit routines.

**SMPPTFIN.** SMPPTFIN is the source of SYSMODs and ++ASSIGN statements to be processed by the RECEIVE command. SMPPTFIN may be a tape file, a data set, or one or more files in a UNIX file system.

**SMPPTS.** The SMP/E data set that contains SYSMODs received from SMPPTFIN. SMPPTS is the source of SYSMODs that are installed in the target and distribution libraries.

**SMPPTS spill data sets.** Optional SMP/E data sets that can be used to store SYSMODs when the SMPPTS data set becomes full.

**SMPPUNCH.** The SMP/E data set or file in a UNIX file system that contains output from various SMP/E commands. This output generally consists of commands or control statements.

- GENERATE: A job stream for building target libraries
- REPORT: Commands for installing or listing SYSMODs
- UNLOAD: UCLIN statements for recreating the entries that were unloaded

**SMPRPT.** The SMP/E data set or file in a UNIX file system that contains the reports produced during SMP/E processing.

**SMPSCDS.** The SMP/E data set that contains backup copies of target zone entries that are created during APPLY processing. These backup copies are made before the entries are (1) changed by inline JCLIN, a ++MOVE MCS, or a ++RENAME MCS, or (2) deleted by an element MCS with the DELETE operand. The backup copies are used during RESTORE processing to return the entries to the way they were before APPLY processing.

**SMPSNAP.** The SMP/E data set that is used for snap dump output. When a severe error such as an abend or severe VSAM return code occurs, SMP/E requests a snap dump of its storage before doing any error recovery. In addition, the DEBUG command can request a snap dump of SMP/E storage when specified messages are issued, or can request a snap dump of control blocks and storage areas associated with a specified dump point.

**SMPSTS.** The SMP/E data set used as a target library for source that exists only in a distribution library. The SMPSTS enables the current version of this source to be used for assemblies during APPLY processing.

**SMPTLIB.** The SMP/E data sets used as temporary storage for relative files loaded from SMPPTFIN during RECEIVE processing. The SMPTLIB data sets are deleted when the associated SYSMOD is deleted by REJECT, RESTORE, or ACCEPT processing.

**SMPWKDIR.** An optional directory in a UNIX file system used for temporary work files.

**SMPWRK1.** The SMP/E data set used as temporary storage for macro updates and replacements that will be processed by an update or copy utility program. SMP/E places the input in SMPWRK1 during APPLY and ACCEPT processing before calling the utility.

**SMPWRK2.** The SMP/E data set used as temporary storage for source updates and source replacements that will be processed by an update or copy utility program. SMP/E places the input in SMPWRK2 during APPLY and ACCEPT processing before calling the utility.

**SMPWRK3.** The SMP/E data set used as temporary storage for object modules supplied by a SYSMOD, object modules created by assemblies, and zap utility input following ++ZAP statements.

**SMPWRK4.** The SMP/E data set used as temporary storage for zap utility or link-edit utility input that contains EXPAND control statements.

**SMPWRK6.** The SMP/E data set used during ACCEPT and APPLY processing as temporary storage for inline replacements for data elements. SMP/E places the input in this data set so that it can be directly accessed and installed by the copy utility or SMP/E.

**source.** The source statements that constitute the input to a language translator for a particular translation.

**source ID.** A 1- to 8-character identifier that indicates how a SYSMOD was obtained—for example, from a particular service level in an ESO. A source ID is associated with a specific SYSMOD by the RECEIVE command or the ++ASSIGN statement.

**SOCKS.** A networking proxy protocol that enables hosts on one side of a SOCKS server to gain full access to hosts on the other side of the SOCKS server without requiring direct IP-reachability.

**SOURCEID.** The operand used to refer to a source ID.

**source module.** The source statements that constitute the input to a language translator, such as a compiler or an assembler, for a particular translation.

**SRC.** The SMP/E entry or MCS statement that describes a source.

**SRCUPD.** The MCS used to update a source.

**SREL.** System release identifier.

**Storage Management Subsystem (SMS).** A DFSMS/MVS facility used to automate and centralize the management of storage. Using SMS, a storage administrator describes data allocation characteristics, performance and availability goals, backup and retention requirements, and storage requirements to the system through data class, storage class, management class, storage group, and ACS routine definitions.

**STS.** Source temporary store data set. See *SMPSTS*.

**STSSRC entry.** An SMP/E entry that is a copy of source that resides only in a distribution library but is needed temporarily during APPLY processing. STSSRC entries are in the SMPSTS data set.

**stub entry.** An element entry or LMOD entry that does not contain the basic information SMP/E requires in order to process the element or load module (such as FMID, RMID, or library names), but does contain other information, such as subentries describing cross-zone relationships.

**stub load module.** A load module that does not contain the modules needed to perform its basic functions, but does contain other modules, such as cross-zone modules.

**subentry.** A field in an SMP/E entry. Each subentry has associated with it a type and a value. The same subentry type may occur several times in a single entry, each time with a different value. For example, the modules supplied by a PTF are saved as MOD subentries in the PTF's SYSMOD entry. Some subentries occur only once within an entry, such as the FMID subentry in a target zone MOD entry.

## subentry indicator • TCP/IP

**subentry indicator.** A subentry that does not have a data value associated with it. An example of an indicator is the ERROR indicator in the SYSMOD entry. An indicator is either on or off.

**subentry list.** Multiple occurrences of the same subentry type in an entry, each with a different value. For example, the modules supplied by a PTF are saved as names in the MOD subentry list within the SYSMOD entry for that PTF.

**SUP.** Supersede.

**superseded-only SYSMOD.** A SYSMOD that has not been installed, but that has been superseded by another SYSMOD that has been installed.

**superseded SYSMOD.** In SMP/E, a SYSMOD that is contained in or replaced by the SYSMOD or requisite set of SYSMODs currently being processed. This is indicated by the SUPBY subentry in the SYSMOD entry for the superseded SYSMOD. A superseded SYSMOD is functionally lower than the SYSMOD that superseded it.

**superseding SYSMOD.** In SMP/E, a SYSMOD that contains all the functions in another SYSMOD and is recognized as the equivalent of that other SYSMOD. The superseding SYSMOD uses SUP operand on its ++VER statement to specify the superseded SYSMOD.

**superzap.** A generic term for the process performed by IMASPZAP. It can also refer to the module updates processed by IMASPZAP.

**SVC.** Supervised call.

**SVRB.** Supervisor request block.

**SYSGEN.** System generation.

**SYSLIB.** (1) A subentry used to identify the target library in which an element is installed. (2) A concatenation of macro libraries to be used by the assembler. (3) A set of routines used by the link-edit utility to resolve unresolved external references.

**SYSMOD.** System modification.

**SYSMOD entry.** An SMP/E entry containing information about a SYSMOD that has been received into SMPPTS, accepted into the distribution libraries, or applied to the target libraries.

**SYSMOD ID.** System modification identifier.

**SYSMOD packaging.** See *packaging*.

**SYSMOD selection.** The process of determining which SYSMODs are eligible to be processed.

**SYSPRINT.** The data set that contains output from the utilities called by SMP/E.

**SYSPUNCH.** The temporary data set containing object modules assembled by running the job stream produced by system generation or the GENERATE command. These modules are not installed in the distribution libraries at ACCEPT time.

**system control program (SCP).** IBM-supplied programming that is fundamental to the operation and maintenance of the system. It serves as an interface with licensed programs and user programs and is available without additional charge.

**system generation (SYSGEN).** The process of selecting optional parts of an operating system and of creating a particular operating system tailored to the requirements of a data processing installation.

**system modification (SYSMOD).** The input data to SMP/E that defines the introduction, replacement, or update of elements in the operating system and associated distribution libraries to be installed under the control of SMP/E. A system modification is defined by a set of MCS.

**system modification identifier (SYSMOD ID).** The name that SMP/E associates with a system modification. It is specified on the ++APAR, ++FUNCTION, ++PTF, or ++USERMOD statement.

**system release identifier (SREL).** A 4-byte value representing the system or subsystem, such as Z038 for MVS-based products.

**SYSUT1, SYSUT2, SYSUT3.** Scratch data sets for SMP/E and the utilities it calls.

**SYSUT4.** A data set that is used instead of the SYSIN data sets when certain utilities are called.

## T

**target library.** A library containing the executable code that makes up a system.

**target system.** The system updated during APPLY and RESTORE processing, also referred to as the operating system. See also target libraries.

**target zone.** In SMP/E, a group of records in a CSI data set that describes the SYSMODs, elements, and load modules in a target library.

**TARGETZONE entry.** An SMP/E entry containing information used by SMP/E to process a specific target zone and the associated target libraries.

**TCP/IP.** Transmission Control Protocol/Internet Protocol (TCP/IP) is a hardware independent communication protocol used between physically separated computers. It was designed to facilitate communication between computers located on different physical networks.



**temporary data set.** A work data set (SMPWRK1–SMPWRK6) or utility data set (SYSUT1–SYSUT4). Temporary data sets are allocated when processing for an SMP/E command begins, and deleted when processing is finished.

**text library (TXLIB).** A data set containing JCLIN input or replacements for macros, source, or object modules that have not been link-edited. It is used when the JCLIN or elements are provided in partitioned data sets rather than inline or in relative files.

**TGTLIB.** Target library.

**TIEDTO relationship.** A cross-zone relationship between two target zones created when the LINK command updates a load module in one of the zones to include modules from the other zone. This relationship is established through the TIEDTO subentry in the zone definition entries for each of the zones.

**TIEDTO zone.** See *cross-zone*.

**TLIB.** Temporary library. See *SMPTLIB*.

**transformed data.** Data processed by the GIMDTS service routine so that it can be packaged inline in fixed-block 80 records.

**Transport Layer Security (TLS).** A protocol that provides communications privacy over the Internet.

**TSO.** Time-sharing option.

**TXLIB.** Text library.

## U

**UCL.** Update control language.

**UCL statement.** An SMP/E control statement used to define or change information in an SMP/E data set entry. UCL statements are coded between the UCLIN and ENDUCL commands. The UCL statement specifies the action to be taken (ADD, REP, or DEL), the entry to be modified, and any indicators and subentries to be changed.

**UCLIN.** The SMP/E command used to mark the beginning of UCL statements, which are used to make changes to entries in SMP/E data sets.

**UMID.** Update modification identifier.

**unconditionally coexisting functions.** Functions that coexist and must be in the same zone.

**UNLOAD.** The SMP/E command used to copy data out of SMP/E data set entries in the form of UCL statements.

**unload.** In SMP/E, to copy data out of SMP/E data set entries in the form of UCL statements, by use of the UNLOAD command.

**update.** In SMP/E, to change an existing element without replacing it.

**update modification identifier (UMID).** The SYSMOD ID of a SYSMOD that updated the last replacement of a given element.

**user modification (USERMOD).** A change constructed by a user to modify an existing function, add to an existing function, or add a user-defined function. USERMODs are identified to SMP/E by the ++USERMOD statement.

**USERMOD.** User modification.

**UTILITY entry.** An SMP/E entry containing information used by SMP/E to invoke a particular system utility program.

## V

**VERSION.** An operand on the ++VER or element statement. VERSION specifies one or more SYSMODs containing elements that are functionally lower than elements in the SYSMOD that specifies the operand. The VERSION operand is also used to change ownership of elements.

**version.** A separate licensed program that is based on an existing licensed program and that usually has significant new code or new functions. Contrast with *release* and *modification level*.

**versioned element.** An element that is part of more than one function—for example, one that is part of a base function and a dependent function.

**VSAM.** Virtual Storage Access Method.

**VTOC.** Volume table of contents.

## Z

**ZAP.** (1) The SMP/E MCS used to package an update for an object module. (2) The superzap control statement used to update an object module. (3) A shortened name for the superzap utility, which is used to install these updates. See *IMASZAP*.

**zone.** A partition in a CSI data set.

**ZONECOPY.** The SMP/E command used to copy a zone from one CSI data set to another.

**ZONEDELETE.** The SMP/E command used to delete a zone from a CSI data set.

**ZONEEDIT.** The SMP/E command used to change the values for a subentry in all the DDDEF or UTILITY entries in a given zone.

**ZONEEXPORT.** The SMP/E command used to copy a zone into a sequential data set.

**ZONEIMPORT.** The SMP/E command used to load an exported zone from a sequential data set into another zone.

**ZONEMERGE.** The SMP/E command used to copy one zone into another, or to merge two zones into one.

**ZONERENAME.** The SMP/E command used to change the name of a zone.

**ZONESET.** A group of zones to be used when processing an SMP/E command. For example, it may define the zones that the REPORT command is to check for cross-zone requisites. A ZONESET may also define a group of zones to be checked or ignored by the REJECT command.

**ZONESET entry.** An SMP/E entry defining a ZONESET.

**z/OS UNIX System Services (z/OS UNIX).** The set of functions provided by the Shell and Utilities, kernel, debugger, file system, C/C++ Run-Time Library, Language Environment, and other elements of the z/OS operating system that allow users to write and run application programs that conform to UNIX standards.

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# Index

## Special characters

- ++element MCS
  - USERMODs 173
- ++HOLD MCS
  - coexistence considerations 211
  - operands 135
- ++IF MCS
  - cross-zone requisite checking 159
- ++JAR MCS
  - using 187, 188
- ++JARUPD MCS
  - using 187
- ++JCLIN MCS
  - USERMODs 172
- ++MAC MCS
  - USERMODs 172
- ++MACUPD MCS
  - USERMODs 172
- ++MOD MCS
  - USERMODs 172
- ++PROGRAM MCS
  - USERMODs 173
- ++RELEASE MCS
  - operands 135
- ++SRC MCS
  - USERMODs 173
- ++SRCUPD MCS
  - USERMODs 173
- ++USERMOD MCS
  - building USERMODs 170
  - examples 174
- ++VER MCS
  - coexistence considerations 211
  - USERMODs 170
- ++ZAP MCS
  - USERMODs 172
- keepalive* attribute
  - migration tasks 197
- pasv* attribute
  - migration tasks 197

## A

- ACCEPT CHECK command
  - See also* ACCEPT command
  - corrective service 128
  - functions 107
  - preventive service 119
- ACCEPT command
  - corrective service 129
  - description 13
  - examples 29
  - exception SYSMOD processing 138
  - functions 108
  - preventive service 120
  - processing 27
  - reports produced 30
  - summary 44
- Access Method Services (AMS)
  - See* AMS utility

- accessibility 223
- alias defined for user catalog 56, 58
- allocating data sets
  - DDDEF entry 63
  - dynamic allocation 62
  - PTS 62
  - SCDS 62
  - SMPCSI 56
- ALLZONES 150
- AMODE=64 link edit parameter 204
- AMS utility
  - allocating the CSI 56
  - default values 65
  - reorganizing a CSI 61
- APAR fixes
  - defining 38
- APAR SYSMODs 5
- APPLY CHECK command
  - See also* APPLY command
  - corrective service 127
  - functions 104
  - preventive service 114
  - USERMODs 132
- APPLY command
  - corrective service 127
  - description 13
  - examples 21
  - exception SYSMOD processing 137
  - functions 106
  - preventive service 117
  - processing 19
  - reports produced 23
  - summary 43
  - USERMODs 133
- ASMA90 utility
  - See* assembler utility
- assembler utility
  - default values 65
- Automated Service Delivery Package
  - HOLDDATA
    - source of 140
- automatic call libraries 147
- automatic cross-zone requisite checking
  - specifying 78

## B

- BACKUP entry 20
- base functions 38
- binder
  - See* link-edit utility
- BPX.SUPERUSER security class
  - coexistence considerations 206

## C

- CALL
  - effect of CALLLIBS subentry on 66
- calling SMP/E 81
- cataloged procedure for SMP/E 82

- catalogs
  - alias defined for user catalog 56, 58
  - for CSI 56
  - listing 61
- causer SYSMODs 183
- CBPDO
  - Recommended Service Upgrade 221
- CBPDO tape
  - format 110
  - functions, source of 101
  - HOLDDATA
    - processing 141
    - source of 139
  - preventive service, source of 109
- CHANGEFILE
  - coexistence considerations 208
- CHECK operand
  - on REJECT command 197
- CISIZE
  - for CSI data set 57
- CLEANUP command 46
- CLIENT data set
  - changes to 194
  - migration tasks 197
- CLIST data set for SMP/E dialogs,  
LIBDEF restrictions 72
- CMWA
  - copy utility parameter 197
- commands
  - ACCEPT 44
  - APPLY 43
  - CLEANUP 46
  - DEBUG 47
  - GENERATE 44
  - JCLIN 45
  - LINK LMODS 47
  - LINK MODULE 47
  - LIST 44
  - LOG 46
  - RECEIVE 42
  - RECEIVE ORDER 42
  - REJECT 45
  - REPORT CROSSZONE 44
  - REPORT ERRSYSMODS 44
  - REPORT SOURCEID 44, 165
  - REPORT SYSMODS 44, 167
  - RESETRC 47
  - RESTORE 44
  - SET 42
  - UCLIN 45
  - ZONECOPY 46
  - ZONEDELETE 46
  - ZONEEDIT 45
  - ZONEEXPORT 46
  - ZONEIMPORT 46
  - ZONEMERGE 46
  - ZONERENAME 47
- COMPACT
  - coexistence considerations 208
- comparing two zones
  - LIST command 153

- comparing two zones (*continued*)
  - REPORT CROSSZONE
    - command 159
- COMPAT=PM4 link edit parameter 204
- compress utility
  - default values 65
- compressing a CSI 61
- concatenating dialog libraries 72
- conditional JCLIN processing
  - coexistence considerations 203
- Consolidated Software Inventory
  - See* SMPCSI
- consolidated software inventory data set (SMPCSI) 11
- CONTROLINTERVALSIZE
  - for CSI data set 57
- copy utility
  - default values 65
- copy utility parameter
  - CMWA 197
  - SPCLCMOD 197
- corrective service
  - description of 38
  - installation
    - ACCEPT CHECK processing 128
    - ACCEPT processing 129
    - APPLY CHECK process 127
    - APPLY processing 127
    - construct the fix 124
    - deciding whether to accept 128
    - prepare 125
    - RECEIVE ORDER processing 126
    - RECEIVE processing 125
    - research the ACCEPT CHECK reports 128
    - research the APPLY CHECK reports 127
    - summary 123
    - test 128
- corrective service (APAR SYSMODs) 5
- cover letters, listing 152
- cross-product load modules
  - example 148
- cross-zone load modules
  - example 148
- cross-zone requisite checking 159
- Cross-Zone Requisite SYSMOD report 160
- cross-zone requisites
  - bypassing unsatisfied 80
  - checking for 79
  - resolving 80
  - unsatisfied 79
- CSI
  - See also* SMPCSI
  - API for 14
  - cataloging considerations 56
  - defining entries
    - sample UCL statements 59
  - defining zones 58
  - importing 61
  - master CSI
    - definition of 52
  - parameter
    - EXEC statement for GIMSMP 81
  - reorganizing 61

- CSI (*continued*)
  - structures, examples of
    - multiple-CSI structure 53
    - separate CSI for each SREL, combining target and DLIB zones 55
    - separate CSI for each zone 54
    - separate global zones 52
    - single-CSI structure 52
  - summary 49
- CUM tape
  - See* cumulative service tape
- customizing
  - an element (USERMOD SYSMODs) 6
  - JOB statement 76
  - SMP/E dialogs 75
- CYLINDERS
  - for CSI data set 57

## D

- data element MCS
  - USERMODs 173
- data set
  - ORDERSERVER 194
- data sets
  - CLIENT 194
  - dynamically allocating 62
- DATE parameter, EXEC statement for GIMSMP 81
- DDDEF entry
  - instead of DD statements in cataloged procedure 83
  - used for dynamic allocation 63
- DEBUG command 47
- default utilities used by SMP/E 65
- default zone group
  - defining 78
- defaults
  - for SMP/E dialogs 75
  - SMPOUT 64
  - SYSPRINT 64
- defining data sets
  - DDDEF entry 63
  - dynamic allocation 62
  - PTS 62
  - SCDS 62
  - SMPCSI 49
- DEIINST job
  - coexistence considerations 206
- deleting SYSMODs from your system (RESTORE command) 13, 23
- dependent functions 38
- dialogs
  - administration 195
  - concatenating libraries 72
  - connecting to ISPF master application menu 74
  - customizing 75
    - migration tasks 201
    - overview 201
  - default values
    - panel GIM@PARM 75
    - SMP/E dialogs 75
  - distribution libraries
    - in logon procedure for SMP/E 74
  - editing dialog JCL 72

- dialogs (*continued*)
  - LIBDEF restrictions 72
  - logon procedure for SMP/E 74
  - query 195
  - required programs 71
  - restrictions 72
  - saving JCL generated by SMP/E dialogs 72
  - specifying defaults for 75
  - table data sets 72
  - target libraries
    - in logon procedure for SMP/E 74
- disability 223
- displaying SMP/E data
  - API for 35
  - LIST command 33
  - Query dialogs 31
  - REPORT commands 34
- distribution libraries (DLIBs)
  - description of 39
  - zones for 40, 58
- distribution zone
  - defining 58
  - description of 11, 40
  - SYSMOD entries 28
- DLIBZONE entry 58
- DYNAM
  - coexistence considerations 212
- dynamic allocation
  - CSI parameter on EXEC statement for GIMSMP 81
  - DDDEF entries 64
  - DDDEF entry 63
  - GIMDDALC 63
  - migration tasks 202
  - SMPPARM 63
  - sources of information
    - DDDEF entries 63
    - standard defaults 64
  - summary 62

## E

- END
  - EXEC statement parameter for GIMSMP 82
- enhanced link name values
  - coexistence considerations 202
  - migration tasks 202
- entries in CSI data sets
  - DLIBZONE entry 58
  - GLOBALZONE entry 58
  - TARGETZONE entry 58
- ESO
  - format 110
  - HOLDDATA
    - processing 142
    - source of 139
- exception data (HOLDDATA) 12
- exception SYSMOD data
  - See also* HOLDDATA
  - Automated Service Delivery Package
    - source of 140
  - CBPDO tape
    - source of 139
- exception SYSMOD management
  - ++HOLD MCS 135



- exception SYSMOD management  
(*continued*)
  - operands 135
  - ++RELEASE MCS 135
  - operands 135
- categories of HOLDDATA 135
- examples of 135
- HOLDDATA
  - CBPDO tape, processing 141
  - ESO, processing 142
  - obtaining 139
  - processing example 144
  - PSP files, processing 143
- introduction 135
- processing
  - ACCEPT 138
  - APPLY 137
  - RECEIVE 136
  - REJECT 139
  - RESTORE 139
- exception SYSMOD report 163
- EXEC statement
  - CSI=dsname 81
  - DATE=date 81
  - PARM 81, 82
  - PROCESS=END 82
  - PROCESS=WAIT 82
- exit routines 86
  - migration tasks 202
- Expanded Service Option (ESO)
  - Recommended Service Upgrade 221
- exporting a CSI data set 61

## F

- FILL
  - coexistence considerations 212
- fixing an element 5
- function SYSMODs 3
  - installation
    - ACCEPT CHECK processing 107
    - ACCEPT processing 108
    - APPLY CHECK processing 104
    - APPLY processing 106
    - choosing the update mode 104
    - get additional SYSMODs 106
    - preparation 102
    - RECEIVE function 103
    - RECEIVE processing 103
    - research the ACCEPT CHECK reports 108
    - research the APPLY CHECK reports 105
    - summary 101
    - test the new function 106
    - summary 37
- functions in a system 2

## G

- GENERATE command
  - summary 44
- generated JCL, saving for SMP/E
  - dialogs 72
- GIM@PARM (SMP/E Dialog
  - Settings) 75, 201, 215

- GIM@PRIM (SMP/E Primary Option
  - Menu) 75, 215
- GIM@UPRM
  - removal of 201
- GIMDFOG
  - ORDER RETENTION subentry 195
- GIMDFUT
  - removal of 201
- GIMGTPKG service routine 196
- GIMMPDFT
  - migration tasks 202
- GIMMPUXD
  - migration tasks 202
- GIMSAMPU 59
- GIMSMP 81, 82
- GIMUNZIP 203
- GIMUTTBL
  - migration tasks 201
  - removal of 201
- GIMXSID 198
- GIMXTRX 205
- GIMZIP
  - archive segmentation
    - coexistence considerations 199
    - overview 198
  - network delivery of SMP/E input
    - coexistence considerations 204
    - overview 203
  - user defined subdirectories
    - coexistence considerations 199
    - overview 199
- global zone
  - defining 58
  - description of 11, 40
  - HOLDDATA entries 16
  - ORDER entry 194
  - SYSMOD entries 16, 20, 25, 28
- GLOBALZONE entry 58

## H

- HEWLH096 utility
  - See* link-edit utility
- HFSINST job
  - coexistence considerations 206
- hierarchical file system
  - copy utility
    - default values 65
- hierarchical file system element MCS
  - coexistence considerations 207
  - USERMODs 174
- HOBSET
  - coexistence considerations 212
- HOLDDATA 139, 140
  - See also* exception SYSMOD management
  - CBPDO tape
    - processing 141
  - checking effect on installed SYSMODs (REPORT ERRSYSMODs) 163
  - ESO
    - processing 112, 127, 142
    - source of 139
  - from IBMLINK 140
  - from the IBM Support Center 127
  - provided for SYSMODs 12

- HOLDDATA (*continued*)
  - PSP files
    - processing 143
    - source of 140
  - summary reports 205
- HOLDDATA entries
  - created during RECEIVE 137
  - in the global zone 16

## I

- IBMLINK, source of HOLDDATA 140
- IDCAMS utility
  - See* AMS utility
- IEANUC01 load module 203
- IEBCOPY utility
  - See* copy utility
- IEBUPDTE utility
  - See* update utility
- IEWBLINK utility
  - See* link-edit utility
- IEWL utility
  - See* link-edit utility
- IMASPZAP utility
  - See* superzap utility
- implicitly including modules from
  - another product 147
- installation methods
  - RECEIVE-APPLY-ACCEPT 101
- installation procedures
  - corrective service 123
  - functions 101
  - preventive service 109
  - USERMODs 131
- installing SMP/E
  - connecting the dialogs 71
- installing SYSMODs
  - distribution libraries (ACCEPT command) 13, 27
  - target libraries (APPLY command) 13, 19
- introducing an element 3
- invoking SMP/E 81
- ISPTCL1 72
- ISPCTL2 72
- ISPF (Interactive System Productivity Facility)
  - concatenating libraries 72
  - connecting dialogs 71, 74
- ISPF/PDF (Interactive System Productivity Facility/Program Development Facility) 71

## J

- Java Archive (JAR) files
  - building 187
  - coexistence considerations 199
  - in FMIDs 187
  - in PTFs 187, 188
  - URL for 199
  - using 187
- JCL generated by SMP/E dialogs,
  - saving 72
- JCLIN command
  - summary 45

JOB statement  
customizing 76

## K

keyboard 223  
KEYS  
for CSI data set 57

## L

LIBDEF restrictions 72  
link edit utility output  
recommended DDDEF entries 77  
LINK LMODS command  
overview of 197  
summary 47  
LINK MODULE command  
description 147  
example 148  
summary 47  
when to use 147  
link-edit utility  
default values 65  
link-editing object modules into load  
modules 2  
LIST command  
comparing two zones 153  
cover letters 152  
description 14  
examples 33  
listing a specific entry type 150  
listing an FMID or FMIDSET 152  
listing specific entries 151  
reports produced 34  
summary 44, 149  
LISTCAT job 61  
listing SMP/E data  
API for 35  
LIST command 33  
Query dialogs 31  
REPORT commands 34  
load module data set for SMP/E dialogs,  
LIBDEF restrictions 72  
load module, created by link-editing  
object modules 2  
LOG command 46  
logon procedure (TSO) 74  
logon procedure, sample 73

## M

master application menu for ISPF 74  
master catalog, alias for user catalog 56,  
58  
master CSI  
definition of 52  
specified on DD statement 83  
specified on EXEC statement 81, 83  
MCS entry, created during  
RECEIVE 136  
methods of installation 101  
migration  
OS/390 V1R2 SMP/E summary 212  
OS/390 V1R3 SMP/E summary 209  
OS/390 V2R5 SMP/E summary 207

migration (*continued*)  
OS/390 V2R7 SMP/E summary 205  
overview 191  
recommended steps for 192  
SMP/E V3R1 summary 201  
terminology 191  
modification control statement (MCS) 3,  
15  
modification identifiers  
function (FMID) 9  
replacement (RMID) 9  
update (UMID) 9  
MSGFILTER  
coexistence considerations 209  
MSGWIDTH  
coexistence considerations 209  
multiple-CSI zone structure 50, 53

## N

NCAL  
effect of CALLLIBS subentry on 66  
network delivery of SMP/E input  
coexistence considerations 204  
notices 225  
NUCID  
migration tasks 203  
operand of APPLY command 203  
subentry 203

## O

object module, link-editing into a load  
module 2  
OPTIONS entry  
ORDER RETENTION subentry 194  
ORDER entry  
global zone 194  
ORDER RETENTION  
OPTIONS entry subentry 194  
ORDERSERVER  
data set 194

## P

PCF (programming control facility) 71  
PE PTF  
*See* exception SYSMODs  
prerequisites for SYSMODs 7  
preventive service 109  
CBPDO tapes 109  
description of 38  
ESO tapes 110  
installation  
ACCEPT CHECK processing 119  
ACCEPT processing 120  
APPLY CHECK processing 114  
APPLY processing 117  
get additional SYSMODs 117  
preparation 112  
RECEIVE processing 112  
research the ACCEPT CHECK  
reports 120  
research the APPLY CHECK  
reports 115  
test 118

preventive service 109 (*continued*)  
PTF SYSMODs 4  
RECEIVE ORDER requests 111  
PROCESS parameter, EXEC statement for  
GIMSMP 82  
product reinstall  
*See* GENERATE  
products (function SYSMODs) 3  
program element MCS  
USERMODs 173  
program temporary fix (PTF) 4  
programming control facility (PCF) 71  
PSP files  
HOLDDATA  
processing 143  
source of 140  
PTF  
*See also* corrective service  
*See also* preventive service  
introduction 109  
Recommended Service Upgrade 221  
summary 38  
PTF cover letters, listing 152  
PTF SYSMODs 4  
PTS, summary 62  
PUT  
*See* ESO

## Q

Query dialog  
description 14  
example 31

## R

RACF (z/OS Security Server)  
regulating SMP/E utility programs  
with 201  
RC  
coexistence considerations 208  
reason IDs 135  
RECEIVE command 194  
assigning source IDs to  
SYSMODs 197  
corrective service 125  
description 13  
entries created  
HOLDDATA entry 137  
MCS entry 136  
SYSMOD entry 137  
examples 17  
functions 103  
preventive service 112  
processing 15  
reports produced 18  
summary 42  
USERMODs 131  
RECEIVE ORDER command  
corrective service 126  
summary 42  
RECEIVE ORDER request  
preventive service, source of 111  
RECEXZGRP  
coexistence considerations 209

- Recommended Service Upgrade (RSU) 221
- RECORDSIZE
  - for CSI data set 57
- recovering from utility errors 69
- RECZGRP
  - coexistence considerations 209
- REJECT command
  - CHECK operand 197
  - exception SYSMOD processing 139
  - summary 45
- removing SYSMODs from your system (RESTORE command) 13, 23
- reorganizing a CSI 61
- REPORT CALLLIBS command
  - removal of 198
- REPORT command
  - description 14
  - example 34
  - reports produced 35
- REPORT CROSSZONE command 80
  - introduction 159
  - summary 44
- REPORT ERRSYSMODS command
  - HOLDDATA for installed SYSMODs 163
  - introduction 163
  - summary 44
- REPORT SOURCEID command
  - introduction 165
  - summary 44
- REPORT SYSMODS command
  - introduction 167
  - summary 44
- reports
  - ACCEPT CHECK reports
    - corrective service 128
    - functions 108
    - preventive service 120
  - APPLY CHECK reports
    - corrective service 127
    - functions 105
    - preventive service 115
    - USERMODs 132
  - Causar SYSMOD Summary report 183
  - SYSMOD Status report 183, 184
- RESETRC command 47
- RESTORE command
  - description 13
  - examples 25
  - exception SYSMOD processing 139
  - processing 23
  - reports produced 26
  - summary 44
- restrictions
  - CLIST data set for SMP/E dialogs 72
  - dialogs 72
  - LIBDEF 72
  - load module data set for SMP/E dialogs 72
- retry processing 69
- retry utility
  - default values 65
- RMODE=ALIASES
  - coexistence considerations 212

- RMODE=SPLIT
  - coexistence considerations 212
- root cause analysis 183
- RSU (Recommended Service Upgrade) 221

## S

- sample logon procedure 73
- saving JCL generated by SMP/E dialogs 72
- SCDS, summary 62
- separate CSI for each SREL, combining target and DLIB zones 55
- separate CSI for each zone 54
- ServerPac
  - Recommended Service Upgrade 221
- servicing a product
  - corrective service (APAR SYSMODs) 5
  - preventive service (PTF SYSMODs) 4
- SET command 13, 42
- SHAREOPTIONS
  - for CSI data set 57
- shortcut keys 223
- SIDEDECKLIB
  - coexistence considerations 212
- single-CSI structure 50, 52
- SMP/E cataloged procedure 82
- SMP/E commands 12, 41
- SMP/E data
  - changing 155
  - listing 149
- SMP/E data sets
  - residing in UNIX file system 204
- SMPCSI 11
- SMPPTS 15
- SMPSCDS 20
- SMPTLIB 15
- SMP/E dialog libraries, concatenating 72
- SMP/E dialogs
  - administration 195
  - customizing
    - migration tasks 201
    - overview 201
  - query 195
- SMP/E reports
  - ACCEPT CHECK reports
    - corrective service 128
    - functions 108
    - preventive service 120
  - APPLY CHECK reports
    - corrective service 127
    - functions 105
    - preventive service 115
    - USERMODs 132
- SMP/E summary 37
- SMPCSI
  - allocating 56
  - master CSI 83
  - multiple-CSI structure 50
  - single-CSI structure 50
  - summary 49
  - zones, description of 40
- SMPDUMMY ddname
  - allocation rules 64

- SMPDUMMY ddname (*continued*)
  - coexistence considerations 201
  - overview 200
- SMPHOLD 113
- SMPLTS
  - coexistence considerations 200
  - use of 41, 199
- SMPMTS
  - use of 41
- SMPOUT
  - default 64
- SMPPROC (cataloged procedure for SMP/E) 82
- SMPPTS
  - coexistence considerations 208
  - spill data sets 204
  - use of 40
- SMPPPUNCH output
  - REPORT CROSSZONE command 160
  - REPORT ERRSYSMODS command 163
- SMPSCDS
  - use of 41
- SMPSTS
  - use of 41
- SMPTABL
  - description 72
  - space allocation 73
- source code, assembling to create an object module 2
- SPCLCMOD
  - copy utility parameter 197
- specifying the zone to be updated (SET command) 13
- standard method of installation 101
- superzap utility
  - default values 65
- SYS1.LINKLIB 205
- SYS1.LPALIB 3
- SYS1.MACLIB 62
- SYS1.MIGLIB 3, 205
- SYS1.SAMPLIB 218
- SYS1.SVCLIB 3
- SYSDEFSD
  - DUMMY data set for
    - coexistence considerations 201
    - overview 200
- SYSLIB
  - concatenation 85
- SYSMOD
  - assigning source IDs to 197
- SYSMOD entries
  - created during RECEIVE 137
- distribution zone 28
- global zone 16, 20, 25, 28
- target zone 20, 24
- SYSMODs
  - APAR 5
  - definition of 37
  - description 2
  - function
    - base 4
    - dependent 4
  - hierarchy 37
  - listing
    - REPORT SOURCEID 165

SYSMODs (*continued*)  
 listing (*continued*)  
   SMPPUNCH 165  
 prerequisites 7  
 PTF 4  
 summary 37  
 USERMOD 6  
 SYSPRINT  
   default 64  
 system modifications  
   *See* SYSMODs

## T

table data sets for dialogs 72  
 target libraries, description of 39  
 target zone  
   defining 58  
   description of 11, 40  
   SYSMOD entries 20, 24  
 TARGETZONE entry 58  
 temporary fix (APAR SYSMODs) 6

## U

UCLIN command  
   general syntax 156  
   introduction 155  
   samples in GIMSAMPU 59  
   summary 45  
 UNIX file system  
   identification of data sets 204  
   SMP/E data sets residing in 204  
 update utility  
   default values 65  
 UPGRADE command  
   coexistence considerations 198  
   overview of 198  
 user catalog  
   alias in master catalog 56, 58  
   for CSI 56  
 user-defined subdirectories  
   coexistence considerations 199  
 USERMOD 133  
   *See also* user modification  
   creating 169  
   examples 174  
   installation  
     APPLY CHECK process 132  
     APPLY process 133  
     prepare 131  
     RECEIVE processing 131  
     research APPLY CHECK  
       reports 132  
     summary 131  
     test 133  
 MCS statements  
   ++element (for data  
     elements) 173  
   ++JCLIN 172  
   ++MAC 172  
   ++MACUPD 172  
   ++MOD 172  
   ++PROGRAM 173  
   ++SRC 173  
   ++SRCUPD 173

USERMOD (*continued*)  
 MCS statements (*continued*)  
   ++USERMOD 170  
   ++VER 170  
   ++ZAP 172  
   hierarchical file system  
     element 174  
   preventing ACCEPT processing 133  
   summary 38  
 USERMOD SYSMODs 6  
 utility errors, recovery from 69  
 utility programs  
   default values  
     access method services (AMS) 65  
     assembler 65  
     compress 65  
     copy 65  
     hierarchical file system copy 65  
     link-edit utility 65  
     retry 65  
     superzap 65  
     update 65  
   specifying which utility programs  
     SMP/E can call 201  
 UTIN  
   coexistence considerations 212

## V

VERSION command  
   coexistence considerations 209

## W

WAIT  
   EXEC statement parameter for  
     GIMSMP 82

## X

XZREQCHK subentry  
   coexistence considerations 210  
   use of 78

## Z

z/OS Security Server (RACF)  
   regulating SMP/E utility programs  
     with 201  
 zone entries  
   impacts 194  
 zone group  
   default 78  
   defining 78  
   specifying on command 78  
   ZONEINDEX for 79  
 zone structures  
   examples 52  
   multiple CSIs 50  
   single CSI 50  
 ZONECOPY command  
   alternative to UCLIN 156  
   summary 46  
 ZONEDELETE command  
   alternative to UCLIN 156

ZONEDELETE command (*continued*)  
   summary 46  
 ZONEEDIT command  
   alternative to UCLIN 156  
   summary 45  
 ZONEEXPORT command  
   alternative to UCLIN 156  
   summary 46  
 ZONEIMPORT command  
   alternative to UCLIN 156  
   summary 46  
 ZONEINDEX  
   for zone group 79  
 ZONEMERGE command  
   summary 46  
 ZONERENAME command  
   alternative to UCLIN 156  
   summary 47  
 zones  
   comparing  
     LIST command 153  
     REPORT CROSSZONE  
       command 159  
     REPORT SYSMODS  
       command 167  
   description of 40  
   zones in the SMPCSI data set  
     *See also* distribution zone  
     *See also* global zone  
     *See* target zone  
 ZONESET entry  
   cross-zone processing 159  
   defining 78

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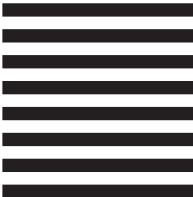
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