



The Mainframe Software Partner
For The Next 50 Years

Compuware Program Analyzer

Mainframe Installation and Configuration Guide

Release 16.05

Please direct questions about Compuware Program Analyzer
or comments on this document to:

Compuware Program Analyzer **Customer Support**

<http://go.compuware.com>

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Introduction

Product Overview

With the Compuware Program Analyzer, developers can analyze even their most complex programs. The Compuware Program Analyzer provides easy to understand analysis and documentation of a COBOL program through views of the program's structure, data items, and logic to help developers solve the problems they face every day. With the addition of Xpediter/Code Coverage it will give you in-depth analysis of your current testing level. The unique Relative Risk metric will guide you to areas where you need to concentrate your efforts. This will help you deliver higher quality code, faster.

Compuware Program Analyzer includes the following components:

- Program Analyzer, which allows you to:
 - Study a program's logic flow in chart and diagram format, which are displayed with intuitive graphics and highlighting. This gives you a quick grasp of how the program works, saving valuable time when resolving logic problems.
 - Analyze and navigate through a COBOL program to refer to specific paragraphs, divisions, and sections.
 - Do a logical walk-through of the program's logic to test it without having to take the time to set up a test environment.
 - Identify and locate logic flaws including code that can't be executed. This can help you quickly isolate problems in unfamiliar programs and save you from reviewing "dead" code.
 - Analyze the flow of data through the program to quickly locate the source of bad data.
 - Obtain detailed information about any perform group or paragraph in the program including counts of GO TOs and I/O.
 - Estimate project scope and task complexity with detailed metric information including the McCabe and Halstead metrics.
 - Document the entire program with easy-to-read printouts of the charts and tables. The analysis can be exported for use in a spreadsheet or database.
- Code Coverage (you must have access to Xpediter/Code Coverage to use this component), which allows you to:
 - Analyze code coverage data provided by Xpediter/Code Coverage.
 - Identify what percentage of an application's code was executed and how often.
 - Determine what percentage of modified code in a program has not been executed.
 - For each System, Program, and Test, measure the current level of risk using the unique Relative Risk metric.
 - View graphical structure charts to understand the current level of testing and help establish requirements for additional test data or user inputs.
 - Generate breakpoints to improve testing results with Xpediter.
 - Document a program's test execution by creating a Code Coverage analysis report. This can be a valuable aid for production turnover evaluations.

Mainframe Installation and Configuration Guide

This guide tells you how to install and configure the Compuware Program Analyzer software on the host.

Contents

This guide contains the following chapters:

- Chapter 1, “Getting Started” lists the system requirements and preinstallation requirements for the mainframe portion of Compuware Program Analyzer.
- Chapter 2, “Installation Overview and Considerations” provides an overview of the process used to install Compuware Program Analyzer.
- Chapter 3, “Collect Site-Specific Information” helps you collect the site-specific information you need to install the mainframe portion of Compuware Program Analyzer on your MVS host.
- Chapter 4, “Customization Procedures” walks you through the following steps for customizing the mainframe portion of Compuware Program Analyzer.
- Appendix A, “Using HCI” explains how to configure HCI and describes the operator commands supported by HCI, HCI security, and the HCI Journal Facility.
- Appendix B, “Customizing Code Coverage After Customizing the Base Product” walks you through the steps to customize the Code Coverage component if you didn’t customize it when you customized Compuware Program Analyzer.
- Appendix C, “Customizing File Transfer” walks you through the steps to customize File Transfer.

Intended Audience

This guide is written for the person responsible for installing and maintaining MVS software products. This guide assumes that you are already familiar with SMP/E, system initialization parameters, and TCP/IP.

Conventions

This guide uses the following convention:

- The names of menus, buttons, and other items that you must enter or press in an Compuware Program Analyzer window are printed in **bold-faced** type.

Compuware Program Analyzer Publications

An RFN order e-mail includes a copy of the *Compuware Installer Mainframe Products SMP/E Installation Guide*, which should be used to perform the installation of Compuware Program Analyzer. Preparation for installation and post-installation configuration should be done according to this *Guide*.

Compuware Program Analyzer publications are also available to users in a variety of formats.

Books

The following books are available for Compuware Program Analyzer:

- *Mainframe Installation and Configuration Guide*: Provides step-by-step instructions for preparing for installation of the mainframe portion of Compuware Program Analyzer on the MVS host, as well as post-installation configuration.
- *Distributed License Management Installation Guide*: Explains how to set up a license to use the workstation portion of Compuware Program Analyzer.
- *Glossary*: Gives definitions of commonly used Compuware Program Analyzer terms.

Books are available where the components are located and from the ProgramFilesPath specified during the installation (which is available in the About dialog box), click the Books folder.

Books can be viewed with Adobe Acrobat Reader. To learn more about Adobe Acrobat Reader or to download this free viewing companion to Adobe Acrobat from the World Wide Web, go to <http://www.adobe.com>.

Help

The following help is available for Compuware Program Analyzer:

- Release Notes, which give highlights about new product features, and list system requirements, technical notes, and known issues are available on FrontLine.
- Step-by-step instructions for installing the workstation portion of Compuware Program Analyzer are available from product browser.
- The **Setting Up Compuware Program Analyzer** help is for verifying the installation and performing the one-time setup of components.
- The **Comprehensive Help** is global help covering all components of Compuware Program Analyzer. This help has an all-inclusive index and search capability across the help of all Compuware Program Analyzer components, and provides links to the help for commonly performed tasks.
- A component's help (index, table of contents, and search capabilities) is available from the **Help** menu of any window within that component.
- Dialog box help is available by clicking the **Help** button on a dialog box.

Customer Support

Compuware provides a variety of support resources to make it easy for you to find the information you need.

Compuware Go Customer Support Website

You can access online information for Compuware products via our Compuware Go customer support website at <http://go.compuware.com>.

Compuware Go provides access to critical information about your Compuware products. You can review frequently asked questions, read or download documentation, access product fixes, or e-mail your questions or comments. The first time you access Compuware Go, you are required to register and obtain a password. Registration is free.

Compuware now offers User Communities, online forums to collaborate, network, and exchange best practices with other Compuware solution users worldwide. To join, go to <http://groups.compuware.com>.

Contacting Customer Support

Phone

- USA and Canada: 1-800-538-7822 or 1-313-227-5444.
- All other countries: Contact your local Compuware office. Contact information is available at <http://go.compuware.com>.

Web

You can report issues via the Quick Link **Create & View Support Cases** on the Compuware Go home page.

Note: Please report all high-priority issues by telephone.

Mail

Compuware Customer Support
Compuware Corporation
One Campus Martius
Detroit, MI 48226-5099

Corporate Website

To access Compuware's site on the Web, go to <http://www.compuware.com>.

The Compuware site provides a variety of product and support information.

If a mainframe abend occurs while you are using any workstation component that connects the mainframe, before contacting Compuware, submit the X2ZAPLST member provided in your Compuware Program Analyzer INSTALL dataset. It lists any fixes that have been applied to your system.

Chapter 1.

Getting Started

This chapter lists the preinstallation considerations for installing the mainframe portion of Compuware Program Analyzer.

Refer to the release notes for the most current system requirements.

Preinstallation Considerations for Compuware Program Analyzer

Compuware Program Analyzer supports IBM TCP/IP communications.

Note: Compuware Program Analyzer must be installed on the same MVS image as IBM TCP/IP for MVS and Compuware's Host Communication Interface (HCI).

Connect to MVS Host

Before you install Compuware Program Analyzer on the MVS host, you must have a connection (link) between the host on which you will install the mainframe component of Compuware Program Analyzer and the workstation on which you will install the workstation component.

TCP/IP

You must be able to run TCP/IP traffic from the workstation to the host. The sample program, PING, is one way to test this. Refer to the help topic entitled *Ensuring TCP/IP connection from the workstation to the MVS host* for information on how to verify workstation to host connectivity.

Note: To avoid any unpredictable connection issues, make sure all current IBM maintenance is applied to TCP/IP.

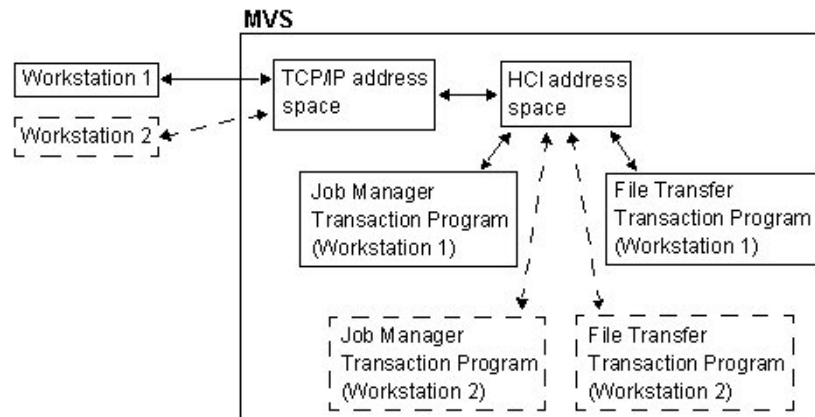
Collect TCP/IP Information

- TCP/IP region name
- TCP/IP host name or IP address
- TCP/IP port number

Overview of HCI

Compuware Program Analyzer uses Compuware's Host Communications Interface (HCI) to provide connectivity between products running on the workstation and the mainframe, using TCP/IP as the communications protocol.

Figure 1-1. Workstation/mainframe connectivity



HCI is a component of Enterprise Common Components.

The design of HCI is based on facilities available to z/OS operating systems. Refer to the software requirements for MVS host in the release notes for additional information.

- HCI itself can be started as a started task or as a batch job.

CAUTION:

Compuware strongly recommends that you convert both HCI and TPs to run as started tasks after verifying that they execute properly. This will eliminate contention for JES initiators and prevent getting 1011 error messages on a workstation when starting TPs.

- HCI starts transaction programs (TPs) as started tasks or as batch jobs.
Started task transaction programs can also be set up with master scheduler JCL using the IEFJOBS DD concatenation of MSTJCLxx. Refer to the step detailing how to set up started task TPs with master JCL on step 3 on page 25.
- When using HCI, the HCI address space must be authorized by the Authorized Program Facility (APF). However, the application programs or the link-edited interface modules using HCI are not required to be APF-authorized. These are normal MVS non-authorized programs.

Chapter 2.

Installation Overview and Considerations

Compuware Program Analyzer is packaged for installation using SMP/E (System Modification Program Extended). SMP/E is a method developed by IBM to install software products in the MVS environment.

The Compuware Program Analyzer installation involves the following:

- Installing the appropriate release of Enterprise Common Components
- Installing the product using SMP/E
- Customizing the product to establish a link between components that communicate with the host and the MVS host.

This chapter provides an overview of the process used to *install* Compuware Program Analyzer. Review this summary before beginning the installation process according to the instructions provided in the *Compuware Installer Mainframe Products SMP/E Installation Guide*. Topics presented in this chapter include:

- Installation Considerations
- Compuware Program Analyzer Packaging

Refer to Chapter 4, “Customization Procedures” for the procedure for *customizing* Compuware Program Analyzer.

Installation Considerations

Enterprise Common Components Installation

Ensure that the appropriate release of Enterprise Common Components (ECC) is installed **before** installing Compuware Program Analyzer. Refer to the release notes for information about the required release.

Compuware Program Analyzer requires the ECC components, which are provided on a separate installation media from the Compuware Program Analyzer product. ECC has its own installation procedure. Refer to the ECC user documentation before installing or reinstalling Compuware Program Analyzer.

To simplify ECC SMP/E installation, Base Services, CSS, LMS, HCI, and CMSC modules are installed as a single ECC FMID. The components are consolidated into the SLCXxxxx libraries. Ensure that you change all references to the old Compuware HCI libraries (SLHCAUTH and SLHCLOAD) to the new ECC libraries (SLCXAUTH and SLCXLOAD) in your installation JCL, especially viewing server JCL when it is converted to this release.

Product Delivery Options

Compuware has made the following product delivery options available:

- Receive From Network (RFN)
- Extended Play (EP) media on DVD or electronic FTP download.

Receive From Network (RFN)

The Receive From Network (RFN) process enables you to receive the product directly to your z/OS environment and install it using System Modification Program Extended (SMP/E).

After completing your product order from Compuware's online ordering system, you receive an e-mail message containing sample JCL to FTP the Compuware Installer which has been customized to include installation information of your current order. Your order e-mail also includes a copy of the *Compuware Installer Mainframe Products SMP/E Installation Guide* (CompuwareInstaller.pdf). The e-mail may also contain links for downloading any PC-based products that may have been ordered at the same time.

Note: For the RFN process, always use the customized Compuware Installer dialog PDS that you receive with your current order.

The Compuware Installer is used to generate the JCL for SMP/E processing of your Compuware mainframe products, including the Receive From Network step which FTPs the binary data from the Compuware FTP site directly to your z/OS Environment.

Post-installation product configuration should still be done according to the procedures in this existing *Installation and Configuration Guide*.

Extended Play (EP) Media

Compuware Program Analyzer can also be delivered as part of the Xpediter installation media (DVD) or electronic FTP download.

Information on the Product Media Label

When Compuware Program Analyzer is delivered as part of the Xpediter installation media, some of the label information applies to installation capability, as noted below:

This DVD contains: List of the included Xpediter products identifying each product's name and release number.

Security: Minimum level of Compuware's License Management System required.

Created on: The Xpediter installation media label shows when it was made. Compare this creation date with any maintenance posted on the Compuware Go customer support website at <http://go.compuware.com>.

If additional maintenance has become available since the date on the installation DVD, either download the maintenance from the Compuware Go customer support website, or contact Compuware Program Analyzer Customer Support (see "Customer Support" on page xxiii) to request a new installation media with the current maintenance.

SMP/E Installation

Follow the procedures as described in the *Compuware Installer Mainframe Products SMP/E Installation Guide*. After the successful SMP/E installation, continue with the product configuration as described in Chapter 3, "Collect Site-Specific Information".

SMP/E Maintenance

Compuware recommends that you periodically obtain and apply maintenance to keep your product version current. All maintenance for Compuware Program Analyzer and each of its releases is provided on the Compuware Go (FrontLine) customer support website at <http://go.compuware.com>.

Locate the **Fixes and Downloads** section for the Compuware Program Analyzer product and select the release for which you wish to apply maintenance. Follow the instructions on the website for acquiring the maintenance.

Optionally you may acquire maintenance by getting a current copy of the Compuware Program Analyzer EP media and using it to generate the JCL for applying maintenance via SMP/E.

To install the Compuware Program Analyzer maintenance to an existing installation, perform the steps described in Chapter 3, “Apply Maintenance with SMP/E” of the *Compuware Installer Mainframe Products SMP/E Installation Guide*.

Compuware Program Analyzer Packaging

The product package contains both the base code and all approved maintenance to date. Whether you received your product package via RFN or via physical media, install the Compuware Program Analyzer base product according to the instructions in the *Compuware Installer Mainframe Products SMP/E Installation Guide*.

Compuware recommends that you periodically obtain and apply maintenance to keep your product version current. You can obtain cumulative maintenance from Compuware Go (FrontLine) or by ordering an updated product package. To install the maintenance to an existing installation, refer to the *Compuware Installer Mainframe Products SMP/E Installation Guide*.

Compuware Program Analyzer Naming Convention

The following is the FMID for Compuware Program Analyzer:

- MLXW160 – Compuware Program Analyzer Base Code

Libraries Created During SMP/E Installation

The chart in Table 2-1 lists the libraries created during the Compuware Program Analyzer installation using SMP/E.

Table 2-1. Libraries Created During Compuware Program Analyzer Installation With SMP/E

| DDname | Library Type and Content | Dataset Name as Defaulted |
|----------|--|---------------------------|
| SMPCSI | Compuware global CSI | CPWR.GLOBAL.CSI |
| SMPLOG | Compuware log file | CPWR.GLOBAL.SMPLOG |
| SMPPTS | Compuware SMP/E system file | CPWR.GLOBAL.SMPPTS |
| ALXWCLST | Compuware Program Analyzer distribution CLIST library | CPWR.MLXW160.ALXWCLST |
| ALXWDFLT | Compuware Program Analyzer distribution DEFAULTS library | CPWR.MLXW160.ALXWDFLT |
| ALXWINST | Compuware Program Analyzer distribution INSTALL library | CPWR.MLXW160.ALXWINST |
| ALXWLOAD | Compuware Program Analyzer distribution LOAD library | CPWR.MLXW160.ALXWLOAD |
| ALXWMSG | Compuware Program Analyzer distribution MSG library | CPWR.MLXW160.ALXWMSG |
| ALXWPARM | Compuware Program Analyzer distribution PARM library | CPWR.MLXW160.ALXWPARM |

Table 2-1. Libraries Created During Compuware Program Analyzer Installation With SMP/E

| DDname | Library Type and Content | Dataset Name as Defaulted |
|---------------|---|----------------------------------|
| ALXWSAMP | Compuware Program Analyzer distribution SAMPLE library | CPWR.MLXW160.ALXWSAMP |
| ALXWSRCM | Compuware Program Analyzer distribution SORCMAC library | CPWR.MLXW160.ALXWSRCM |
| LXWnnnD | Compuware Program Analyzer distribution zone | CPWR.MLXW160.DZONE.CSI |
| SLXWCLST | Compuware Program Analyzer target CLIST library | CPWR.MLXW160.SLXWCLST |
| SLXWDFLT | Compuware Program Analyzer target DEFAULTS library | CPWR.MLXW160.SLXWDFLT |
| SLXWINST | Compuware Program Analyzer target INSTALL library | CPWR.MLXW160.SLXWINST |
| SLXWLOAD | Compuware Program Analyzer target LOAD library | CPWR.MLXW160.SLXWLOAD |
| SLXWMSG | Compuware Program Analyzer target MSG library | CPWR.MLXW160.SLXWMSG |
| SLXWPARM | Compuware Program Analyzer target PARM library | CPWR.MLXW160.SLXWPARM |
| SLXWSAMP | Compuware Program Analyzer target SAMPLE library | CPWR.MLXW160.SLXWSAMP |
| SLXWSRCM | Compuware Program Analyzer target SORCMAC library | CPWR.MLXW160.SLXWSRCM |
| LXWnnnT | Compuware Program Analyzer target zone | CPWR.MLXW160.TZONE.CSI |
| SMPMTS | Compuware Program Analyzer SMP/E system file | CPWR.MLXW160.SMPMTS |
| SMPSCDS | Compuware Program Analyzer SMP/E system file | CPWR.MLXW160.SMPSCDS |
| SMPSTS | Compuware Program Analyzer SMP/E system file | CPWR.MLXW160.SMPSTS |
| SMPLTS | Compuware Program Analyzer SMP/E system file | CPWR.MLXW160.SMPLTS |

Chapter 3.

Collect Site-Specific Information

This chapter helps you collect the site-specific information you need to customize the mainframe portion of Compuware Program Analyzer in order to establish the link between components that communicate with the workstation and the MVS host. Because the information for the installation and customization comes from different sources, it is easiest to collect it before beginning the install and customization process.

Note: If you have already installed this release of Compuware Program Analyzer without the Code Coverage component, refer to Appendix B, “Customizing Code Coverage After Customizing the Base Product”.

Installation of Compuware Program Analyzer should be done according to the instructions in the *Compuware Installer Mainframe Products SMP/E Installation Guide*. The actual installation process is handled by SMP/E through the submission of several batch jobs created by the Compuware Installer. After the SMP/E installation has been completed, some customization is required by the Customization Manager. This is an automated ISPF application that prompts you for the site-specific information you collect and controls the customization process. Customization Manager provides default values for most datasets, programs, and other entries that must be specified to perform the customization. However, these values may not be appropriate for your site. Use the tables in this chapter to record the correct values before beginning the customization. Then use Chapter 4, “Customization Procedures” to perform the customization.

Compuware Program Analyzer Dataset Names

Use this table to record the names of datasets loaded and used by Compuware Program Analyzer. Your value is based on the SMP/E dataset high-level qualifier you entered when specifying SMP/E high-level qualifiers as described in the *Compuware Installer Mainframe Products SMP/E Installation Guide*.

Table 3-1. Compuware Program Analyzer dataset names

| Description | Your Value |
|-----------------------------------|----------------------------|
| Product Installation Dataset | <Your SMP/E HLQ>.INSTALL |
| SMP/E Target CLIST Library | <Your SMP/E HLQ>.SLXWCLST |
| SMP/E Target Defaults Library | <Your SMP/E HLQ>.SLXWDFLT |
| Communication File | <Your SMP/E HLQ>.DSC |
| SMP/E Target Product Load Library | <Your SMP/E HLQ>.SLXWLOAD |
| Customization Log File | <Your SMP/E HLQ>.LOGFILE |
| SMP/E Target ISPF Message Library | <Your SMP/E HLQ>.SLXWMSG |
| SMP/E Target Parm Library | <Your SMP/E HLQ>.SLXWPARAM |
| HCI Parm Library | <Your SMP/E HLQ>.PARMLIB |
| SMP/E Target Sample Library | <Your SMP/E HLQ>.SLXWSAMP |
| SAS/C Runtime Library v5.5 | <Your SMP/E HLQ>.LOADLIB |
| SMP/E Target Sorcmac Library | <Your SMP/E HLQ>.SLXWSRCM |

ISPF Datasets

Use this table to record the names of the standard IBM-supplied ISPF datasets used at your site. If you only have one library for each component type, leave unused libraries blank.

Note: The ISPF library names you specify during the Compuware Program Analyzer install must match those used in the PAJOBM TP JCL member. If library names change after the install, make corresponding changes to the JCL.

CAUTION:

Talk to your MVS Systems Programmer to get the correct dataset names of the standard IBM-supplied ISPF libraries if your site is not using the "ISP.SISP*" naming convention provided as the default (see Table 3-2). The ISPF command ISRDDN, issued on the TSO command line, lists the current TSO allocations. From the ISRDDN list, the ISPF library names are listed as part of concatenations for DDnames such as ISPMLIB and ISPPLIB.

Table 3-2. ISPF dataset names

| Description | Default Value | Your Value |
|-----------------------|---------------|------------|
| 1st Messages Library | ISP.SISPMENU | |
| 2nd Messages Library | | |
| 3rd Messages Library | | |
| 1st Panels Library | ISP.SISPPENU | |
| 2nd Panels Library | | |
| 3rd Panels Library | | |
| 1st Skeletons Library | ISP.SISPSENU | |
| 2nd Skeletons Library | | |
| 3rd Skeletons Library | | |
| 1st Tables Library | ISP.SISPTENU | |
| 2nd Tables Library | | |
| 3rd Tables Library | | |

Enterprise Common Components and System Libraries

Use this table to record the names of the following Enterprise Common Components and system libraries. Your value is based on the high-level qualifier of the Compuware ECC HCI load library name you entered as described in the *Compuware Installer Mainframe Products SMP/E Installation Guide*.

- ECC HCI CLIST library
- ECC HCI Authorized library
- ECC HCI Macro library
- ECC HCI Panel library
- ECC HCI Table library
- ECC Shared Services Loadlib

This is the load library used by:

- Code Coverage to get code coverage statistics
 - File Transfer to get source from DDIO files
 - IEFJOBS Lib (Optional. Used when running TPs with master JCL. See step Note: on page 25.)
- This is the library concatenated within MSTJCLXX, which is used to place job cards for started task TPs that run with master JCL.

CAUTION:

Compuware strongly recommends that you convert both HCI and TPs to run as started tasks after verifying that they execute properly. This will eliminate contention for JES initiators and prevent getting 1011 error messages on a workstation when starting TPs.

- System Proclib
- PL/I Compiler library (Optional. Used by the Metadata Analyzer to collect metadata from the PL/I collector.)

Table 3-3. ECC Shared Services and System Libraries dataset names

| Description | Default Value | Your Value |
|-----------------------------|---------------|------------|
| ECC HCI CLIST Lib | CPWR.SLCXEXEC | |
| ECC HCI Auth Lib | CPWR.SLCXAUTH | |
| ECC HCI Macro Lib | CPWR.SLCXCNTL | |
| ECC HCI Panel Lib | CPWR.SLCXPENU | |
| ECC HCI Table Lib | CPWR.SLCXTLIB | |
| ECC Shared Services Loadlib | CPWR.SLCXLOAD | |
| IEFJOBS Lib | SYS1.STCJOBS | |
| System Proclib | SYS1.PROCLIB | |
| PL/I Compiler Lib | | |

Code Coverage Loadlib

If you chose to customize Code Coverage, use this table to record the Xpediter/Code Coverage Loadlib that is installed at your site.

Table 3-4. Code Coverage Loadlib dataset name

| Description | Default Value | Your Value |
|-----------------------|-----------------------|------------|
| Code Coverage Loadlib | CPWR.MLXV310.SLXVLOAD | |

Install Options Variables

Use this table to record variables that are specific to your site, including JCL parameters used during the installation and parameters for optional interfaces to other products.

Table 3-5. Installation options

| Variable | Default Value | Your Value | Comments |
|--|---|------------|--|
| DTYPE | PDS | | Specify the type of Compuware Program Analyzer partition dataset to allocate: PDS or PDSE. |
| DUNIT | SYSDA | | The disk unit name. Optional. |
| DVOLUME | | | The disk VOLSER. Optional. |
| JESDEF | JES2 | | Directs Customization Manager to build a JES2 or JES3 parm card to direct the TP to the specified MVS Image in your SYSPLEX. This parm is only used in a SYSPLEX environment if your TP is running as a Batch job. |
| JOBCARD1 JOBCARD2 JOBCARD3 JOBCARD4 | /// /// /// /// JOBNAME /* /* /* | | The jobcard that Customization Manager will use throughout the installation process. Specify a valid jobcard in JOBCARD1 through JOBCARD4. |
| OUTCLASS | * | | The SYSOUT class used in the JCL generated to install the product. |
| PLINAME | IBMZPLI | | The program name of your PL/I compiler. |
| REALIO | SYSDA | | The valid DASD work unit for REALIO. If your site uses SMS, ensure that the temporary datasets that require REALIO are not directed to VIRTUAL IO. |
| REALVOL | | | Enter the VOLSER for REALVOL if your site uses certain VOLSERS for non-VIO DASD units. |
| STTP | NO | | Set this value to YES if you intend to run the TPs as started tasks. CAUTION: Compuware strongly recommends that you set the TPs to run as batch jobs during the Compuware Program Analyzer installation and then, after verifying that they execute properly, convert them to run as started tasks. Running them as batch jobs during the installation makes it easier to verify that they execute properly. Running them as started tasks after the installation will eliminate contention for JES initiators and prevent getting 1011 error messages on a workstation when starting TPs. |
| STTPMJCL | NO | | Specifies whether your started task transaction programs will run with master scheduler JCL using the IEFJOBS DD concatenation of MSTJCLxx. Refer to step Note: on page 25. |
| SYSID | | | Specify a unique four-character alphanumeric name for the MVS Subsystem that this execution of HCI is to assume. The SYSID name must be unique across all subsystems on the MVS complex. |
| TCPNAME | TCPIP01 | | Enter the TCPIPJOBNAME used to start the TCP/IP address space (up to eight characters). |
| VIO | VIO | | Work unit for virtual IO. |

Table 3-5. Installation options (Continued)

| Variable | Default Value | Your Value | Comments |
|----------|---------------|------------|---|
| XPPORT | 1316 | | The TCP/IP port number used in Connection Manager to create an HCI connection to the host. This is a unique, dynamically allocated number that defines the TCP/IP port used only by Compuware Program Analyzer. The number can range from 0 to 32767. |

Transaction Program Definitions

Use this table to record custom variable names used for running the following:

- Job Manager TP variable
- File Transfer TP variables
- Job Manager Debugging TP variables

We recommend that you leave these values as is, although they can be changed to meet your site-specific needs. Values that cannot be changed are indicated in the “Your Value” column.

Note: The Job Manager Debugging TP is used to collect tracing information to send to Compuware for troubleshooting, when necessary.

Table 3-6. TP definitions

| Variable | Default Value | Your Value |
|--|---------------|------------|
| Job Manager TP Variables | | |
| • TP Name | PAJOBM | |
| • TP Type | JM | JM |
| • Compuware Program Analyzer PARMLIB Member Name | HCIPJOBM | |
| • MVS SYSID | | |
| File Transfer TP Variables | | |
| • TP Name | PAXFER | |
| • TP Type | FT | FT |
| • Compuware Program Analyzer PARMLIB Member Name | HCIPXFER | |
| • MVS SYSID | | |

Chapter 4.

Customization Procedures

This chapter walks you through the following steps for customizing the mainframe portion of Compuware Program Analyzer. This customization establishes the link between components that communicate with the host and the MVS host.

- “Step 1. Determine Which Components To Customize”
- “Step 2. Execute Customization Manager”
- “Step 3. Select Components To Customize”
- “Step 4. Define Dataset Names”
- “Step 5. Specify Options”
- “Step 6. Define Variables for TP Definitions”
- “Step 7. Perform Customization Tasks”
- “Step 8. Establish Security Protections”
- “Step 9. Set Up HCI Security”

Note: If you have already customized this release of Compuware Program Analyzer without the Code Coverage component, refer to Appendix B, “Customizing Code Coverage After Customizing the Base Product”.

The customization process is handled by Customization Manager, an automated ISPF-like application that prompts you to enter the site-specific information you collected and controls running a series of batch jobs that complete the customization process.

Step 1. Determine Which Components To Customize

During this customization, you will select which of the following components should be available to workstation users:

- Program Analyzer
- Code Coverage

It is imperative that you work with the end users of the product to determine which components they need customized. If you do not customize the mainframe portion of a component, end users will not be able to use that component.

The tasks and options that appear on each screen are based on your customization choices. Therefore, some tasks and options may appear as “option not selected” or not appear at all.

Further, if you are planning to perform CICS collections with the Metadata Analyzer, the Metadata Analyzer collection must have read authority—through the UserID specified in the related connection—to access the dataset that contains the CICS Startup JCL, the dataset pointed to by the DFHCSD DD, and the load library that contains the DFHSIT module.

Step 2. Execute Customization Manager

1. Execute the CLIST \$XASETUP from the install dataset created when you transferred files to the mainframe by entering the following in an ISPF/PDF COMMAND field:

```
TSO EX '<Your SMP/E HLQ>.SLXWINST($XASETUP)'
```

The SOFTWARE LICENSE AGREEMENT screen appears.

2. Read the agreement and type **1** to accept the agreement or **2** to reject the agreement. Press **Enter**. If you accept the agreement, the **Welcome** screen appears.
3. Select option **1** to select which components to customize. The **SELECT COMPONENTS TO CUSTOMIZE** screen appears.

Step 3. Select Components To Customize

By default, the following component is set to YES, meaning it will be available for the workstation user.

- Code Coverage

1. Change the YES value to NO if you don't want to customize this component at this time. Press **F3**. The **Welcome** screen appears again.

CAUTION:

It is imperative that you work with the end users of the product to determine which components they need to use. If you do not customize the mainframe portion of a component, end users will not be able to use that component.

2. Select option **2** to begin customization. The **SET UP** screen appears.

Note: The tasks and options that appear on each screen vary based on your customization choices. Therefore, some tasks and options may appear as “option not selected” or not appear at all.

Note: Several screens within Customization Manager provide a CHANGE command that allows you to perform a search-and-replace operation on character strings. Refer to “Using the CHANGE Command” on page 29 for how to use this command.

Step 4. Define Dataset Names

1. Select option **1** and press **Enter** on the **SET UP** screen to define the names of datasets required for this customization. The **DATASET NAMES** screen appears.
2. Select option **1** and press **Enter** to display the **PRODUCT DATASETS** screen.
3. Confirm the correct entries for all datasets under **Dataset Name**. These entries match Table 3-1 on page 17, which are based on the SMP/E dataset high-level qualifier you entered when specifying SMP/E high-level qualifiers as described in the *Compuware Installer Mainframe Products SMP/E Installation Guide*. Refer to “Using the CHANGE Command” on page 29 to easily perform search-and-replace operations on character strings.
4. Press **F3** to save your changes and return to the **DATASET NAMES** screen.
5. From the **DATASET NAMES** screen, select option **2** and press **Enter** to display the **ISPF DATASETS** screen.

6. Enter the dataset names to match your existing site standards, making sure to scroll down and confirm the correct entries for all datasets. If you are upgrading from a prior release, verify that the names of the ISPF libraries merged from the previous installation are still current. These entries match Table 3-2 on page 18.

Note: The ISPF library names you specify during the Compuware Program Analyzer customization must match those used in the PAJOBM TP JCL member. If library names change after the customization, make corresponding changes to the JCL.

7. Press **F3** to save your changes and return to the **DATASET NAMES** screen.
8. From the **DATASET NAMES** screen, select option **3** and press **Enter** to display the **ECC SHARED SERVICES & SYSTEM LIBRARIES** screen.
9. Enter the dataset names for the ECC Shared Services Loadlib, IEFJOBS lib, and System Proclib, making sure to scroll down and confirm the correct entries for all datasets. These entries match Table 3-3 on page 19. If you are upgrading from a prior release, verify that the names of the libraries merged from the previous installation are still current.
10. Press **F3** to save your changes and return to the **DATASET NAMES** screen.
11. If you selected Code Coverage to customize, from the **DATASET NAMES** screen, select option **4** and press **Enter** to display the **CODE COVERAGE LOAD LIBRARY** screen.
12. Enter the dataset name of the Code Coverage Load Library installed at your site, and confirm that the entry is correct. This entry matches Table 3-4 on page 19. If you are upgrading from release 4.2.1 or higher, verify that the name of the Code Coverage library merged from the previous installation points to the most current installation of Code Coverage at your site.
13. Press **F3** to save your changes and return to the **DATASET NAMES** screen.
14. Press **F3** until you reach the **SET UP** screen.

Step 5. Specify Options

In this step, you will specify the customization parameters. The table is populated with the default values delivered with the product. If you are upgrading from a prior release, make sure that the following options are **different** from the ones specified in the previous installation.

1. Select option **2** and press **Enter** on the **SET UP** screen. The **OPTIONS** screen, which is several pages long, appears.
2. Verify and/or update the values, making sure to scroll down and confirm the correct entries for all values. These entries match Table 3-5 on page 20.

Note: For information on a specific field, type an H in the CMD field to display help.

Note: Whenever you are scrolling through a list of options, make sure that **SCROLL** is not set to **MAX**. Specify either **CSR**, **HALF** or **PAGE** to ensure that you do not skip over list items.

Compuware strongly recommends that you convert both HCI and TPs to run as started tasks after verifying that they execute properly. This will eliminate contention for JES initiators and prevent getting 1011 error messages on a workstation when starting TPs.

3. If you chose to set up your started task TPs with master JCL using the IEFJOBS DD concatenation, do the following:

- a. Verify that both STTP and STTPMJCL customization option variables are set to YES for TPs to run with master JCL.
- b. Verify that the dataset name associated with DD IEFJOBS in the master scheduler JCL dataset (commonly known as the MSTJCLxx member of SYS1.PARMLIB) is specified in the ECC SHARED SERVICES & SYSTEM LIBRARIES screen. Refer to Table 3-3 on page 19. Customization Manager creates members in this dataset that contain tailored job cards and an execute card to support each started task TP.

CAUTION:

Ensure that the HCI Authorized Library is APF-authorized and is available on all MVS images. This library must be APF-authorized on every MVS, not just on the MVS where the HCI will run.

4. Press F3 to save your changes and return to the SET UP screen.

Step 6. Define Variables for TP Definitions

In this step, you will define the variables for the Transaction Program (TP) definitions you will use with Compuware Program Analyzer. This includes the TP names and member names for the TP JCL and the TP types.

1. Select option 3 and press **Enter** on the SET UP screen. The TP DEFINITIONS screen appears.
2. Review the table and update the values where appropriate, making sure to scroll down and view all TP information. **TPs are provided as part of the installation.** These entries match Table 3-6 on page 21. If you are upgrading from a prior release, make sure that the TP NAMES are different from the ones specified in the previous installation. Make sure to change PARMLIB MEMBER names from the default—HCIPJOBM/HCIPXFER—to the new names specific to the new release of the product. This ensures that the existing HCIPJOBM/HCIPXFER will not be overwritten when new started tasks are copied into your system's PROCLIB.
3. Refer to “How To Add a TP” on page 30 if you want to add additional TPs.
4. Press F3 to save your changes and return to the SET UP screen.

Step 7. Perform Customization Tasks

The SET UP screen's Option 4 - Installation contains a list of tasks that must be selected and processed sequentially to install Compuware Program Analyzer.

Some tasks generate a batch job and then invoke an ISPF/PDF Edit session for the job. Review this JCL and submit the job, then review the job output before moving on to the next task.

For each task, use the S line command to generate JCL from the values entered in Options 1-4 on the SET UP screen. When you use the S or E line command, a standard ISPF/PDF Edit screen appears with notes and comments that explain what to do next. **It is imperative that you read the internal notes and comments for each task to understand the steps that are taking place during the installation.** Most of the JCL or objects should not require any manual modification.

If you are upgrading from a prior release, after you have performed the following installation tasks, the new TPs are independent and separate from the TPs currently running at your site.

Note: S Line Command vs. E Line Command for Generating and Editing JCL

To generate the JCL for the task, you must use the S line command before you can submit the associated job. If you make changes to the JCL immediately before submitting, your changes will be lost if you later attempt to resubmit the job after using the S line command (that is, the JCL is regenerated). You can resubmit the job using the most recent version of the JCL by using the E line command.

Note: Before installing, make sure the library you designated for the HCI Authorized library is APF-authorized. You will receive a 047 abend from Step 8 if the library is not properly authorized.

1. Select option **4** and press **Enter** from the **SET UP** screen to display the **CUSTOMIZATION** screen.
2. Enter **S** in the **Cmd** field next to Task 1. Review and submit this job. This task submits a batch job to copy all applicable datasets from the product media to disk based on the values established in the **DATASET NAMES** and **INSTALL OPTIONS** screens.

Note: After each task that submits a job, verify that the job completed successfully before proceeding to the next task.

3. Enter **S** in the **Cmd** field next to Task 2. Review and submit this job. This task decompresses the load modules sent on the product media.
4. Enter **S** in the **Cmd** field next to Task 3.

CAUTION:

This task will run either as a batch job or as a started task depending on how you set the STTP installation variable earlier (see page 20). Compuware strongly recommends that you run the TPs as a batch job during the Compuware Program Analyzer installation to make it easier to verify that they execute properly, and then convert them to run as a started task (see step 7). Before you can test your TPs, the HCI must be active with the Compuware Program Analyzer definitions. Task 5 will generate a report with the HCI definitions needed for Compuware Program Analyzer.

5. Select each displayed TP JCL member and submit it. You should have at least one member executing the program XPPJOBM and one member executing the program XPPXFER.

CAUTION:

Sites may restrict the use of TSO commands for background use by modifying the system PARMLIB member IKJTSOxx or by modifying the TSO exit IKJEFTNS. Because the TP executes under background TSO, it must NOT be restricted.

To determine whether your site has restricted the TP task from background use, search for the character string FTTSRVR in IKJTSOxx. It should not be found. IKJEFTNS is a CSECT in IKJTABLS. Browse IKJTABLS in SYS1.LPALIB. Search for the character string FTTSRVR. It should not be found.

Note: The TPs must be submitted on the same MVS image that the HCI is running on. If you have JES/3 installed on your system, make sure the CLASS parm directs the job to the same MVS image that the HCI is running on.

6. Verify that XPPJOBM and XPPXFER TPs are running and that these jobs do not terminate with a completion code of 0 or abend. If your installation is correct, the results should be that the TPs execute and go to a waiting status. After you verify this, cancel the TPs.

7. If you ran the TPs as batch jobs, Compuware recommends, now that you have verified that they can execute without errors, that you convert them to started tasks. To do this, do the following:
 - Press **PF3** until you reach the **SETUP** screen.
 - Select option **2** and press **Enter**.
 - On the **OPTIONS** screen, change the value of **STTP** (the install option variable for **TPS**) to **YES**.
 - Press **PF3** to return to the **SETUP** screen and select option **4**.
 - On the **CUSTOMIZATION** screen, enter **S** in the **Cmd** field next to Task 3 and rerun it.

Note: Running the HCI and TPs as a started task will eliminate contention for JES initiators and prevent getting 1011 error messages on a workstation when starting TPs.

8. Enter **S** in the **Cmd** field next to Task 4. This task copies the JCL members that were generated and tested in Task 3 to the **PROCLIB** dataset if you set up the HCI to run as a started task (or to the **PARMLIB** dataset if you set up to run as a batch job).

CAUTION:

For the JCL to successfully copy your started tasks to the system's PROCLIB, the PROCLIB name must be specified on the DATASET NAMES screen and the STTP install options variable must be set to YES.

If you choose to run transaction programs as started tasks, an extra option is available to run these started tasks with master JCL using the IEFJOBS DD concatenation. Refer to the step detailing how to set up started task TPs with master JCL on page 25.

9. Enter **S** in the **Cmd** field next to Task 5. This task generates a report from the information you entered. This information will be used to configure the workstations to connect with the host component of Compuware Program Analyzer. It also contains a report describing the definitions needed in the HCI **PARMLIB**.
10. The mainframe installation is now complete. To exit the Customization Manager, select **X** on the **WELCOME** screen and press **Enter**.

Step 8. Establish Security Protections

If your site uses a security package, assign the following protections for any of the datasets that were created during the installation.

| Dataset | Protection |
|------------------------------|-------------------------------|
| CPWR.MLXW160.SLXWCLST | Programmers need READ access. |
| CPWR.MLXW160.SLXWDFLT | Programmers need READ access. |
| CPWR.MLXW160.DSC | Programmers need READ access. |
| CPWR.MLXW160.HCICNFIG.LOAD | Programmers need READ access. |
| CPWR.MLXW160.SLXWLOAD | Programmers need READ access. |
| CPWR.MLXW160.SLXWMSG | Programmers need READ access. |
| CPWR.MLXW160.SLXWPARAM | Programmers need READ access. |
| CPWR.MLXW160.SASC550.LOADLIB | Programmers need READ access. |

| Dataset | Protection |
|------------------------|-------------------------------|
| CPWR.MLXW160.SLXWSAMP | Programmers need READ access. |
| CPWR.XA050300.SLXWINST | Programmers need READ access. |

Step 9. Set Up HCI Security

If you are running HCI as a started task, the user ID associated with this task must have READ authority to the Compuware Program Analyzer datasets.

To use HCI with TCP/IP, Open Edition MVS segment (OMVS) access also needs to be defined.

For more information on HCI security considerations, refer to “System Security for the HCI” on page 40.

TP Performance Considerations

Compuware suggests assigning TPs to a performance group above BATCH but below CICS, VTAM, and JES.

Summary

This completes the base installation of the Compuware Program Analyzer components that communicate with the host.

You can now install, set up, and verify the Compuware Program Analyzer workstation components. Refer to the help for step-by-step procedures for installing and setting up the product.

If you plan to use File Transfer and your source is stored in Endeavor, Panvalet, or Librarian, customize File Transfer. Refer to Appendix C, “Customizing File Transfer” for detailed instructions.

Using the CHANGE Command

Several screens within Customization Manager provide a CHANGE command that allows you to perform a search-and-replace operation on character strings. For example, if you enter CPWR.MLXW530 in the FROM field and CPWR.MLXW160 in the TO field, all dataset names in the table are changed accordingly.

If you are upgrading from a prior release, change all dataset names to be different from the existing dataset names, thus ensuring that the new release is installed in different datasets.

Note: Customization Manager provides a comprehensive help system. After you complete the initialization of Customization Manager, you can access help by pressing F1 on any Customization Manager screen. Additionally, Customization Manager provides help for all input fields. When an H is listed as a valid line command, enter an H in the COMMAND field to display a help window for that field.

How To Add a TP

The ADD command allows you to add additional TPs.

1. Type **ADD** in the option field and press **Enter**. The **ADD** screen appears.
2. Enter the appropriate values for the TP you are creating.
3. Enter the appropriate values for the MVS system ID, which are used to route the TP to a specific MVS image for execution, and press **Enter**.
4. Verify that the “Row Added” message appears in the upper right corner of the screen.

Appendix A. Using HCI

This appendix describes how to configure HCI, the operator commands supported by HCI, HCI security, and the HCI Journal Facility. It also contains documentation about HCI-XPRT, a collection of diagnostic tools used for tuning and resolving local problems.

Note: For information about HCI return codes and messages, refer to the *Enterprise Common Components Messages and Codes MVS Version* manual.

Configuring an HCI

Step 1: HCI00 Parameter File

Located in SLCXCNTL, the HCI00 Parameter File contains customization parameters for HCI, CSS TP and (optionally) Compuware Program Analyzer. A copy of this member must reside in the //CWPARM concatenation of the CMSC (see the *Enterprise Common Components Installation Guide* for release 16.5 for further information on CMSC).

Specify the following:

SYSID

Specifies the four-character subsystem name of HCI. You must ensure this name is unique among all subsystems running on the LPAR, and not defined in SYS1.PARMLIB. The HCI dynamically creates this subsystem for you. Each HCI that you desire to run on a single LPAR must have its own unique SYSID value.

DEFAULT_USER

Specifies the name of a valid RACF (ACF/2 or TOPSECRET) user ID to be used by the HCI when TP jobs are submitted or started and when there is no other user ID available. Ensure that the default user ID has either ACCESS(READ) or ACCESS(EXECUTE) to the //STEPLIB DD used in the TP JCL and that it has appropriate access to any other datasets that it processes under the default user ID. Once the TP has issued a security call, the default user ID is no longer used for access as the TP starts running under the user ID passed in the security call. Must be a valid USERID.

OPCMD

How operator commands are entered to the HCI.

OPCMD=[WTOR|MODIFY]

WTOR — Reply to Operator (r nn,) is to be used

MODIFY — z/OS MODIFY (/F) is to be used

JOURNALn

Specifying journal datasets allows for logging of HCI activity. The HCI uses the Journaling Facility to write out diagnostic information that may then be provided to Compuware Developers.

Minimum CSS TP Parameters

Advanced details on the CSS TP parameters are located in the *Topaz Workbench Installation Guide*. The CSS TP parameters section begins at the PORT_CONFIG location in the HCI00 Parameter File. Order must be retained for composite keywords.

Specify the following:

PORT_CONFIG

Denotes the start of a CSS TP port configuration. Everything below this keyword will apply to the value specified for PORT_CONFIG.

STASK

CSS TP Started Task procedure name. This address space is intended to run APF authorized functions on behalf of Topaz Workbench.

SSAS_PROC

SSAS_NAME

CSS TP Started Task procedure name and address space name. This address space is intended to run unauthorized functions on behalf of Topaz Workbench.

LOCAL_PORT=nnnnn

LOCAL_HOST=&LPARNAME..COMPUWARE.COM

LOCAL_ZIIP=Y

The Local statements identifies the HCI using this PORT_CONFIG configuration, and whether select TP activity should be executed on an available ZIIP processor.

HCI_SYSNAME=&LPARNAME.-TP-PROD

HCI_LPAR=&LPARNAME

HCI_PORT=nnnnn

HCI_HOST=&LPARNAME..COMPUWARE.COM

Service HCI definition. This allows for support of Host Explorer connections to this LPAR.

Strobe Web Service Users only

If the datasets below are not in the LINKLIST, ensure the STASK STEPLIB contains the following datasets.

"STROBE.SSTRAUTH

"DSNxxx.SDSNLOAD

Compuware Program Analyzer Users only

The following parameters are required to run Compuware Program Analyzer. These default parameters must be included in the HCI00 PARMLIB member Product Definitions section.

```

DEVENT_GCS_PORT=1216          COLLECTOR GCS
DEVENT_TCP_PORT=12160        COLLECTOR TCP
TPT_NAME=XPPXFER             -- XFER JCL START
START XPEDFT16
END
TPT_NAME=XPPJOBM             -- JOBM JCL START
START XPEDJM16
END
TPT_NAME=XPPTCPIP           -- TCPIP JCL START
START XPDDIO16
END

```

DEVENT_GCS_PORT=

Specify the Compuware Program Analyzer Job Manager port.

DEVENT_TCP_PORT=

Specify the Compuware Program Analyzer TCP/IP port.

TPT_NAME=**START *name*****END**

Specify the *name* of a TP and command input to the HCI. Text between TPT_NAME= and END will be used as input to the HCI.

for Sysplex Support

Sysplex support is available to

SYSPLEX=xxxx

Four-character subsystem name, which must be different than the HCI SYSID specified. This name must be unique among all MVS images in the SYSPLN and must not be specified in the IEFSSNxx member of SYS1.PARMLIB.

ROUTCMD=YES|NO

Yes specifies that the HCI routes z/OS START commands to the active member of the sysplex that currently has the least number of routes to it. The following example illustrates what changes would be required to enable XPPJOBM a SYSPLEX routed task.

TPT_NAME=XPPJOBM**ROUTE (CW09,CW03,CW01) XPEDJM16****END****PREPROC=procedure**

This value specifies the name of the procedure in which the HCI should invoke on each MCS image in the SYSPLEX to prepare the MVS for HCI communication.

Sample PREPROC procedure that will activate SYSPLEX support in the HCI. No changes are required below aside from specifying the SLCXAUTH dataset:

```
//IEFPROC PROC HCISYSP=DUMY,HCITYPE=
```

```
//HCIPREP EXEC PGM=HCIYPREP,PARM='&HCISYSP,&HCITYPE'  
//STEPLIB DD DISP=SHR,DSN=CPWR.SLCXAUTH
```

Overview of Operator Commands

DISPLAY

Display status information about an HCI region.

| Operands | Description |
|----------|---|
| ALL | Displays all HCI status fields. |
| JOURNAL | Displays information about the journal. |
| STOR | Displays information about current storage utilization. |
| CB | Displays information about control block utilization. The CURRENT utilization, HIGHEST utilization, and MAXIMUM allowed as configured in the HCICNFIG file are displayed. |

SHUTDOWN

Terminate the HCI.

| Operands | Description |
|----------|------------------------------|
| IMMED | For an immediate shutdown |
| NORMAL | For normal shutdown |
| ABEND | For a forced abend situation |

Additional Commands

Various commands that may be useful in controlling an HCI.

| Operands | Description |
|----------------|---|
| CLOSE | Turn journaling off. Close and deallocate the current journal dataset. |
| OPEN | Allocate and open the next journal dataset. |
| JMASK [ON/OFF] | Turn on/off full journaling. TP activity is the default journal mask. |
| SWAP | Close and deallocate current journal dataset, open the next for journaling. |

Optional DD Statements

In addition to the DDs supplied in the sample HCIPROC, the following DDs may be used.

| | |
|---------------------|---|
| //CWSCsss DD DUMMY | Used to override the default CMSC in which the HCI will retrieve parameters. Where ssss is the four-character CMSC identifier specified on the CMSC PARM=. |
| //PMaaNNNN DD DUMMY | Optionally used to override the default PARMLIB member specified in the CMSC configuration. Where aa is the two-character product code and NNNN is the PARMLIB member suffix. |

Step 2: HCIJOURN

The HCIJOURN job allocates the HCI journal datasets and the CSS TP journal datasets. The CSS TP journals are only necessary if you are going to deploy the SSAS address space to enable Compuware DDIO file support of Code Coverage/Eclipse (see Chapter 9, “Implement the Shared Services Address (SSAS)”).

Step 3: HCIPROCS

The HCIPROCS job creates three procedures in the dataset specified by SYSUT2 required for Topaz Workbench.

- **HCIPROC** — HCI procedure. Optionally, the HCI can be run as a batch job. Typically this is done to verify customization.
- **CXSSAS** — Shared Services Address Space (SSAS), used primarily for DDIO and Xpediter/Code Coverage.
- **CCSS** — CSS TP started task, used mainly by File-AID and Strobe, designed to run as unauthorized.

Caution: All datasets in the STASK proc STEPLIB must be APF-Authorized and must have universal read access.

IMPORTANT: If you are planning to use the File-AID Data Editor or File-AID Data Privacy, be sure to verify and uncomment the DD for the File-AID libraries in the STEPLIB concatenation. See Chapter 7, “File-AID Product Installations and Configurations”

Depending on your installed releases of File-AID products, you may optionally code each of the File-AID libraries in the STEPLIB concatenation of the STASK procedure. When specifying individual libraries for each File-AID product.

For File-AID 10.1 or higher, there are no separate product libraries, there are only two required datasets CXVJLOAD and SXVJAUTH.

Use the File-AID 10.1 or higher (File-AID 16.3 recommended) customization (CXVJLOAD) and distribution authorized load library SXVJAUTH (as shown in Figure 4-1).

IMPORTANT: If using this HCI configuration to support Strobe Web Services or SQLAF, the STEPLIB datasets to be activated for Strobe are:

STRnnn.SSTRAUTH (**can be in the LINKLIST**)

DSNxxx.SDSNLOAD (**if not in LINKLIST**).

Add

```
//*SBSQLTRC DD DUMMY
```

```
//*SBSQLSNP DD DUMMY
```

Figure 4-1. SLCXCNTL member HCIPROCS Startup JCL example

```

/*HCI      JOB  0,HCI
/* *****
/* THIS JCL PERFORMS THE FOLLOWING INSTALLATION PROCESSING:
/* STEP(S)  FUNCTION
/* -----
/* HCIPROC  CREATE CATALOGED PROCEDURES TO SYSTEM
/*          PROCEDURE LIBRARY.
/*
/* NAME(S)  FUNCTION
/* -----
/* HCIPROC  HOST COMMUNICATIONS INTERFACE
/* CXSSAS   SHARED SERVICES STARTUP PROCEDURE
/* CXSS0000 SHARED SERVICES TP STARTED TASK
/*
/* DATASET(S)  DESCRIPTION
/* -----
/* CPWR.SLCXAUTH  ECC AUTHORIZED LIBRARY
/* CPWR.SLCXLOAD  ECC LOAD LIBRARY
/* SYS1.PROCLIB   PROCEDURES DESTINATION LIBRARY
/*
/* *****
/*HCIPROC EXEC PGM=IEBUPDTE,PARM=NEW
/*SYSPRINT DD SYSOUT=*
/*SYSUT2   DD DISP=SHR,DSN=SYS1.PROCLIB
/*SYSIN    DD DATA,DLM=ZZ
./ ADD NAME=HCIPROC
/*HCI      PROC
/*
/* HOST COMMUNICATIONS INTERFACE PROCEDURE
/*
/*STEP1    EXEC PGM=HCIMMAIN,DYNAMNBR=125,
/*          REGION=64M
/*STEPLIB DD DISP=SHR,DSN=CPWR.SLCXAUTH
/*HCIJCL  DD SYSOUT=(A,INTRDR)
/*SYSPRINT DD SYSOUT=*
/*HCIERR  DD SYSOUT=*
/*ABNLIGNR DD DUMMY
/*IDIOFF  DD DUMMY
./ ADD NAME=CXSSAS
/*CXSSAS  PROC
/*
/* SSAS STARUP PROCEDURE
/*
/* - THE HCI AUTOMATICALLY STARTS THIS PROCEDURE AS NEEDED
/* AND SHOULD NOT BE STARTED MANUALLY.
/* - FOR CODE COVERAGE SUPPORT UNCOMMENT THE CC LIB DD
/*
/*IEFPROC  EXEC PGM=CXASINIT,
/*          PARM=('&TPNAME'), ** DO NOT CHANGE THIS PARM VALUE **
/*          REGION=0M
/*STEPLIB DD DISP=SHR,DSN=CPWR.SLCXLOAD
/*          DD DISP=SHR,DSN=CPWR.SLXVLOAD <== CC LIB
./ ADD NAME=CXSS0000
/*CXSS0000 PROC PROG=IEFBR14
/*
/* CSS TP STARTED TASK
/*
/* - ALL STEPLIB LIBRARIES MUST BE APF-AUTHORIZED
/* - FOR FILE-AID SUPPORT UNCOMMENT THE FA CUST/DIST LIB DDS
/* - FOR STROBE SUPPORT UNCOMMENT THE SB LIB DDS AND
/* OPTIONALLY THE DB2 SDSNLOAD LIBRARY
/*
/*IEFPROC  EXEC PGM=&PROG,
/*          REGION=0M,
/*          PARM=('&TPNAME')
/*          DD DISP=SHR,DSN=CPWR.SKXAUTH
/*          DD DISP=SHR,DSN=CPWR.CXVJLOAD <== FA CUST LIB
/*          DD DISP=SHR,DSN=CPWR.SXVJAUTH <== FA DIST LIB
/*          DD DISP=SHR,DSN=CPWR.SSTRAUTH <== SB LIB
/*          DD DISP=SHR,DSN=DSNA10.SDNSLOAD <== DB2 FOR SB
./ ENDUP
ZZ

```

Step 4: HCITEST

The HCITEST job attempts to ping the HCI to validate connections. HOSTIP= must contain the value of the home address in which the HCI is executing. PORT= must represent the port on which the HCI is listening.

Figure 4-2. Sample JCL in SLCXCNTL, HCITEST member

```

/**
/**  CSS TP COMMUNICATION VERIFICATION UTILITY
/**
/**  JOBSTREAM TO VERIFY THAT THE HCI AND CSS TP ARE INSTALLED
/**  AND CONFIGURED.
/**
/**
/**  EXEC PGM=CXTPIVP,REGION=1M,TIME=(,20)
/**
/**STEPLIB DD DISP=SHR,DSN=COMPWARE.MLCXNNN.SLCXLOAD      <== VERIFY
/**SYSPRINT DD SYSOUT=*
/**SYSIN   DD *
HOSTIP=MVS1.XYZCORP.COM                                <== VERIFY
PORT=16196                                             <== VERIFY
/**

```

Figure 4-3. TP Connection established example

```

Compuware Shared Services TP Connection Verification Utility

Control statement specification:
HOSTIP=MVS1.XYZCORP.COM
PORT=16196

OPEN connection      RC = 00, ERRNO=00000
SEND data            RC = 00, ERRNO=00000
RECV data            RC = 00, ERRNO=00000
SEND data            RC = 00, ERRNO=00000
RECV data            RC = 00, ERRNO=00000

Connection to the port was successfully validated.
Valid Compuware mainframe product license verified.

```

If a connection cannot be established, or there are error conditions present, the output might resemble the example in Figure 4-4, along with suggested causes and areas that might require verification.

Figure 4-4. Example of TP Connection not established

```

Compuware Shared Services TP Connection Verification Utility

Control statement specification:
HOSTIP=MVS1.XYZCORP.COM
PORT=46806

OPEN connection      RC = 00, ERRNO=00000
SEND data            RC = 00, ERRNO=00000
RECV data            RC = 28, ERRNO=00054

The connection was unexpectedly terminated. Possible causes:
* HCI configuration macros HCICNPCB or HCICNTPT are not correctly set.
* The PORT number specified is a secure port via AT-TLS.
* The PORT number specified is an active port, but is in use by another kind of
application.

```

Different messages could be output depending on the exact return code received during operation.

If a connection to HCI is established, messages will be issued and will be visible in the HCI job log. The messages might resemble the example in Figure 4-5.

Figure 4-5. Example messages from an established HCI connection

```
CXTPMAI009I 0001 Init CXTP01 H0882400
CXTPCFG019I 0001 Configuration file CXTP01 successfully processed
CXTPMAI043I 0001 Ping from 10.10.0.200
CXTPMAI007I 0001 Term RC=00000000 FDBK=0 Reason=00000000
```

Additionally, messages will be shown in the job log of the CXTPIVP utility execution. These messages might resemble the example in Figure 4-6.

Figure 4-6. Example job log messages from CXTPIVP utility execution

```
IEF403I CXTPIVP0 - STARTED - TIME=07.14.59
+CXCM001I HOST 10.10.0.200 ACTIVE
+CXCM002I ATTEMPTING CONNECTION WITH IP 10.10.0.200:16196
+CXCM003I CONNECTION SUCCESSFUL
+CXCM005I CONNECTION CLOSED
IEF404I CXTPIVP0 - ENDED - TIME=07.14.59
```

IMPORTANT: It is recommended that once the HCI is implemented, it should be set up to run as a started task and included in the IPL startup sequence.

HCI Security Considerations

HCI security is categorized into two types: user and network. *User security* refers to the process of validating that a particular user is authorized to perform requested functions. *Network security* is concerned with encrypting and decrypting data as it flows through the network. Because the HCI does not handle network security, this section only describes *user* security considerations.

Note: **Top Secret users**

A new facility needs to be placed in the Facility Matrix Table. Use the following facility control options:

```
FACILITY (USER33=NAME=HCI)
FACILITY (HCI=NOABEND, ASUBM, NOAUDIT, AUTHINIT, NOINSTDATA)
FACILITY (HCI=MULTIUSER, PGM=HCI, SHRPRF, SIGN(M), NOTSOC)
FACILITY (HCI=RES, KEY=8, NOXDEF, NOLUMSG, NOSTMSG)
```

Overview

User security is handled with HCI as prescribed by MVS requirements.

A separate module, which accesses no HCI storage areas other than the parameter list that is passed to it, processes all security requests. It does so by issuing RACROUTE macros, which invoke the IBM Security Access Facility. The underlying security package (RACF, ACF/2, or Top Secret) is automatically invoked by RACROUTE. If you are running any of these security packages, you do not need to modify the HCI security module. If, however, you are running on a very old release of ACF/2 or Top Secret or have a home-grown package, you may need to modify the source module. Therefore, the source is shipped as part of the installation process.

Default User ID

A default user ID is extracted from the MVS security system (for example, RACF) when any user of HCI registers. Therefore, if the task that is registering was operator-started (that is, not started by HCI's Server Activation Facility [SAF]), the user ID associated with the task becomes the default user ID. For communications purposes, this user ID can be overridden by HCI CPI-C extension calls, or it can be left alone and used as is.

Inbound Conversation Requests

Inbound conversation requests are initiated by the receipt of an FMH-5 from the partner LU. An FMH-5 can contain one of the following:

- User ID and a password
- User ID only
- Neither user ID nor password

HCI performs security validation as follows:

- When both a user ID and a password exist within the FMH-5, they are checked against the RACF database. If either is invalid, the conversation request is denied. If both are valid and a user has already registered, the conversation is passed to the user, who continues to execute under that user's default user ID. If no user has registered, SAF initiates a user address space, and it runs under the user ID that was received in the FMH-5. This user ID becomes the default user ID.
- When only a user ID exists within the FMH-5, the "already verified" bit must also be set, which indicates that the user identified by the user ID has entered a valid password and is recognized as a valid user. The user ID (with no password) is checked against the RACF database. If the user is not defined to RACF, the conversation request is denied. If the user is defined and has already registered with HCI, the conversation is passed to the user. If no user has registered for the conversation, SAF initiates a new address space and it executes under the user ID that was received in the FMH-5. This user ID becomes the default user ID. Again, the JCL initiating the task can contain USER and PASSWORD operands that will override the default user ID.
- When no security fields exist within the FMH-5, no security checking is performed. If a user has already registered with HCI, the conversation is passed to that user and it executes under the default user ID. If no user is registered, and the SAF starts an address space to handle the incoming request, a default user ID is specified in the configuration assembly, and it is under this user ID that the user program runs. Note that this user ID can have no authority to access protected resources except if the resource carries an appropriate "universal access." If the JCL used to initiate the user address space carries valid USER and PASSWORD operands, they are the ones used for the task.

TPNAME Security

An optional feature of HCI is to require that all application programs be defined to RACF as having access to the TPNAMEs that they are registering as. This facility is a protection

against rogue application programs masquerading as valid programs and intercepting transactions that were not meant for them to process. The facility requires that the security administrator define a RACF entity, which is the TPNAME, under the security class of FACILITY. The format for this is TPNAME prefixed with the SYSID (for example, Xvrm.PAXFERvrm). Then, the administrator must grant READ access to any user ID that will own an application that issues CWRNU. This facility is available on a TPNAME-by-TPNAME basis, because if HCI finds that the TPNAME in question has not been defined as an entity to RACF, it allows unlimited access to the TPNAME. Therefore, an installation can choose to protect some of the local TPNAMEs, but not others.

System Security for the HCI

To use HCI with TCP/IP, Open Edition MVS segment (OMVS) access also needs to be defined. Missing OMVS segment attached to HCI will result in TCP/IP error (Sockets ERRNO=156) during startup of HCI.

For the HCI to properly function, it must be permitted access to the following, regardless of whether it is a started task or a submitted job:

- Authorized load library containing the HCI modules
- HCI PARMLIB data set containing HCI Server Activation Facility members
- Load library PDS containing the HCI configuration module

The HCI must be authorized for the following via the MVS system security package:

- To generate SDUMPS, if DMPPFX=SDUMP has been specified (the SDUMP specification is recommended by Compuware)
- To output submitted jobs via an internal reader
- For operator commands with “update” authority:
 - START (if any TP will be initiated via the HCI START parm)
 - STOP
 - CANCEL
 - MODIFY (if OPCMD=MODIFY has been specified)
 - ROUTE (if SYSPLEX=xxxx has been specified)

Dispatching Considerations

It can be difficult to determine the “pecking order” of task execution in an MVS system without knowing the functions of the tasks. The HCI is much like a multiple user region because it services many other regions much like VTAM. But it itself uses resources like VTAM and VSAM. Its position in the pecking order, dispatching priority, should be set so that it is *below* VTAM, VSAM, and other communications subsystems (for example, TCP/IP) but *above* the regions, TP applications, that it services. Namely the regions started via the HCI Server Activation Facility.

If the HCI and the TP applications are all started task and are all lumped together in one dispatching group, it may be necessary to watch closely for any bottlenecks involving the HCI. If one is found, it would then be necessary to have the TP application started tasks run at a lesser dispatching order than HCI.

The TP applications should run at a dispatching priority pursuant to that of any other online application, for example, TSO. This would then provide adequate response time to the workstation users.

HCI in a SYSPLEX Environment

Running TPs Under a SYSPLEX Environment

SYSPLEX Batch Jobs

The HCI submits JCL to the JES/2 or JES/3 internal reader to initiate TP programs as batch jobs. JCL within the PARMLIB member is identified by the presence of “//” in the first two positions of the first statement in the member. For a JES/2 installation, a /*ROUTE card is added to the JCL to route the job to the specific MVS image. For a JES/3 installation, a /*MAIN card is added.

SYSPLEX Routed Tasks

Routed task support is part of the SYSPLEX implementation, and is always active when SYSPLEX=xxxx has been specified.

The HCI issues the MVS ROUTE command to initiate server applications. To use the routed task support, the HCI PARMLIB member named in the HCICNTPT entry must contain at least a single record. Starting in column one must be the word “ROUTE” followed by either:

- One or more blanks and then the name of the procedure that must exist in one of the system PROCLIBs
- A list of SYSPLEX MVS names separated by commas and enclosed in parentheses, followed by one or more spaces, then the name of the procedure that must exist in one of the system PROCLIBs

If no list is specified, the ROUTCMD= configuration parameter is checked. If ROUTCMD=NO was specified, the ROUTE is changed to a simple “START” from “ROUTE.” This results in the task being started on the same MVS as the HCI is running on. If ROUTCMD=YES was specified, all active MVS systems are evaluated and the one currently least routed to (from an HCI perspective) is selected.

Note: Check that HCI is authorized to issue the ROUTE command on all MVS systems in a SYSPLEX through security to avoid ROUTE command rejection.

ROUTE System List

The route system list is evaluated to determine the least number of tasks that have been routed to each of them. The one with the least number is chosen. The SYSPLEX MVS names can be specified as a prefix name (that is, any MVS name having the same prefix becomes part of the list). A prefix name is specified by suffixing an “*” to the prefix, such as “CW*.” In this example, any MVS name starting with “CW” will be added to the list. This allows the specification of a group of MVS systems with one single list entry. In addition, it is possible to group entries in the list by using a “;” instead of a comma. The groups are processed from left to right. If all MVS systems in a group are inactive, the next group is evaluated. Again, within a group of one or more active MVS systems, the least routed is selected. Using this grouping technique, it is possible to establish a priority list. For example:

```
(CW03;CW05;CW01)
```

would evaluate from left to right and select the first active MVS system. Whereas:

```
(CW03, CW05, CW01)
```

would select the one with the least number of routes to it. It is possible to mix prefix names and grouping in the list. If the last is a group, it is not necessary to use a “;” prior to the ending parenthesis or “,” if not a group. Spaces within the list will be compressed

out (not used as if a comma). Short notation of a single “*” can be used to denote all MVS systems in the SYSPLEX.

Appendix B.

Customizing Code Coverage After Customizing the Base Product

If you have already installed the mainframe portion of this release of Compuware Program Analyzer and want to customize Code Coverage, follow the procedures in this appendix.

CAUTION:

It is imperative that you work with the end users of the product to determine which components they need customized. If you do not customize the mainframe portion of a component, end users will not be able to use that component.

This customization involves two steps:

1. Collecting the site-specific information needed to customize the component
2. Performing the customization

Collecting Site-Specific Information

Collect the site-specific information for Code Coverage.

Code Coverage Loadlib

Use this table to record the Xpediter/Code Coverage Loadlib that is installed at your site.

Table B-1. Code Coverage Loadlib dataset name

| Description | Default Value | Your Value |
|-----------------------|-----------------------|------------|
| Code Coverage Loadlib | CPWR.MLXV310.SLXVLOAD | |

Customizing Code Coverage

The tasks and options that appear on each screen are based on your customization choices. Therefore, some tasks and options may appear as “option not selected” or not appear at all.

Customizing Code Coverage

Step 1. Execute Customization Manager

1. Execute the CLIST \$XASETUP from the install dataset created when you transferred files to the mainframe by entering the following in an ISPF/PDF COMMAND field:

```
TSO EX '<Your SMP/E HLQ>.SLXWINST($XASETUP)'
```

where *hlq* is the high-level qualifier you entered when transferring the files to the mainframe.

The SOFTWARE LICENSE AGREEMENT screen appears.

2. Read the agreement and type 1 to accept the agreement or 2 to reject the agreement. Press **Enter**. If you accept the agreement, the **Welcome** screen appears.
3. Select option 1 to select which components to customize. The **SELECT COMPONENTS TO CUSTOMIZE** screen appears.
4. Set the value for customizing Code Coverage to YES, but change other values to NO.
5. Press **F3**. The **Welcome** screen appears again.

CAUTION:

It is imperative that you work with the end users of the product to determine which components they need customized. If you do not customize the mainframe portion of a component, end users will not be able to use that component.

6. Select option 2 and press **Enter** to begin customization. The **SET UP** screen appears.

Define Dataset Names

1. Select option 1 and press **Enter** on the **SET UP** screen. The **DATASET NAMES** screen appears.
2. From the **DATASET NAMES** screen, select option 4 and press **Enter** to display the **CODE COVERAGE LOAD LIBRARY** screen.
3. Enter the dataset name of the Code Coverage Load Library installed at your site, and confirm that the entry is correct. This entry matches Table 3-4 on page 19. If you are upgrading from release 4.2.1 or higher, verify that the name of the Code Coverage library merged from the previous installation points to the most current installation of Code Coverage at your site.
4. Press **F3** to save your changes and return to the **DATASET NAMES** screen.
5. Press **F3** until you reach the **SET UP** screen.

Perform Code Coverage Customization Tasks

The **SET UP** screen's Option 4 – Execute contains a list of tasks that must be selected and processed sequentially to customize Code Coverage.

These tasks generate a batch job and then invoke an ISPF/PDF Edit session for the job. Review this JCL and submit the job, then review the job output before moving on to the next task.

For each task, use the **S** line command to generate JCL from the values entered in option 4. When you use the **S** or **E** line command, a standard ISPF/PDF Edit screen appears with notes and comments that explain what to do next. **It is imperative that you read the internal notes and comments for each task to understand the steps that are taking place during the customization.** Most of the JCL or objects should not require any manual modification.

Note: S Line Command vs. E Line Command for Generating and Editing JCL

To generate the JCL for the task, you must use the **S** line command before you can submit the associated job. If you make changes to the JCL immediately before submitting, your changes will be lost if you later attempt to resubmit the job after using the **S** line command (that is, the JCL is regenerated). You can resubmit the job using the most recent version of the JCL by using the **E** line command.

1. Select option 4 and press **Enter** on the **SET UP** screen to display the **CUSTOMIZATION** screen.
2. Enter **S** in the **Cmd** field next to Task 3. Select only the Job Manager TP JCL member and submit it.

CAUTION:

Sites may restrict the use of TSO commands for background use by modifying the system PARMLIB member IKJTSOxx or by modifying the TSO exit IKJEFTNS. Because the TP executes under background TSO, it must NOT be restricted.

To determine whether your site has restricted the TP task from background use, search for the character string FTTSRVR in IKJTSOxx. It should not be found. IKJEFTNS is a CSECT in IKJTABLS. Browse IKJTABLS in SYS1.LPALIB. Search for the character string FTTSRVR. It should not be found. Before you can test your TPs, the HCI must be active with the Compuware Program Analyzer definitions. Task 5 will generate a report with the HCI definitions needed for Compuware Program Analyzer.

Note: The TPs must be submitted on the same MVS image that the HCI is running on. If you have JES/3 installed on your system, make sure the CLASS parm directs the job to the same MVS image that the HCI is running on.

3. If you ran the TP as a batch job, Compuware recommends that you now convert it to a started task. This will eliminate contention for JES initiators and prevent getting 1011 error messages on a workstation when starting TPs. Refer to step 7 on page 28 for how to do this.
4. Enter **S** in the **Cmd** field next to Task 4. This task copies the Job Manager TP that was regenerated and tested in Task3 to the Compuware Program Analyzer PARMLIB or PROCLIB.

CAUTION:

To copy the JCL PROCLIB successfully, ensure that the PDS name is specified in the DATASET NAMES screen. Also, ensure that the install options variable STTP is set to YES.

If you choose to run transaction programs as started tasks, an extra option is available to run these started tasks with master JCL using the IEFJOBS DD concatenation. Refer to step 3 detailing how to set up started task TPs with master JCL.

Summary

This completes the customization of Code Coverage at your site.

You can now install, set up, and verify the Compuware Program Analyzer **workstation** Code Coverage component. Refer to the help for step-by-step procedures for installing and setting up this component.

Before you can test your TPs, the HCI must be active with the Compuware Program Analyzer definitions. Task 5 will generate a report with the HCI definitions needed for Compuware Program Analyzer.

Appendix C.

Customizing File Transfer

File Transfer copies information stored on the MVS host and transfers the copy to the workstation. It also transfers information from the workstation to the MVS host. You can customize File Transfer to access source code, JCL, and/or copybooks from source management systems.

Using File Transfer With Host Source Management Systems

You can customize File Transfer to access source code, JCL, or copybooks from source management systems by using a library exit.

Four exits are shipped with Compuware Program Analyzer:

- Endeavor
- Panvalet
- Librarian
- PDS

Both the load libraries and the source code for exits are included with Compuware Program Analyzer.

XPPFTDEF is the dataset that tells File Transfer which library exits to access and the information it needs to use them.

There are two methods for customizing XPPFTDEF: the mainframe method and the workstation method. The mainframe method is preferred when all workstations should use the same default settings. The workstation method is preferred when using replaceable parameters, because brackets ([]) display on a workstation (on the mainframe display, these characters are invalid). They can be viewed and updated in HEX mode, where the left bracket ([) displays 'AD' and the right bracket (]) displays 'BD'.

Note: The source management system with which the exit is interfacing must be available either by steplib or by link list. For Endeavor, link list is the preferred method because the Endeavor module runs in an authorized environment.

The exits included with Compuware Program Analyzer serve to illustrate how to construct an exit for each supported source management system. While you are encouraged to customize the exits for your own purposes, Compuware does not support these exits in any modified forms.

You may need to modify exits functional in a previous release of Compuware Program Analyzer for use in the current release. Contact Compuware Customer Support for more information.

The load modules for the exits are shipped with the Compuware Program Analyzer Loadlib.

Customizing the Defaults Dataset on the Mainframe

Note: The term “library” is used here to mean “library” or “dataset,” whichever is appropriate to the environment you are using.

1. Open XPPFTDEF, from your Compuware Program Analyzer install dataset, **on the host**.
2. Find the reference to the exit you want to use:
 - For Endeavor, use one of the following:
 - R,ENDEVORX,“ENDEVOR GENERIC”
 - R,ENDEVORX,“ENDEVOR XP11-MACRO”
 - R,ENDEVORX,“ENDEVOR XP11-CPP”
 - For PANVALET, use:
 - R,FTXPANEX,“X2.Xpediter.PANV”
 - For Librarian, use one of the following:
 - R,FTLIBRX,“X2.LIB.MASTER”
 - R,FTLIBRX,“X2.PFHABT0.LIB.MASTER”

Note: XPPFTDEF, as shipped with Compuware Program Analyzer, is set up so you can use multiple exits. If, however, you do not plan to use more than one exit, delete from XPPFTDEF the references to the exits you don’t plan to use.

Figure C-1. XPPFTDEF

```

Session - EXHAI Personal Client
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT USERNAME.TEST.JUNK(XPPFTDEF) - 01.01 Columns 00001 00072
Command ==> Scroll ==> PAGE
000078 * The following exit will be used for Get, Put, and Directory List
000079 * for the sample PANVALET exit
000080 R,FTXPANEX,"X2.XPEDITER.PANV"
000081 DSN='X2.XPEDITER.PANV'
000082 GENPAN=N
000083
000084 * The following exit will be used for Get, Put, and Directory List
000085 * for the sample LIBRARIAN exit
000086 R,FTLIBRX,"PFHABT0.LIB.MASTER"
000087 DD=MASTER2,DSN=PFHABT0.LIB.MASTER
000088 -ADD X,SEQ=/81,6,10,10/
000089 -EMOD
000090 -END
000091 -SEL X,SEQ=/81,6,10,10/
000092 -REP ALL
000093 -EMOD
000094 -END
000095
***** Bottom of Data *****
04/15

```

1. Duplicate the R line and all the parameters that follow it (to the blank line) for each library to be accessed with the exit. For XPPFTDEF to function properly, there must be a blank line between the last parameter and the next ‘R,exit module’ statement.
2. Customize the parameters according to the instructions in “Valid Parameters for Each Exit” on page 56. The following example accesses two CA-PANVALET libraries.

Figure C-2. XPPFTDEF customized to access two CA-PANVALET libraries

```

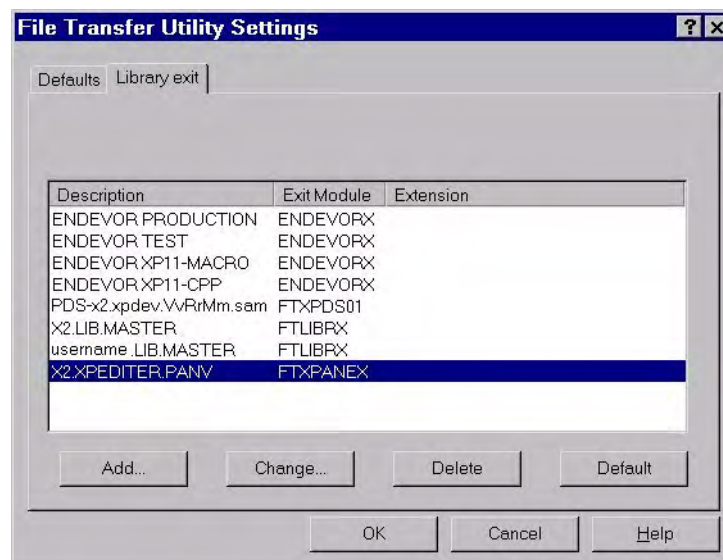
Sessinet - EXTERNAL Param Client
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      USERNAME.TEST.JUNK(XPPFTDEF) - 01.01      Columns 00001 00072
Command ==>                                     Scroll ==> PAGE
000078 * The following exit will be used for Get, Put, and Directory List
000079 * for the sample PANVALET exit
000080
000081 R,FTXPANEX,"Production Panvalet"
000082 DSN='PANVALET.PROD'
000083 GENPAN=N
000084
000085 R,FTXPANEX,"Test Panvalet"
000086 DSN='PANVALET.TEST'
000087 GENPAN=N
000088
000089 * The following exit will be used for Get, Put, and Directory List
000090 * for the sample LIBRARIAN exit
000091 R,FTLIBRX,"PFHABT0.LIB.MASTER"
000092 DD=MASTER2,DSN=PFHABT0.LIB.MASTER
000093 -ADD X,SEQ=/81,6,10,10/
000094 -EMOD
000095 -END
000096 -SEL X,SEQ=/81,6,10,10/
000097 -REP ALL

```

Connected to host ts0270 [172.22.1.202] (TCW00560) CAP NUM 13/23 10:26 AM

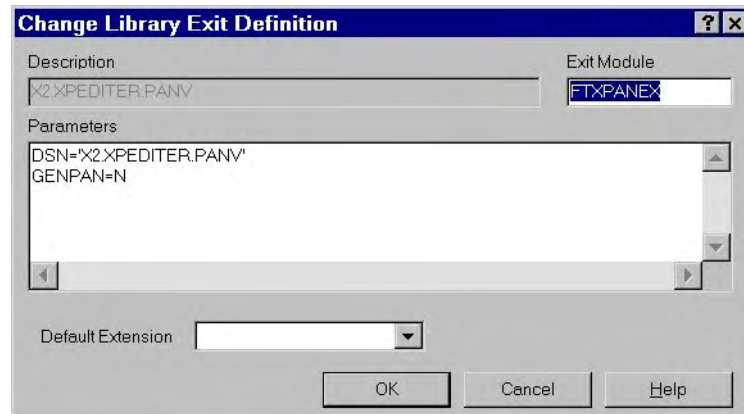
3. Save the changes to XPPFTDEF.
4. Use File Transfer to download XPPFTDEF to each workstation or client's ProgramDataPath specified during the installation (which is available in the **About** dialog box).
5. To load the XPPFTDEF parameters onto each workstation after downloading XPPFTDEF to the Compuware Program Analyzer directory, open File Transfer.
6. From the **Transfer** menu, select **Settings**.
7. Click the **Library** exit tab.
8. Click **Default**. This loads the parameters in the XPPFTDEF file.

Figure C-3. Library Exit tab of the File Transfer Utility Settings dialog box



9. Click **OK**.
10. To see your changes to XPPFTDEF, select the appropriate exit module on the **Library Exit** tab and click **Change**. The **Change Library Exit Definition** dialog box shows your XPPFTDEF changes.

Figure C-4. Change Library Exit Definition dialog box



Note: The term “library” is used here to mean “library” or “dataset,” whichever is appropriate to the environment you are using.

There are two ways you can customize XPPFTDEF on the workstation:

- Set up one value per parameter: If you always want to use the same value for each parameter, use the Editor to indicate these values by manually modifying XPPFTDEF.
- Set up more than one value per parameter: If you want to set up your parameters so they can easily access more than one library, set up replaceable parameters in File Transfer.

Allow only one value per parameter

1. Download XPPFTDEF to each workstation using File Transfer. (The default location of XPPFTDEF is your Compuware Program Analyzer install dataset, and the default download directory is the ProgramDataPath specified during the installation, which is available in the **About** dialog box).
2. Open XPPFTDEF in the Compuware Program Analyzer Editor. The Editor should **not** be in ISPF mode because a blank line is required between each set of parameters. ISPF mode does not support this—CUA emulation is suggested.
3. Find the reference to the exit you want to use:
 - For Endeavor, use one of the following:
 - R,ENDEVORX,“ENDEVOR GENERIC”
 - R,ENDEVORX,“ENDEVOR XP11-MACRO”
 - R,ENDEVORX,“ENDEVOR XP11-CPP”
 - For PANVALET, use:
 - R,FTXPANEX,“X2.Xpediter.PANV”

- For Librarian, use one of the following:
 - R,FTLIBRX,"X2.LIB.MASTER"
 - R,FTLIBRX,"X2.PFHABTO.LIB.MASTER"

Note: XPPFTDEF, as shipped with Compuware Program Analyzer, is set up so you can use multiple exits. If, however, you do not plan to use more than one exit, delete from XPPFTDEF the references to the exits you don't plan to use.

Figure C-5. XPPFTDEF

```

000090 * The following exit will be used for Get, Put, and Directory List
000091 * for the sample PANVALET exit
000092 R,FTXPANEX,"X2.XPEDITOR.PANV"
000093 DSN='X2.XPEDITOR.PANV'
000094 GENPAN=N
000095
000096 -----BOTTOM OF DATA-----
000097
000098
000099
  
```

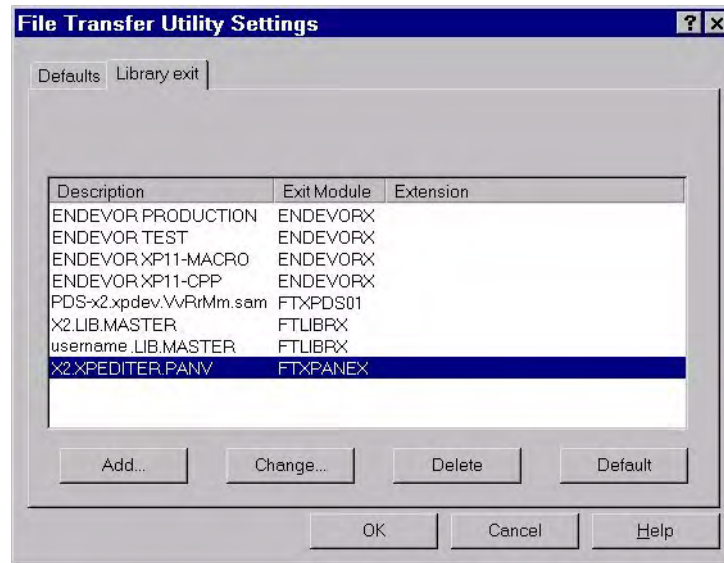
4. Duplicate the R line and all the parameters that follow it (to the blank line) for each library to be accessed with the exit. For XPPFTDEF to function properly, you must have a blank line between the last parameter and the next 'R,exit module' statement.
5. Customize the parameters according to the instructions in "Valid Parameters for Each Exit" on page 56. The following example accesses two CA-PANVALET libraries.

Figure C-6. Change Library Exit Definition dialog box

```

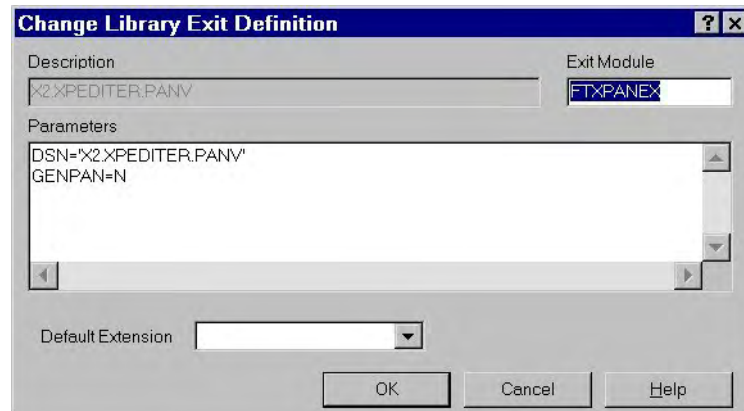
000090 * The following exit will be used for Get, Put, and Directory List
000091 * for the sample PANVALET exit
000092
000093 R,FTXPANEX,"PRODUCTION PANVALET"
000094 DSN='PANVALET.PROD'
000095 GENPAN=N
000096
000097 R,FTXPANEX,"TEST PANVALET"
000098 DSN='PANVALET.TEST'
000099 GENPAN=N
00100
00101
00102
  
```

6. Save the changes to XPPFTDEF.
7. To load the NEW XPPFTDEF parameters onto the workstation, open File Transfer.
8. From the **Transfer** menu, select **Settings**.
9. Click the **Library** exit tab.
10. Click **Default** and click **OK** on the warning message. This loads the parameters in the XPPFTDEF file.

Figure C-7. Library Exit tab of the File Transfer Utility Settings dialog box

11. Click **OK**.

12. To see your changes to XPPFTDEF, select the appropriate exit module on the **Library Exit** tab and click **Change**. The **Change Library Exit Definition** dialog box shows your XPPFTDEF changes.

Figure C-8. Change Library Exit Definition dialog box

Note: If you want to have workstation-specific settings but still be able to restore the default settings in XPPFTDEF in the future:

- Open File Transfer
- In the **Settings** dialog box - **Library Exit** tab, click **Default**.
- Select the exit and click **Change**.
- Modify the exit as necessary. Refer to “Valid Parameters for Each Exit” on page 56.
- Click **OK**.

To revert to the default settings in XPPFTDEF, click **Default** in the **Settings** dialog

box - **Library Exit** tab. Either of these actions reverts XPPFTDEF to its default settings and loses the custom settings on the workstation.

Allow more than one value per parameter

Using replaceable parameters allows you to access more than one dataset/library with a single library exit by setting up a parameter set that accesses multiple libraries. This enables one parameter list to be used in place of many parameter lists that differ in only a few values. In the future, when you attempt to perform a file transfer where replaceable parameters have been set up, File Transfer will invoke a dialog box so the user can accept or change this value.

For Endeavor, replaceable parameters are an alternative to building separate definitions for fields such as Environment, System, Subsystem, Type, or Stage.

For Panvalet, replaceable parameters are an alternative to building separate definitions for Panvalet dataset names.

For Librarian, replaceable parameters are an alternative to building separate definitions for Librarian dataset names.

Note: If the request to transfer files originated from the Compuware Program Analyzer Editor or Program Analyzer, the dialog box does not display and the defaults are used.

The title bar of the dialog box indicates the library exit description from the parameter list.

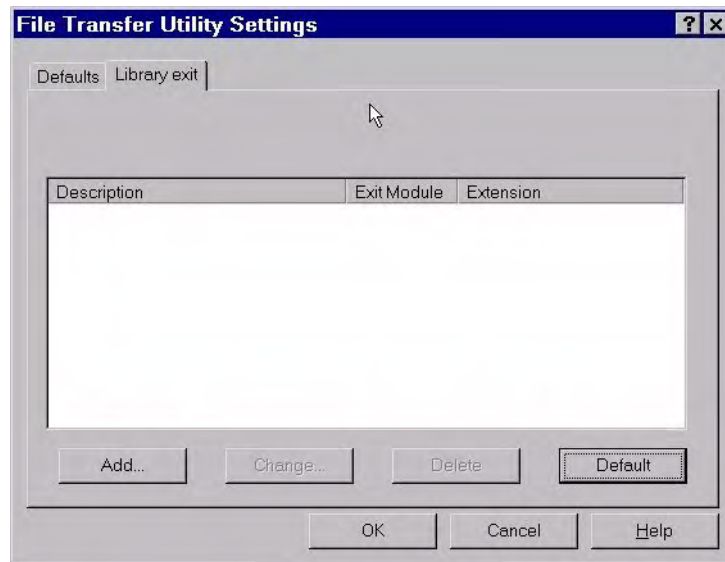
The last value entered for a specific parameter displays when the dialog box appears.

If multiple members are selected from the same dataset list, the user is only presented with the replaceable parameter dialog box one time. All members from the same dataset list have the same parameter settings.

Setting up the Parameter Sets

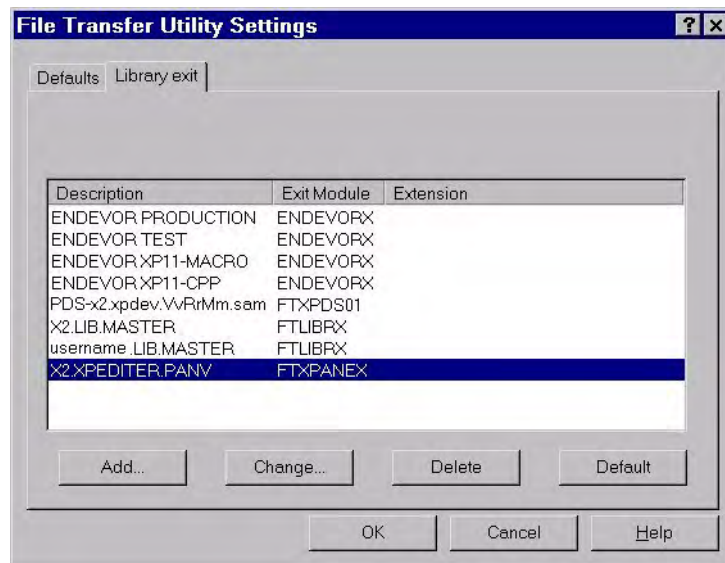
1. From the **Start** menu, select **Programs>Compuware>Compuware Program Analyzer>File Transfer**. The File Transfer Utility window appears.
2. If the **Logon List** dialog box appears, select a connection and click **OK**. The **Enter Password** dialog box appears. Type the required password and click **OK**.
3. From **Transfer** menu, select **Settings**. The **File Transfer Utility Settings** dialog box appears.
4. Select the **Library Exit** tab.

Figure C-9. Library Exit tab of the File Transfer Utility Settings dialog box



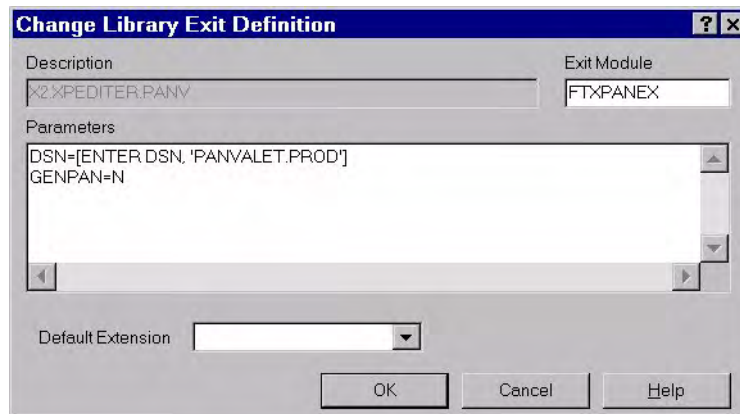
5. Click **Default** to populate the **Library Exit** tab with the default values sent with the product.

Figure C-10. Library Exit tab of File Transfer Utility Settings dialog box



6. Do one of the following:
 - To set up your own exit, refer to “Assembling and Linking the Library Exit” on page 63.
 - To modify a sample exit sent with Compuware Program Analyzer, go to the next step.
7. On the **Library Exit** tab, select the exit you want to modify and click **Change**. The **Change Library Exit Definition** dialog box appears.

Figure C-11. Change Library Exit Definition dialog box



8. In the **Parameters** list box, find the parameters (for example, TYPE) that you want to set up as replaceable.
9. Use the following format to add a prompt (to tell you what action to take (and a value (to give one possible value for the parameter):

[user prompt,value]

For example, change:

X2.Xpediter.PANV

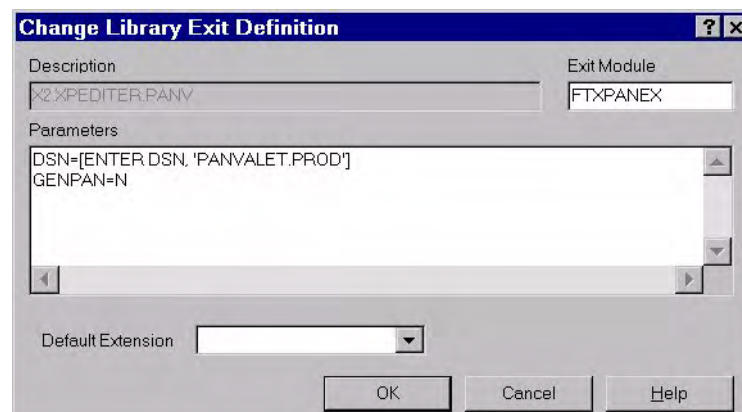
to:

[ENTER DSN, PANVALET.PROD]

where ENTER DSN is a prompt to tell the user what to do and PANVALET.PROD is one possible value for the parameter of DSN.

Refer to “Valid Parameters for Each Exit” on page 56 to find out which parameters can be changed for the type of exit you are using.

Figure C-12. Change Library Exit Definition dialog box



10. Click **OK** in the **Change Library Exit Definition** dialog box.
11. Click **OK** in the **File Transfer Utility Settings** dialog box.

Valid Parameters for Each Exit

The valid parameters vary depending on the library exit. An example of replaceable parameters is in XPPFTDEF, in the Compuware Program Analyzer install dataset R, ENDEVORX, “ENDEVOR GENERIC”. The format of the R command is explained in “R Group” on page 63.

Endevor

To use the Endevor exit, you must customize the Endevor parameters in XPPFTDEF. The Endevor parameters shipped in XPPFTDEF (in R, ENDEVORX, “Endevor XP11 Macros”) are as follows.

Table C-1. Endevor Parameters Shipped in XPPFTDEF

| Parameter | Explanation | Customizing |
|--|---|--|
| SET OPT CCID ENDEX3 COM“TEST ENDEVOR EXIT”. | Supplies the default CCID ‘ENDEX3’ and description of ‘TEST ENDEVOR EXIT’. | <ul style="list-style-type: none"> • Replace ENDEX3 with your CCID. • Replace the description with a description regarding the addition or retrieval you are now doing with the Endevor exit. |
| SET FROM ENV CORPDATA SYS‘XP11’ SUB BASE TYPE MACRO STAGE 2. | Tells Endevor the environment, system, subsystem, type, and stage. | <ul style="list-style-type: none"> • Replace CORPDATA with your environment name. • Replace XP11 with your system name. • Replace BASE with your subsystem name. • Replace MACRO with the type or dataset/library you are accessing. • Replace 2 with the stage of the dataset/library you are accessing. |
| RET ELE ENDEXIT TO FILE FTXWORK | Retrieves a dataset from the source management system. The name ENDEXIT is the name of the element to be retrieved; ENDEXIT is automatically replaced by the element the exit is processing. File ‘FTXWORK’ is the dd name the output is written. | |
| LIST ELEMENTS * TO FILE ENDVRDIR. | Lists the datasets available from the source management system. “LIST ELEMENTS” lists the directories to the DD ENDVRDIR. | |
| NO SIGNOUT | Tells Endevor whether to sign out the member to you. | Delete the NO SIGNOUT parameter if you want to sign out the member. |
| ADD ELEMENT ENDEXIT3 FROM FILE FTXWORK TO ENV CORPDATA SYS XP11 SUB BASE TYPE MACRO OPT UPD. | Adds the element to the Endevor system indicated by the associated environment, system, subsystem, and type. The name ENDEXIT3 is the name of the element to be added; ENDEXIT3 is automatically replaced by the element the exit is processing. | <ul style="list-style-type: none"> • Replace CORPDATA with your environment name. • Replace XP11 with your system name. • Replace BASE with your subsystem name. • Replace MACRO with the type of dataset/library you are accessing. |

Note: The parameters are explained in more detail in the *CA-Endevor SCL Reference* manual.

Panvalet

To use the Panvalet exit, you must customize the Panvalet parameters in XPPFTDEF. The Panvalet parameters shipped in XPPFTDEF (in R, FTPANEX, "X2.Xpediter.PANV") are as follows.

Table C-2. Panvalet Parameters Shipped in XPPFTDEF

| Parameter | Explanation | Customizing |
|------------------------|---|---|
| DSN='X2.Xpediter.PANV' | DSN points the name of the Panvalet dataset that the host session must use for the Panvalet source. | <ul style="list-style-type: none"> Replace X2.Xpediter.PANV with the dataset name. |
| GENPAN=N | Means to not generate PANVALET Control Cards on a Get request. | <ul style="list-style-type: none"> Replace N with Y if you want to generate PANVALET Control Cards on a Get request. |

Note: Other valid parameters are listed in the FTPANEX source file.

Librarian

To use the Librarian exit, you must customize the Librarian parameters in XPPFTDEF. The Librarian parameters shipped in XPPFTDEF (the Assembler version is R, FTLIBRX, "X2.LIB.MASTER" and the COBOL version is R,FTLIBRA,"X2.LIB.MASTER") are as follows.

Table C-3. Librarian Parameters Shipped in XPPFTDEF

| Parameter | Explanation | Customizing |
|---|---|--|
| DD=MASTER1,DSN=X2.LIB.MASTER | Specifies the DD to dynamically allocate and the related dataset name. Be sure, if you have multiple Librarian exits defined, be sure to use a different DD name for each (for example, MASTER1 and MASTER2). The DD= is an exit directive and is not a CA-Librarian command. | Replace X2.LIB.MASTER with the dataset name. |
| -ADD, -DEL, -SEL, -EMOD, -END, and -REP | Information on these is found in the <i>CA-Librarian Command Reference (Batch) Guide</i> . | Customizing this parameter is optional. |
| -ADD X, SEQ=/81,6,10,10/ | -ADD is used if the exit determines that the member sent from the workstation does not exist in the library. SEQ=/81,6,10,10/ avoids line numbers at the end of the source. | Customizing this parameter is optional. |
| -EMOD | Marks the end of one module's control statements and data. | Customizing this parameter is optional. |
| -END | Marks the end of the entire CA-Librarian control stream. | Customizing this parameter is optional. |
| -SEL X,SEQ=/81,6,10,10/ | Selects a module from the master file for processing. | Customizing this parameter is optional. |
| -REP ALL | Is used if the exit determines that the member sent from the workstation exists in the library. | Customizing this parameter is optional. |

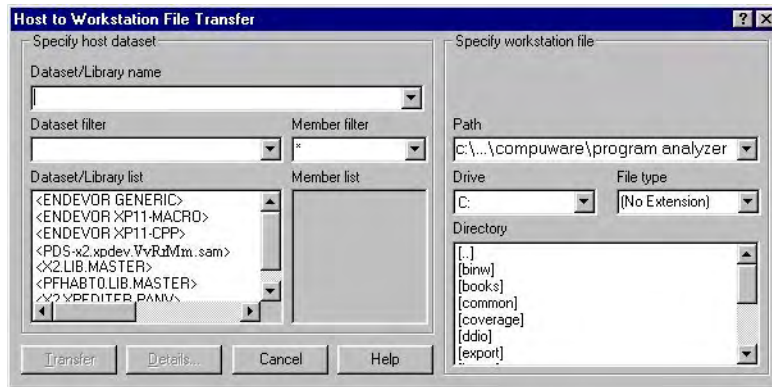
Note: Other valid parameters are listed in the FTLIBRX source file.

More information about Librarian commands issued by FTLIBRX is found in the *CA-Librarian Command Reference (Batch) Guide*.

What Happens When you Use File Transfer With Library Exits

File Transfer's **Host to Workstation** and **Workstation to Host** dialog boxes are used to transfer datasets/libraries between the host and workstation.

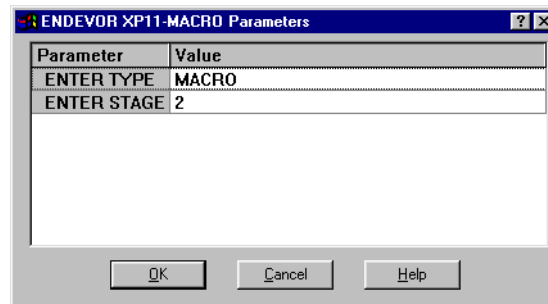
Figure C-13. Host to Workstation File Transfer dialog box



What happens when you double-click an item in the **Dataset/Library List** to use File Transfer to upload or download members using a library exit depends on whether you set up replaceable parameters for the given dataset member or library.

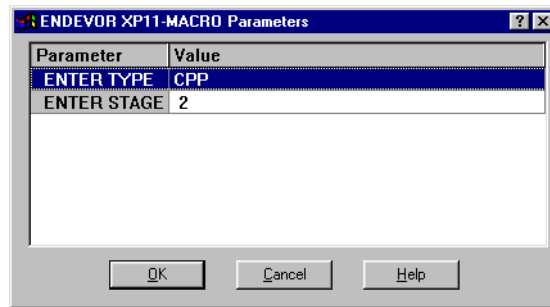
- If you did not, File Transfer operates “normally”—the same way it does when accessing sequential files or PDSs.
- If you set up replaceable parameters, the replaceable parameters dialog box appears when you double-click—in the **Dataset/Library list**—a dataset/library that has replaceable parameter sets established.

Figure C-14. Replaceable Parameters dialog box



- When this happens, accept the default values or change them:
 - To accept the parameter and value shown in the dialog box, click **OK**.
 - To change the parameter and value shown in the dialog box, double-click the value, type the new value, and click **OK**. In Figure C-15, the parameter **MACRO** (as in the previous figure) was modified to **CPP**.

Figure C-15. Replaceable Parameters dialog box



In this example, the replaceable parameter dialog box receives

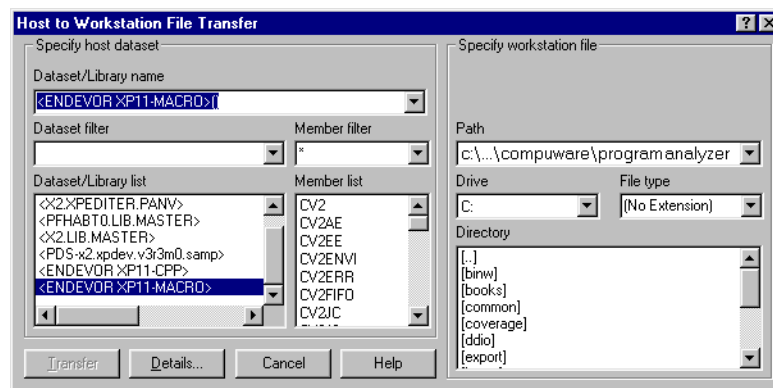
```
'TYPE [ENTER TYPE, CPP] STAGE [ENTER STAGE, 2]'
```

from the parameter list. The substitutions are made during the dialog process and the host library exit receives

```
'TYPE CPP STAGE 2'
```

Thus, the parameters sent have the value enclosed in brackets replaced with the default value. The **Member list** in the **Host to Workstation File Transfer** dialog box populates with the members of the exit you chose.

Figure C-16. Host to Workstation File Transfer dialog box



- Continue with the host to workstation file transfer according to the instructions in the File Transfer help.

Library Exit Reference Information

The library exit is called from the File Transfer host component with various parameters that specify which of the following functions are performed:

- **Get:** Gets a member or file and writes it to the FTXWORK file for subsequent downloading.
- **Put:** Puts a member or file after reading it from the FTXWORK file.
- **List:** Writes a member list to the FTXWORK file.
- A sample library exit that can be used as a pattern to create a customized exit is located in PA.VvRrMm.DEFAULTS(FTXPS01). "v" is the version of Compuware

Program Analyzer, “r” is the release number, and “m” is the maintenance number.

Source Code for the Library Exits

The source code for each exit is shipped with Compuware Program Analyzer.

Endevor Exit

The CA-Endevor exit module—ENDEVORX—is linked into the Compuware Program Analyzer load library. It was written in Assembler. Sample JCL—called JCLFTEXT—is in your Compuware Program Analyzer install dataset and may be used to assemble this source.

XPPFTDEF contains Endevor SCL commands. The parameters are built from commands that are listed in the *CA-Endevor SCL Reference* manual.

Panvalet Exit

The CA-Panvalet exit module—FTXPANEX— is linked into the Compuware Program Analyzer load library. It was written in Assembler. Sample JCL—called JCLFTEXT—is in your Compuware Program Analyzer install dataset and may be used to assemble this source.

XPPFTDEF contains Panvalet directives for the mainframe module FTXPANEX. FTXPANEX uses the CA-Panvalet Access Method (PAM) to query and update the Panvalet library. Further information on PAM is found in the *CA-Panvalet System Management Guide*.

Librarian Exit

There are two CA-Librarian exit modules: one written in Assembler and another written in COBOL. Both exit modules are functionally equivalent. XPPFTDEF contains Librarian directives for the mainframe module FTLIBRX. FTLIBRX uses the CA-Librarian File Access Interface Routines—FAIR—to query and update the Librarian library. Further information on the FAIR routines is found in the *CA-Librarian File Access Interface Routines Guide*.

Assembler Version

The Assembler version of the Librarian exit module—FTLIBRX— is linked into the Compuware Program Analyzer load library. This is the version used for Librarian by default. It requires CAIMAC in the syslib concatenation if assembled. CAIMAC is part of the Librarian installation libraries and is not available from Compuware.

COBOL Version

The COBOL version of the Librarian exit module—FTLIBRC— may be linked into the Compuware Program Analyzer load library. It requires CAISRC in the syslib concatenation. CAISRC is part of the Librarian installation libraries and is not available from Compuware.

The dynamic allocation routines required by FTLIBRC are implemented by FTLIBRA. The combination of FTLIBRC and FTLIBRA is functionally equivalent to FTLIBRX (see “Assembler Version” on page 60). To use the COBOL version, replace FTLIBRX on the “R” line in XPPFTDEF with FTLIBRC.

Sample JCL—called JCLFTEXT—may be used to assemble the source for FTLIBRA. Sample JCL—COBEXIT—can be used to compile the source available for FTLIBRC. Both are in your Compuware Program Analyzer install dataset.

PDS Exit – FTXPDS01

This library exit provides the same functionality as File Transfer does when unmodified—that is, it provides access to flat files and partitioned datasets. You can, however, use this exit to customize how PDSs are accessed.

FTXWORK File

While the library exit receives and returns parameters through a short parameter list as described in “Parameter DSECT” on page 61, the actual files and directory listings are passed through a temporary work file. The work file is assigned the DDNAME of FTXWORK. This file is defined for File Transfer in the File Transfer TP JCL.

The FTXWORK file must be defined with RECFM=VB. The BLKSIZE, LRECL, and space allocation need to be large enough to accommodate the largest file you may want to transfer.

Note: FTXWORK is a temporary file that exists only as long as the File Transfer session is active.

Parameter DSECT

When the library exit is invoked, R1 addresses a parameter list described by the FTXPLIST assembler macro and DSECT of the same name.

The FTXPLIST macro can be found in PA.VvRrMm.DEFAULTS(FTXMACRO). Except as described below, the fields in this DSECT should be considered **reserved and should not be modified**.

FTX_FUNCT

Binary halfword that contains a value of 0 for GET, 1 for PUT, or 2 for LIST specify which function is requested. Any other value is treated as an error.

FTX_PARM_LEN

Binary halfword field that specifies the length of any additional user parameter string specified for this function in the XPPFTDEF file. This is always a multiple of 80 characters to provide support for control statements.

FTX_PARM_ADDR

Address pointer that specifies the address of any additional user parameter string specified for this function in the XPPFTDEF file.

FTX_RET_CODE

Field used to pass a return code back to the File Transfer host component. All non-zero codes mean a failure.

Note: Codes 1 through 100 are reserved for Compuware’s use. Use codes above 100 for error conditions.

FTX_EXIT_NAME

Eight-byte character field that contains the name of the load module invoked for the library exit.

FTX_MEM_NAME

12-byte character field that contains the name of the member to be GET/PUT/LIST, padded with blanks. For LIST functions, this field may contain a filter suffixed with an asterisk (wildcard) character.

FTX_DESC

44-byte character field that contains the library exit name, padded with blanks.

FTX_ERR_MSG

A field used to pass a 64-byte text message that is displayed by the File Transfer workstation component if an error is detected by the library exit.

Calling and Coding Conventions

On entry to the library exit, R1 addresses the FTXPLIST parameter list; R13 points to a standard save area; R14 contains the return address; and R15 contains the entry point address.

Any storage that is allocated must also be freed because the exit may be called multiple times for each file transfer execution. All registers must be saved and restored.

Following is an overview of the sample library exit.

1. FTXPDS01 is the main entry point name used in the sample program. It performs the following tasks:
 - a. Validates the function code in FTX_FUNCT
 - b. Validates the optional parameters
 - c. Dynamically allocates the source/target dataset
 - d. Branches to the requested function
2. FUNCTION_DIR gets the member list of the specified library and writes it to the work file. The required convention is to write a title record as the first record in the work file. This record should have space-delimited fields for each field in the member list. In subsequent records, it is assumed that the member name is first and the next field, separated by one or more blanks, is the number of lines in each member. The sample program assumes ISPF-type statistics in the member list. This function performs the following:
 - a. Opens the FTXWORK file for output and the source/target file for input.
 - b. Writes the title record.
 - c. Reads each record from the library, compares it to the filter in the FTX_MEM_NAME field, formats it as needed, and writes selected lines to the work file.
 - d. Closes the FTXWORK file and the specified source/target file.
 - e. Dynamically frees the specified source/target file.
 - f. Returns any error messages and codes.

If the library has no directory structure, the exit should return a code of 100 in the FTX_RET_CODE field. The file transfer will continue as if it were a sequential file.
3. FUNCTION_GET gets a member from a library so that it can be downloaded. This function performs the following:
 - a. Opens the FTXWORK file for output and the specified source file for input.
 - b. Reads each record from the source file and writes it to the FTXWORK file.

- c. Closes the FTXWORK file and the specified source file.
 - d. Dynamically frees the specified source file.
 - e. Returns a text message in FTX_ERR_MSG if any error occurred, and sets a return code in FTX_RET_CODE. This code should be zero if no errors occurred or above 100, which indicates that the download process failed. The error message appears on the workstation.
4. FUNCTION_PUT gets a file from FTXWORK, where it was uploaded, and writes it to the specified target file. This function performs the following:
 - a. Opens the FTXWORK file for input and the target file for output.
 - b. Reads each record from the work file, and writes it to the specified target file.
 - c. Closes the FTXWORK file and the specified target file.
 - d. Dynamically frees the specified target file.
 - e. Returns any error messages and codes.

Handling Abends

Any abends in your library exit are trapped by a higher level ESTAE exit routine. In the event of an abend, the message, "Exit Module issued message:Abend:Saaa/Ubbb" appears where aaa is the system abend code and bbb is the user abend code. Dumps are directed to SYSUDUMP.

Assembling and Linking the Library Exit

The JCL to assemble and link-edit the sample library exit is in member JCLFTEXT of your Compuware Program Analyzer install dataset. Be sure to change the dataset names to your site's standards and supply the proper member name for both the assembler SYSIN and link-edit SYSLMOD. No SYSLIB is needed because a standalone module is generated without any external references.

Definition File

The values that appear in the **Dataset/Library name** field on the user's workstation are specified by the definition file. The definition file is installed during normal mainframe installation but can be refreshed from the host as needed when the host system programmer creates a library exit that necessitates new entries in the definition file.

The definition file resides on the MVS host in DEFAULTS as member XPPFTDEF. The definition file contains multiple groups of parameters, each group separated by a blank line. Lines beginning with an asterisk are treated as comments and are ignored.

The parameter groups can be any one of the following types, as determined by the letter code in column one of the first line.

D Group

This directory parameter group specifies the high-level directory on the workstation that is to contain files downloaded from the host. This command consists of only the D in column 1, followed by a comma, and then the starting directory to be used (for example, D,C:\Program Files\...\ProgramAnalyzer\FT).

R Group

This group specifies a library exit and parameter combination that can be selected to process members or directories of some file type. The format of the first line consists of the following three parameters separated by a comma:

1. The letter R in column 1.
2. The one- to eight-character name of the library exit load module.
3. A short description of the exit enclosed in double quotation marks. Because this is the description that the programmers will see, name it something that they will understand like the actual name of the source library or some other identifiable description.

The R group can contain one or more other lines of data that specify a parameter string to be passed to the library exit whenever a request is made for a transfer of a member or directory. The case-sensitive parameter string is defined by whoever writes the code for the library exit.

Each parameter record is concatenated to form one long parameter string. The address and length of this string is passed to the library exit in the FTXPLIST parameter DSECT described in "Parameter DSECT" on page 61.

The R group definition for a sample exit that provides transfer and directory list support for a PDS might look like the following:

```
R,FTXPDS01,"PDS Download"  
DSN=your.pds.dsname
```

You can have multiple R group definitions. Separate them with a blank line.

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