

Interactive System Productivity Facility
(ISPF)



Library Management Facility

OS/390 Version 2 Release 100

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OS/390 Version 2 Release 100

Note

Before using this document, read the general information under "Notices" on page 97.

Fifth Edition (September 2000)

This edition applies to ISPF for Version 2 Release 10 of the licensed program OS/390 (program number 5647-A01) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Preface

This book provides reference and usage information for programmers who need to create, control, and access controlled libraries.

About This Book

This book describes:

- LMF concepts
- How a library administrator:
 - Creates a controlled project
 - Establishes project, library, and member controls
 - Maintains the controlled project
- How a programmer accesses, modifies, and promotes controlled library members.

Who Should Use This Book

This book is for:

- Library administrators who use ISPF Library Management Facility (LMF) to manage the development process
- Programmers whose project is controlled by LMF.

This book requires a general knowledge of using ISPF in the MVS environment.

What is in This Book

This manual is intended primarily for library administrators and programmers. "Library administrators" are those individuals who manage their development process with the Library Management Facility. "Programmers" are those individuals who develop a project under the controls set by a library administrator. The manual assumes that you are engaged in program development and are familiar with the operation of ISPF in the MVS environment.

Chapter 1 presents an overview of LMF. Regardless of whether you are a library administrator or a programmer, you should read this chapter first. Chapters 2 and 3 assume that you have read and understood Chapter 1.

Chapter 2 describes how a library administrator administers the controlled library. If you are a library administrator, reading through this chapter rapidly before working through it will help you master the task quickly. If you want to use LMF as a programmer only, you can skip this chapter and continue with Chapter 3.

Chapter 3 describes how a programmer promotes and retrieves the members of a controlled project.

Appendix A contains record format information that you will need if you want to use the information from activity logs and library status to produce special reports. Appendix B contains a scenario that can be used by new users as an introduction to LMF.

Please note that the identification of a panel as an option number, for example, ISPF option 8.1.3, is intended as an aid to assist you in locating and confirming the identification of a particular panel. This notation does not imply that you can enter 8.1.3 on a primary option panel in order to “jump” directly to the panel. Usually, you must work through the panels in hierarchical order.

The example of a programming project used in this manual is not intended to illustrate an actual project’s history. It is provided to assist you in understanding LMF concepts and the basics of LMF use. Your project will probably be quite different, and LMF gives you considerable flexibility in structuring and controlling your project.

Summary of Changes

OS/390 V2R10.0 ISPF contains the following changes and enhancements:

- ISPF Product and Library Changes
- ISPF Dialog Manager Component Changes
- ISPF PDF Component Changes
- ISPF SCLM Component Changes
- ISPF Client/Server Component Changes

ISPF Product Changes

Changes to the ZENVIR variable. Characters 1 through 8 contain the product name and sequence number in the format *ISPF x.y*, where x.y indicates:

- <= 4.2 means the version.release of ISPF
- = 4.3 means ISPF for OS/390 release 2
- = 4.4 means ISPF 4.2.1 and ISPF for OS/390 release 3
- = 4.5 means ISPF for OS/390 Version 2 Release 5.0
- = 4.8 means ISPF for OS/390 Version 2 Release 8.0
- = 5.0 means ISPF for OS/390 Version 2 Release 10.0

The ZENVIR variable is used by IBM personnel for internal purposes. The x.y numbers DO NOT directly correlate to an ISPF release number in all cases. For example, as shown above, a ZENVIR value of 4.3 DOES NOT mean ISPF Version 4 Release 3. NO stand-alone version of ISPF exists above ISPF Version 4 Release 2 Modification 1.

The ZOS390RL variable contains the OS/390 release on your system.

The ZISPFOS system variable contains the level of ISPF code that is running as part of the OS/390 release on your system. This might or might not match ZOS390RL. For this release, the variable contains **ISPF for OS/390 Version 2 Release 10.0**.

New system variables:

ZBDMAX

BDISPMAX value

ZBDMXCNT

Count of current displays in batch mode session

ZPANELID

Name of currently displayed panel

ZSCREENI

Logical screen data

ZSCREENC

Cursor position within the logical screen data

The ISRDDN utility is now documented in the ISPF User's Guide.

ISPF DM Component Changes

The DM component of ISPF includes the following new functions and enhancements:

- Additional support for panel process:
 - Support added for "verify data set name with filter, (DSNAMEF)".
 - Support added for "verify data set name with filter with member, (DSNAMEFM)".
 - Support added for "verify data set name with quotes and parentheses, (DSNAMEPQ)".
 - Support added for "verify name with filter, (NAMEF)".
 - Support added for "verify specific constants within a variable, (PICTCN, string)".
 - Support added for "verify international format date, (IDATE)".
 - Support added for "verify standard date, (STDDATE)".
 - Support added for "verify Julian date, (JDATE)".
 - Support added for "verify Julian standard date, (JSTD)".
 - Support added for "verify international time, (ITIME)".
 - Support added for "verify standard time, (STDTIME)".
 - Support added for NOJUMP attribute keyword.
 - Support added to allow INTENS(NON) on LI, LID, VOI and LEF attribute types.
 - Update)HELP section processing to support variables for keyword values and two new keywords MSG(message-name) and PASSTHRU.
- Support added for STKADD keyword on LIBDEF service.
- New QBASELIB service to query base libraries.
- Add Panel Id to CUAATTR utility.
- Add support for starting a new screen or application from the ISPF Task List panel.
- Add support for command CMDE which provides ability to expand command line if more room is required for the command.
- Add support to allow ISPF panel exits to be written in REXX.
- Add support for ZSCREENI and ZSCREENC variables to retrieve data from the logical screen at the cursor position.
- Add a field to the ISPF configuration table for the default language.
- Add fields to the ISPF configuration table to allow customization of the ISPF temporary data sets.
- Add a field to the ISPF configuration table for the default ISPF panel used when invoking ISPF.
- Pass the screen name to the SELECT Service Start and End and DISPLAY Installation exits.
- Update various ISPF messages with additional information. For example, a better message will be displayed when the user's profile is out of space, and the data set name and abend code will be added to the error message displayed as a result of an abend when opening a data set.

ISPD TLC enhancements:

ISPD TLC changes include new invocation options, new tags, and new tag attributes as ISPF extensions to the Dialog Tag Language.

General improvements:

- A new option has been added to the interactive invocation panel, the DISPLAY(W) option check interval. This option controls the display frequency of a control panel for the DISPLAY and DISPLAYW options. The control panel choices are to continue, cancel the DISPLAY(W) option, or change the interval for the display of the control panel.
- New tags:
 - GENERATE
 - TEXTLINE
 - TEXTSEG
- Remove obsolete OS/2 DM compatibility and ISPF DTL extension messages for OS/390 V3.
- Add support for Tutorial selection panel ZSEL generation via ACTION tags.
- Revise member list processing to behave more like SUPERC by leaving the "S" code in the member selection field. Members can be deselected by removing the "S" before using PF3 to run the requested members.
- REQ70311 - Provide a user cancel/reset for the DISPLAY and DISPLAYW invoke options. A new panel - ISPCP08 - will display every nn (1 default) panels to allow the user to cancel or continue the display processing.
- Expand the interactive panel to 16 DTL source files.
- Expand the HELP attribute on tags for field level help to support the ISPF enhancement for MSG(message-ID) and PASSTHRU. HELP values can be: NO, YES, help-panel-name, *message-id, %varname, or *%varname. The "*" prefix defines a message-id.

New or changed tag attributes:

Tag name	Attribute update
ATTR	Add ATTN
CHECKI	Add support for "VER(&variable, DSNAMEF)" Add support for "VER(&variable, DSNAMEFM)" Add support for "VER(&variable, DSNAMEPQ)" Add support for "VER(&variable, NAMEF)" Add support for "VER(&variable, PICTCN, ...)" Add support for "VER(&variable, IDATE)" Add support for "VER(&variable, STDDATE)" Add support for "VER(&variable, JDATE)" Add support for "VER(&variable, JSTD)" Add support for "VER(&variable, ITIME)" Add support for "VER(&variable, STDTIME)"
CHOFLD	Add ATTRCHAR and CAPS Support HELP for: YES, *message-id, *%varname
CHOICE	Add AUTOSEL Support HELP for: YES, *message-id, *%varname
CMDAREA	Add CAPS, NOJUMP, and SCRCAPS Support HELP for: YES, *message-id, *%varname Support SCRHELP for: YES, *message-id, *%varname
DA	Add HELP and SCRCAPS Support SCRHELP for: YES, *message-id, *%varname
DTACOL	Add VARCLASS, REQUIRED, and CAPS

Tag name	Attribute update
DTAFLD	Add ATTRCHAR, CAPS, and NOJUMP Support HELP for: YES, *message-id, *%varname Support DISPLAY=NO on CUA output fields
FIG	Add NOSKIP
GRPHDR	Add INDENT
LI	Add NOSKIP
LINES	Add NOSKIP
LP	Add NOSKIP
LSTCOL	Add CAPS and DISPLAY Support HELP for: YES, *message-id, *%varname
LSTFLD	Add SCRCAPS Support HELP for: YES, *message-id, *%varname
MSG	Add FORMAT Support HELP =*
MSGMBR	Add WIDTH
PANEL	Add ERRORCHECK
SELFLD	Support TYPE=TUTOR Support HELP for: YES, *message-id, *%varname
XMP	Add NOSKIP

ISPF PDF Component Changes

The ISPF PDF component contains the following new functions and enhancements:

- An Edit settings dialog is now available via the EDSET and EDITSET primary commands as well as from the Edit_Setting pulldown choice when editing data. This enables the user to change:
 - the line that Edit positions the target of a FIND, CHANGE or EXCLUDE command.
 - whether or not the Editor always scrolls the target of a FIND, CHANGE, or EXCLUDE command to the target line specified.
 - the user session initial macro, a macro to be run whenever an edit session is started.
 - the maximum storage allowed for Edit.
 - Confirm Cancel/Move/Replace.
 - Preserve VB record length.
- The Edit COMPARE command will now compare your current Edit session against another data set without requiring a SAVE.
- The Edit COMPARE parameter SESSION or * will compare your current Edit data against the data saved on disk.
- The Edit COMPARE command can be issued while editing an uncataloged data set to compare members within the same data set.
- The new MEMLIST service provides an interface into ISPF option 3.1, providing all the built-in commands available from option 3.1.

- A new option in the ISPF Configuration Table dialog provides the automatic creation of a ++USERMOD for the configuration data.
- The new DSINFO service will return information about a specified data set in dialog variables.
- The Editor will no longer append a 1 character blank to variable length records that are 8 bytes in length.
- An ISPF Configuration option was added to disallow wildcards in the high level qualifier of option 3.4.
- The SuperC utility now supports an ALLMEMS option to enable compares of all members including alias entries without member selection.
- The primary and secondary quantity for the SuperC LIST and UPDATE data sets can be configured.
- Allow use of the SYSOUT field when doing a local print from option 3.6.
- Add an OPTION(DELETE) to the LMMDISP service to delete a member of the displayed list.
- Update the edit macro command DATASET to also return the data set from which the member being edited was found.
- Add a new dialog service called VIIF (View Interface service) which provides View function for the EDIF environment.
- Add an edit macro command LINE_STATUS which indicates whether a line of data has been changed during the edit session, and if so, how.
- Add additional keywords that can be specified in the expiration date field when creating a data set to indicate permanent retention: 9999, NEVER, NOLIMIT and PERM.
- Add a new option in the ISPF Configuration Table dialog to allow disabling all ENQ displays. This option indicates whether or not users should be able to see who has existing data set ENQs when they press the help key or when they use the ISRDDN utility.
- The LMINIT service specified with the DDNAME parameter will now handle DDNAMEs with up to 16 concatenated data sets. The DATAID generated by the LMINIT can then be passed to services such as EDIT and BROWSE to process members in any of the 16 data sets.

ISPF SCLM Component Changes

The ISPF SCLM component contains the following new functions and enhancements:

- Additional/modified SCLM Services:
 - An AUTHCODE service to update authorization codes has been added.
 - A NEXTGRP service to return the promote target for a given group.
 - The MIGRATE service will now allow the DATE/TIME of the member to be set by the caller.
 - The MIGRATE service will now be supported via the FLMLNK interface.
 - The MIGRATE service has a new report output and associated specification on the service call (default is to go to the terminal).
 - The FLMCMPPLB macro has been deleted. Any projects using FLMCMPPLB currently must be recoded to use: FLMSYSLB dsn,INCLS=COMPOOL.
- Additional exit points have been added:
 - At edit start and when the SPROF command is invoked.
 - When data is saved (Edit SAVE, Migrate, etc.).

- After the NOTIFY step of a DELETE.
- After the VERIFY step of a DELETE.
- After the VERIFY step of a BUILD.
- The Versioning Utility will now allow a SuperC COMPARE of versions to be done.
- The Versioning Utility will capture output members, in addition to editable types.
- Workstation commands can now be used from translators running during a PROMOTE in batch mode.
- SCLM will now display dates in 4-character year format.
- The NRETRIEV command is now supported for SCLM.
- Added the ability to specify separate VERCOUNT values for each group/type combination.
- Additional samples:
 - A sample interface into ServiceDesk for OS/390 to show how a change management system can be integrated into SCLM.
 - An Edit autoflagger to automatically flag changed lines.
 - A versioning delete sample.

ISPF Client/Server Component Changes

The ISPF Client/Server Component enables a panel to be displayed unchanged (except for panels with graphic areas) at a workstation using the native display function of the operating system of the workstation. ISPF manuals call this "running in GUI mode."

There are no changes to the ISPF Client/Server for this release.

ISPF User Interface Considerations

Many changes have been made to the ISPF Version 4 user interface to conform to CUA guidelines. If you prefer to change the interface to look and act more like the Version 3 interface, you can do the following:

- Use the CUAATR command to change the screen colors
- Use the ISPF Settings panel to specify that the TAB or HOME keys position the cursor to the command line rather than to the first action bar item
- Set the command line to the top of the screen by deselecting *Command line at bottom* on the ISPF Settings panel
- Set the primary keys to F13–24 by selecting 2 for Primary range on the Tailor Function Key Definition Display panel
- Use the KEYLIST OFF command to turn keylists off
- Use the PSCOLOR command to change point-and-shoot fields to blue.
- Change the DFLTCOLR field in the PDF configuration table ISRCONFIG to disable action bars and or edit highlighting

ISPF Migration Considerations

When migrating to OS/390 V2R8.0 or higher for the first time, you must convert your ISPF customization to the new format. Refer to the section entitled *The ISPF Configuration Table* in the *ISPF Planning and Customizing manual*.

When migrating from one version of ISPF to another, you must be sure to reassemble and re-link the SCLM project definition.

ISPF Profiles

Major changes were made to the ISPF profiles for ISPF Version 4.2 and OS/390 Version 1 Release 1.0 ISPF. The profiles for ISPF Version 3 and the profiles for OS/390 ISPF are not compatible. If you are moving back and forth between an ISPF Version 3 system and OS/390 V1R1.0 or higher system, you must run with separate profiles. Profiles for OS/390 V1R1.0 and higher are compatible with each other.

Year 2000 Support for ISPF

ISPF is fully capable of using dates for the year 2000 and beyond. All of your existing applications should continue to run (some may need minor changes, as explained below) when the year 2000 comes. The base support for the year 2000 was added to OS/390 Version 1 Release 2.0, but the same level of support is available for ISPF Version 3.5, ISPF Version 4, and OS/390 Version 1 Release 1.0 as well. To get support for the earlier versions, be sure that your system has the correct APARs installed. All ISPF APARs that add or correct function relating to the year 2000 contain the YR2000 identifier in the APAR text. You should search for these APARs to ensure you have all the function available.

What function is included?

- ISPF Dialog variable ZSTDYEAR now correctly shows the year for dates past 1999. Earlier versions always showed the first 2 characters of the year as 19.
- A new ISPF dialog variable (ZJ4DATE) is available for Julian dates with a 4-digit year.
- An ISPF Configuration Table field enables PDF to interpret 2 character year dates as either a 19xx or 20xx date. The default value is 65. Any 2-character year date whose year is less than or equal to this value is considered a 20xx date, anything greater than this value is considered 19xx. To see what value has been set by the ISPF Configuration Table, use the new ZSWIND variable.
- New parameters in the LMMSTATS service (CREATED4 and MODDATE4) for specifying 4-character year dates. All existing parameters still exist and you can continue to use them. If both the 2-character year date parameters (CREATED and MODDATE) and the 4-character year date parameters (CREATED4 and MODDATE4) are specified, the 2-character versions are used.
- Dialog variables ZLC4DATE and ZLM4DATE have been added.
 - You *can* set them before making an LMMREP or LMMADD call. Do this to specify a 4-character *created* or *last modified* date to set in the ISPF statistics.
 - They *are* set by LMMFIND, LMMLIST and LMMDISP to the current value of the created and last modified dates in the ISPF statistics.

What might need to change? Some minor changes to your existing ISPF dialogs might be necessary, especially in ISPF dialogs that use the Library Access Services to manipulate ISPF member statistics.

- For those services that accept both 4-character year dates and 2-character year dates, you can specify one or the other. If you specify both, the 2-character year date is used to avoid affecting existing dialogs. When the 2-character year date is used, the configuration table field mentioned above is used to determine whether the date should be interpreted as 19xx or 20xx.

- ISPF will not necessarily show 4-character dates in all circumstances but it will process them correctly. For example, a member list might only display 2-character year dates but will sort those dates in the proper order.
- SCLM stores dates past the year 1999 in a new internal format. If an accounting file contains dates in this new format, it cannot be processed by a system without year 2000 support. Accounting files without dates past 1999 can be processed with or without the year 2000 support.
- No conversion of the LMF control file is necessary.

What's in the OS/390 V2R10.0 ISPF library?

You can order the ISPF books using the numbers provided below.

OS/390 V2R10.0 ISPF

Title	Order Number
<i>OS/390 V2R10.0 ISPF Dialog Tag Language Guide and Reference</i>	SC28-1219-04
<i>OS/390 V2R10.0 ISPF Planning and Customizing</i>	SC28-1298-04
<i>OS/390 V2R10.0 ISPF User's Guide Volume I</i>	SC34-4791-00
<i>OS/390 V2R10.0 ISPF User's Guide Volume II</i>	SC34-4792-00
<i>OS/390 V2R10.0 ISPF Services Guide</i>	SC28-1272-04
<i>OS/390 V2R10.0 ISPF Dialog Developer's Guide and Reference</i>	SC28-1273-04
<i>OS/390 V2R10.0 ISPF Reference Summary</i>	SC28-1308-04
<i>OS/390 V2R10.0 ISPF Edit and Edit Macros</i>	SC28-1312-04
<i>OS/390 V2R10.0 ISPF Library Management Facility</i>	SC28-1317-04
<i>OS/390 V2R10.0 ISPF Messages and Codes</i>	GC28-1326-04
<i>OS/390 V2R10.0 ISPF Software Configuration and Library Manager Project Manager's and Developer's Guide</i>	SC34-4750-02
<i>OS/390 V2R10.0 ISPF Software Configuration and Library Manager Reference</i>	SC28-1320-04
Entire library Bill of Forms	SBOF-8569

The licensed books that were declassified in OS/390 Version 2 Release 4 appear on the OS/390 Online Library Collection, SK2T-6700.

The remaining licensed books for OS/390 Version 2 appear on the OS/390 Licensed Product Library, LK2T-2499, in unencrypted form.

Elements and Features in OS/390

You can use the following table to see the relationship of a product you are familiar with and how it is referred to in OS/390 Version 2 Release 10.0. OS/390 V2R10.0 is made up of elements and features that contain function at or beyond the release level of the products listed in the following table. The table gives the name and level of each product on which an OS/390 element or feature is based, identifies the OS/390 name of the element or feature, and indicates whether it is part of the base or optional. For more compatibility information about OS/390 elements see *OS/390 Planning for Installation, GC28-1726*

Product Name and Level	Name in OS/390	Base or Optional
BookManager BUILD/MVS V1R3	BookManager BUILD	optional
BookManager READ/MVS V1R3	BookManager READ	base
MVS/Bulk Data Transfer V2	Bulk Data Transfer (BDT)	base
MVS/Bulk Data Transfer File-to-File V2	Bulk Data Transfer (BDT) File-to-File	optional
MVS/Bulk Data Transfer SNA NJE V2	Bulk Data Transfer (BDT) SNA NJE	optional
IBM OS/390 C/C++ V1R2	C/C++	optional
DFSMSdfp V1R3	DFSMSdfp	base
DFSMSdss	DFSMSdss	optional
DFSMSHsm	DFSMSHsm	optional
DFSMSrmm	DFSMSrmm	optional
DFSMS/MVS Network File System V1R3	DFSMS/MVS Network File System	base
DFSORT R13	DFSORT	optional
EREP MVS V3R5	EREP	base
FFST/MVS V1R2	FFST/MVS	base
GDDM/MVS V3R2 • GDDM-OS/2 LINK • GDDM-PCLK	GDDM	base
GDDM-PGF V2R1.3	GDDM-PGF	optional
GDDM-REXX/MVS V3R2	GDDM-REXX	optional
IBM High Level Assembler for MVS & VM & VSE V1R2	High Level Assembler	base
IBM High Level Assembler Toolkit	High Level Assembler Toolkit	optional
ICKDSF R16	ICKDSF	base
ISPF V4R2M1	ISPF	base
Language Environment for MVS & VM V1R5	Language Environment	base
Language Environment V1R5 Data Decryption	Language Environment Data Decryption	optional

Product Name and Level	Name in OS/390	Base or Optional
MVS/ESA SP V5R2.2		
BCP	BCP or MVS	base
ESCON Director Support	ESCON Director Support	base
Hardware Configuration Definition (HCD)	Hardware Configuration Definition (HCD)	base
JES2 V5R2.0	JES2	optional
JES3 V5R2.1	JES3	base
LANRES/MVS V1R3.1	LANRES	base
IBM LAN Server for MVS V1R1	LAN Server	base
MICR/OCR Support	MICR/OCR Support	base
OS/390 UNIX System Services	OS/390 UNIX System Services	base
OS/390 UNIX Application Services	OS/390 UNIX Application Services	base
OS/390 UNIX DCE Base Services (OSF DCE level 1.1)	OS/390 UNIX DCE Base Services	base
OS/390 UNIX DCE Distributed File Services (DFS) (OSF DCE level 1.1)	OS/390 UNIX DCE Distributed File Services (DFS)	optional
OS/390 UNIX DCE User Data Privacy	OS/390 UNIX DCE User Data Privacy	optional
SOMobjects Application Development Environment (ADE) V1R1	SOMobjects Application Development Environment (ADE)	
SOMobjects Runtime Library (RTL)	SOMobjects Runtime Library (RTL)	base
SOMobjects service classes	SOMobjects service classes	base
Open Systems Adapter Support Facility (OSA/SF) R1	Open Systems Adapter Support Facility (OSA/SF)	base
MVS/ESA RMF V5R2	RMF	optional
OS/390 Security Server	Resource Access Control Facility (RACF) <ul style="list-style-type: none"> • DCE Security Server • OS/390 Firewall Technologies • Lightweight Directory Access Protocol (LDAP) Client and Server • Open Cryptographic Enhanced Plug-ins (OCEP) 	optional
SDSF V1R6	SDSF	optional
SMP/E	SMP/E	base
	Softcopy Print	base
SystemView for MVS Base	SystemView for MVS Base	base
IBM TCP/IP V3R1 <ul style="list-style-type: none"> • TCP/IP CICS Sockets • TCP/IP IMS Sockets • TCP/IP Kerberos • TCP/IP Network Print Facility (NPF) • TCP/IP OS/390 Communications Service IP Applications • TCP/IP OS/2 Offload 	TCP/IP <ul style="list-style-type: none"> • TCP/IP CICS Sockets • TCP/IP IMS Sockets • TCP/IP Kerberos • TCP/IP Network Print Facility (NPF) • TCP/IP OS/390 Communications Service IP Applications • TCP/IP OS/2 Offload 	base <ul style="list-style-type: none"> • optional • optional • optional • optional • optional • optional
TIOC R1	TIOC	base
Time Sharing Option Extensions (TSO/E) V2R5	TSO/E	base

Product Name and Level	Name in OS/390	Base or Optional
VisualLift for MVS V1R1.1	<ul style="list-style-type: none"> • VisualLift Run-Time Environment (RTE) • VisualLift Application Development Environment (ADE) 	<ul style="list-style-type: none"> • base • optional
VTAM V4R3 with the AnyNet feature	VTAM	base
3270 PC File Transfer Program V1R1.1	3270 PC File Transfer Program	base

Chapter 1. LMF Concepts and Terminology

This chapter defines Library Management Facility concepts and terminology and provides an overview of the following:

- ISPF libraries
- Promotion hierarchy
- Library development
- Library use.

Definition of LMF

The Library Management Facility is an extension of the ISPF library concepts and ISPF options.

A *library* is a repository for information. Information can be taken from the library and used in some manner. It may also be changed as a result of use or from the addition of new data. The information, either changed or unchanged, can then be returned to the library.

A library must be organized so that information can be readily retrieved from, and returned to, its rightful place. Therefore, there must also be a mechanism to permit the retrieval and replacement of information.

In ISPF, each library is a cataloged partitioned data set, identified by a three-level name in the form:

‘project-name.group-name.type’

where:

- “project-name” is the common identifier for all libraries in the same project
- “group-name” identifies a particular set of libraries
- “type” identifies the type of information in the library, such as assembler source code, COBOL programs, or SCRIPT files.

Note: LMF does not support PDSE load modules. Only PDS load modules are supported.

An *ISPF library* is a collection of code or data units called members. ISPF can have many libraries containing different types of information. However, any individual library generally contains members with the same type of information.

A library member is identified as:

‘project-name.group-name.type(member)’

where “member” is the name of a particular member in the library.

Libraries can be organized in a hierarchy. For example, members being developed or updated are generally in a development library. Those members that have been unit tested and are ready for integration testing can be moved up the hierarchy to a test library. Those members that have been completely tested can be moved up the hierarchy to a master library.

LMF allows you to control the contents of your libraries and to manage your development processes. Libraries controlled by LMF are called “controlled libraries.”

LMF controls determine who can:

- Enter information into a controlled library
- Get information from a controlled library to modify it and return it to the controlled library
- Move information from one controlled library to another.

In other words, LMF controls allow the library administrator to determine who can manipulate library members.

One major concern in a development project is maintaining data integrity. LMF helps maintain integrity by ensuring that only one person at a time can update a member in a controlled library. In addition, LMF allows only those people authorized to do so to update a member in a controlled library. It does this by allowing only authorized people to replace a member in a controlled library with an updated member. LMF also aids the development process in other ways, such as allowing authorized people to put a member into two or more hierarchies at the same time.

Note: RACF or an equivalent protection system is needed to enforce the controls set by LMF. Without data protection, there is a high risk of compromising the integrity of the data. For more information on the use of RACF, refer to *ISPF Planning and Customizing*

ISPF does not allow the use of alias names for controlled libraries.

MVS password protection cannot be used on libraries controlled by LMF because the LMF-initiated task cannot know what the password is. You will get an error message if you attempt to use a password-protected library that LMF cannot handle.

To use LMF, you will need a library administrator to set up and maintain the controls.

LMF requires a control file allocated to ddname ISRCFIL. Refer to *ISPF Planning and Customizing* for more information on allocating this file.

Promotion Hierarchy

LMF uses the same library concepts and structure as ISPF. In fact, LMF libraries are ISPF libraries. However, the libraries managed by LMF are controlled. The controls determine which members can be promoted, or edit-locked. Edit-locking prevents more than one person at a time from updating a member in a controlled library.

The following terminology applies to libraries controlled by LMF:

Controlled Library

An ISPF library that has been identified to LMF as a library to which users must have specific authority for access, for updates, and for promotion activities.

Controlled Project

A collection of controlled libraries that have a common project name.

Controlled Group

A collection of controlled libraries that have common project and group names.

Promotion

The process by which a member is moved into a controlled library, or moved into higher levels within a controlled library hierarchy.

When a member is moved into a controlled library it is “defined;” that is, it is made known to LMF. A “predefined” member is a potential member that is defined to LMF sometime before the actual member is promoted into a controlled library. An “undefined” member is a member that is neither defined nor predefined.

Promotion Hierarchy

An ordered set of related controlled libraries through which a member is moved during the development or maintenance process.

Library Hierarchy

A promotion hierarchy in which all the libraries have the same “type” qualifier.

Figure 1 on page 4 illustrates the promotion hierarchy of a controlled project, ISPFEXAM. This project has a 3-level hierarchical structure with four controlled groups: PROD, SYSTST, DEPT1, and DEPT2. Each controlled group has three controlled libraries, one for each member type (PLI, MSGS, and PANELS). The libraries in group PROD, for example, are ISPFEXAM.PROD.PLI, ISPFEXAM.PROD.MSGS, and ISPFEXAM.PROD.PANELS.

Promotion to the controlled project involves moving a member into an entry-level library; for example, into ISPFEXAM.DEPT2.PLI. Promotion within the controlled project involves moving a member from one level library to the next higher-level library with the same type. Thus, promotion of a member is within the library hierarchy. Promotion from ISPFEXAM.DEPT2.PLI moves a member to the next level in the hierarchy, ISPFEXAM.SYSTST.PLI. You will look at promotion again later in this chapter.

You use the controlled libraries and promotion hierarchy in Figure 1 throughout this manual to illustrate the operations available in LMF.

Figure 2 on page 5 illustrates the ISPFEXAM library hierarchy for the controlled libraries of type PANELS. If you compare Figure 1 with Figure 2, you will see the graphic difference between the terms “promotion hierarchy” and “library hierarchy.”

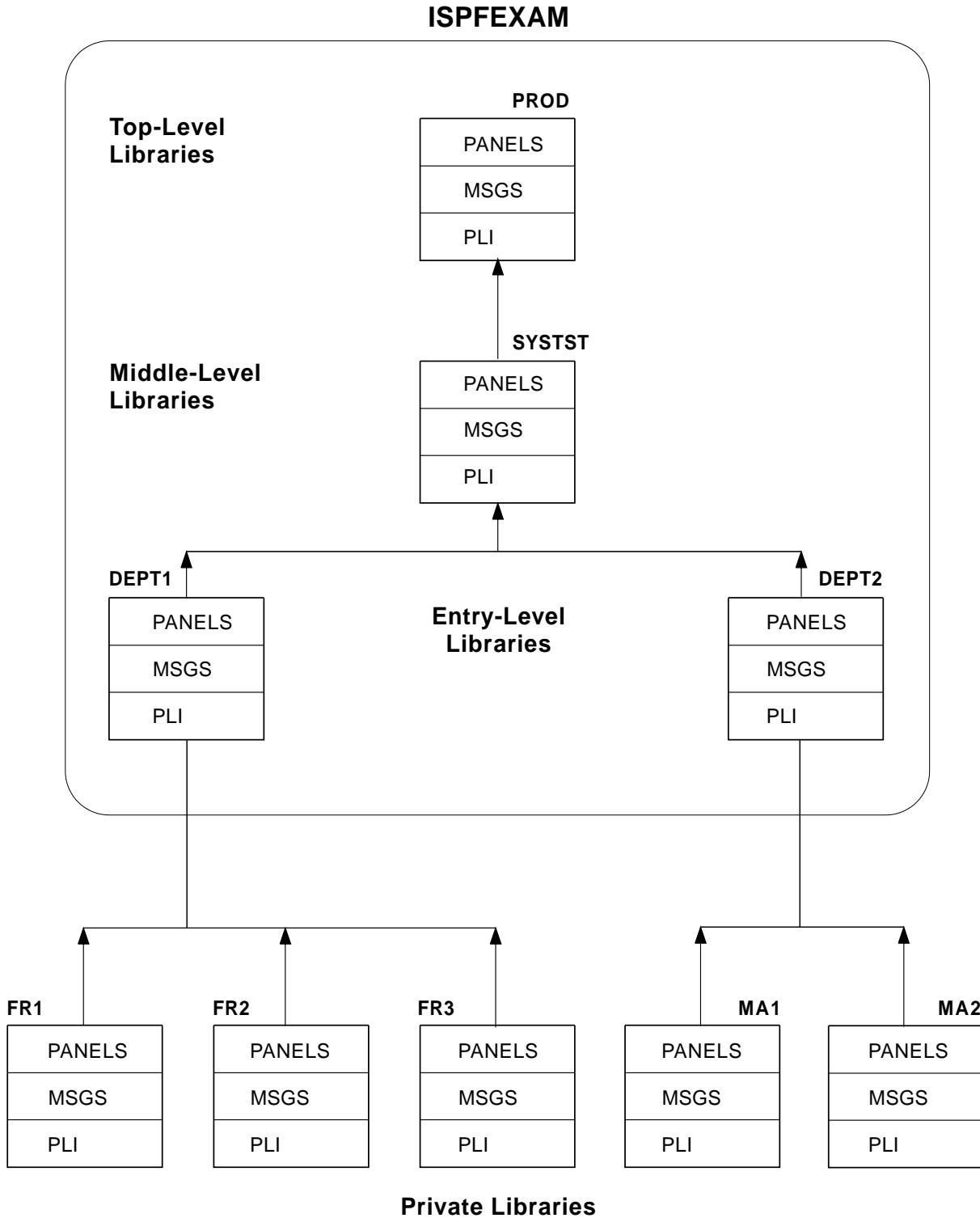


Figure 1. Project ISPFEXAM Showing the Promotion Hierarchy

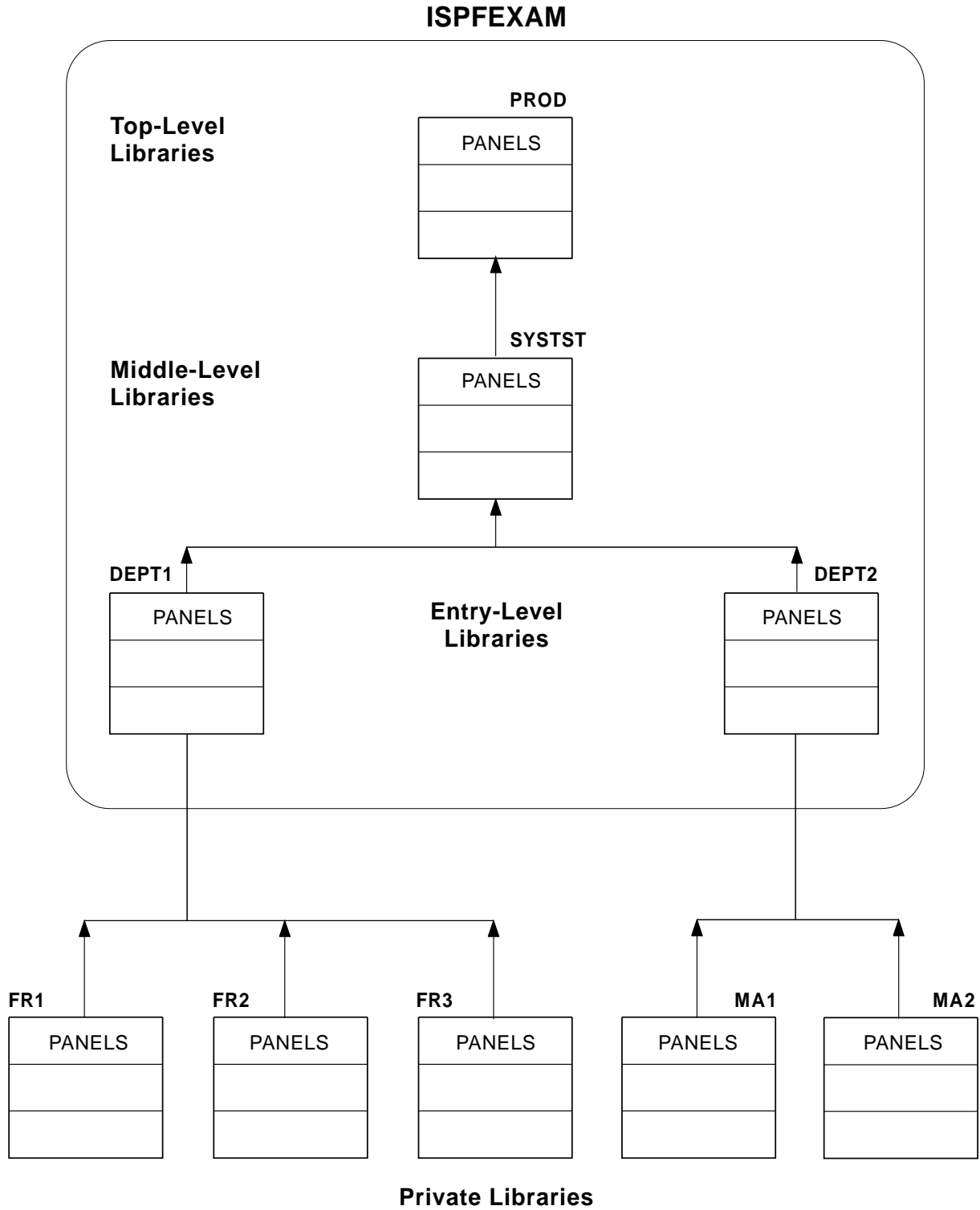


Figure 2. Project ISPFEXAM Showing a Library Hierarchy for PANELS Members

Controls

The controls that are available with LMF organize your libraries into a hierarchical structure. They also direct the movement of members into and out of controlled libraries. Controls are set up by the library administrator. The details for setting up controls are given in Chapter 2 of this manual.

The following kinds of authority can be controlled:

- Authority to promote a member into an entry-level library
- Authority to access a member for update (edit-lock) and, later, replace it by a promotion
- Authority to promote a member from one controlled library to another
- Authority to promote an undefined member into an entry-level library
- Authority to modify controls.

Other controls can also be established:

- Ability to pack a member when promoting it into a controlled library
- Ability to log the edit-lock, deletion, and promotion of members
- Ability to distribute a member on promotion into a library
- Ability to have a user exit before and/or after promotion.

Library Development

The library hierarchy is developed by the library administrator. The library administrator has to determine the relationship of the libraries to be controlled and the number of levels in the hierarchy. At least one group of libraries must be defined for each level.

The group at the highest level of a hierarchy is called the *top group* (PROD in Figure 1 on page 4). The group at the lowest level of a hierarchy is called the *bottom group* (DEPT1 and DEPT2 in Figure 1 on page 4). You can have more than one group in each level of the hierarchy below the top group.

A member can enter a controlled project only through a library in a bottom group. Thus, each controlled library in a bottom group of libraries is an *entry-level library*, a library into which a member can be promoted when entering the controlled project.

All groups except the top group have a *target group*. A target group is a controlled group containing the library into which a member can be promoted. Specifying target groups is the means by which a library administrator defines the promotion hierarchy.

Referring again to Figure 1 on page 4, you can categorize the different promotion target groups as follows:

DESCRIPTIONS	GROUP NAMES
Target group for PROD	none
Target group for SYSTST	PROD
Target group for DEPT1	SYSTST
Target group for DEPT2	SYSTST
Group for which DEPT1 or DEPT2 is target	none

The chart shows that the top group is the only controlled group that does not have a target group. Also, the bottom groups are the only groups that are not identified as target groups in the library controls.

When defining the controls within the promotion hierarchy, the library administrator can identify those people who are authorized to:

- Promote a member into the entry-level library
- Access a member with intent to update and promote it
- Promote a member from one controlled library into another
- Modify library controls, by making them library administrators.

When authorizing more than one person to perform the various LMF functions, the library administrator simply enters their user IDs into a named *user set*. A user set is a collection of user IDs.

A user set is dynamic. User IDs can be added or deleted from the user set during the course of the project. However, only the library administrator can create the user set and add or delete entries in the user set.

The library administrator can also create *distribution tables*. A distribution table is a table containing the groups that identify the different library hierarchies into which a specified member is to be promoted. Distribution tables allow members common to several different library hierarchies of a project to be promoted into those hierarchies at the same time by a single promotion.

Members are distributed according to *version numbers*. A version number is used to associate a member with a particular promotion hierarchy. The meaning of a version is assigned by the library administrator. The corresponding version number is set by the programmer.

Library Use

To work with a controlled library, the programmer must have LMF authorization to access a member for update. Without it, the programmer cannot lock, copy, edit, and again promote the member into a controlled library. Using a concatenated edit or copy with lock, the programmer must copy a member from a controlled library to work on it. Thus, members are updated in the programmer's private library. The updated member must then go through the promotion process to be returned to the controlled library. RACF or an equivalent protection system must be in place to enforce this procedure.

When a member is promoted to a controlled library, the programmer is asked for the target library. The programmer must specify the entry-level library. The "target" library for promotion of a member into a controlled library is an entry-level library.

When a member is promoted from one controlled library to another controlled library, the user does not need to specify a target library. The library administrator defined all target libraries when the controlled project was developed.

LMF Tutorial and Help Function

Tutorials are provided to help you in working with LMF. The tutorials assist both the library administrator and the programmer.

If you need help in your work, enter the command HELP on any panel. You will be provided with a tutorial for that panel. You can use the tutorials to obtain definitions, information about messages, and general concepts, as well as help on particular panels.

You can also use the tutorials for obtaining an overview of LMF. Select ISPF option 8, LM Facility; then select option T on the LM Utilities panel.

LMF Migration Utility

You can convert LMF control files created with LMF Version 2.1 or 2.2 to Version 3.3 by using the LMF Migration Utility (ISRLMIGC). Control files created with LMF Version 2.1 or 2.2 do not work with LMF Version 2.3 or higher. Also, control files created with LMF Version 2.3 or higher do not work with LMF Version 2.1 or 2.2. If you are migrating from 2.3 or higher to Version 3.3 no conversion is necessary.

You should not convert a control file if there is a possibility that you may want to use the converted control file with Version 2.1 or Version 2.2 of LMF in the future. Instead, you should use the Initialize member controls option (ISPF 8.1.3) and start with a new control file. Otherwise, you should make duplicate data sets to use with each version. All controls from the old control file are preserved across the migration except for the activity log group name. The activity log in Version 2.3 or higher is not compatible with Version 2.1 or 2.2. Refer to *ISPF Planning and Customizing* for more information on running this utility.

SCLM Utilities

Another way you can maintain different levels or versions of a library member is to use the ISPF Software Configuration and Library Manager (SCLM) utilities. SCLM is a software tool that helps you develop complex software applications. Throughout the development cycle, SCLM automatically controls, maintains, and tracks all of the software components of the application. And, as with LMF, you can lock the version being edited in a private library and then promote it to another group within the library for further development or testing. Refer to *SCLM Developer's and Project Manager's Guide* for more information about SCLM.

ISPF Planning and Customizing contains more information about data protection.

Note: Some Library Access Services (LAS) perform LMF functions. LMCOPY (with LOCK option), LMPROM and LMMFIND (with LOCK option) fail if one of the specified libraries is SCLM-controlled. ISPF and LMF use the following rule to determine whether a library is SCLM-controlled. If there is a data set with a name of the form '<project>.PROJDEFS.LOAD' such that <project> is the high level qualifier (or project) of the library in question, then the library is SCLM-controlled. Otherwise, the library is not SCLM-controlled. Note also that this means that ISPF or LMF may treat a library as if it were SCLM-controlled even though it may not be SCLM-controlled.

For example, if there existed a data set named 'PDFUSER.PROJDEFS.LOAD', then ISPF and LMF would treat each of the following data sets as if they were SCLM-controlled:

```
'PDFUSER.LIST'  
'PDFUSER.DEV.PANELS'  
'PDFUSER.MAINT.NEW.SKELS'
```

Chapter 2. LMF for the Library Administrator

This chapter describes how a library administrator establishes a controlled project under LMF. This process includes:

- Planning the library structure
- Obtaining a project virtual machine
- Defining library controls
- Maintaining the library and controls.

Planning the Library Structure

As the library administrator, you are responsible for performing the actions listed in the chapter overview. The first person to create controls for a library with a unique project name becomes, by default, the library administrator for that project.

The library structure illustrated in Figure 1 on page 4 represents a project, ISPFEXAM, having two sets of programmers. Each programmer has a private library (one of the “FR” and “MA” libraries) for development purposes. Members are moved into the controlled library structure by being promoted into the entry-level controlled libraries from these private libraries.

In this example, promotion to the middle-level libraries is for integrating and testing the work of the two groups DEPT1 and DEPT2 before promoting this work into the production stage. Promotion to the top-level libraries is for integrating new material with older material, probably from a previous release.

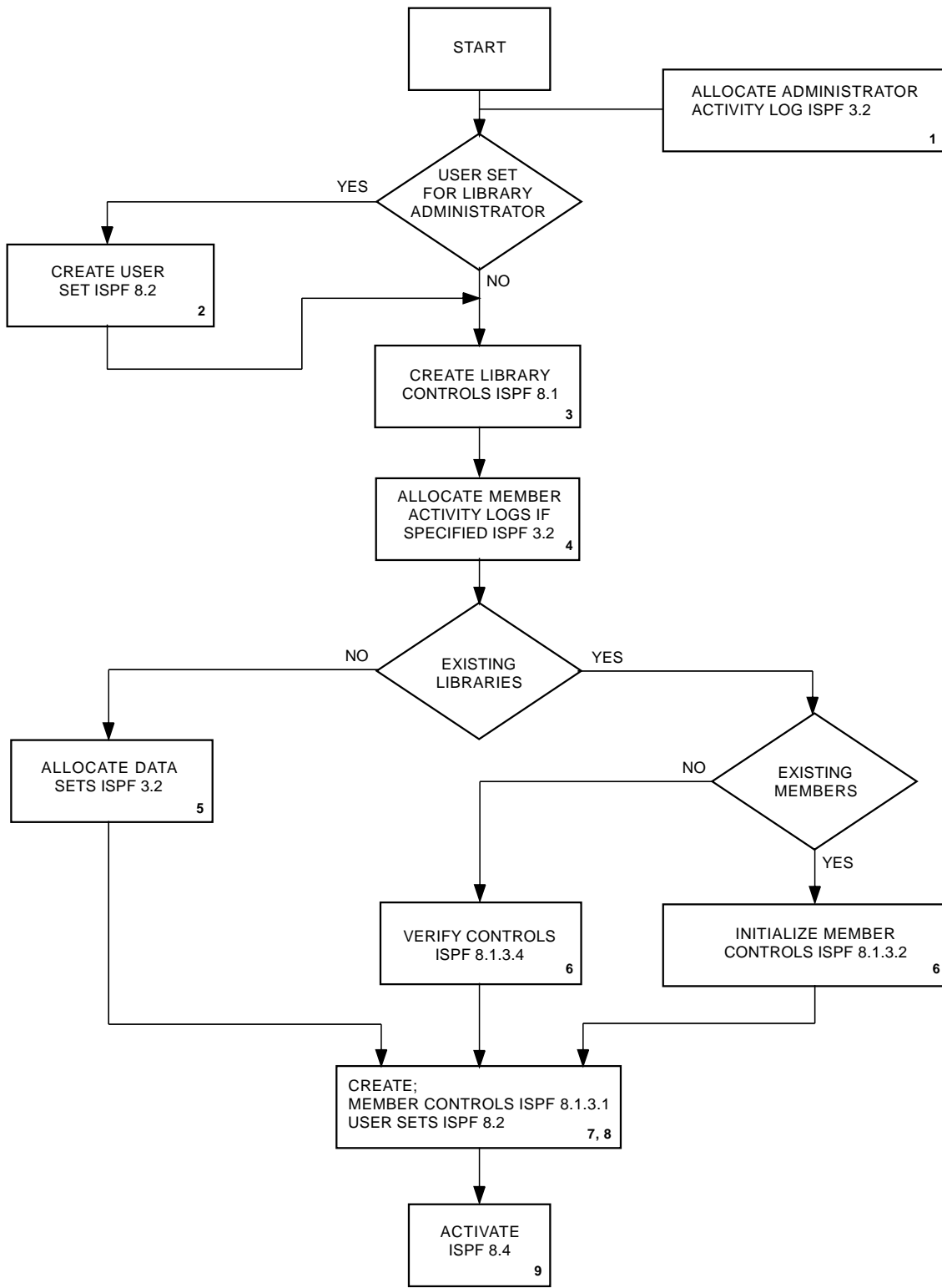
All library controls that define the structure of library hierarchies can be created by using two panels, the Specify Library Controls panel and the Create or Update Library Controls panel. You create the library controls one at a time, starting with the top-level library and proceeding down the hierarchy to the bottom-level, or entry-level, library or libraries.

To create your own library hierarchy and define the library controls, plan the structure of the libraries first. Identify the libraries to be managed and their relationships to each other in a promotion hierarchy. Members with the same status (development, test, or production) should be together in a single level of the library hierarchy. For example, stable programs may be in a top-level group of libraries and programs being tested may be in a middle-level group of libraries in the hierarchy, similar to the example.

If there are many members with the same project name and type, you can improve system performance by breaking the one large project into two or three small projects.

The next two sections list the steps required to create a library hierarchy and controls according to whether or not you are going to specify a distribution table. Follow the steps in the appropriate section to create your library hierarchy and controls.

Defining the Library Controls for Hierarchies without Distribution Tables



To create the library hierarchy and controls through ISPF and its LM Facility option (ISPF option 8), the following steps are required:

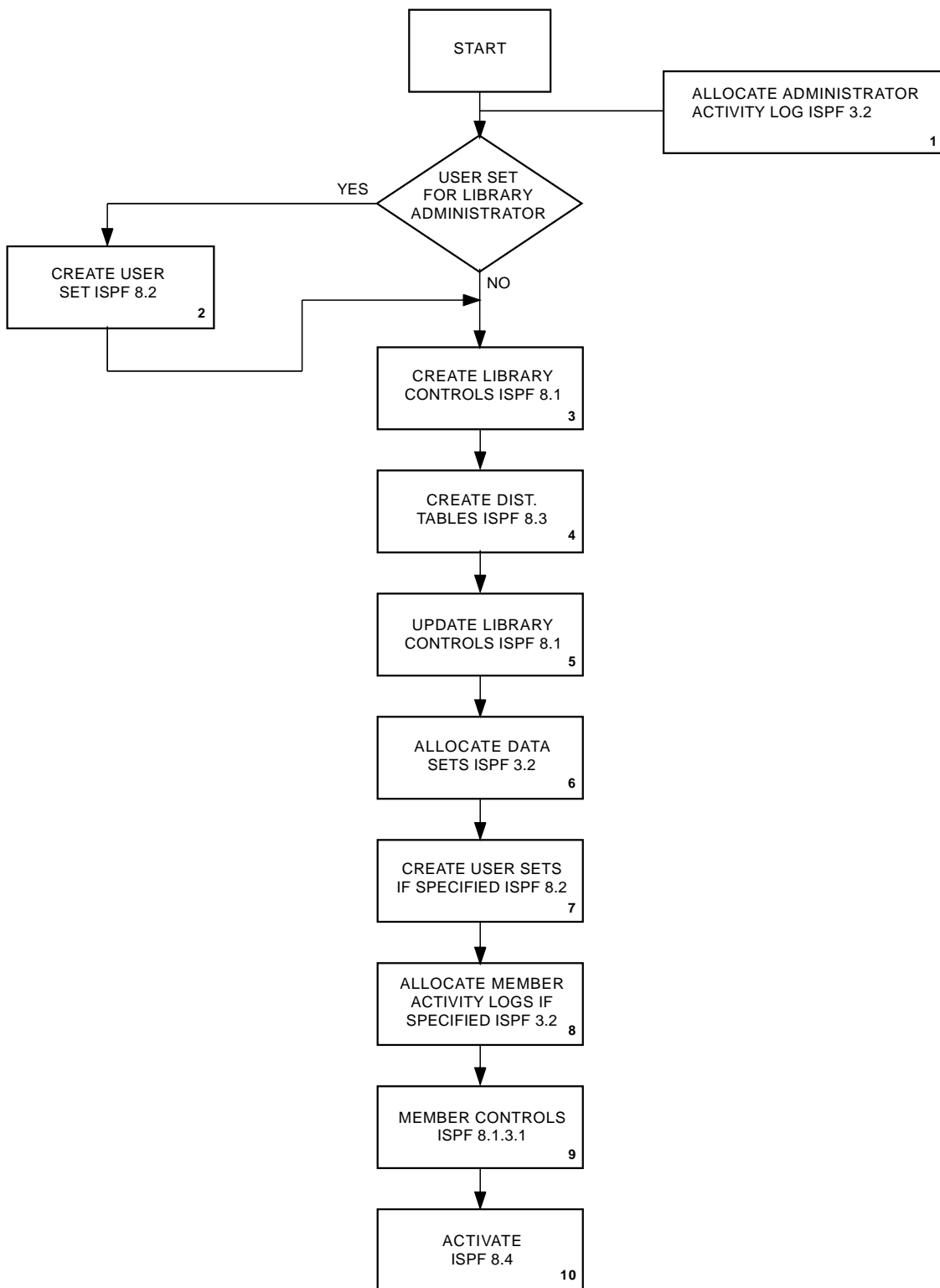
1. If you want to log administrator activities, including the activities involved with creating your library controls, you must allocate an administrator activity log data set "project.ADMIN.ACTLOG" (ISPF 3.2). See "Administrator Activity Log" on page 18 for more information.
2. If you are going to specify a user set to be the library administrator, you must first create this user set (ISPF option 8.2). See "USER SET (Option 2)" on page 34.
3. Working down from the top group in the promotion hierarchy, identify each library in turn with its associated controls (ISPF option 8.1). See "CONTROLS (Option 1)" on page 15.
4. If you specified a member activity log when you created your library controls, you must allocate the member activity log data set (ISPF option 3.2). See ""Activity Log Group" on page 18" for more information on allocating member activity log data sets.
5. If you are creating controls for new libraries, you must allocate the data sets (ISPF option 3.2). Do not use alias names.
6. If you are creating controls for existing libraries, do the following:
 - If these libraries have existing members, do an initialize member controls on the top group (ISPF option 8.1.3.2).
 - If these libraries do not have existing members, do a verification of member controls on the top group (ISPF option 8.1.3.4).

See Figure 13 on page 26, for information on member level controls.

7. Create a user set (ISPF option 8.2) for each user set name that was used to specify the authorized promoters, and each user set name that was used to specify persons having authority to access and update a member.
8. If undefined members are not allowed, you must predefine the members in the top-level library. Create member controls for predefined members by using (ISPF option 8.1.3.1).
9. Activate the promotion hierarchy controls (ISPF option 8.4).

After creating the controlled project, you can use additional options. See "Other LMF Options" on page 13.

Defining the Library Controls for Hierarchies with Distribution Tables



To create the library hierarchy and controls through PDF component and its LM Facility option (ISPF option 8), the following steps are required:

Note: Do not create controls over existing libraries if you are going to specify distribution tables.

1. If you want to log administrator activities, including the activities involved with creating your library controls, you must allocate an administrator activity log data set “project.ADMIN.ACTLOG” (ISPF 3.2). See “Administrator Activity Log” on page 18 for more information.
2. If you are going to specify a user set to be the library administrator, you must first create this user set (ISPF option 8.2). See “USER SET (Option 2)” on page 34.
3. Working down from the top group in the promotion hierarchy, identify each library in turn with its associated controls (ISPF option 8.1). Do not specify the distribution tables in this step. See “CONTROLS (Option 1)” on page 15.
4. Create the distribution tables (ISPF option 8.3). See “DISTRIBUTION (Option 3)” on page 37.
5. Update the library controls for each target group specified in the distribution table (ISPF option 8.1). Specify the distribution table name.
6. Allocate the data sets (ISPF option 3.2). Do not use alias names.
7. Create a user set (ISPF option 8.2) for each user set name (if specified) that was used to specify the authorized promoters, and each user set name that was used to specify persons having authority to access and update a member.
8. If you specified a member activity log when you created your library controls, you must allocate the member activity log data set (ISPF option 3.2). See ““Activity Log Group” on page 18” for more information on allocating member activity log data sets.
9. Create member level controls for predefined members (ISPF option 8.1.3.1). If undefined members are not allowed, you must predefine the members in the top-level library.
10. Activate the promotion hierarchy controls (ISPF option 8.4).

After creating the controlled project, you can use additional options. See “Other LMF Options”.

Other LMF Options

After you create the controlled project, you can use additional options such as:

- Review activity and library controls information (ISPF option 8.5).
- Review activity log information (ISPF option 8.6).
- Update the actions to be taken for a data set full condition (ISPF option 8.7).

Each of these options is discussed in this chapter.

LMF gives you the results of your requested actions whether they are successful or unsuccessful. The message always appears on the right side of the title line, the top line of the panel.

Invoking the LM Facility

Option 8 of the ISPF Primary Option Menu takes you into the Library Management Facility.

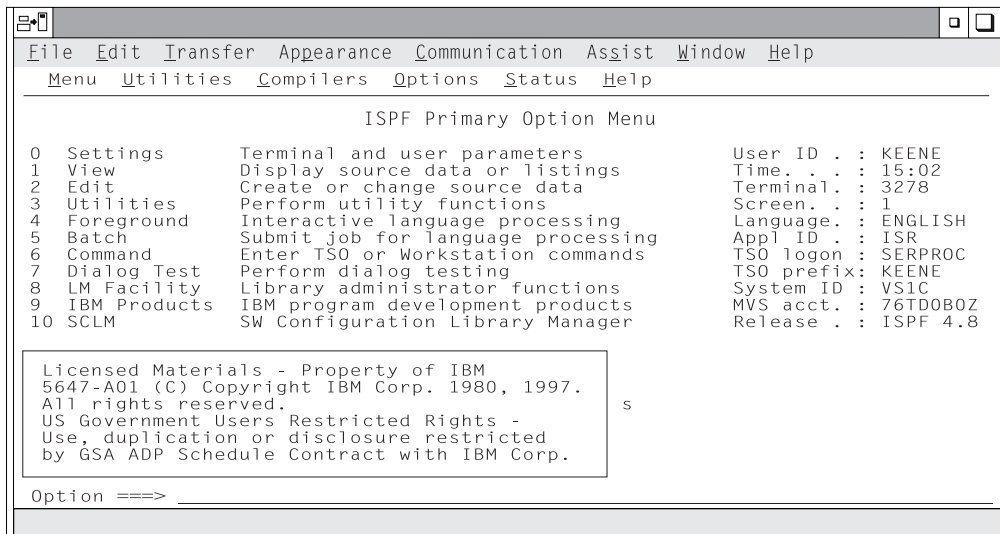


Figure 3. ISPF Primary Option Menu

The next panel you see is the Library Management Utilities panel (Figure 4).

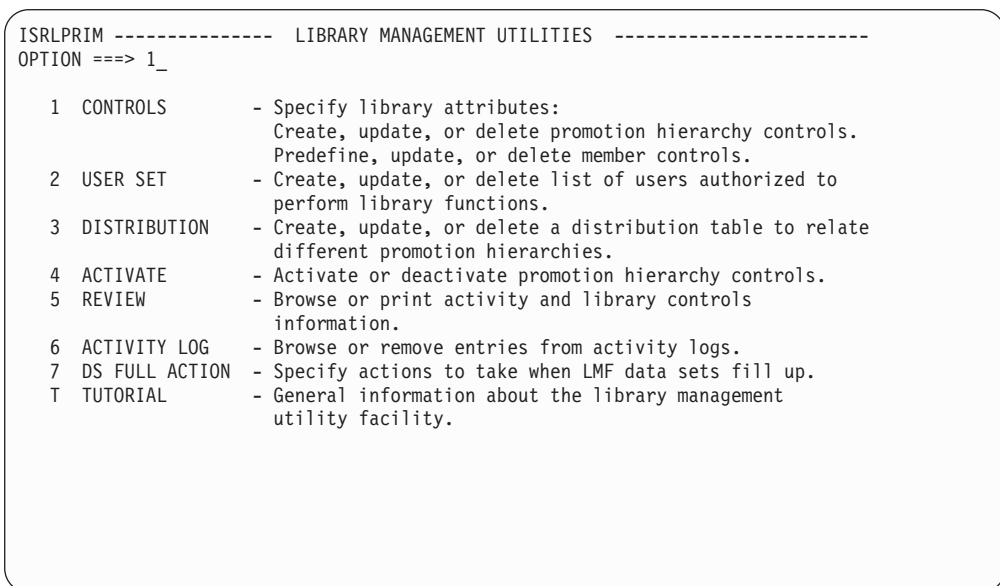


Figure 4. Library Management Utilities

The options are listed in the sequence in which they are logically used in the example. Although you may not use all of them immediately, you probably will select all eight options sometime in your work.

1. CONTROLS

This option allows you to create your library hierarchies and to put the controls for the promotion hierarchies in place. With this option you can update or delete promotion hierarchies, and create, update, or delete controls for members. This option also allows you to specify the action to be taken if the controlled library runs out of space, or the activity log becomes full.

2. USER SET

This option allows you to create a named set of users that is used in creating library controls. You can define more than one user set.

3. DISTRIBUTION

This option allows you to create tables that permit the promotion of a member to more than one library hierarchy with just one promotion. Each library hierarchy can have only one distribution table.

4. ACTIVATE

This option allows you to activate or deactivate the controls you created. For anyone to be able to promote members into the hierarchy, or to edit-lock members in the hierarchy, you must activate the controls. If you want to update or delete any of the controls, you must first deactivate them.

5. REVIEW

This option allows you to see how the library and member controls are set up, who has accessed members for update, and who has promoted members.

6. ACTIVITY LOG

This option allows you to browse member activity logs and administrator activity logs. It also allows you to delete entries referring to a particular library type from a member activity log, and empty an administrator activity log.

7. DS FULL ACTION

This option allows you to specify what action to take if the control file, the activity logs, or any controlled libraries run out of space.

T. TUTORIAL

This option allows you to obtain an overview of LMF.

The following sections describe options 1 through 7 in more detail. Option T is discussed in "LMF Tutorial and Help Function" on page 7.

CONTROLS (Option 1)

The LMF promote exits and variables described in "CONTROLS (Option 1)" are general use programming interfaces, which you may use for programming purposes.

When you select option 1, CONTROLS, the Specify Library Controls panel appears (see Figure 5 on page 16).

Option 1

```
ISRLLEDEF ----- SPECIFY LIBRARY CONTROLS -----
OPTION ==> 1

  1 - Create or update controls for library hierarchies.
  2 - Delete library controls.
  3 - Member level controls utilities.

ISPF LIBRARY:
PROJECT ==> ISPFEXAM
GROUP   ==> SYSTST
TYPE    ==> PLI
```

Figure 5. Specify Library Controls

This panel allows you to choose what you want to do with the controls for the library you identify. To create controls, always start with the top-level library. Build your library hierarchy by going down one level at a time, continuing until you create the controls for the entry-level library. You can create the controls for one library hierarchy at a time, or you can create all the controls for all the libraries in a group before going to the next-lower group.

Because the creation of the top group is similar to the creation of lower-level groups, but simpler, the example assumes that you have created the controls for the top-level PLI library and are now ready to create the controls for the middle-level PLI library. Therefore, you have entered ISPFEXAM.SYSTST.PLI.

The three options allow you to indicate what you want done for the identified library:

Option 1

Creation or update of controls for the specified library.

Option 2

Deletion of the controls for the specified controlled library.

Option 3

Creation, update, or deletion of the controls for the specified library's members. Also initialize, clear, and verify member controls.

- Members and their associated controls can be deleted from any level in a library hierarchy.
- If the members exist in the library, you can change the IDs of those who can update the members.
- If the members do not exist in the library, you can predefine them. That is, you can control who can promote a specific member into a controlled library for the first time and subsequently update that member. If undefined members are not allowed, you must predefine the members

in the top-level library of the appropriate hierarchy. When promoted the first time, the members are promoted into the entry-level library as predefined members.

The **Members** field should contain a name, a truncated name, or an asterisk (*).

Create Library Controls

Selecting option 1 of the Specify Library Controls panel allows you to create the controls for the library specified. Remember that you have to create the controls in a top-down fashion; that is, create the controls for the top-level library first, then the controls for successive lower-level libraries, ending with the controls for the entry-level library.

When you select option 1, the Create or Update Library Controls panel appears. The panel for creating the middle-level PLI library in the example is shown in Figure 6.

```

ISRLDPI ----- CREATE OR UPDATE LIBRARY CONTROLS -----
COMMAND ==>

Enter the END command to save changes, or CANCEL to exit without saving.

Global controls:
  TARGET GROUP FOR PROMOTE  ==> PROD      (Blank if SYSTST is top group)
  ADMINISTRATOR FOR ISPFEXAM ==> LIBADMN
  ACTIVITY LOG GROUP        ==>          (Leave blank for no logging)

Controls for library ISPFEXAM.SYSTST.PLI:
  AUTHORIZED PROMOTERS      ==> USSET     (Blank if library is top)
  DISTRIBUTION TABLE NAME  ==>          (Optional)
  COLLECTION NAME           ==>          (Optional)
  USER EXIT BEFORE PROMOTION ==>        EXIT TYPE ==>      (CMD or PGM)
  USER EXIT AFTER PROMOTION ==>        EXIT TYPE ==>      (CMD or PGM)
Controls for promotion into entry-level libraries: (Required only if entry-level)
  PACK DATA ON PROMOTION   ==> NO       (YES or NO)
  UNDEFINED MEMBERS ALLOWED ==> YES       (YES or NO)
  If Yes, enter the following controls for undefined members:
  MEMBER ACCESS CONTROL     ==> PRIVATE   (LIMITED, OPEN, or PRIVATE)
  AUTHORIZED ENTRY ID       ==>          (Blank for anyone)

```

Figure 6. Create or Update Library Controls

This panel allows you to define global controls, general library controls, entry-level library controls, and undefined member controls.

Global Controls:

The following controls are global; that is, they apply to more than the library entered on the Specify Library Controls panel on page 16.

Target Group for Promote

- When a member is promoted within a controlled library, it is necessary to indicate the group to which it is being promoted, the “target” group. The target group is always the next higher-level group. Leave this entry blank for a top-level group. The target group must have a library with controls already defined. When the controls for a library in group SYSTST are created, PROD is entered as the target group, as shown on the above panel. Similarly, the target group for libraries in both controlled groups

Option 1

DEPT1 and DEPT2 is SYSTST. The target group applies for all libraries within this particular project and group except PROD.

Administrator for Project

- This field allows you to indicate the library administrator. You can enter your user ID or the name of a user set. If you enter your user ID, as the first person to create controls for a library with a unique project name, you are by default the library administrator. Alternatively, a project can have more than one library administrator. If so, you enter the name of a user set. The user set contains the user IDs of all library administrators who can update controls. If you intend to use a user set as the administrator, you must create it, and include your user ID in it, before you enter its name in this field. You use the USER SET option, LM Utilities option 2, to create a user set.

In the example, there is one library administrator with the user ID LIBADMN. The administrator is global with respect to the controlled project.

Activity Log Group

- This field allows you to specify a *member* activity log data set. You may want to log the activities performed on library members in your project. Information on member activity can be logged to a data set where it can be used to generate member activity logs. If you want to log member activity, enter the "group" name (middle qualifier) for an ISPF data set in this field. The "group" name can be any user-specified name that conforms to standard MVS data set naming conventions. It does not have to be one of the group names in your project. The naming convention of a member activity log data set is:

"project.group.ACTLOG"

You can log member activity for all members of a single controlled project into one data set (including members of different types from different hierarchies). You do not have to specify a different data set for each member type.

If you enter a group name in this field, you must allocate space for the data set "project.group.ACTLOG" (ISPF option 3.2). Library controls cannot be activated if the data set is not allocated. The data set allocated must be sequential and have a fixed record length of 100. You should define the block size to be whatever is most efficient for your installation. The LMF address space must have write authority to this data set. For the example, the 'group' name is MEMLOG.

From the information stored in this data set, member activity logs are generated. Each log contains information on all the members of a single type (for which logging was specified) under a top group. You can browse or print member activity logs by using ISPF option 8.5.1. For a sample printout of a member activity log see "Activity Log Group".

Administrator Activity Log:

You may want to log information on administrator activities not directly related to the control of individual members. Information on the activities performed on library groups, user sets, distribution tables, and data set full actions can be logged to a data set. If you want to log these type of activities you must create an administrator activity log data set. This data set is created by allocating a data set (ISPF option 3.2) with a naming convention of:

"project.ADMIN.ACTLOG"

You must allocate this data set as a sequential data set with a fixed record length of 178. After allocating this data set, you do not need to do anything else to start the administrator activity log. For a sample printout of an administrator activity log see page 48.

The LMF address space must have write authority to this data set.

General Library Controls:

The items discussed in this section apply to the library entered on the Specify Library Controls panel. Because you specified the library ISPFEXAM.SYSTST.PLI, the following line is displayed on the current panel:

Controls for library ISPFEXAM.SYSTST.PLI

The general library controls on the panel are:

Authorized Promoters

- This field lists the person, or persons, authorized to promote a member from the specified library to the library in the target group. It is either the user ID of the person or the name of a user set that contains the user IDs of the people so authorized.

If the library is contained in a top group, you must leave this item blank. If the library is not contained in a top group, you must indicate both the Authorized Promoters and the target group.

Distribution Table Name

- If you want to promote a member into more than one hierarchy, specify the hierarchies in a distribution table. The name of the table for this hierarchy is entered here. Distribution tables are discussed in "DISTRIBUTION (Option 3)" on page 37.

Collection Name

- If you want to label a particular set of promotions in the activity log, enter a name in this field. The collection name is a user field included in the activity log for each promotion. It could be used to group promotions by driver or release.

User Exit Before Promotion

- You can do additional operations such as validation, compression, or compilation on a member before it is promoted to the target group by specifying the name of an exit routine. User exits can be performed before a member is promoted to an entry-level library group, and before a member is promoted from one library group to another within the hierarchy.

In the example, the name of the user exit routine is PROMCHEK.

Exit Type

- This field indicates whether the user exit routine before promotion is a command procedure (CMD) or a program (PGM).

For the user exit routine, PROMCHEK, the type is CMD.

When you request that a member be promoted into a controlled library, this user exit is taken prior to promoting the member. Usually user exits are taken to check, validate, or modify the member before it is promoted. However, you can use the user exit for any purpose you want. In the

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command procedure or program, any or all of the ISPF variables can be used but changes to their values are ignored.

User Exit After Promotion

- You can do additional operations such as one or more compilations on a member after it is promoted to a target library group by specifying the name of an exit routine. User exits can be performed after a member is promoted to an entry-level library group, and after a member is promoted from one library group to another within the hierarchy. This exit is taken only after a valid promotion. If the "after" promote exit routine completes successfully, it must return a zero return code; if not, a non-zero return code must be returned to notify the user that the "after" promote exit routine failed.

Exit Type

- This field indicates whether the user exit routine after promotion is a command procedure (CMD) or a program (PGM).

Entry-Level Library Controls:

The following fields apply to member promotions into an entry-level library. The following Create or Update Library Controls panels show the library controls for the DEPT1.PLI entry-level library. Therefore, these controls are for an entry-level library, as illustrated by the Create or Update Library Controls panel in Figure 7.

```
ISRLDP1 ----- CREATE OR UPDATE LIBRARY CONTROLS -----
COMMAND ==>

Enter the END command to save changes, or CANCEL to exit without saving.

Global controls:
  TARGET GROUP FOR PROMOTE   ==> SYSTST      (Blank if DEPT1 is top group)
  ADMINISTRATOR FOR ISPFEXAM ==> LIBADNM
  ACTIVITY LOG GROUP         ==>              (Leave blank for no logging)

Controls for library ISPFEXAM.DEPT1.LOAD
  AUTHORIZED PROMOTERS       ==> USSET      (Blank if library is top)
  DISTRIBUTION TABLE NAME   ==>              (Optional)
  COLLECTION NAME            ==>              (Optional)
  USER EXIT BEFORE PROMOTION ==>              EXIT TYPE ==>      (CMD or PGM)
  USER EXIT AFTER PROMOTION  ==>              EXIT TYPE ==>      (CMD or PGM)

Controls for promotion into entry level libraries: (Req. only if entry level)
  PACK DATA ON PROMOTION    ==> NO        (YES or NO)
  UNDEFINED MEMBERS ALLOWED  ==> YES        (YES or NO)
  If YES, enter the following controls for undefined members:
  MEMBER ACCESS CONTROL      ==> PRIVATE   (LIMITED, OPEN, OR PRIVATE)
  AUTHORIZED ENTRY ID        ==> PROGRAM   (Blank for anyone)
```

Figure 7. Create or Update Library Controls

Pack Data

- This refers to members being promoted into the entry-level library. If you want the data packed to save space when it is promoted, enter YES here. The default value of NO appears in this field when the panel is displayed.

The program developer can override the **Pack Data** field when promoting the member. After the member is promoted, the data remains packed or unpacked throughout the hierarchy.

PACK uses a unique ISPF data compression routine. Attempts to access or execute the data outside of ISPF may cause unpredictable results.

Also note that Pack Data is not the same as the ISPF compression of a PDS. With ISPF, compression means that a PDS is rewritten so that any space containing deleted members is made available for reuse.

Undefined Members

- An undefined member is a member that does not exist in a controlled library or does not have member controls predefined. Valid values for this field are YES and NO. The default value of YES appears in this field when the panel is displayed.

YES Indicates that undefined members can be promoted into a controlled library. If you enter YES and the members are not predefined, member controls are created for them according to the information in the next two fields.

NO Indicates that members that have no controls associated with them cannot be promoted into the hierarchy. In this situation, new members can be promoted into the hierarchy only if they are predefined. The next two fields are ignored if the entry is NO.

Member Access Control

- Establishes the ownership (access ID) of the member when controls are created for it. Access to the member can be:

Open Anyone can access and update the member.

Limited

The access of the member for update depends on the Authorized Entry ID. If the Authorized Entry ID is:

blank Anyone can access the member for update (the same as an access control of open).

User ID

Only this person can access the member for update (the same as an access control of private).

user set name

Anyone in the user set can access the member for update.

Private

Only the person who promoted the member can access and update it. The default value of PRIVATE appears in this field when the panel is displayed.

Authorized Entry ID

- This field lists the person, or persons, authorized to promote an undefined member into the controlled library. It is either the user ID of that person or the name of a user set that contains the user IDs of the authorized people. If you leave this field blank, anyone can promote undefined members.

In the example, you have limited the access to the user set PROGRAMRS.

After all the necessary fields are correctly entered on the Create or Update Library Controls panel, enter the END command.

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If a name is entered in the **Activity Log Group** field on the Create or Update Library Controls panel, the following panel appears (Figure 8).

```
ISRLDF1 ----- SET DATA SET FULL ACTION FOR LMF DATA SETS -----  
COMMAND ==>  
  
ISPF LIBRARY: PROJECT1.TOP1.PLI  
  
ACTION ==>          (NOTIFY, EXIT, or FAIL)  
  
IF ACTION IS EXIT:  
EXIT NAME ==>      (Name of the exit)  
EXIT TYPE ==>     (CMD or PGM)  
  
ACTIVITY LOG: PROJECT1.TOP1.ACTLOG  
  
ACTION ==>          (NOTIFY, EXIT, or FAIL)  
  
IF ACTION IS EXIT:  
EXIT NAME ==>      (Name of the exit)  
EXIT TYPE ==>     (CMD or PGM)  
  
Instructions:  
Press ENTER to change the action to be taken for the specified data sets.  
Enter END command to cancel the data set full action request.
```

Figure 8. Set Data Set Full Action for LMF Data Sets. This panel is displayed when a name is entered in the Activity Log Group field on the Create or Update Library Controls panel.

If the **Activity Log Group** field on the Update Library Controls panel is left blank, the following panel appears (Figure 9):

```
ISRLDF1 ----- SET DATA SET FULL ACTION FOR LMF DATA SETS -----  
COMMAND ==>  
  
ISPF LIBRARY: PROJECT1.TOP1.PLI  
  
ACTION ==>          (NOTIFY, EXIT, or FAIL)  
  
IF ACTION IS EXIT:  
EXIT NAME ==>      (Name of the exit)  
EXIT TYPE ==>     (CMD or PGM)  
  
Instructions:  
Press ENTER to change the action to be taken for the specified data sets.  
Enter END command to cancel the data set full action request.
```

Figure 9. Set Data Set Full Action for LMF Data Sets. This panel is displayed when the Activity Log Group field on the Update Library Controls panel is left blank.

Note: The two preceding panels are only displayed the first time controls are created for a library, or when a member activity log name has changed.

If you press the END key, the Specify Library Controls panel reappears with the top line stating that the controls have been created:

```
----- SPECIFY LIBRARY CONTROLS ----- CONTROLS CREATED
```

Allocating Space

If you are creating library controls for new libraries, you must allocate space for every library in your library structure. You must also allocate library space for the member activity log and the administrator activity log if you want these logging activities. This allocation is very important. Unless you allocate space for your libraries, your library structure will be unusable. Use the Data Set Utility, ISPF option 3.2, to allocate the required space.

Note: RACF or an equivalent protection system is needed to enforce the controls set by LMF. Without data protection, there is a high risk of compromising the integrity of the data.

Update Library Controls

To update library controls, select option 1 on the Specify Library Controls panel again. However, you will not be given the entire Create or Update Library Controls panel if lower-level libraries have been specified. If you specify an entry-level library, you get the entire panel. For updating all but the entry-level libraries, the following partial panel appears (Figure 10):

Note: Library controls must be deactivated to update library controls.

```
ISRLDP1 ----- CREATE OR UPDATE LIBRARY CONTROLS -----
COMMAND ==> _

Enter the END command to save changes, or CANCEL to exit without saving.

Global controls:
  TARGET GROUP FOR PROMOTE ==>          (Blank if PROD is top group)
  ADMINISTRATOR FOR ISPFEXAM ==> LIBADMN
  ACTIVITY LOG GROUP      ==>          (Leave blank for no logging)

Controls for library ISPFEXAM.PROD.PLI
  AUTHORIZED PROMOTERS    ==>          (Blank if library is top)
  DISTRIBUTION TABLE NAME ==>          (Optional)
  COLLECTION NAME         ==> RELEASE1 (Optional)
  USER EXIT BEFORE PROMOTION ==>      EXIT TYPE ==>      (CMD or PGM)
  USER EXIT AFTER  PROMOTION ==>      EXIT TYPE ==>      (CMD or PGM)
```

Figure 10. Create or Update Library Controls

The panel in Figure 10 has a Collection Name of RELEASE1 specified.

Delete Library Controls

There are three things you must be careful about when you delete library controls:

- The library controls must first be deactivated.

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- The library must be empty; that is, the library must contain no member controls.
- After the deletion, the library structure must retain validity.

Only those members in the library whose controls are being deleted should be removed. You should delete library controls before deleting the physical data sets.

Once the hierarchy is deactivated, you can delete all but one of the libraries in a group of the promotion hierarchy. That one remaining library can also be deleted provided it is not the target library for any other library in the controlled project.

The sequence of steps for deleting a library's controls is:

1. Deactivate the hierarchy (top group) that contains the controls.

The section "ACTIVATE (Option 4)" on page 43 explains how to deactivate controls.

2. If you are deleting libraries in more than one level of a promotion hierarchy, start with the lowest-level library and work up to the highest-level library whose controls are to be deleted.

Remove all members in the library. To do this, either promote the members to the next level in the hierarchy or delete the member controls (ISPF option 8.1.3.1).

Remove a promoted member that is to be retained by promoting it to the next level in the library hierarchy. The section "Promoting Within the Controlled Library" on page 76 explains how to promote a member to the next level of a library hierarchy.

Remove a promoted member that is not to be retained by deleting the controls with ISPF option 8.1.3.1, or by making its length zero. You can make the length zero by:

- a. Accessing the member for update (see "Accessing a Controlled Library Member" on page 69)
- b. Deleting all records from the member
- c. Promoting the zero length member to the top group (see "Promoting Within the Controlled Library" on page 76).

If you are deleting a top group, remember to remove both the predefined members and members that are available for update. The section on "Member Level Controls Utilities" explains how the controls for these members can be deleted.

3. For non-entry level libraries, you must retain the validity of the hierarchy by changing the target group for lower-level libraries to the next higher-level group. For example, suppose that library ISPFEXAM.SYSTST.PLI is being deleted. The target group for the libraries ISPFEXAM.DEPT1.PLI and ISPFEXAM.DEPT2.PLI must be changed from SYSTST to PROD. To change target groups, use the Create Or Update Library Controls panel (see page 17).
4. Delete the library controls by selecting option 2 on the Specify Library Controls panel.

When you select option 2, the Confirm Delete panel appears (Figure 11).


```
----- CONFIRM DELETE -----  
COMMAND ==> _  
CONTROLS FOR LIBRARY: ISPFEXAM.PROD.PLI  
  
INSTRUCTIONS:  
    Press ENTER to confirm delete request.  
    Enter END command to cancel delete request.
```

Figure 11. Confirm Delete

When you press ENTER to confirm the delete request, a message on the Specify Library Controls panel indicates whether the deletion was successful or unsuccessful.

After you have deleted the library controls, make sure you activate the remaining library controls, if any.

Member Level Controls Utilities

As soon as someone promotes an undefined member into an entry-level library, LMF creates controls for that member. Thus, controls for an undefined member are created in accordance with the Create or Update Library Controls panel (page 20). A predefined member, on the other hand, is promoted in accordance with the controls established under option 3 on the Specify Member Level Controls panel (Figure 12).

Note: Library controls must be deactivated to do these functions.

Option 1

```
ISRLLEDEF ----- SPECIFY LIBRARY CONTROLS -----
OPTION ==> 3

  1 - Create or update controls for library hierarchies.
  2 - Delete library controls.
  3 - Member level controls utilities.

ISPF LIBRARY:
PROJECT ==> ISPFEXAM
GROUP   ==> PROD
TYPE    ==> MSGS
```

Figure 12. Specify Library Controls

Option 3 on the Specify Library Controls panel allows you to:

- Control who can create, update, or delete members in a library hierarchy
- Initialize, clear, and verify member controls.

Notice that you must specify the top group library when you select option 3 on the Specify Library Controls panel. Creating member controls for the top group library creates them for the entire library hierarchy.

When you select option 3 on the Specify Library Controls panel, the Member Level Controls Utilities panel appears (Figure 13).

```
ISRLLEDEM ----- MEMBER LEVEL CONTROLS UTILITIES -----
OPTION ==>

  1 - Create, update, or delete controls for members.
  2 - Initialize member controls.
  3 - Clear member controls.
  4 - Verify member controls.

ISPF LIBRARY: ISPFEXAM.PROD.MSGS

For option 1:
MEMBER           ==>                (Name, truncated name, or * allowed)
For option 2:
NEW STATISTICS  ==>                (YES or NO)
NEW ACCESS ID   ==>                (User ID or user set,
* to use existing owner,
blank for open access)
PRESERVE EXISTING CONTROLS ==>    (YES or NO)
For options 2, 3, and 4:
OUTPUT DATA SET ==>                (Required)
```

Figure 13. Member Level Controls Utilities

Create, Update, or Delete Member Controls

Option 1 on the Member Level Controls Utilities panel allows you to:

- Change which users are allowed to update a member in a controlled library.
- Predefine controls for a member; that is, predefine the member. Predefining the members allows you to control who can create a particular new member and then promote it into the controlled library. Thus, predefining the members can limit the names of members in a controlled library. If undefined members are allowed in a controlled library, predefining the members can reserve certain member names to specific users.
- Delete members and their associated controls.

For this option, you must enter a member name, a truncated name, or an asterisk (*) in the **Member** field. The member designation determines which member controls are displayed and, therefore, are available for update or deletion.

Name Only the controls for the member with this name are displayed.

Truncated name

The controls for all members whose names start with the truncated name are displayed. A truncated name ends with an asterisk (*) to differentiate it from a member name.

- * The controls for all members are displayed.

To see the difference in designating the member as a truncated name or as an asterisk (*), assume that the library ISPFEXAM.PROD.MSGS has members CMSG1, EMSG1, EMSG2, SMSG1, and SMSG2, among others. Designating the member as

```
MEMBER ==> *
```

displays the controls for all members of the library. However, using a truncated name, such as

```
MEMBER ==> EM*
```

displays the controls for only those members whose names begin with EM, namely, EMSG1 and EMSG2.

When you select option 1 on the Member Level Controls Utilities panel, you get the Specify Member Level Controls panel, which shows individual member controls for the specified library hierarchy (Figure 14). These controls are sorted by member name, and within member name by group hierarchy.

Option 1

```
----- SPECIFY MEMBER LEVEL CONTROLS ----- ROW 1 OF 13
COMMAND ==>                                SCROLL ==> PAGE

Add, delete, or change member names or access IDs for
library hierarchy: ISPFEXAM.PROD.MSGS
Enter the END command to save changes, or CANCEL to exit without saving.

      MEMBER   ACCESS   GROUP   VV.MM   DELETE   LOCK
      NAME     ID       NAME                    STATUS   STATUS

''  CMSG1_     JONES_   PROD     01.00    1    AVAILABLE
''  EMSG1_     GONZALEZ.  PROD     01.00    1    *LOCKED*
''  EMSG1_     _        SYSTST   01.01    I
''  EMSG2_     MA1      PROD     _        P    PREDEFINED
''  SMSG1_     MILLER   PROD     _        1    *LOCKED*
''  SMSG1_     MILLER   SYSTST   01.00    2    *LOCKED*
''  SMSG1_     MILLER   DEPT1    01.01    3    AVAILABLE
''  SMSG2_     WONG_    PROD     01.00    1    WONG
```

Figure 14. Specify Member Level Controls

The access IDs are either user IDs or user set names of those people who have the authority to create or update the corresponding members. The access ID for a predefined member determines who can promote the member into the hierarchy. **Member Name** and **Access ID** are input fields; however, on this panel you can create the predefined member controls, or update predefined or existing member controls.

The remaining fields (**Group Name**, **VV.MM**, **Delete Status**, and **Lock Status**) are read-only fields. Group Name identifies the group associated with that member control. A blank version and modification (**VV.MM**) field indicates there is no physical member associated with that control.

The apostrophes on the left define the line command area, where you can enter commands such as INSERT (I[n]), DELETE (D[n]), and REPEAT (R[n]). The line commands are useful when you update this list. The use of the line commands can cause the sort order to get out of sequence or the lock status to change. You must enter the END command and then reenter this option to see the correct order or lock status changes.

The INSERT command inserts one line or *n* lines directly after this line, with underscores and quotes identifying the input fields. Inserted lines are set to indicate predefined controls.

In the example, you inserted a line and entered EMSG2 into the **Member Name** field and MA1 into the **Access ID** field. LMF entered the **Group Name**, **Delete Status**, and **Lock Status** fields.

The **Delete Status** and **Lock Status** fields determine the action of the DELETE line command.

Delete Status displays one of the following values:

1, 2, 3 ... 50

Indicates the member's hierarchical position. A "1" indicates the top group, a "2" indicates the second-level group, and so on.

I Indicates there is a promotion in process for this member.

P Indicates this member does not exist, but its controls have been predefined.

Lock Status displays one of the following values:

Available

Indicates this member is available for update.

LOCKED

Indicates this member is locked because it is a back-level modification; that is, there is a more current modification in a lower level of the hierarchy. Therefore, this type of lock does not apply to entry-level members.

Predefined

Indicates this member does not exist, but its controls have been predefined.

Owner ID

Specifies the user ID of the user (the owner) who has this member out for update; that is, this member is edit-locked.

The following actions take place when the DELETE line command is used:

- The physical member, if it exists, is deleted.
- If the member being deleted is owned or available, and is not in the top group, its controls are deleted and its previous modification, if it exists, becomes available. If no previous modification exists, the controls for that member become predefined in the top group.
- If the member being deleted is *LOCKED* and is not in the top group, the controls are deleted.
- If the member being deleted is owned or available, and is in the top group, the controls are set to predefined.
- If the member being deleted is *LOCKED* and is in the top group, the version code and modification number are blanked.
- If a member is predefined, its controls are deleted.
- If a member has a promotion in process, it cannot be deleted.

Note: If you delete a member and its associated controls from a library hierarchy that references a distribution table, you are responsible for maintaining the integrity of the other library hierarchies pointed to by the referenced distribution table.

Because only a valid library administrator can delete members, the programmer must tell you what members to delete. If you want to make the deletions on a periodic rather than a current basis, you can have the programmer temporarily "delete" the member by promoting a null member. Of course, the programmer must still tell you what null members to delete.

The "null" member should contain data that tells its invoker that it has been logically deleted. For example, in the case of a function, it should cause an abnormal termination; in the case of a panel, its body section should indicate that it is being deleted from the controlled library. When this null member is promoted

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into the top group of the promotion hierarchy, it will have gone through the proper development process. You can now delete it by using LM Utilities option 1.3.

The REPEAT command repeats the input fields of this line one to n times. The VV.MM field is set to blank and the **Delete** and **Lock Status** fields indicate a predefined control.

The primary commands available are CANCEL, LOCATE, and END. LOCATE can be used to locate either a member name or an access ID. It has the following syntax and meaning:

```
LOCATE argument  
LOC  
L
```

It positions the scrollable display to the first (next) row containing the argument in the member name column. If the argument is not found in the member name column, the scan then searches the access ID column. (The scan searches vertically down the columns, not horizontally.) The scan starts at the first row in the list. If the LOCATE argument ends in an asterisk (*), the scan is done for the characters preceding the asterisk. A message appears indicating the results of the scan.

Initialize Member Controls

This function is initiated by selecting option 2 on the Member Level Controls Utilities panel. This option creates member controls for an LMF hierarchy just as if the members were each promoted in. By providing the information in the required fields on the Member Level Controls Utilities panel, the library administrator can:

- Use existing ISPF statistics or create new ones. For existing ISPF statistics, the version codes will not be changed. Otherwise, the version codes are set to 1.
- Specify the access controls in the **New Access ID** field. To use the current owner ID from the ISPF statistics you can specify a user set, a user ID, or an asterisk (*). A blank allows anyone access control.
- Specify whether existing controls are to be preserved by typing YES or NO in the **Preserve Existing Controls** field. Preserving existing controls is very useful in the event recovery is necessary for the controlled libraries or the control file.

This option requires that an output data set name be specified. This data set can be sequential or a member of a fully-qualified partitioned data set. The format of this data set is fixed blocked with record length 90. If the data set specified does not exist, one will be allocated for you. The LMF address space must have write authority to this data set. A report on any discrepancies found in the creation of member level controls will be outputted to this data set. If there is more than one problem with a member, only the first problem found is reported.

The initialize utility sorts out any conflicts between members in the hierarchy. It reports any members that do not have member controls created because of conflicts. The library administrator should delete these members or reconsider their position in the hierarchy.

A Member Initialize - Confirm screen appears before the initialization process begins.

Note: This function cannot be used on a hierarchy that has a distribution table specified. If you later add a distribution table to a hierarchy that was initialized, the controls may no longer be valid.

Clear Member Controls

This function is initiated by selecting option 3 on the Member Level Controls Utilities panel. With this option you can have member level controls cleared in an LMF-controlled library. The members are removed from the LMF control file, but they are not physically deleted from the data set.

This option requires that an output data set name be specified. This data set can be sequential or a member of a fully-qualified partitioned data set. The format of this data set is fixed blocked with record length 90. If the data set specified does not exist, one will be allocated for you. The LMF address space must have write authority to this data set. A listing of each member that was edit-locked along with its associated user ID will be written to this data set.

A Member Clear - Confirm screen appears before the clear process begins.

Note: This function cannot be used on a hierarchy that has a distribution table specified.

Verify Option

This function is initiated by selecting option 4 on the Member Level Controls Utilities panel. With this option you can verify member level controls in an LMF-controlled library.

This option requires that an output data set name be specified. This data set can be sequential or a member of a fully-qualified partitioned data set. The format of this data set is fixed block with record length 90. If the data set specified does not exist, one will be allocated for you. The LMF address space must have write authority to this data set. This data set is needed for the output of a report that is generated showing any discrepancies between the control file contents and the contents of the controlled data set. This verification shows the LMF hierarchy (project, group, and type) at all levels. All discrepancies have to be reconciled before the controls can be activated.

User Exits

You entered PROMCHEK in the **User Exit Before Promotion** field and CMD in the **Exit Type** field. When you request that a member be promoted to a controlled library, this user exit is taken prior to promoting the member. Usually, user exits are taken to check or validate the member before it is promoted. However, you can use the user exit for any purpose you want. In the command or program, you can use any or all of the ISPF variables. The library management variables are:

ZLTPRJ	"To" project name
ZLTGRP	"To" group name
ZLTTYP	"To" type
ZLTMEM	"To" member name
ZLFPRJ	"From" project name
ZLFGRP	"From" group name
ZLFTYP	"From" type
ZLFMEM	"From" member name
ZLFDSN	"From" data set name
ZLFVOL	"From" volume serial
ZLFPWD	Data set password
ZLACT	Action
ZLRCD	Reason code
ZLPAC	Pack data
ZLVER	Version code

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Use the VGET service to get the variables set by LMF from the shared pool.

User Exit Example:: The user exit routine name (PROMCHEK) and user exit routine type (CMD) are entered for the following CLIST example. Figure 15 on page 33 checks the necessary library management variables and sets the return code. If all checks are good, the promotion takes place. If any check fails, the member is not promoted. A return code of zero indicates that all checks were successful, so the member is promoted into the controlled library. If the return code is not zero, at least one check failed and the member is not promoted.

If the “before” promote exit routine does not issue a message through the SETMSG service, LMF formats its own “promote failed” message.


```

PROC 0
/*****/
/*                                     */
/* THIS CLIST IS THE 'USER EXIT' FOR PROMOTION INTO AN          */
/* ISPFEXAM LIBRARY                                           */
/*                                     */
/*****/
ISPEXEC CONTROL ERRORS RETURN
SET RC = 0
  ISPEXEC VGET (ZLTPRJ, -
               ZLTGRP, -
               ZLTYP, -
               ZLTMEM, -
               ZLFPRJ, -
               ZLFGRP, -
               ZLFTYP, -
               ZLFMEM, -
               ZLFDNS, -
               ZLFDVOL, -
               ZLFPWD, -
               ZLACT, -
               ZLRCD, -
               ZLPAC, -
               ZLVER) SHARED      /* 15 VARIABLES */

/*****/
/*                                     */
/* EXAMPLES OF LOGIC THAT CAN DYNAMICALLY STOP THE           */
/* PROMOTION PROCESS BY RETURNING A NON-ZERO RETURN CODE      */
/*                                     */
/*****/

/*****/
/* CHECK PROJECT NAME                                         */
/*****/

IF &ZLTPRJ ^= ISPFPROJ THEN +
  SET &RC = 4
ELSE +

/*****/
/* CHECK WHETHER TYPE IS PLI                                 */
/*****/

DO
  IF &ZLTYP ^= PLI THEN +
    SET &RC = 8
  ELSE +
    /*****/
    /* CHECK WHETHER ACTION IS MOVE                         */
    /*****/

  DO
    IF &ZLACT ^= MOVE THEN +
      SET &RC = 12
    ELSE +

```

Figure 15. User Exit Example (Part 1 of 2)

Option 2

```

/*****
/* CHECK FIRST SEVEN CHARACTERS OF REASON CODE      */
*****/

DO
  IF &SUBSTR(1:7,&ZLRCD)≠ PROBLEM THEN +
    SET &RC=16
  ELSE +

    /*****
    /* CHECK IF DATA IS PACKED                      */
    *****/

    DO
      IF &ZLPAC = NO THEN +
        SET &RC = 17
      END
    END
  END
END
EXIT CODE(&RC)

```

Figure 15. User Exit Example (Part 2 of 2)

USER SET (Option 2)

A user set can identify:

- More than one library administrator assigned to a project
- More than one person authorized to promote members out of a controlled library
- More than one person authorized to promote undefined members to a controlled library
- More than one person authorized to access and update a member.

The user set lists the user IDs for those people who are authorized to promote members or to have access to particular library members or library controls. The same user set does not need to apply to all four cases noted above. In the example, only one user set, named USSET, is defined.

When you select option 2 on the Library Management Utilities panel, the Specify User Sets panel appears (Figure 16 on page 35).

```
----- SPECIFY USER SETS -----  
OPTION ==> 1  
  
1 - Create or update user set  
2 - Delete user set  
  
PROJECT      ==> ISPFEXAM  
USER SET NAME ==> USSET
```

Figure 16. Specify User Sets

The Specify User Sets panel is used for each user set you want to create. The project name and user set name are required for either option.

Option 1 Allows you to create or update a user set. In the example, you select option 1 to create the user set named USSET.

Option 2 Allows you to delete a user set.

When you select option 1, the Create or Update User Sets panel appears. The panel for the example is shown in Figure 17.

Option 2

```
----- CREATE OR UPDATE USER SETS -----
COMMAND ==>                                SCROLL ==> HALF

Add, delete, or change user IDs for user set: USSET
Enter the END command to save changes, or CANCEL to exit without saving.

      USER ID          DESCRIPTION
''      GONZALES      Juan Gonzalez
''      JONES        Janet Jones
''      MILLER       Jason Miller
''      LIBADMN
''      WILLIAMS     John Williams
''      WONG         Jane Wong
```

Figure 17. Create or Update User Sets

The apostrophes on the left define the line command area where you can enter commands such as INSERT (I), DELETE (D), and REPEAT (R). The line commands are useful when you update this list.

The primary commands available are CANCEL, LOCATE, and END. The only argument you can use with the LOCATE command is the user ID.

The column labeled Description allows you to enter information pertaining to the user IDs, if desired. The data in that column is neither checked nor used by LMF. In the example, the name of the person associated with each user ID is indicated in the Description column.

User sets can be updated while the controls are active.

You cannot delete your own user ID from a library administrator user set, but you can have your user ID deleted by someone else who is authorized as a library administrator. This ensures that there is always a valid administrator.

Enter the END command to create or update the user set. If a project does not already exist, creating a user set for a project defines that project.

When you select option 2 on the Specify User Sets panel, the following Confirm Delete panel is displayed (Figure 18):

```

----- CONFIRM DELETE -----
COMMAND ==> _
PROJECT: ISPFEXAM
USER SET NAME: FR1

INSTRUCTIONS:

    Press ENTER to confirm delete request.
    Enter END command to cancel delete request.

```

Figure 18. Confirm Delete

If you want to delete a user set that is used as a library administrator, you must first change the administrator control (Create or Update Library Controls, ISPF option 8.1.1) to a different valid library administrator. Once the user set is no longer used as a library administrator, it can be deleted.

Note that the user set entered will be deleted, but library controls referencing that user set will not be deleted. You must update all library controls that refer to the deleted user set.

DISTRIBUTION (Option 3)

Option 3 of the Library Management Utilities panel creates the distribution table. A distribution table allows you to promote a member from a private library into multiple entry-level libraries with a single interaction. It also allows you to promote members from one level of a library hierarchy to another.

Before considering the manner in which a distribution table is implemented, you might want to know why you would want one.

For example, assume that you have a project, PROJ, with two separate library hierarchies, as illustrated in Figure 19 on page 38. For simplicity, only one type and two hierarchies are being considered.

Some reasons for having separate library hierarchies in a project might be:

- Parallel efforts with different implementation techniques are in progress, with some members in common.
- One hierarchy is used as a checkpoint set for the other hierarchy.
- One hierarchy is used for updating purposes while the other hierarchy, not accessible for updating, maintains the latest updated state.

Option 3

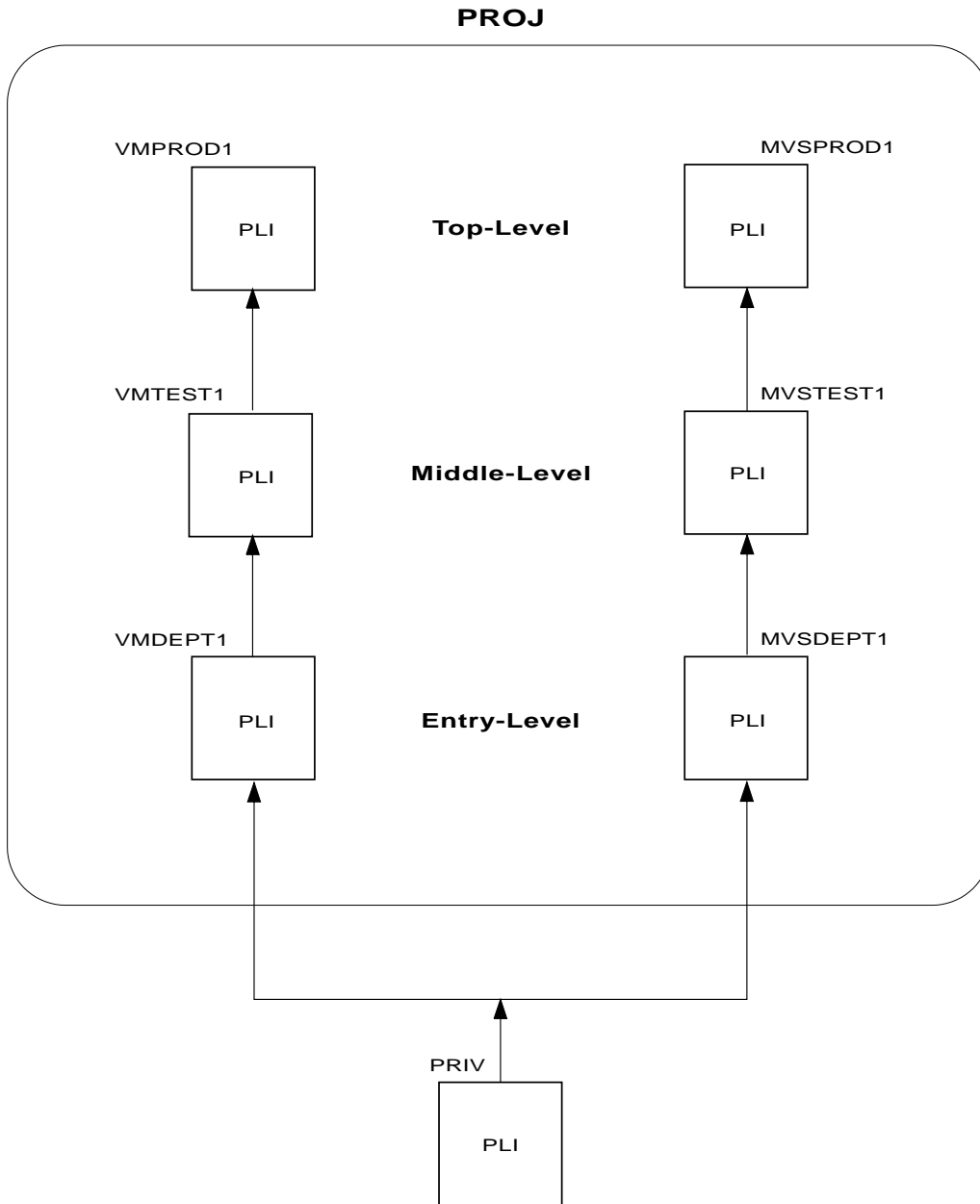


Figure 19. Sample Structure for Distributive Promotion

Suppose a member, MEMB, has been created or updated in a private library. MEMB is to be promoted to both entry-level libraries depicted in Figure 19, and you want to use only one promotion. This distributive promotion can be accomplished with a distribution table. The distribution table contains version numbers of members to be distributively promoted, together with the target groups for each version number identified.

Version numbers are established by the library administrator when the distribution table is created. These version numbers must be given to the programmers, who assign them to the members they are developing. Programmers assign version numbers by using the Edit VERSION primary command in the ISPF editor, or by using Reset ISPF Statistics, ISPF option 3.5.

The library hierarchies that are associated with a distribution table must be identified as such. This is accomplished by entering the name of the distribution table in the **Distribution Table Name** field on the Create and Update Library Controls panel for each target library.

For the structure shown in Figure 19 on page 38, the target libraries are the entry-level libraries. Therefore, if the distribution table is named DIST, the entry in each of the Create and Update Library Controls panels for the libraries PROJ.VMDEPT1.PLI and PROJ.MVSDEPT1.PLI is

DISTRIBUTION TABLE NAME ==> DIST

Only one library in the library hierarchy can name a distribution table. However, there can be other distribution tables in the promotion hierarchy associated with other library types.

Distribution tables do not need to be confined to entry-level libraries. You can even have a distribution table associated with an entry-level library in one hierarchy and a middle-level library in another hierarchy. You must remember, however, that you cannot have more than one distribution table referenced in a given library hierarchy.

When a distribution table is associated with a library hierarchy, all members promoted to, or within, that hierarchy must have a version number listed in the distribution table. Even if a member is promoted only to its own hierarchy, its version number must still appear in the distribution table. Version numbers of members that are promoted in more than one hierarchy appear several times in the distribution table, once for each hierarchy.

Note: If you are adding a distribution table to a hierarchy that already has members, make sure all the members in the hierarchy have version numbers that will be specified in the distribution table.

To define a distribution table, select option 3 on the Library Management Utilities panel. The following panel appears (Figure 20):

Option 3

```
----- SPECIFY DISTRIBUTION TABLES -----
OPTION ==> 1

  1 - Create or update distribution table
  2 - Delete distribution table

PROJECT           ==> PROJ
DISTRIBUTION TABLE NAME ==> DIST
```

Figure 20. Specify Distribution Tables

The Specify Distribution Tables panel presents two options. You can create or update a distribution table, or you can delete a distribution table. In either case, you have to enter the project name and the name of the distribution table.

Selecting option 1 displays the following panel, with which you can create a distribution table (Figure 21).

```
----- CREATE OR UPDATE DISTRIBUTION TABLES ----- ROW 1 OF 13
COMMAND ==>                                       SCROLL ==> HALF

Add, delete, or change version numbers and target groups for distribution
table: DIST
Enter the END command to save changes, or CANCEL to exit without saving.

      VERSION      TARGET
      NUMBER      GROUP
''    11          VMDEPT1
''    11          MVSDEPT1
''    12          VMDEPT1
''    13          MVSDEPT1
      .           .
      .           .
      .           .
```

Figure 21. Create or Update Distribution Tables

If you assigned 1 as the first version number, that 1 could be confused with the LMF default version code of 1. Therefore, you have assigned 11 as the first version number.

Option 3

Every library that gets a copy of a member must be listed here. In the example, the member with version number 11 is promoted into two entry-level libraries, VMDEPT1 and MVSDEPT1. The members with version numbers 12 and 13 are each promoted into only one entry-level library, VMDEPT1 and MVSDEPT1, respectively. LMF verifies that the controls of each target group library (VMDEPT1 and MVSDEPT1) include this distribution table's name (DIST).

The apostrophes on the left define the line command area where you can enter commands such as INSERT (I), DELETE (D), and REPEAT (R). The line commands are useful when you update this list.

The primary commands available are CANCEL, LOCATE, and END. You can use either the version number or the target group as an argument with the LOCATE command.

Selecting option 2 of the Specify Distribution Tables panel to delete a distribution table displays the Confirm Delete panel (Figure 22):

```
----- CONFIRM DELETE -----
COMMAND ===> _
PROJECT: PROJ
DISTRIBUTION TABLE NAME: DIST
INSTRUCTIONS:
    Press ENTER to confirm delete request.
    Enter END command to cancel delete request.
```

Figure 22. Confirm Delete

If you confirm the deletion, the distribution table is deleted. However, library controls that refer to that distribution table are not deleted. You must also update the library controls that refer to the deleted distribution table.

When you create, update, or delete a distribution table, LMF makes various checks to ensure that the distribution table can be created, updated, or deleted. The checks are:

- Creation of a Distribution Table
 - To create a distribution table:
 - The user is an authorized project administrator.
 - The project exists.
 - The project is not in use by any other project administrator.
 - To save a created distribution table:

Option 3

- For each group entered in the distribution table, there are controls for at least one library in that group.
- For each group entered in the distribution table, all libraries within that promotion hierarchy are deactivated.
- For each group entered in the distribution table, all members belonging to any library using that group qualifier and the specified distribution table are in the top group and available.
- The members of the library hierarchy are available for update up to and including the level at which the distribution table is created.
- For each library hierarchy associated with a group in a distribution table, only one library has a distribution table. (For example, the top and middle groups for the same hierarchy cannot both be in a distribution table.)
- Update of a Distribution Table
 - To access a distribution table for update:
 - The user is an authorized project administrator.
 - The project exists.
 - The project is not in use by any other project administrator.
 - For each group entered in the distribution table, all libraries using that hierarchy are deactivated.
 - The members of the library hierarchy are available for update up to and including the level at which the distribution table is created.
 - To save an updated distribution table:
 - For each group entered in the distribution table, there are controls for at least one library in that group.
 - For each group entered in the distribution table, all libraries within that promotion hierarchy are deactivated.
 - For each group entered in the distribution table, all members belonging to any library using the group qualifier and the specified distribution table are in the top group and available.
 - The members of the library hierarchy are available for update up to and including the level at which the distribution table is created.
 - For each library hierarchy associated with a group in a distribution table, only one library has a distribution table created. (For example, the top and a middle group from the same hierarchy cannot both be in a distribution table.)
- Deletion of a Distribution Table
 - To access a distribution table for deletion:
 - The user is an authorized project administrator.
 - The project exists.
 - The project is not in use by any other project administrator.
 - The distribution table exists.
 - For each group entered in the distribution table, all libraries using that group qualifier are deactivated.

There does not have to be a library in the hierarchy for each group in the distribution table. This allows you to delete groups out of the hierarchy before deleting them from the distribution table, and to delete the entire distribution table even though not all the groups have been deleted from the hierarchy.

If any of the above checks fail, you are notified by a message. How you continue depends on which check failed. Therefore, if you get a message, request the tutorial by entering the HELP command.

ACTIVATE (Option 4)

For the example, you created the library structure, put the controls in place, defined the user set, and created and protected the data sets. In order to allow the library structure to be used, the controls must be activated. Selecting option 4 on the Library Management Utilities panel displays the following panel (Figure 23), on which you indicate the controls you want activated.

```

----- ACTIVATE OR DEACTIVATE CONTROLS -----
OPTION ==> 1

  1 - Activate controls and display hierarchy structure
  2 - Deactivate controls

PROJECT ==> ISPFEXAM
TOP GROUP ==> PROD      (* for all top groups)

```

Figure 23. Activate or Deactivate Controls

The top group name is required to activate or deactivate the controls for a promotion hierarchy. If you choose option 1, Activate controls, and the activation is successful, a panel showing your structure appears. For the example, the following panel is displayed (Figure 24 on page 44).

Option 4

```
HIERARCHY(IES) ACTIVATED - ISPFEXAM.PROD-----LINE 000000 COL 001 080
COMMAND ==> _                               SCROLL ==> CSR
***** TOP OF DATA *****

STRUCTURE FOR - ISPFEXAM          DATE: 83/06/30      TIME: 09:56

1 PROD          Where:
2 SYSTST        1, 2 ... 50 Indicates hierarchical position
  B DEPT1        B           Indicates bottom group
  B DEPT2

DEFINED TYPES
PANELS
MSGS
PLI

***** BOTTOM OF DATA *****
```

Figure 24. Hierarchy Activated

When this panel, which reflects your library structure, is displayed, you know that the controls have been activated. You can use it, therefore, to validate your entire hierarchy. If all of the library hierarchies selected could not be activated because they were deactivated by another ID, a separate list will be displayed showing the libraries not activated and the deactivate ID.

Before you update library controls, you must deactivate them. You do this by selecting option 2 on the Activate or Deactivate Controls panel. Only the person who deactivates the controls can activate them again.

When a library is active, the only controls you can update are user sets and Data Set Full actions for a control file. However, you can review the activity log or the control status and delete type-related entries from the member activity logs when the library is active.

Note: LMACT and LMDEACT can also be used to activate and deactivate library controls. Refer to *ISPF Services Guide* for more information on these services.

REVIEW (Option 5)

The member and administrator activity logs and the control and member status listings, described in “REVIEW (Option 5)”, are general use programming interfaces, which you may use for programming purposes.

Selecting option 5 on the Library Management Utilities panel allows you to look at member activity logs, the administrator activity log, and library control status. This option is not restricted to use by the library administrator. If you want to delete a type from a member activity log, or empty an administrator activity log, you must use ISPF option 8.6. See “ACTIVITY LOG (Option 6)” on page 59.

Selecting option 5 displays the Review Activity and Controls panel (Figure 25 on page 45).

```

----- REVIEW ACTIVITY AND CONTROLS -----
OPTION ==> _
1  ACTIVITY LOG    - Update and promote activity
2  CONTROL STATUS - Library control data
3  MEMBER STATUS  - Member control data

```

Figure 25. Review Activity and Controls

- | | |
|-----------------|---|
| Option 1 | Displays the member activity and administrator activity log. This log lists the promotion, lock, update, and free activities that have taken place. |
| Option 2 | Displays the library control data. |
| Option 3 | Displays the member control data. |

A discussion of each of these options follows.

Activity Log

When you select option 1, the Activity Log Review panel appears (Figure 26 on page 46).

Option 5

```
ISRLATL ----- ACTIVITY LOG REVIEW -----
OPTION ==> 2

  1 - Browse activity log
  2 - Print activity log

ISPF LIBRARY:
  PROJECT   ==> ISPFEXAM

FOR MEMBER ACTIVITY LOG:
  GROUP     ==> PROD           (Top group name, * for all top groups)
  TYPE      ==> PLI           (* for all types)
  MEMBER    ==> *             (Name, truncated name, or * allowed)
  SORT TYPE ==> TIME          (MEMBER or TIME)

  ACTIVITY LOG GROUP NAME ==> (Use ADMIN to review the
                               administrator activity log)
```

Figure 26. Activity Log Review

Member Activity Log

By entering an asterisk (*) in the **Group**, **Type**, and **Member** fields, you can review the activities logged for every member in all controlled libraries for the given project that uses this activity log group.

When you enter an asterisk (*) for a top group, only those hierarchies that record activity to the same activity log library are processed for review.

In the **Type** field, enter the type whose activity you want to review. This field refers only to those types for which logging activity was specified.

In the **Member** field enter the name of the member whose log activity you want to review. The **Member** field is required.

Sorting by member name or by time must be specified in the **Sort Type** field.

In the **Activity Log Group Name** field, enter the corresponding name previously entered in the **Activity Log Group** field of the Create or Update Library Controls panel.

Administrator Activity Log

To review the administrator activity log, type ADMIN in the **Activity Log Group Name** field.

Option 1

Displays the administrator activity log ("Administrator Activity Log" on page 18) or member activity log (Activity Log Group). for the requested members. This display is scrollable, so you can see all the data available, or stop whenever you wish.

Option 2

Sends the log activity data to the ISPF list data set. You can then obtain a listing of the log activity data.

The member activity log project headings are shown in Table 1.

```

ACTIVITY LOG OF PROJECT : ISPFEXAM  GROUP : PROD  PAGE 1

TYPE : PLI

MEMBER  GROUP  ACTION  USER ID  DATE      TIME  VER MOD COLLECT  REASON  I
-----
AAA     SYSTST  LOCK   JONES   87/04/02 16:42 01 00
AAA     SYSTST  FREE   JONES   87/04/02 16:44 01 00
AAA     DEPT2   MOVE   JONES   87/04/02 16:44 01 01  RELEASE1  PLACED FILE INTO LIBRARY
BBB     PROD    LOCK   WONG    87/04/02 16:42 01 00
BBB     DEPT2   MOVE   WONG    87/04/12 07:12 01 01
CCC     DEPT1   LOCK   WILLIAMS 87/04/02 16:44 01 00
CCC     DEPT1   FREE   WILLIAMS 87/04/12 10:30 01 00
DDD     SYSTST  LOCK   MILLER  87/04/13 12:35 01 00  ADDED COMMENTS TO PROLOG
DDD     DEPT2   MOVE   MILLER  87/04/14 12:40 01 01
    
```

Figure 27. Member Activity Log

Table 1. Member Activity Log of Project Headings

HEADINGS	CONTENTS
MEMBER	Member name.
GROUP	Group in which the action was done.

Option 5

Table 1. Member Activity Log of Project Headings (continued)

HEADINGS	CONTENTS
ACTION	Action taken: MOVE - The member was promoted into the library. FREE - The member was made available for update. EDITLOCK - The member is edit-locked. It can be promoted or freed only by the person who edit-locked it. The person whose user ID is listed is the only one who is allowed to change the member in the controlled library. This is done by promoting the member from an uncontrolled library. The MOVE and FREE actions are discussed in more detail on page 68. DELETEP - The zero length member was deleted from this group after it was promoted to a top group. DELETEA - The member was deleted from this group by the library administrator. PREDEF - The member has been predefined and not yet promoted into a controlled library. INIT - INITIALIZE utility was used. Individual changes to members in the group are not logged. CLEAR - CLEAR utility was used. Individual changes to members in the group are not logged.
USER ID	User who requested the action.
DATE	Date when the action occurred. The date is in the national format for your country.
TIME	Time, in hh:mm 24-hour format, when the action occurred.
VER MOD	Version and Modification level of member.
COLLECT	Collection name, as specified on the Create or Update Library Controls panel.
REASON	Reason code as entered on the second Move/Copy Utility panel for promoting a member (ISPF option 3.3).
I	The specified action did not complete.

If you want to use the data in the activity log to produce special reports, you must know the record layout. The record layout for the member activity log project.group.ACTLOG, is shown in "Appendix A. Special Reports" on page 81.

Administrator Activity Log

The administrator activity log contains group-related information, and information on user sets, distribution tables, and data set full actions.

ADM IN ISTRATOR ACTIV ITY LOG OF PROJECT : ISFFPROJ PAGE 1

GROUP : BASE

ACTION	TYPE	USER ID	DATE	TIME	TARGET GROUP	ADMIN ID	ACTIVITY GROUP	AUTH PROMOTER	DISTRIB TABLE	COLLECT NAME	PUA ENTRY	ID DEVELOP	PROMOTE EXITS	
													BEFORE	AFTER
CREATE	MESSAGES	BENTLEY	87/01/20	11:37		ADM IN1	ACTGROUP	AUTHROM	DISTTAB	COLLECT1	Y	L DEVELOP	B4EXIT1	C
CREATE	PLI	BENTLEY	87/01/20	11:39		ADM IN1	ACTGROUP	AUTHROM	DISTTAB	COLLECT1	Y	L DEVELOP	PNLXT	C
MEMBER	PLI	NADEL	87/02/29	19:38										
MEMBER	MESSAGES	BENTLEY	87/02/30	20:25										
ACT	MESSAGES	BENTLEY	87/02/30	21:37										
ACT	PLI	BENTLEY	87/02/30	21:37										
DEAC	MESSAGES	BENTLEY	87/03/27	11:12										
DEAC	PLI	BENTLEY	87/03/27	11:52										
UPDATE	PLI	BENTLEY	87/03/22	11:33		ADM IN1	ACTGROUP	PROMOTER	DISTTAB	COLLECT2	Y	L DEVELOP	PNLXT	C
UPDATE	MESSAGES	BENTLEY	87/03/24	11:37		ADM IN1	ACTGROUP	AUTHROM	DISTTAB	COLLECT2	Y	L DEVELOP	B4EXIT1	C
													AFTRXT1	P
MEMBER	PLI	BENTLEY	87/03/27	11:40										
ACT	PLI	BENTLEY	87/03/27	11:52										
MEMBER	MESSAGES	BENTLEY	87/03/29	20:25										
ACT	MESSAGES	BENTLEY	87/03/29	21:32										

ADM IN ISTRATOR ACTIV ITY LOG OF PROJECT : ISFFPROJ PAGE 2

USER SET, DISTRIBUTION TABLES AND DATA SET FULL ACTIONS

ACTION	USER ID	DATE	TIME	USER SET	DISTRIB	DS FULL DS FULL		DATA SET	LOG GROUP	LIBRARY GROUP	LIBRARY TYPE
						ACTION	NAME				
CREATE	BENTLEY	87/01/05	12:53	ADM IN1							
UPDATE	NADEL	87/01/05	13:04	ADM IN1							
CREATE	NADEL	87/01/15	06:01		DISTTAB1						
DELETE	BENTLEY	87/01/17	12:53	ADM IN2							
CREATE	NADEL	87/03/15	06:01		DISTTAB1						
UPDATE	NADEL	87/03/23	09:12			EXIT	DFULL1	C LIBRARY		STAGE	PLI
UPDATE	NADEL	87/03/23	10:14			FAIL		MEMBER LOG	LOGGRP	BASE	PLI
UPDATE	NADEL	87/03/23	10:19			FAIL		ADM IN ISTRATOR LOG	ADM IN		
UPDATE	NADEL	87/03/26	19:130			NOTIFY		CONTROL FILE			
CREATE	BENTLEY	87/04/23	09:14			EXIT	DFULL1	C LIBRARY		BASE	PLI
CREATE	BENTLEY	87/04/23	09:14			FAIL		MEMBER LOG	LOGGRP	ACTLOG	
CREATE	BENTLEY	87/04/23	09:14			NOTIFY		CONTROL FILE			

Figure 28. Administrator Activity Log of Project

The headings for the group related section are listed in Table 2 on page 50.

Option 5

Table 2. Administrator Activity Log Project Headings

HEADINGS	CONTENTS
ACTION	<p>Action taken:</p> <p>CREATE - Create controls for user set or distribution table.</p> <p>DELETE - Delete controls for user set or distribution table.</p> <p>UPDATE - Update controls for user set or distribution table.</p> <p>MEMBER - Update member controls. This record appears only in a top group.</p> <p>INIT - The INITIALIZE utility was run against this hierarchy. This record appears only in a top group.</p> <p>CLEAR - The CLEAR utility was run against this hierarchy. This record appears only in a top group.</p> <p>ACT - Activate controls for the top group.</p> <p>DEAC - Deactivate controls for the top group.</p> <p>EMPTY - The activity log was emptied. If this record is in the control file, it will be printed for each group listed.</p>
TYPE	The library type to which a change was made.
USERID	User who initiated the changes.
DATE	Date when the action occurred. The date is in the national language format for your country.
TIME	Time in hh:mm 24-hour format, when the action occurred.
TARGET GROUP	Target group for promotion.
ADMIN ID	Project administrator user ID or user set.
ACTIVITY GROUP	Library name where member controls activity log is stored.
AUTH PROMOTER	User ID or user set containing users allowed to promote into library from lower level.
DISTRIB TABLE	Distribution table associated with this group and type.
COLLECT NAME	Collection name from the Create Controls Panel.
P	Pack indicator (Y - Yes, N - No)
U	Undefined members allowed (Y - Yes, N - No)
A	Access control (P - Private, L - Limited, O - Open)
ENTRY ID	Authorized entry ID
PROMOTE EXITS	<p>Name of exit routines for performing additional operations before and after promotion into this group.</p> <p>BEFORE - Exit routine performed before promotion.</p> <p>T - Type (C or P) of user exit routine before promotion. C is command, and P is program.</p> <p>AFTER - Exit routine performed after promotion.</p> <p>T - Type (C or P) of user exit routine after promotion. C is command, and P is program.</p>
I	The requested action did not complete. If the action completes successfully, this field is blank.

The headings for the user set, distribution table, and data set full section are listed in Table 3.

Table 3. Administrator Activity Log Project Headings

HEADINGS	CONTENTS
ACTION	Action taken: CREATE - Create user set or distribution table. DELETE - Delete user set or distribution table. UPDATE - Update user set or distribution table.
USERID	User who initiated the changes.
DATE	Date when the action occurred. The date is in the national language format for your country.
TIME	Time in hh:mm 24-hour format, when the action occurred.
USER SET	The user set that was created, changed, or deleted.
DIST TAB	The distribution table that was created, changed, or deleted.
DS FULL ACTION	Action to be taken when the data set is full.
DS FULL NAME	The name of the exit routine to be taken when the data set is full.
T	Type of exit (C for command, P for program).
DATA SET TYPE	Type of data set for which action was defined: LIBRARY - Controlled library. CONTROL FILE - The control file. ADMINISTRATOR LOG - Administrator activity log data set. MEMBER LOG - Member activity log data set.
LOG GROUP	Group name of the activity log for which Data Set Full actions were updated. For administrator logs, this field is always ADMIN.
LIBRARY GROUP	Group name of the controlled library with which these actions are associated. If a data set full condition occurs when processing the library, the updated Data Set Full actions are used.
LIBRARY TYPE	The library type of the controlled library with which these actions are associated.

Control Status

Selecting option 2, CONTROL STATUS, on the Review Activity and Controls panel displays the Control Status Review panel (Figure 29).

Option 5

```
----- CONTROL STATUS REVIEW -----
OPTION ==> 2

  1 - Browse control status
  2 - Print control status
  3 - Write control status to a data set

ISPF LIBRARY:

PROJECT   ==> ISPFEXAM
TOP GROUP ==> PROD      (* for all top groups)
TYPE      ==> *         (* for all types)
MEMBER    ==> *         (Name, truncated name, or * allowed)

OUTPUT DATA SET:          (Option 3 only)

DATA SET NAME ==>
```

Figure 29. Control Status Review

The following options are available:

- | | |
|-----------------|---|
| Option 1 | Displays the library control status for the requested members. This display is scrollable. |
| Option 2 | Sends the library control data to the ISPF list data set. You can then obtain a printout of the library control data. |
| Option 3 | Writes the library control data to the data set you specify. Enter the data set name where indicated on the panel. The data set will be allocated if it does not already exist. You can then do what you want with the library control data, such as formatting it in different ways for different reports. See Appendix A for the record format. |

Enter the member whose library control status you want to review. If the **Member** field is left blank, no member controls are shown. With the use of the asterisk (*) for top group, type, and member, you can review the library control status for every member in all top groups of the controlled library.

If you type an asterisk (*) in the **Top Group** field, user sets and distribution tables are included at the bottom of the listing or in the output data set.

The **Data Set Name** field is completed using the ISPF format, where a period is used to separate the project-name, group-name, and type values.

If you want to use the data in the control status reports for special reports, you must know the record layout. The record layout is given in "Appendix A. Special Reports" on page 81. The ISPF library to which you write is the ISPF library whose name you entered on the Control Status Review panel.

An example of a printout of a control status listing for project ISPFEXAM is shown in Figure 30 on page 53. The Library Control Status Review provides information

Option 5

Table 4. Library Control Status Review Fields and User Input

	FIELDS	CONTENTS
PROJECT INFORMATION	Project	Project name.
	Administrator	Project administrator ID.
	Update in Progress	Yes or no.
	Date	Date of activity in national language format.
	Time	Time of activity in hh:mm 24-hour format.
	Control File Full Action	Action taken if the control file is full: FAIL, NOTIFY, or EXIT.
	Control File Exit Name	Name of exit to be executed if EXIT was specified for CONTROL FILE FULL ACTION.
	Control File Exit Type	Command or program.
	Administrator Log Full Action	Action taken if administrator activity log is full: FAIL, NOTIFY, or EXIT.
	Admin. Log Exit Name	Name of exit routine executed if EXIT was specified for ADMINISTRATOR LOG FULL ACTION.
	Admin. Log Exit Type	Command or program.

Table 4. Library Control Status Review Fields and User Input (continued)

	FIELDS	CONTENTS
GROUP INFORMATION	GROUP	Group name.
	Target	Target group name.
	Level	Identifier for the level of a group within its hierarchy.
	Type	Type name.
	Promoter	Promoter ID.
	Pack	Packed data indicator (yes or no).
	Log Group	Activity log group name.
	Dist Tab	Distribution table name.
	Entry ID	Identification of who can promote an undefined member into a controlled library.
	Access ID Control	Type of access allowed (limited, open, or private): Limited - Only those in the entry ID can access the member to update it. Open - Anyone can access the member to update it. Private - Only the user who promotes the member into the controlled library can access the member to update it.
	Promotion Exit Names	Name of exit routines for performing additional operations before the member is promoted and after the member is promoted to a library group.
	Promotion Exit Types	Type of exit routines (command or program).
	Collect Name	Name given to the collection by the administrator.
	Data Set Full Action	Action to take if one of the LMF data sets is full: FAIL, NOTIFY, or EXIT.
Data Set Type	An LMF control file, administrator activity log, library activity log, or an LMF controlled library.	
Action	FAIL, NOTIFY, or EXIT.	
Exit - T	Name and type of exit routine if EXIT is specified in the ACTION column.	

Option 5

Table 4. Library Control Status Review Fields and User Input (continued)

	FIELDS	CONTENTS
MEMBER INFORMATION	Member	Member name.
	Ver	Version number.
	Mod	Modification level.
	Group	Group name.
	Access ID	Access ID.
	Status	<p>Indication of member availability for update:</p> <p>Available - Available for update.</p> <p>Predefined - Member has been predefined and not yet promoted into a controlled library.</p> <p>User ID - Member has been edit-locked and taken out for update by this user ID. No other user can promote this member until the user who edit-locked it either promotes the member back into the entry-level library or frees it.</p>

If you want to use the data in the control status for special reports, you have to know the record layout. The data set name is the name you specified in the Control Status Listing panel. The record layout is specified in "Appendix A. Special Reports" on page 81.

Member Status

When you select option 3 on the Review Activity and Controls panel, the Member Status Review panel appears (Figure 31).


```

----- MEMBER STATUS REVIEW -----
OPTION ==> 2

  1 - Browse member status
  2 - Print member status
  3 - Write member status to a data set

ISPF LIBRARY:

PROJECT   ==> ISPFEXAM
TOP GROUP ==> PROD      (* for all top groups)
TYPE      ==> *         (* for all types)
MEMBER    ==> *         (Name, truncated name, or * allowed)

OUTPUT DATA SET:      (Option 3 only)

DATA SET NAME ==>

```

Figure 31. Member Status Review

Enter the member whose status you want to review. By entering an asterisk (*) in the **Top Group**, **Type**, and **Member** fields, you can review the status for every member in all top-level groups of the controlled library.

- | | |
|-----------------|--|
| Option 1 | Displays the status for the requested members. This display is scrollable. |
| Option 2 | Sends the member status data to the ISPF list data set. You can then obtain a printout containing the member status data. |
| Option 3 | Writes the member status data to the data set specified on the panel. The data set will be allocated if it does not already exist. You can then do what you want with the member status data, such as formatting it in different ways for different reports. See Appendix A for the record format. |

Figure 32 is an example of a printout of a member status listing for project ISPFEXAM.

Option 5

```

LIBRARY MEMBER STATUS REVIEW                                PAGE: 1
PROJECT: ISPFEXAM    UPDATE IN PROGRESS: NO    DATE: 87/04/14    TIME: 09:40
MEMBERS FOR HIERARCHY: ISPFEXAM.PROD.MSGS
MEMBER  VER  MOD  GROUP  ACCESS ID  STATUS
-----
CM SG 1  01  00  PROD   JONES     *LOCKED*
CM SG 1  01  01  DEPT1  JONES     JONES
EM SG 1  01  00  PROD   GONZALEZ  AVA ILABLE
EM SG 2  01  00  PROD   W ILLIAM S  PREDEF INED
SM SG 1  01  00  PROD   M ILLER    PREDEF INED
SM SG 2  01  00  PROD   WONG       PREDEF INED

MEMBERS FOR HIERARCHY: ISPFEXAM.PROD.PLI
MEMBER  VER  MOD  GROUP  ACCESS ID  STATUS
-----
AAA     01  00  PROD   JONES     *LOCKED*
AAA     01  00  SYSTST JONES     AVA ILABLE
BBB     01  00  PROD   WONG      AVA ILABLE
CCC     01  00  DEPT1  W ILLIAM S  AVA ILABLE
CCC     01  00  PROD   W ILLIAM S  *LOCKED*
DDD     01  00  PROD   M ILLER    *LOCKED*
DDD     01  01  SYSTST M ILLER    *LOCKED*
DDD     01  01  DEPT2  M ILLER    M ILLER

***** END OF STATUS LISTING *****

```

Figure 32. Library Member Status Review Listing

The library member status review headings are shown in Table 5

Table 5. Library Member Status Review Fields and User Input

	FIELDS	CONTENTS
PROJECT INFORMATION	Project	Project name.
	Update in Progress	Yes or no.
	Date	Current date in the national language format of your country.
	Time	Current time in hh:mm 24-hour format.
Member Information	MEMBER	Member name.
	Ver	Version number.
	Mod	Modification level.
	Group	Group name.
	Access ID	Access ID.
	Status	Indication of member availability for update: Available - Available for update. Predefined - Member has been predefined and not yet promoted into a controlled library. User ID - Member has been edit-locked and taken out for update by this user ID. *LOCKED* - Member can be accessed for update only in a lower level of the library hierarchy.

If you want to use the data in the member status for special reports, you must know the record layout. The data set name is the name you entered on the Control Status Review panel. The record layout is described in Appendix A.

Note: The LMREVIEW service can be used to build a data set of records containing information about the current LMF controls. Refer to *ISPF Services Guide* for more information on LMREVIEW.

ACTIVITY LOG (Option 6)

Option 6 allows you to browse the activity for one or more types in a member activity log, browse an administrator activity log, delete entries that reference one or more types from a member activity log, and empty an administrator activity log. When you select option 6 on the Library Management Utilities panel, the Activity Log panel appears (Figure 33).

Option 1 allows you to browse the activity of a single type in a member activity

```
ISRLALGP ----- ACTIVITY LOG -----
OPTION ==>

  1 - Browse a type in a member activity log.
  2 - Delete a type from a member activity log.
  3 - Browse an administrator activity log.
  4 - Empty an administrator activity log.

ACTIVITY log name:
PROJECT ==>
GROUP   ==>                (Required for option 1 and 2)

TYPE    ==>                (Blank for type selection list)
```

Figure 33. Activity Log

log. The information displayed in the log is the same as in ISPF 8.5.1. The log is sorted chronologically.

Option 2 allows a valid project administrator to delete a type from a member activity log.

Note: Before deleting a type from a member activity log, you should deactivate all libraries that reference this member activity log. This is to avoid the situation of a promote activity being logged to the activity log while you are deleting a type from the log.

In options 1 and 2, the group name for the member activity log data set must be specified in the **Group** field. If the **Type** field is left blank, a type selection list appears. This panel displays a list of types logged in a member activity log. It also shows the number of entries for each type, and the range of dates these entries refer to. From this list you can select a type to be browsed or deleted by typing an **S** in the left column next to the type desired. If this is a delete, the Member Activity Log - Confirm panel appears.

Option 6

If you select option 3, the administrator activity log for the project appears.

Option 4 allows a valid project administrator to empty an administrator activity log. If you select option 4, the Administrator Activity Log - Confirm panel appears. If the user is not a valid project administrator, the Confirm panel does not appear.

DS FULL ACTION (Option 7)

Option 7 allows you to specify what action to take if the control file, the activity logs, or any controlled libraries run out of space. There are three actions you can specify for a full data set:

FAIL

LMF indicates to the user that the requested function has failed.

NOTIFY

LMF sends a message to the library administrator indicating which data set has run out of space, and indicates to the user that the requested function has failed. If a control file runs out of space, the library administrator of the project associated with that control file receives the message. If the library administrator is a user set, all members of the user set receive the message.

This action is the default if no action is specified.

EXIT

LMF calls an installation-supplied user exit routine. LMF passes to the user exit routine ISPF variables containing:

- The name of the data set that is out of space
- The system ABEND code caused by the data set full condition. If the directory of a partitioned data set is full, LMF passes the letters "DIR" in place of an ABEND code.

If the EXIT action is specified, an EXIT routine name and type must be specified. The type is either CMD (command) or PGM (program).

Notes:

1. To ensure that the integrity of the control file and other files is not compromised, you should test exits before they are used by the LMF address space.
2. Exits that run on the LMF address space must not use the LMACT, LMDEACT, or LMPROM service, nor should they use EDIT, LMMFIND, or LMCOPY with the LOCK option.

When you select option 7 on the Library Management Utilities panel, the Data Set Full Actions panel is displayed (Figure 34).

```

ISRLDFU1 ----- DATA SET FULL ACTIONS FOR LMF DATA SETS -----
OPTION ==>

 1 ISPF LIBRARIES - Change data set full action for ISPF libraries.
 2 ACTIVITY LOGS  - Change data set full action for member activity logs.
 3 ADMINISTRATOR  - Change data set full action for library
   ACTIVITY LOGS  administrator activity logs.
 4 CONTROL FILE   - Change data set full action for the control file.

```

Figure 34. Data Set Full Actions for LMF Data Sets

Option 1 on the Data Set Full Actions panel allows the library administrator to change the action to be taken when an ISPF data set runs out of space. When option 1 is selected the Data Set Full Action for ISPF Libraries panel is displayed (Figure 35).

```

ISRLDFU2 ----- DATA SET FULL ACTION FOR ISPF LIBRARIES -----
COMMAND ==>

ISPF LIBRARY:
  PROJECT ==> PROJECT1
  GROUP   ==> *           (* for all groups)
  TYPE    ==> PLI         (* for all types)

  ACTION  ==> EXIT       (NOTIFY, EXIT, or FAIL)

IF ACTION IS EXIT:
  EXIT NAME ==>          (Name of the exit)
  EXIT TYPE ==>          (CMD or PGM)

Instructions:
  Press ENTER to change the action to be taken for the specified data sets.
  Enter END command to cancel the data set full action request.

```

Figure 35. Data Set Full Action for ISPF Libraries

Option 2 on the Data Set Full Actions panel allows the library administrator to change the action to be taken when a member activity log runs out of space. When option 2 is selected, the Data Set Full Action for Member Activity Logs panel is displayed (Figure 36).

Option 7

```
ISRLDFU3 ----- DATA SET FULL ACTION FOR ACTIVITY LOGS -----  
COMMAND ==>  
  
ACTIVITY LOG GROUP NAME ==> TOP1  
  
    ACTION ==> NOTIFY      (NOTIFY, EXIT, or FAIL)  
  
IF ACTION IS EXIT:  
EXIT NAME ==>              (Name of the exit)  
EXIT TYPE ==>              (CMD or PGM)  
  
ISPF LIBRARIES USING THE ABOVE ACTIVITY LOG:  
  
    PROJECT ==> PROJECT1  
    TOP GROUP ==> TOP1      (* for all groups that use the activity log)  
    TYPE ==> *              (* for all types that use the activity log)  
  
Instructions:  
Press ENTER to change the action to be taken for the specified data sets.  
Enter END command to cancel the data set full action request.
```

Figure 36. Data Set Full Action for Activity Logs

Option 3 on the Data Set Full Actions panel allows the library administrator to change the action to be taken when the administrator activity log runs out of space. When option 3 is selected, the Data Set Full Action for Administrator Activity Logs panel is displayed (Figure 37).

```
ISRLDFU4 -----DATA SET FULL ACTION FOR ADMINISTRATOR ACTIVITY LOGS -----  
COMMAND ==>  
  
CONTROLLED PROJECT USING THE ADMINISTRATOR ACTIVITY LOG:  
    PROJECT ==> PROJECT1  
  
    ACTION ==> NOTIFY      (NOTIFY, EXIT, or FAIL)  
  
IF ACTION IS EXIT:  
EXIT NAME ==>              (Name of the exit)  
EXIT TYPE ==>              (CMD or PGM)  
  
Instructions:  
Press ENTER to change the action to be taken for the specified data sets.  
Enter END command to cancel the data set full action request.
```

Figure 37. Data Set Full Action for Administrator Activity Logs

Option 4 on the Data Set Full Actions panel allows the library administrator to change the action to be taken when an LMF control file for a project runs out of space. When option 4 is selected the Data Set Full Action for Control Files panel is displayed (Figure 38).

```

ISRLDFU5 ----- DATA SET FULL ACTION FOR CONTROL FILES -----
COMMAND ==>

CONTROL FILE   : ISPFLMF.CONTROL.FILE
LMF STARTED TASK: PDFLMF

PROJECT ==> PROJECT1

ACTION ==> FAIL           (NOTIFY, EXIT, or FAIL)

IF ACTION IS EXIT:
EXIT NAME ==>             (Name of the exit)
EXIT TYPE ==>            (CMD or PGM)

Instructions:
Press ENTER to change the action to be taken for the specified data sets.
Enter END command to cancel the data set full action request.

```

Figure 38. Data Set Full Action for Control Files

Writing a Data Set Full User Exit

LMF calls the Data Set Full User Exit. If you specify the exit action, you must also specify the exit name and exit type. The exit type must be either CMD or PGM.

When the user exit routine ends, LMF checks the return code from the user exit routine. If the return code is 0, LMF again attempts the task it was trying to perform when the data set ran out of space. If the data set runs out of space again, LMF takes the NOTIFY action.

Figure 39 shows an example of a data set full exit routine for a partitioned LMF data set.

```

PROC 0
/*****/
/*                                     */
/* This CLIST is a data set full exit for a partitioned LMF data set */
/*                                     */
/* This example CLIST will allocate the full data set in shared mode */
/* and call the system utility IEBCOPY to compress the data set.    */
/*                                     */
/*****/
ISPEXEC CONTROL ERRORS RETURN

```

Figure 39. Sample Data Set Full Exit Routine (Part 1 of 2)

Option 7

```
ISPEXEC VGET ( +
              ZDSFDSN,          /* Name of full data set      */ +
              ZDSFMCOD,        /* Abend code (E37, B37, etc) */ +
              ) SHARED         /* If the directory is full,  */
                              /* variable ZDSFMCOD contains */
                              /* the string 'DIR'.          */
ALLOC F(SYSIN) UNIT(VIO) SPACE(1,0) /* Create SYSIN file for    */ +
      BLKSIZE(80) LRECL(80)        /* Control card              */ +
      RECFM(F B) DSORG(PS) +
      NEW DELETE REUSE
IF &MAXCC=0 THEN                 /* If allocation was OK     */ +
DO
  ISPEXEC LMINIT DATAID(CNTLCARD) /* Allocate file for services */ +
      DDNAME(SYSIN) ENQ(EXCLU)
  IF &LASTCC=0 THEN             /* If services allocation was */ +
DO                               /* OK, then write control card */
  SET CARD=&STR( COPY INDD=CMPRDD,OUTDD=CMPRDD,LIST=NO)
  ISPEXEC LMOOPEN DATAID(&CNTLCARD) OPTION(OUTPUT)
  ISPEXEC LMPUT DATAID(&CNTLCARD) DATALOC(CARD) DATALEN(80) +
      MODE(INVAR)
  ISPEXEC LMCLOSE DATAID(&CNTLCARD)
  ISPEXEC LMFREE DATAID(&CNTLCARD)
  /*****
  /* Allocate files needed by utility IEBCOPY */
  /*****
  ALLOC F(CMPRDD) DA('&ZDSFDSN') SHR REUSE
  ALLOC F(SYSUT1) UNIT(VIO) SPACE(1,1) CYL NEW DELETE REUSE
  ALLOC F(SYSUT2) UNIT(VIO) SPACE(1,1) CYL NEW DELETE REUSE
  ALLOC F(SYSUT3) UNIT(VIO) SPACE(1,1) CYL NEW DELETE REUSE
  ALLOC F(SYSUT4) UNIT(VIO) SPACE(1,1) CYL NEW DELETE REUSE
  ALLOC F(SYSPRINT) DUMMY REUSE
  /*****
  /* If everything is set up correctly, compress the */
  /* data set. */
  /*****
  IF &MAXCC=0 THEN +
      ISPEXEC SELECT PGM(IEBCOPY) /* Invoke system utility */
  END
  ELSE
      /* Initial allocate failed */ +
      ISPEXEC LOG MSG(ISRZ002) /* Log message from LMINIT */
  END
IF &MAXCC=0 THEN /* If compress was completed */ +
  SET EXITRC=0 /* Tell LMF to continue */
ELSE /* If compress failed */ +
  SET EXITRC=20 /* Tell LMF to stop by returning */
              /* a non-zero return code */
FREE FILE(CMPRDD,SYSIN,SYSUT1,SYSUT2,SYSUT3,SYSUT4,SYSPRINT)
EXIT CODE(&EXITRC)
```

Figure 39. Sample Data Set Full Exit Routine (Part 2 of 2)

Maintaining the Library Structure

Library maintenance consists of keeping the libraries and the library controls current by adding or deleting libraries or controls when necessary.

For help in maintaining the libraries, you can obtain listings of the activity logs, control status, and member status. You can browse through displays of these formatted listings, get printouts of the listings, or both browse and print the

Option 7

unformatted data. The listings can be obtained by selecting option 5 on the Library Management Utilities panel or by using the LMREVIEW services and writing your own report generator.

The panels used to create libraries and library controls are also used to update the libraries and controls. Some controls, especially tables such as the distribution table and user set, may be changed frequently. However, remember that you must deactivate the controls when performing most maintenance functions. User sets and member controls are an exception; they can be updated while active. However, after completing the maintenance, be sure to activate all deactivated controls again so that the libraries can be used.

Library controls can be deleted by selecting option 2 on the Specify Library Controls panel. However, to delete library controls, the library cannot contain any promoted members. Also, the library cannot be the target of a lower-level library.

A user set can be deleted and a distribution table can be deleted by choosing option 2 of the Specify User Set panel and option 2 of the Specify Distribution Table panel, respectively. However, the library controls that reference the user set or distribution table are not automatically deleted. You must update those controls yourself.

Option 7

Chapter 3. LMF for the Programmer

This chapter tells you how to promote members into a controlled library. Such information includes accessing a controlled library member, using the move/copy option, promoting within the controlled library, and changing member version numbers. This chapter also tells you how to use the LMF promote override.

Promoting into the Controlled Library

You promote a member by using the Move/Copy Utility panel, ISPF option 3.3. You cannot copy or move a member into a controlled library. You can only copy it from a controlled library to a private library, promote it into an entry-level library, or promote it within a controlled library hierarchy. There are two options available with ISPF 3.3 for promoting a member: P for Promote, and PP for Promote and Print.

When promoting a member into a controlled library from any private library, the utility does not know which entry-level library (that is, target library) you want the member moved into. You must enter the name of the target entry-level library because a member can be promoted from your private library into any entry-level library, provided you have authority to promote.

Note: If you are a project administrator, you can promote a member when the owner of the part is unavailable. See “Using the LMF Promote Override” on page 80 for more information.

The Move/Copy utility deletes the promoted member from your private library only if the promotion is successful. In the event of a system failure during the promotion, the member is not lost; it remains in your private library, and you can promote the member again, if necessary. Once the member is successfully promoted, only the library administrator can delete it from the controlled library.

Note: You can also use the LMPROM service to promote a member or a list of members to a controlled library. LMPROM with the FREE option makes a member available for updating by all authorized owners. Refer to the *ISPF User's Guide* for more information on LMPROM.

The Move/Copy Utility panel shown in Figure 40 on page 68 illustrates the operation of promoting a member from a private library to an entry-level library. The example assumes that you accessed member DDD of the middle-level library PLI, updated member DDD, and you now want to promote it into the entry-level library. (If you were promoting a new member, the panel would look the same.)

```

Menu  RefList  Utilities  Help
-----
ISRUMC1                      Move/Copy Utility                      More:  +
C  Copy data set or member(s)      CP Copy and print
M  Move data set or member(s)      MP Move and print
L  Copy and LMF lock member(s)     LP Copy, LMF lock, and print
P  LMF Promote data set or member(s)  PP LMF Promote and print

Specify "From" Data Set below, then press Enter key

From ISPF Library:
Project . . . ISPFDEMO      (--- Options C, CP, L, and LP only ----)
Group . . . MYLIB . . . _____ . . . _____ . . . _____
Type . . . PLI
Member . . . _____      (Blank or pattern for member list,
                             "*" for all members)

From Other Partitioned or Sequential Data Set:
Data Set Name . . . _____
Volume Serial . . . _____ (If not cataloged)
Option ==>> _____

```

Figure 40. Move/Copy Utility Panel

Had you left the **Member** field blank, a member selection list would have been displayed.

The requested promotion is from a private library (FR3), so the promote utility does not know the target library. The utility requests identification of the target library by displaying the following panel (Figure 41).

```

Promote --- From (ISPFEXAM.FR3.PLI(DDD))-----
Specify "Target" Controlled Library Below:

To ISPF Library:
Project . . ISPFEXAM
Group . . . DEPT1__
Type . . . PLI____
Member . . . _____

Action . . . . MOVE      (MOVE to copy and delete source
                        FREE to only delete source)

Reason Code . . . _____

Pack Data . . . . ____  (YES, NO, or blank to default to library controls)

Command ==>>

```

Figure 41. Promote Panel

The following fields have special meaning for the promotion process:

ACTION

This field indicates whether a normal promotion of the member is to occur,

or the member is to be made available (freed) for update. Enter MOVE for a new member. For an old member, which is edit-locked, you can enter either MOVE or FREE. Enter FREE if you do not want to promote the member but want to make the member available to others. The possible actions are:

MOVE

The member is promoted to the target library and deleted from the private library. The member becomes available for update. If the member is edit-locked by your user ID, the member is unlocked. However, if the member was edit-locked from a top-level library it is then *LOCKED* at the top level.

Note: For more information on edit-locked and *LOCKED* see "Accessing a Controlled Library Member".

FREE The member is not moved to the target library, but is deleted from the private library. The member is again available. The edit-lock is removed.

REASON CODE

The library administrator determines the contents of this 26-character field. It can be used for tracking, testing in a user exit routine, or another purpose. It is written to the activity log.

PACK DATA

This field overrides the library control. A blank field defaults to the packed data library control set by the library administrator. If the data is packed (or unpacked) when promoted into an entry-level library, it remains packed (or unpacked) throughout each subsequent promotion.

The "data compression" algorithm that is used by Pack Data is unique to ISPF. Attempts to access or execute the data outside of ISPF may cause unpredictable results. Note that many programs, such as some compilers, cannot handle packed data.

For more information about ISPF's data compression routine, refer to the description of the ISPF EDIT command, especially the PACK option explanation, in *ISPF Edit and Edit Macros*

A message on the Move/Copy Utility panel indicates whether the promotion is successful. In the example, you receive this message:

```
MEMBER DDD PROMOTED
```

If the promotion is not successful, you receive the message:

```
PROMOTE FAILED
```

unless the message is set by the before user exit routine.

Enter the HELP command for additional information on the reason for a failure.

Accessing a Controlled Library Member

The controlled libraries are ISPF libraries that can be used with the ISPF tools. There is one important difference, however, in using controlled libraries. In order to edit or update a member of a controlled library, you must bring that member into an uncontrolled library to work on it. Then, when you have completed editing that member, you return it to the controlled library by means of the promotion process.

You must have the same project and type for the controlled library and your private (uncontrolled) library to access a member for updating.

When a member is accessed for editing, that member becomes locked. Members are locked in one of two ways: edit-locked or *LOCKED*. When you access a member in a controlled library, that member is edit-locked under your user ID in that library. Edit-locking a member makes it unavailable to anyone else until you either update the member and promote it into an entry-level library, or free the member.

If a member is in two or more levels of a hierarchy with the same name in all levels, it is *LOCKED* in each of the higher levels and available for updating only from the lowest level of the hierarchy in which it appears. This ensures that you always update the most recent copy of a member.

Once *LOCKED*, the member at a certain level remains *LOCKED* until either the member is again promoted through the library hierarchy to that level or the library administrator alters it.

For example, if you have a member named MEMBERA that exists only in the top-level library (PROD), MEMBERA is edit-locked in the PROD library when you access it for editing. When you promote MEMBERA to DEPT1, the edit-lock in PROD is replaced by *LOCKED*. When you finally promote MEMBERA to PROD, the *LOCKED* set in the PROD library is replaced with the MEMBERA's lock status at the time it was promoted from DEPT1. MEMBERA can now be accessed for updating from the PROD library, providing that it is not locked.

You can access a library member from a controlled library for updating, by any of the following methods:

- Using the Edit Entry Panel (ISPF option 2) with library concatenation and LMF Lock 3 (Yes)
- Using the L or LP option from the Move/Copy Utility panel (ISPF option 3.3) to copy the member to a private library and then edit the member
- Using the LMCOPY utility services with the lock option to copy the member to a private library and then edit the member
- Using the LMMFIND library access services with the lock option, then copy the member to a private library and edit the member.
- Using the EDIT services with LMF LOCK = YES.

For more information on LMCOPY, LMMFIND, and EDIT services, refer to the *ISPF Services Guide* .

Because of *LOCKED* locking, be careful of the concatenation sequence you use for your libraries. When searching for a requested member, LMF searches through the libraries in the order defined by your concatenation sequence. As soon as LMF finds a *LOCKED* member, LMF tells you that the member is unavailable for update and stops its search. Even though the member is available for updating from a lower-level library, if you have concatenated the lower-level library after the higher-level library containing the *LOCKED* member, LMF does not find that member. In this case, you would have to know that the member is available in the lower-level library, and would have to reaccess your libraries in the proper concatenation sequence to successfully access the member.

Using the Edit Entry Panel

To use the Edit Entry Panel with the library concatenation technique, concatenate the controlled library hierarchy to your private library. The most recent members are then available for editing in your private library.

Select ISPF option 2 to display the Edit Entry Panel, shown in Figure 42.

```
Menu RefList RefMode Utilities Help
-----
ISREDM01                      Edit Entry Panel                      More:  -
Project . . . ISPFEXAM
Group . . . . FR3 . . . _____ . . . _____ . . . _____
Type . . . . . PLI
Member . . . _____ (Blank or pattern for member selection list)

Other Partitioned or Sequential Data Set:
Data Set Name . . . _____
Volume Serial . . . _____ (If not cataloged)

Initial Macro . . . . _____ Enter "/" to select option
Profile Name . . . . _____ / Confirm Cancel/Move/Replace
Format Name . . . . _____ _ Mixed Mode

Data Set Password . . . (If password protected) LMF Lock
3 1. Never
2. No
3. Yes

Command ==> _____
```

Figure 42. Edit Entry Panel

In the example, the controlled libraries are concatenated to the private library in group FR3. The libraries are concatenated in a bottom-to-top sequence: DEPT1 is concatenated to FR3, SYSTST to DEPT1, and PROD to SYSTST. PROD is the top-level, SYSTST the middle-level, and DEPT1 a bottom-level, or entry-level, group of libraries structured in Chapter 1.

You must select and also save the member to actually get that member into your private library. If you are not authorized to access the member for update, the access attempt fails, and you receive a message indicating the failure. If the message indicates the member is locked, either the member is in fact locked or you have not selected the most recent copy. The latter case can occur when the concatenation sequence on the Edit Entry Panel for the controlled library does not correspond to the library hierarchy sequence.

If the member is locked, you can press Enter again and proceed with editing and saving the member in your private library. However, because the member is not edit-locked under your user ID, you cannot promote your copy of the member back into the controlled library.

If you end an Edit session without saving the data, the member is no longer locked under your ID. If you want the automatic lock feature enabled, you must specify 3 (Yes) in the **LMF Lock** field on the Edit Entry Panel.

As with any ISPF Edit operation, there are two ways of selecting the member you want to update.

The first way you can select the member is by entering the member name on the Edit Entry Panel. For the example, you enter:

```
Member . . . BBB
```

The lowest-level occurrence of member BBB is displayed.

The second way is to leave the **Member** field blank, as in the preceding sample panel. This results in the display of the member list (Figure 43).

```

Menu  Functions  Utilities  Help
-----
EDIT  ISPFEXAM.FR3.PLI                               Row 00001 of 00016
Name      VV MM  Created      Changed      Size  Init  Mod  ID
AAA          3 01.00 83/07/26 83/07/26 15:13   2    2    0  FR2
S BBB          4 01.00 83/07/26 83/07/26 15:15   4    4    0  MA2
CCC          2 01.00 83/07/26 83/07/26 15:16   4    4    0  MA1
DDD          1 01.00 83/07/27 83/07/27 08:07   2    2    0  FR3
**End**

Command ====> _____ Scroll ====> PAGE

```

Figure 43. Edit Member List Panel

The date is displayed in the national format of the language being used.

This list shows you all the members that now reside in your private library or in libraries concatenated to your private library. However, the list tells you only the library in which the first occurrence of the member is found, in the column labeled LIB. In the example, the column contains the number (1 to 4) that identifies the library where a member can be found. These numbers correspond to the four group entry fields on the Edit Entry Panel. The meanings of the numbers for the example are:

Number	First Library in Which Member is Found
1	ISPFEXAM.FR3.PLI
2	ISPFEXAM.DEPT1.PLI
3	ISPFEXAM.SYSTST.PLI
4	ISPFEXAM.PROD.PLI

When you select the member you want displayed, that member is locked in the control file with your ID. In the example, member BBB was selected by entering an S next to BBB. When the member is updated, it is placed in your private library. You can then return it to the controlled library by promoting it.

Either way, you get the member from the lowest-level library in which it is found.

Note that a member can be in two or more levels of the library hierarchy. However, each level of the hierarchy has a different modification of the member. In the example, member DDD was promoted up to a middle-level library, in group SYSTST. Later it was accessed, updated, and promoted back into the entry-level library, in group DEPT1, as modification 1. Now you have accessed member DDD for updating and have not yet promoted it back into an entry-level library. The member list display shows an entry for the member in the private library (FR3) because this was the first occurrence of member DDD found.

You have not yet seen, though, that member DDD is in the middle-level library, and that it has a different modification from the member in the private library. To verify that member DDD is in library PLI of group SYSTST, you can specify Browse Mode on the View Entry Panel (ISPF option 1).

For the example, the View Entry Panel is shown in Figure 44:

```

Menu  RefList  RefMode  Utilities  Help
-----
                                View Entry Panel

ISPF Library:
Project . . . ISPFEXAM
Group . . . SYSTST . . . _____ . . . _____ . . . _____
Type . . . PLI
Member . . . DDD_____ (Blank or pattern for member selection list)

Other Partitioned or Sequential Data Set:
Data Set Name . . . _____
Volume Serial . . . _____ (If not cataloged)

Initial Macro . . . _____ Enter "/" to select option
Profile Name . . . _____ / Browse Mode
Format Name . . . _____ / Confirm Cancel/Move/Replace
                                   - Mixed Mode

Data Set Password . . (If password protected)

Command ==> _____

```

Figure 44. View Entry Panel with Browse Mode Selected

The display of member DDD in ISPFEXAM.SYSTST.PLI is shown in Figure 45 on page 74.

```

BROWSE --- ISPFEXAM.SYSTST.PLI(DDD) - 01.01 -----Line 00000000 CoL 001 080
Command ==> _____ Scroll ==> PAGE
***** Top of Data *****
SAMPLE:
PROC OPTIONS(MAIN);
/*****/
/* */
/* A SAMPLE PL/I PROGRAM TO PRINT NUMBERS 1 TO 5 */
/* */
/*****/
DCL /* DECLARE VARIABLES */
A FIXED BINARY(31); /* COUNTING VARIABLE */
DO A=1 TO 5; /* LOOP WITH VALUES 1 THRU 5 */
PUT LIST(A); /* PRINT THE VALUE */
END; /* END OF LOOP */
END SAMPLE; /* END OF PROGRAM */
***** Bottom of Data *****

```

Figure 45. Browse Panel - Member DDD

Using Browse again, the modification of member DDD from the library ISPFEXAM.FR3.PLI is shown in Figure 46.

```

BROWSE --- ISPFEXAM.FR3.PLI(DDD) - 01.02 -----Line 00000000 CoL 001 080
Command ==> _____ Scroll ==> HALF
***** Top of Data *****
SAMPLE:
PROC OPTIONS(MAIN);
/*****/
/* */
/* A SAMPLE PL/I PROGRAM TO PRINT NUMBERS 1 TO 9 */
/* */
/*****/
DCL /* DECLARE VARIABLES */
A FIXED BINARY(31); /* COUNTING VARIABLE */
DO A=1 TO 9; /* LOOP WITH VALUES 1 THRU 9 */
PUT LIST(A); /* PRINT THE VALUE */
END; /* END OF LOOP */
END SAMPLE; /* END OF PROGRAM */
***** Bottom of Data *****

```

Figure 46. Browse Panel - Modification of Member DDD

Thus, there are two modifications of member DDD in two different libraries in the hierarchy, plus the updated member in the private library. Promoting member DDD puts the updated member into the entry-level library, replacing what was previously there, and deletes the member from the private library.

As noted before, LMF does not allow more than one person to update and promote a member into the same controlled library at the same time. When

someone accesses a member by means of the Edit Entry Panel, the member is edit-locked. No one else can access an edit-locked member for edit and promotion into the same controlled library until it is freed. However, the user who edit-locked the member can obtain another copy of the member without first promoting it into the entry-level library.

If you attempt to access a member that is edit-locked with a user ID not your own, the error panel shown in Figure 47 appears.

```
----- ISPF LIBRARY SERVICES ERROR -----
COMMAND ==> _
*****
*
* ERROR DESCRIPTION:
*
* EDIT LOCK FAILED
* THE MEMBER IS NOT FREE.
*
*
* INSTRUCTIONS:
*
* Press ENTER to proceed with Edit.
* Enter END command to terminate Edit.
*
*****
```

Figure 47. ISPF Library Services Error Panel

If you want only to have the member in your private library and do not intend to promote it, press ENTER. You can then proceed with your changes. If you want to promote the member after you change it, enter the END command. Then, either wait until the member is freed, or request that the current owner promote the member so it will be available to you. To find the ID of the person who edit-locked the member, you can review the member status (ISPF option 8.5.3) if the library administrator has given you the necessary read authority.

Using the Move/Copy Option

Another way to access a library member from a controlled library for updating is to use a copy and lock option (L or LP) on the Move/Copy Utility panel (ISPF 3.3). Since this panel does not have library concatenation, you must identify the specific ISPF library from which to copy the member. Therefore, you must verify that you are requesting the latest modification of the member.

If the requested member is available, option L (or LP) copies the member into your private library and locks that member in the controlled library. If you are not authorized to access the member for update, the copy function is not performed. The Move/Copy Utility panel for the example is shown in Figure 48 on page 76.

```

Menu  RefList  Utilities  Help
-----
ISRUMC1                      Move/Copy Utility                      More:  +
C  Copy data set or member(s)      CP Copy and print
M  Move data set or member(s)      MP Move and print
L  Copy and LMF lock member(s)     LP Copy, LMF lock, and print
P  LMF Promote data set or member(s) PP LMF Promote and print

Specify "From" Data Set below, then press Enter key

From ISPF Library:
Project . . . ISPFDEMO      (--- Options C, CP, L, and LP only ----)
Group . . . MYLIB . . . TEST___ . . . STAGE___ . . . BASE___
Type . . . PLI
Member . . . _____      (Blank or pattern for member list,
                              "*" for all members)

From Other Partitioned or Sequential Data Set:
Data Set Name . . . _____
Volume Serial . . . _____ (If not cataloged)
Option ==> L_____

```

Figure 48. Move/Copy Utility (Lock) Panel

In the example, you are requesting a copy and lock of member BBB from the ISPFEXAM.PROD library. (Had you left the **Member Name** field blank, you would have received a member selection list.)

After pressing ENTER, you can specify the name of the “to” library on the next panel. LMF then copies member BBB from the ISPFEXAM.PROD.PLI library into the private library. The member BBB is locked at the time. If the member is already locked, it is not copied, and you receive a short message to that effect.

With the member in the private library, it can now be edited. To put the edited member back into a controlled library, you must promote it. If you want to unlock a member so it can be available for update, promote it with the free option. This will also delete the member from your private library.

Note: A library member can be locked with the LMMFIND service, the LMCOPY service with the LOCK keyword, and the EDIT service with the LOCK(YES) parameter.

Promoting Within the Controlled Library

In the example, you want to promote member BBB, currently in an entry-level library, into the middle-level library. You promote the member by using the Move/Copy Utility panel. To promote member BBB to the middle-level library, you enter the information shown on the panel in Figure 49 on page 77.

```

Menu  RefList  Utilities  Help
-----
ISRUMC1                      Move/Copy Utility                      More:  +
C  Copy data set or member(s)      CP Copy and print
M  Move data set or member(s)      MP Move and print
L  Copy and LMF lock member(s)     LP Copy, LMF lock, and print
P  LMF Promote data set or member(s)  PP LMF Promote and print

Specify "From" Data Set below, then press Enter key

From ISPF Library:
Project . . . ISPFDEMO      (--- Options C, CP, L, and LP only ----)
Group . . . MYLIB . . . TEST___ . . . STAGE___ . . . BASE___
Type . . . . PLI
Member . . . _____      (Blank or pattern for member list,
                             "*" for all members)

From Other Partitioned or Sequential Data Set:
Data Set Name . . . _____
Volume Serial . . . _____      (If not cataloged)
Option ==> L_____

```

Figure 49. Move/Copy Utility (Promote) Panel

In this case, the utility knows the target library from the hierarchical library controls that the library administrator has set up. Therefore, you did not enter the target library. However, the target library must be of the same type as the library from which the promotion was requested. You also entered the data set password of the “from” file.

All promotions into a controlled library and within a controlled library hierarchy are performed by the Move/Copy Utility. The only variation is that promotions into a controlled library require that the entry-level library name be entered. The utility requests that information when it is needed.

Changing Member Version Numbers

If a library administrator has established a distribution table, you may at some point need to change the version numbers of the members in your hierarchy. For instance, if you have a set of programs that run in three library hierarchies, at some point a program that is common to all three hierarchies may have to be changed so that there is a different version in each hierarchy. Conversely, you might have three different versions of the same program in the three library hierarchies, which can be made into a common program.

For the example shown in Figure 50 on page 78, you have a two-level hierarchy for a set of programs that run in each of three environments.

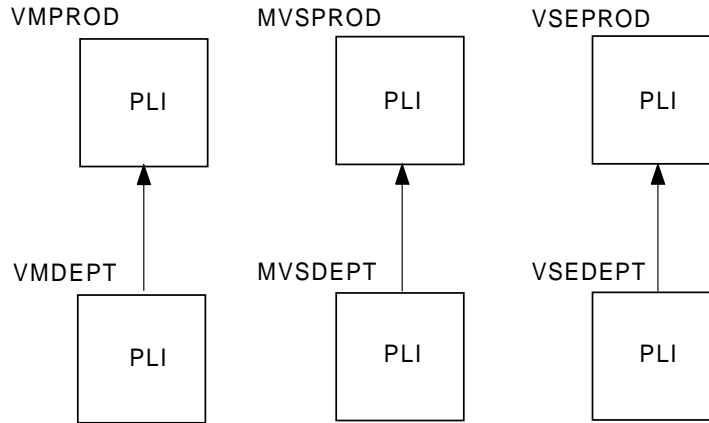


Figure 50. Example #1

The library hierarchies are as follows:

<i>ENTRY-LEVEL LIBRARY</i>	<i>TARGET LIBRARY</i>
EXAMPLE1.VMDEPT1.PLI	EXAMPLE1.VMPROD.PLI
EXAMPLE1.MVSDEPT.PLI	EXAMPLE1.MVSPROD.PLI
EXAMPLE1.VSEDEPT.PLI	EXAMPLE1.VSEPROD.PLI

Thus, there is a PLI library in each of these top- and bottom-level groups.

The distribution table for the programs could look like this:

VERSION NUMBER	TARGET GROUP
50	VMDEPT_
50	MVSDEPT_
50	VSEDEPT_
51	VMDEPT_
52	MVSDEPT_
53	VSEDEPT_

In this distribution table, all programs common to all three environments have version code 50. Programs for only the first environment have version code 51. Similarly, programs for only the second environment have version code 52, and programs for only the third environment have version code 53.

Changing a Member from One Common Version to Several Different Versions

In this case, you have to change the version numbers of the member in all three hierarchies from the version number for common programs to the version numbers of the individual environment.

To change the version code of a member with a version code of 50 in the example, to version codes 51, 52, and 53, you would change the version numbers one at a time by performing the following steps:

1. Edit the member from the first library hierarchy. Remember to concatenate your private library ahead of the controlled libraries on the Edit Entry Panel.

2. Change the version number to the proper one for the environment. In the example, you would change the version number from 50 to 51.
3. Use the Move/Copy Utility, ISPF option 3.3, to promote the member into the desired entry-level library. In the example, you would enter the target library as EXAMPLE1.VMDEPT1.PLI.
4. Edit the member from the library hierarchy for the second library hierarchy, concatenating those libraries to your private library.
5. Change the version number to the proper one for the second environment. This time, you would change the version number from 50 to 52.
6. Use the Move/Copy Utility to promote the member into the desired entry-level library, which would be EXAMPLE1.MVSDEPT.PLI in the example.
7. Repeat the three-step process by continuing to edit-lock the member, change the version number, and promote the member to the appropriate library until all of the members with that name have been changed to the proper version number. In the example, you would repeat the steps for the third environment.

Changing a Member from Several Different Versions to One Common Version

In this case, you have to change the version numbers of the member in all three hierarchies from the version number for each individual environment to the version number for common programs. Because you cannot promote a member into a library in which you have not edit-locked it, you cannot merely change the version number of the members. Instead, follow these steps:

1. Copy and lock one of the members to your private library by using ISPF option 3.3. *Do not start with the member that is going to be made common.* That is, if the member with version number 52, in the example above, is the one you want made a common program, start with the first or the third hierarchy. Save the one you want to keep for last.
2. Continue with Copy and lock with the replace option, saving the members in your private library and deleting them until you have deleted all but one of the members with that name. Again, the member you want to keep should be the only one left with that name in the library hierarchies affected by the distribution table.
3. Change the version number of the member to the version number for common members, which is version number 50 in the example. Use the Move/Copy Utility, ISPF option 3.3, to promote the member into a library hierarchy. Because of the distribution table, the member will be promoted to all of the library hierarchies. In the example, if you specify EXAMPLE1.VMDEPT.PLI as the target for the promotion, the member is also promoted to EXAMPLE1.MVSDEPT.PLI and EXAMPLE1.VSEDEPT.PLI. This promotion succeeds because you have edit-locked this member in all target libraries by completing the previous steps.

These guidelines apply regardless of the number of groups in your distribution table. The same considerations apply for the different combinations that could occur if you have programs that are common to some library hierarchies, but are different in one or more other library hierarchies.

Refer to *ISPF Edit and Edit Macros* for a discussion of version numbers.

Using the LMF Promote Override

If you are a project administrator, LMF allows you to promote or unlock a member when the owner of the part is unavailable. When you promote a member that you do not own, LMF prompts you to confirm an override request (see Figure 51).

```
----- LMF PROMOTE OVERRIDE -----  
COMMAND ==>  
  
One or more of the members requested for  
promote is locked by another user.  
As the library administrator you have  
the authorization to override the LMF  
controls and promote these members  
on behalf of the other user.  
Please indicate whether you wish to  
override standard LMF promote processing.  
A response to override indicates that ALL  
members selected during this interaction  
that are eligible for the override will be promoted.  
  
INSTRUCTIONS:  
  
    Press ENTER to confirm the override request.  
  
    Enter END command to cancel the override request.
```

Figure 51. LMF Promote Override Panel

ISPF User's Guide includes a discussion of the member selection list as well as a discussion of promoting members with aliases.

The library access services of ISPF are extended with the addition of the Library Management Facility. Refer to the *ISPF User's Guide* for a complete description of these services.

Appendix A. Special Reports

This section contains information that can be helpful if you use the review options available under LM Utilities option 5. These options, as described in the text, can help you review the activity log, library control status, and member control status.

Using the Activity Log:

The format of the records in the member activity log data set is shown in Table 6.

Table 6. Member Activity Log Record Format

Byte	Field	Description
1-8	Member name	Char(8)
9-16	Group name	Char(8)
17	Action type A - Deleted by administrator R - Clear utility was run against this library D - Deleted by promotion F - Free I - Initialize utility was run against this library L - Edit-lock M - Move P - Predefined by administrator	Char(1)
18-25	Requester's user ID	Char(8)
26-33	Date of this request (national language format)	Char(8)
34-38	Time of this request (hh:mm)	Char(5)
39	Colon (always character :)	Char(1)
40-41	Time of request in seconds	Char(2)
42-49	Library Type	Char(8)
50-57	Version identifier	Char(8)
58-59	Modification level	Char(2)
60-67	Collection name	Char(8)
68-93	Reason on promote	Char(8)
94	Processing complete N - No Y - Yes	Char(1)
95-100	Reserved	Char(6)

The format of the records in the administrator activity log data set is shown in Table 7 on page 82.

Table 7. Administrator Activity Log Record Format

Byte	Field	Description
1-8	Group name	Char(8)
9	Action type A - Activate C - Create D - Delete E - Deactivate F - Data set full update I - Initialize M - Member controls R - Clear U - Update X - Empty this activity log	Char(1)
10-17	Type	Char(8)
18-25	User ID of requester	Char(8)
26-33	Date of this request (national language format)	Char(8)
34-38	Time of this request (hh:mm)	Char(5)
39	Colon (always character :)	Char(1)
40-41	Time of request in seconds	Char(2)
42-49	Target group	Char(8)
50-57	Administrator ID (for Create controls only). Blank for update, delete, user sets, and distribution tables.	Char(8)
58-65	Activity log group	Char(8)
66-73	Authorized Promoter	Char(8)
74-81	Distribution table (only if the Administrator field is blank)	Char(8)
82-89	User set	Char(8)
90-97	Collection name	Char(8)
98-105	User exit before promotion	Char(8)
106	User exit before promotion type C - Command P - Program	Char(1)
107-114	User exit after promotion	Char(8)
115	User exit after promotion type C - Command P - Program	Char(1)
116	Library data set full action F - Fail N - Notify X - Exit	Char(1)

Table 7. Administrator Activity Log Record Format (continued)

Byte	Field	Description
117-124	Library data set full exit name	Char(8)
125	Library data set full exit type C - Command P - Program	Char(1)
126	Activity log data set full action F - Fail N - Notify X - Exit	Char(1)
127-134	Log data set full exit name	Char(8)
135	Activity log data set full exit type C - Command P - Program	Char(1)
136	Control file data set full action F - Fail N - Notify X - Exit	Char(1)
137-144	Control file data set full exit name	Char(8)
145	Control file data set full exit type C - Command P - Program	Char(1)
146	Undefined members allowed N - No Y - Yes	Char(1)
147	Pack indicator N - No Y - Yes	Char(1)
148	Access control L - Limited O - Open P - Private	Char(1)
149-156	Entry ID	Char(8)
157	Processing complete N - No Y - Yes	Char(1)
158-178	Reserved	Char(21)

Using the Status Listing:

The format in Table 8 on page 84 is used for all status listing records written when the data set ISPF/PDF options 8.5.2.3 and 8.5.3.3 are selected. Each record consists of a sort area and a data area. The sort area has fields common to all kinds of output records. The data area has different information depending upon the kind of record being written.

2. Hierarchy level indicates the depth of the group within the hierarchy. The levels are numbered from 1 to n, with the top groups being level 1.

3. Possible record types are A0=Project record, C0=Group record, 10=Type record, 80=Member record, 94=User set, 98=Distribution table.

Table 8. Status Listing Record Format

	Byte	Field	Description
SORT AREA	1-4	Promote hierarchy number	Fixed(31) ¹
	5-8	Promote hierarchy level	Fixed(31) ²
	9-16	Group name	Char(8)
	17-24	Type name	Char(8)
	25-32	Member name	Char(8)
	33-34	Record type	Char(2) ³
	35-45	Not currently used	Char(11)
DATA AREA	46-160	Data area description	Char(115)

The following figures describe the contents of the data area, depending on the kind of record identified in the **Record Type** field.

Table 9 shows the data area format for a project record.

Table 9. Data Area for a Project Record

Byte	Field	Description
46-53	Project name	Char(8)
54	Blank	Char(1)
55-62	Project administrator	Char(8)
63	Blank	Char(1)
64-71	Deactivator ID	Char(8)
72	Blank	Char(1)
73-80	Date	Char(8)
81	Blank	Char(1)
82-89	Time	Char(8)
90	Blank	Char(1)
91	Control file full action (F - Fail, N - Notify, E - Exit)	Char(1)
92	Blank	Char(1)
93-100	Control file exit name	Char(8)
101	Blank	Char(1)
102	Control file full type (P - program, C - command)	Char(1)
103	Blank	Char(1)
104	Administrator log full action (F - Fail, N - Notify, E - Exit)	Char(1)
105	Blank	Char(1)
106-113	Administrator log exit name	Char(8)
114	Blank	Char(1)
115	Administrator log exit type (P - program, C - command)	Char(1)

1. Groups are numbered in preorder sequence with top groups in alphabetical order. Each group has a number. These numbers are sequential with the exception of illegally defined groups, which are numbered 999 999.

Table 9. Data Area for a Project Record (continued)

Byte	Field	Description
116-160	Blank	Char(45)

Table 10 shows the data area format for a group record.

Table 10. Data Area for a Group Record

Byte	Field	Description
46-53	Group name	Char(8)
54	Blank	Char(1)
55-62	Target group name	Char(8)
63	Blank	Char(1)
64	Group Position (T=Top group, O=Only group (both Top group and Bottom group), M=Middle group (not a top or a bottom group), E=Entry group)	Char(1)
65	Blank	Char(1)
66-73	Deactivator (User ID, User set or blank if active)	Char(8)
74-160	Blank	Char(87)

Table 11 shows the data area format for a type record.

Table 11. Data Area for a Type Record

Byte	Field	Description
46-53	Type name	Char(8)
54	Blank	Char(1)
55-62	Promoter ID	Char(8)
63	Blank	Char(1)
64	Pack (Y=Yes, N=No)	Char(1)
65	Blank	Char(1)
66-73	Activity log group name	Char(8)
74	Blank	Char(1)
75-82	Distribution table name	Char(8)
83	Blank	Char(1)
84-91	Type entry ID	Char(8)
92	Blank	Char(1)
93	Access ID control (C=Closed, L=Limited, O=Open, P=Private)	Char(1)
94	Blank	Char(1)
95-102	Promotion exit name - Before	Char(8)
103	Blank	Char(1)
104	Promotion exit type - Before	Char(1)

Table 11. Data Area for a Type Record (continued)

Byte	Field	Description
105	Blank	Char(1)
106-113	Promotion exit name - After	Char(8)
114	Blank	Char(1)
115	Promotion exit type - After	Char(1)
116	Blank	Char(1)
117-124	Collection name	Char(8)
125	Blank	Char(1)
126	Activity log full action (F - Fail, N - Notify, E - Exit)	Char(1)
127	Blank	Char(1)
128-135	Activity log exit name	Char(8)
136	Blank	Char(1)
137	Activity log full type (P - program, C - command)	Char(1)
138	Blank	Char(1)
139	Library full action (F - Fail, N - Notify, E - Exit)	Char(1)
140	Blank	Char(1)
141-148	Library full exit name	Char(8)
149	Blank	Char(1)
150	Library full exit type (P - program, C - command)	Char(1)
151-160	Blank	Char(10)

Table 12 shows the data area format for a member record.

Table 12. Data Area for a Member Record

Byte	Field	Description
46-53	Member name	Char(8)
54	Blank	Char(1)
55-56	Version number	Char(2)
57	Blank	Char(1)
58-59	Modification number	Char(2)
60	Blank	Char(1)
61-68	Group name	Char(8)
69	Blank	Char(1)
70-78	Access ID (User ID, User set name, *OPEN*=Access is open, *LOCKED*=Member may be available at a lower hierarchy level.	Char(9)
79	Blank	Char(1)

Table 12. Data Area for a Member Record (continued)

Byte	Field	Description
80-88	Status (User ID, User set name, available, or predefined)	Char(9)
89-160	Blank	Char(72)

Table 13 shows the data area format for a user set record.

Table 13. Data Area for a User Set Record

Byte	Field	Description
46-53	User set 1	Char(8)
54-55	Blank	Char(2)
56-63	User set 2	Char(8)
64-65	Blank	Char(2)
66-73	User set 3	Char(8)
74-75	Blank	Char(2)
76-83	User set 4	Char(8)
84-85	Blank	Char(2)
86-93	User set 5	Char(8)
94-95	Blank	Char(2)
96-103	User set 6	Char(8)
104-105	Blank	Char(2)
106-113	User set 7	Char(8)
114-160	Blank	Char(47)

Table 14 shows the data area format for a distribution table record.

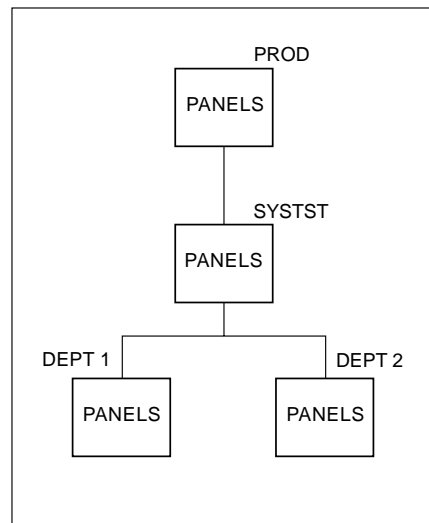
Table 14. Data Area for a Distribution Table Record

Byte	Field	Description
46-53	Distribution table 1	Char(8)
54-55	Blank	Char(2)
56-63	Distribution table 2	Char(8)
64-65	Blank	Char(2)
66-73	Distribution table 3	Char(8)
74-75	Blank	Char(2)
76-83	Distribution table 4	Char(8)
84-85	Blank	Char(2)
86-93	Distribution table 5	Char(8)
94-95	Blank	Char(2)
96-103	Distribution table 6	Char(8)
104-105	Blank	Char(2)
106-113	Distribution table 7	Char(8)
114-160	Blank	Char(47)

Appendix B. Running a Sample LMF Session

This sample LMF session creates a controlled library hierarchy for a project. This sample session also promotes and updates a member in the hierarchy.

Most projects use controlled libraries to maintain effective version control over the programming development process and reduce contention in library usage. Controlled libraries are established and maintained by a library administrator. This scenario will create a controlled library hierarchy for project USERID. The project name can be any authorized user. As you go through this scenario you should substitute your user ID or some other authorized user ID for USERID. This project will have 3 levels, 1 type, and 4 groups with a library hierarchy that looks like this:



The libraries will contain members of the type PANELS.

You will create one private library, FR1. The private library will be used for creating new members and updating old members.

The entry-level libraries will represent members that are being unit tested.

The middle-level library (SYSTST) will represent the group of members ready for integration into system testing.

The top-level library (PROD) will represent the group of members that have been fully tested.

Before starting this scenario, LMF must be properly installed and started..

Our first task is to create hierarchical controls for the project. For this scenario, the PF3 key is defined as the END key.

Action	Result
1. Log on to TSO.	A Ready message appears on your screen.
2. Type ISPF (or the appropriate alias) and press Enter.	The ISPF Primary Option Menu appears.

Action	Result
3. On the Option line, type 8 to select the LM Facility option. Press Enter.	The Library Management Utilities panel appears.
4. On the Option line, type 1 to select the Controls option. Press Enter.	The Specify Library Controls panel appears.
5. On the Option line, type 1 to select Create controls for library hierarchies. Specify the following library: PROJECT ==> USERID GROUP ==> PROD TYPE ==> PANELS Press Enter.	The Create or Update Library Controls panel appears. You will create controls for the hierarchy starting with the top group and work down.
6. Because PROD is the top group, fill in only two fields: ADMINISTRATOR FOR PROJECT ==> USERID ACTIVITY LOG GROUP ==> MEMLOG Leave the other fields as they are. Type END on the Command line and press Enter.	The Set Data Set Full Actions For LMF Data Sets panel appears.
7. On this panel, type NOTIFY for both Action fields. Type END on the Command line and press Enter.	The Specify Library Controls panel appears again.
8. On the Option line, type 1 to select Create controls for library hierarchies. Specify the library by typing in the following information: PROJECT ==> USERID GROUP ==> SYSTST TYPE ==> PANELS Press Enter.	The Create or Update Library Controls panel appears.
9. Type information in these fields as follows: TARGET GROUP FOR PROMOTE ==> PROD AUTHORIZED PROMOTERS ==> USERID Leave the other fields as they are. Type END on the Command line and press Enter.	The Set Data Set Full Actions For LMF Data Sets panel appears.
10. On this panel, make sure NOTIFY is entered for both Action fields. Type END on the Command line and press Enter.	The Specify Library Controls panel appears again.
11. On the Option line, type 1 to select Create controls for library hierarchies. Specify the library by typing in the following information: PROJECT ==> USERID GROUP ==> DEPT1 TYPE ==> PANELS Press Enter.	The Create or Update Library Controls panel appears.
12. For this step change only one field as follows: TARGET GROUP FOR PROMOTE ==> SYSTST Leave the other fields as they are. Type END on the Command line and press Enter.	The Set Data Set Full Actions For LMF Data Sets panel appears.
13. On this panel, make sure NOTIFY is entered for both Action fields. Type END on the Command line and press Enter.	The Specify Library Controls panel appears again.

Action	Result
<p>14. On the Option line, type 1 to select Create controls for library hierarchies. Specify the library by typing in the following information:</p> <pre>PROJECT ===> USERID GROUP ===> DEPT2 TYPE ===> PANELS</pre> <p>Press Enter.</p>	The Create or Update Library Controls panel appears.
<p>15. This time leave all fields as they are. Type END on the Command line and press Enter.</p>	The Set Data Set Full Actions For LMF Data Sets panel appears.
<p>16. On this panel, make sure NOTIFY is entered for both Action fields. Type END on the Command line and press Enter.</p>	The Specify Library Controls panel appears again.
<p>17. Press F3 twice.</p>	The ISPF Primary Option Menu appears.

Now you must allocate library space for the libraries you just finished creating controls for, including the activity log USERID.MEMLOG.ACTLOG. You will also allocate space for a private library (FR1).

Action	Result
<p>18. On the Option line, type 3 to select the Utilities option. Press Enter.</p>	The Utility Selection menu appears.
<p>19. On the Option line, type 2 to select the Data Set option. Press Enter.</p>	The Data Set Utility panel appears.
<p>20. On the Option line, type A to allocate a new data set. Specify an ISPF library by typing the following information, but substitute your TSO user ID for USERID in the Project field:</p> <pre>Project . . USERID Group . . . PROD Type PANELS</pre> <p>Press Enter.</p>	The Allocate New Data Set panel appears.
<p>21. Type the following information in these fields:</p> <pre>Directory blocks 10 Record length 80 Block size 6160</pre> <p>Leave the other fields as they are.</p> <p>Press Enter.</p>	Data set USERID.PROD.PANELS is allocated. The Data Set Utility panel appears again.
<p>22. Select option A again and specify the following ISPF library:</p> <pre>Project . . USERID Group . . . SYSTST Type PANELS</pre> <p>Press Enter.</p>	The Allocate New Data Set panel appears again.
<p>23. Leave everything the same. Just press Enter.</p>	Data set USERID.SYSTST.PANELS is allocated. The Data Set Utility panel appears again.

Action	Result
<p>24. Select option A again and specify the following ISPF library:</p> <pre>Project . . USERID Group . . . DEPT1 Type PANELS</pre> <p>Press Enter.</p>	The Allocate New Data Set panel appears again.
<p>25. Leave everything the same. Just press Enter.</p>	Data set USERID.DEPT1.PANELS is allocated. The Data Set Utility panel appears again.
<p>26. Select option A again and specify the following ISPF library:</p> <pre>Project . . USERID Group . . . DEPT2 Type PANELS</pre> <p>Press Enter.</p>	The Allocate New Data Set panel appears again.
<p>27. Leave everything the same. Just press Enter.</p>	Data set USERID.DEPT2.PANELS is allocated. The Data Set Utility panel appears again.
<p>28. Select option A again and specify the following ISPF library:</p> <pre>Project . . USERID Group . . . FR1 Type PANELS</pre> <p>Press Enter.</p>	The Allocate New Data Set panel appears again.
<p>29. Leave everything the same. Just press Enter.</p>	Data set USERID.FR1.PANELS is allocated. The Data Set Utility panel appears again.
<p>30. On the Option line, type A to allocate a new data set. Specify an ISPF library by typing the following information, but substitute your TSO user ID for USERID in the Project field:</p> <pre>Project . . USERID Group . . . MEMLOG Type ACTLOG</pre> <p>Press Enter.</p>	The Allocate New Data Set panel appears.
<p>31. Type the following information in these fields. This data set must be sequential:</p> <pre>Directory blocks 0 Record length 100 Block size 3000</pre> <p>Leave the other fields as they are.</p> <p>Press Enter.</p>	Data set USERID.MEMLOG.ACTLOG is allocated. The Data Set Utility panel appears again.
<p>32. Press F3 twice.</p>	The ISPF Primary Option Menu appears.
<p>33. Type 8 on the Option line and press Enter. (You are now going to activate the controlled hierarchy.)</p>	The Library Management Utilities panel appears.
<p>34. Type 4 on the Option line to select the Activate Library Controls option. Press Enter.</p>	The Activate or Deactivate Controls panel appears.
<p>35. Type 1 on the Option line and type the following information in these fields:</p> <pre>PROJECT ===> USERID TOP GROUP ===> PROD</pre> <p>Press Enter.</p>	A panel showing the promotion structure appears.

The panel should look similar to the following:

```

HIERARCHY(IES) ACTIVATED - USERID.PROD-----ACTIVATED SUCCESSFULLY
COMMAND ==> _                                SCROLL ==> PAGE
***** TOP OF DATA *****

                STRUCTURE FOR - USERID                DATE: 87/03/02                TIME: 09:56

The following groups are active

1 PROD          Where:
2 SYSTST        1, 2 ... 50 Indicates hierarchical position
  B DEPT1       B          Indicates bottom group
  B DEPT2

Defined Types
PANELS
***** BOTTOM OF DATA *****

```

Action	Result
36. Press F3.	The Activate or Deactivate Controls panel appears.
37. Press F3.	The ISPF Primary Option Menu appears.

You have now created and activated the controls for the hierarchy. You will now create two members (AAA and BBB) in FR1 and promote them into the controlled libraries.

Action	Result
38. Type 2 on the Option line and press Enter.	The Edit Entry Panel appears.
39. Specify the following ISPF library and member: Project . . .USERID GroupFR1 TypePANELS Member . . .AAA Specify LMF Lock - 3 (Yes). Press Enter.	An edit screen appears for input.
40. Type some information into this member and save it by pressing F3.	The Edit Entry Panel appears again.
41. Specify the following ISPF library and member. Project . . .USERID GroupFR1 TypePANELS Member . . .BBB Specify LMF Lock - 3 (Yes). Press Enter.	An edit screen appears for input.
42. Type some information into this member and save it by pressing F3.	The Edit Entry Panel appears again.
43. Press F3 again.	The ISPF Primary Option Menu appears.
44. Type 3.3 on the Option line and press Enter.	The Move/Copy Utility panel appears.

Action	Result
<p>45. Type P on the Option line and specify the following From ISPF Library:</p> <pre>Project . . .USERID Group . . .FR1 Type . . .PANELS Member . . .AAA</pre> <p>Press Enter.</p>	The Specify Target panel appears.
<p>46. Specify the following To ISPF library:</p> <pre>Project . . .USERID Group . . .DEPT1 Type . . .PANELS Member . . .(leave blank)</pre> <p>Press Enter.</p>	The Move/Copy Utility panel appears again with the message MEMBER AAA PROMOTED.
<p>47. Type P on the Option line and specify the following From ISPF Library:</p> <pre>Project . . .USERID Group . . .FR1 Type . . .PANELS Member . . .BBB</pre> <p>Press Enter.</p>	The Specify Target panel appears.
<p>48. Specify the following To ISPF library:</p> <pre>Project . . .USERID Group . . .DEPT2 Type . . .PANELS Member . . .(leave blank)</pre> <p>Press Enter.</p>	The Move/Copy Utility panel appears again with the message MEMBER BBB PROMOTED.
<p>49. Type P on the Option line and specify the following From ISPF Library:</p> <pre>Project . . .USERID Group . . .DEPT1 Type . . .PANELS Member . . .AAA</pre> <p>Press Enter. (You are promoting member AAA from DEPT1 to SYSTST.)</p>	The message MEMBER AAA PROMOTED appears. You did not have to specify a target library (SYSTST) because this was done when you set up the controls.

You are now going to copy member AAA from SYSTST to FR1, update it, then promote it back into the controlled hierarchy.

Action	Result
<p>50. On the Option line of the Move/Copy Utility panel, type L. Specify the following From ISPF Library:</p> <pre>Project . . .USERID Group . . .SYSTST Type . . .PANELS Member . . .AAA</pre> <p>Press Enter.</p>	The Specify to Data Set panel appears.

Action	Result
51. Specify the following To ISPF Library: Project . . .USERID GroupFR1 TypePANELS Member . . .(leave blank) Press Enter.	The Move/Copy Utility panel appears again with the message MEMBER AAA COPIED.
52. Press F3.	The ISPF Primary Option Menu appears.
53. Type 2 on the Option line and press Enter.	The Edit Entry Panel appears.
54. Specify the following ISPF Library: Project . . .USERID GroupFR1 TypePANELS Member . . .AAA Press Enter.	Member AAA appears.
55. Add, delete, or change some information in this member. Press F3.	The Edit Entry Panel appears again.
56. Press F3 again.	The ISPF Primary Option Menu appears.
57. Type 3.3 on the Option line and press Enter.	The Move/Copy Utility panel appears.
58. Type P on the Option line and specify the following From ISPF Library: Project . . .USERID GroupFR1 TypePANELS Member . . .AAA Press Enter.	The Specify Target panel appears.
59. Specify the following To ISPF library: Project . . .USERID GroupDEPT1 TypePANELS Member . . .(leave blank) Press Enter.	The Move/Copy Utility panel appears again with the message MEMBER AAA PROMOTED.
60. Press F3.	The ISPF Primary Option Menu appears.
61. Type 8 on the Option line and press Enter. (You are now going to review the member status of your project.)	The Library Management Utilities panel appears.
62. Type 5 on the Option line and press Enter.	The Review Activity and Controls panel appears.
63. Type 3 on the Option line and press Enter.	The Member Status Review panel appears.
64. Type 1 on the Option line and specify the following ISPF Library: PROJECT ==== USERID TOP GROUP ==== PROD TYPE ==== PANELS MEMBER ==== * Press Enter.	The Library Member Status Review panel appears.

The Library Member Status Review panel looks like this:

```

MEMBER STATUS REVIEW - USERID.PROD.PANELS(*)-----LINE 00000000 COL 001 080
COMMAND ==> SCROLL ==> PAGE
***** TOP OF DATA *****
LIBRARY MEMBER STATUS REVIEW PAGE: 1
PROJECT: USERID UPDATE IN PROGRESS: NO DATE: 86/10/09 TIME: 15:06
MEMBERS FOR HIERARCHY: USERID.PROD.PANELS
MEMBER VER MOD GROUP ACCESS ID STATUS
=====
AAA 01 01 DEPT1 USERID AVAILABLE
AAA PROD USERID *LOCKED*
AAA 01 00 SYSTST USERID *LOCKED*
BBB 01 00 DEPT2 USERID AVAILABLE
BBB PROD USERID *LOCKED*
***** BOTTOM OF DATA *****

```

The panel above shows that the latest version of member AAA is in DEPT1 as a result of updating and promoting. The version in SYSTST is not available for updating because it is not the latest version. The version in SYSTST can be copied out of the controlled structure, but it cannot be promoted back.

Both members are shown *LOCKED* in the top group PROD, but a blank is indicated in the VER and MOD columns. That means the actual member does not exist in PROD. This is the way LMF indicates that an updated version of the member exists at a lower level.

This ends the scenario. Return to the ISPF Primary Option Menu by pressing F3 four times.

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