STORAGETEK ®

ExPR

Expert Performance Reporter

INSTALLATION, CONFIGURATION, AND ADMINISTRATION GUIDE

PRODUCT TYPE

Software

ExPR
Expert
Performance
Reporter

Installation, Configuration, and
Administration Guide (ICAG)

Release 6.1

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Document Effectivity

EC Number	Date	Doc Kit Number	Type	Effectivity
132453	May, 2006	---	Revision A	This document applies to ExPR Release 6.1.

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About This Book

Overview

This book describes how to install and configure the StorageTek Expert Performance Reporter (ExPR) software product.

Audience

The audience for this document includes MVS system programmers and system administrators who will install and configure ExPR, as well as StorageTek support personnel who support ExPR customers in these efforts.

Organization

This book is organized as follows:

- Chapter 1, *Introduction*, provides an overview of the ExPR installation and configuration process and the specific ExPR hardware and software requirements.

- Chapter 2, *Installation Planning for Existing ExPR Sites*, describes the installation and configuration requirements for existing ExPR customers.

- Chapter 3, *Installation Planning for New ExPR Sites*, describes ExPR functional requirements and processes, the types of data ExPR will collect, site planning issues such that should be considered when inserting the ExPR data collection process into your MVS batch jobstream, and ExPR dataset requirements.

- Chapter 4, *Installation Overview and Checklist,* provides a sequential overview of the ExPR installation process.

- Chapter 5, *ExPR Mainframe Installation and Configuration*, provides instructions for installing and configuring ExPR in the mainframe environment. The instructions are presented as a set of sequential tasks.

- Chapter 6, *ExPR GUI Installation and Configuration*, provides instructions for installing and configuring the ExPR GUI software and StorageTek HTTP Server on a host system in your network.

- Chapter 7, *Host Configuration*, provides instructions for configuring ExPR using the ExPR GUI Host Configurator application.

- Chapter 8, *Database Update and Installation Verification*, provides post-installation instructions for existing users to copy their previous version data to the new datasets, and a procedure for verifying that ExPR is running and collecting data.

- Chapter 9, *ExPR Monitor Service*, describes how to install the optional monitor service on an open system in your network. This service continuously monitors the real-time data produced by the ExPR host.

- Chapter 10, *User Interfacing Facilities*, describes the ExPR Application Programming Interface (API) and the Drive Utilization Sampling feature.

- Appendix A, *ExPR Started Task Control Statements*, describes the control statements found in the various STCPARM*x* members of SAMPLIB.

- Appendix B, *ExPR Special Considerations for MSP Installations*, provides MSP installations with details of differences between the MVS and MSP variants of ExPR.

- Appendix C, *JES3 Installation Notes*, provides information about special situations and set-up issues pertaining specifically to JES3 installations.

- Appendix D, *Automatic File Reorganization – Failure Recovery Procedures*, provides recovery steps to use in the event the file reorganization process fails.

- Appendix E, *Setting up ExPR Started Tasks on CSC or SMC MVS Systems*, provides information for installations that use the StorageTek CSC client software component to communicate with an HSC/LS server system or for installations that use the SMC client software component.

- Appendix F, *ExPR PC Component Installation and Configuration*, provides information for users who wish to use the ExPR PC component in addition to or instead of the ExPR GUI web-based application.

Conventions

The following conventions are used in this book:

- Statement keywords are shown in **boldface** type

- Variable information you enter is shown in *italics*

- A bar (|) separates mutually exclusive choices in command strings

- Brackets [ ] indicate optional items in command strings

- Parentheses ( ) and single quotation marks ' ' must be entered as shown in command strings

Related Documentation

- *Introduction to ExPR*

- *ExPR Mainframe User's Guide*

- *ExPR Client User's Guide*

- *ExPR Messages Guide*

- *ExPR MONTAPE/MONREPT Utility Guide*

- *IBM System Management Facility*

- *IBM RMF User's Guide*

- *IBM TCP/IP for MVS-API Reference*

StorageTek Support

StorageTek Software Support and the StorageTek Customer Resource Center (CRC) maintain information about known ExPR problems and updates. You can contact Software Support or access the CRC for the latest information available concerning product updates (i.e., documentation, PTFs, PUTs).

See the *Requesting Help from Software Support* guide (included in the ExPR package) for information about contacting StorageTek for technical support and for requesting changes to software products, or access StorageTek's CRC homepage at:

http://www.support.storagetek.com

Note: You must obtain a login ID and password in order to access the CRC. You can request a login ID and password from the CRC homepage.

Refer also to the *ExPR Messages Guide*, appendix B, *Reporting ExPR MVS Problems* and appendix C, *Reporting ExPR PC GUI Problems* for instructions about specific information you will need to provide when reporting a problem.

Chapter 1: Introduction

Overview

This chapter provides an overview of the ExPR installation and configuration process and the specific ExPR hardware and software requirements.

Installation and Configuration Process Overview

ExPR is installed using standardized IBM SMP/E processes at the MVS host and configured using the ExPR GUI Host Configurator application.

- If you are installing ExPR at a site where no other version is currently installed, you should read chapter 3, *ExPR Installation Planning for New ExPR Sites* before installing the software.

- If you are an existing ExPR Version 5 user, you should read chapter 2, *ExPR Installation Planning for Existing ExPR Sites* before installing the software. You should also read chapter 3, *ExPR Installation Planning for New ExPR Sites* for an overall technical review of the product.

- ExPR installation and configuration are presented as a set of sequential tasks to perform, starting at chapter 4, *Installation Overview and Checklist* through chapter 8, *Database Update and Installation Verification*.

Skills Required for Installing and Configuring ExPR

The person who installs and configures ExPR should have experience with the following:

- JCL
- SMF/RMF post-processing
- SYS1.PARMLIB members
- VSAM, SMP/E, and IBM Utilities
- TCP/IP
- An understanding of HSC, Nearline ACS/LSM concepts, procedures, and operations
- An understanding of VTCS, VSM/VTSS and the SWSADMIN utility (if applicable)

Execution Environment

Item	Description
Hardware	• An MVS host system, or an MSP host system, on which to install the ExPR Server. • A Microsoft Windows-capable PC (Windows 2000/XP/2003 or 98/Me/NT4) for the PC Client. • A PC, Unix or Linux workstation running a supported browser for the ExPR GUI.
Operating System	• MVS (all releases supported by HSC) and the MVS HTTP Server, or MSP (all releases supported by HSC) and the MSP HTTP Server. • Windows 2000/XP/2003 or 98/Me/NT4 running a supported browser (Microsoft Internet Explorer 6.0 or higher with SP2 installed, Firefox, or Mozilla 1.4 or higher). **Note:** ExPR has been fully tested and certified against Windows 2000 and XP. It should still operate under Windows 98/Me/NT4, but this has not been subjected to a formal test process. • Sun Solaris 8 or higher running a supported browser of Firefox or Mozilla 1.4 or higher, or Red Hat 8 Linux or higher running a supported browser of Firefox or Mozilla 1.4 or higher. **Note:** It is expected that any other OS running Firefox or Mozilla 1.4 or higher should function as a client but this has not been subjected to a formal test process.
Supporting Software	• MVS operating system (Version 5 or higher, OS/390 any release, z/OS any release) • StorageTek Host Software Component (HSC), Release 2.1 or higher • StorageTek Virtual Tape Control Software (VTCS 2.0.0 or higher) if using VSM/VTSS, VTCS 5.0 or higher is required for the ExPR GUI. • SORT product (DF-SORT, SyncSort, or compatible) • SMF/RMF (all releases) • TCP/IP (IBM Version 3.1 or higher, or CA-TCPAccess 5.2 or higher) • SMP/E, Release 8 or higher • Optionally, tape management system (TMS) software, either CA-1 (Release 5.0 or higher), CA-TLMS (Release 5.4 or higher), DF/SMSrmm (Release 1.4 or higher), BMC Control-T (Release 5.0.0 or higher), or ASG-Zara (Release 1.3 or higher). • For the ExPR PC component, Microsoft Windows 2000/XP/2003 or 98/Me/NT4 with a TCP/IP stack capability. • For the ExPR GUI component, Java Runtime Environment 1.4 or higher (download free at www.java.com). • For the ExPR GUI component, a supported browser: (1) Microsoft Internet Explorer 6.0 or

	higher with SP2 installed (download free at www.microsoft.com), (2) Firefox (download free at www.mozilla.com), or (3) Mozilla 1.4 or higher (download free at www.mozilla.org).
Embedded Products	ExPR GUI: • Tigra Menu javascript (SoftComplex www.softcomplex.com) • Binding, Forms, Validation libraries (Jgoodies Karsten Lentzsch http;//www.dev.java.net) * • Jcalendar library (Kai Toedter http://www.toedter.com/en/jcalendar) * • JDesktop Network Components (Swing Labs http://swinglabs.dev.java.net) * • Jfreechart, Jfreecommon libraries (JFree software projects http://www.jfree.org) * • Shani Xml parser (Quentin Anciaux http://sourceforge.net/projects/shanidom) * * *Open Source project* ExPR PC Client: • Graphics Server version 6.0 (Graphics Server Technologies - www.graphicsserver.com) • dsSocket (Dolphin Systems - www.dolphinsys.com) • SizerOne version 7.0 (ComponentOne www.componentone.com) • VSVIEW version 7.0 (ComponentOne www.componentone.com)

Note: Unless specifically stated, references to MVS apply equally to MSP, and references to ExPR GUI/web browser/workstation apply equally to the ExPR PC component and vice versa.

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Chapter 2: Installation Plan for Existing ExPR Sites

Overview

This chapter describes the installation and configuration requirements for existing ExPR customers.

ExPR Requires APF Authorization of ExPR Loadlib

APF authorization is required by the ExPR started task and the batch reorganization function. It is used for the following specific purposes:

- During started task initialization, ExPR determines the initial status of all RTDs via an MVS console issuing a "VT D RTD" command. This MVS function requires APF authorization.

- The RTM and SMF-COLLECTOR functions use the MVS SETLOCK CMS/LOCAL locking mechanism to synchronize with the ExPR IEFU83 SMF exit. SETLOCK requires APF authorization.

- The batch PERFORM REORGANIZATION function requires authorization because certain levels of DF/SMS IDCAMS may fail if it is not APF authorized.

- The TAPECAT extraction from the DF/SMSrmm catalogs. The IBM EDGHSKP utility requires APF authorization.

In the first two cases, ExPR enters privileged mode only for the required function and then immediately switches back to application mode. This minimizes any potential exposure. The third and fourth cases are strictly for IDCAMS/EDGHSKP internal purposes.

Migrating from a Previous Version of ExPR

The ExPR installation process is detailed as a series of tasks to be performed sequentially. This process is described in the following chapters:

- Chapter 4, *Installation Overview and Checklist*

- Chapter 5, *ExPR Mainframe Installation and Configuration*

- Chapter 6, *ExPR GUI Installation and Configuration*

- Chapter 7, *Host Configuration*

The ExPR installation process has an optional component that is described in chapter 9, *ExPR Monitor Service*. If you wish to enable E-mail or MVS console alerts for ExPR

events, you will need to install and configure the ExPR Monitor Service on a separate open system platform that can communicate with the ExPR started task and a host that can service E-mail requests.

There are no database changes in ExPR 6.1 that require migration of the previous ExPR database. Your existing database is simply copied into the newly allocated database files when the installation is complete. This process is described in chapter 8, *Database Update and Installation Verification*.

Note: Refer to the separate book *Introduction to ExPR*, chapter 1, *What's New in this Release* for complete information about new and revised ExPR features.

Important: Ensure that you always use the new JCL samples as shipped. DO NOT use JCL from a previous release to run this version of ExPR.

JES3 Installations

JES3 sites should review appendix C, *JES3 Installation Notes*.

MSP Installations

MSP sites should review appendix B, *Special Considerations for MSP Installations*.

Chapter 3: Installation Plan for New ExPR Sites

Overview

This chapter describes ExPR functional requirements and processes, the types of data ExPR will collect, site planning issues such that should be considered when inserting the ExPR data collection process into your MVS batch jobstream, and ExPR dataset requirements.

Component Structure and Software License Keys

ExPR components and features are packaged as discrete functions controlled by a license key that you must enter during the installation process. The license key activates the features your site has purchased. Additional features can be purchased and activated with a new license key at any time.

License keys are issued by StorageTek Software Manufacturing Distribution (SMD). Refer to the separate license key data sheet for instructions about contacting SMD and the information you will need to supply to receive your license key.

Once you have received your license key, you will enter it into your ExPR configuration during the ExPR installation process. This is described in chapter 5, *ExPR Mainframe Installation and Configuration Tasks*.

Installation and Configuration Process Summary

The ExPR installation process is detailed as a series of tasks to be performed sequentially. This process is described in the following chapters:

- Chapter 4, *Installation Overview and Checklist*
- Chapter 5, *ExPR Mainframe Installation and Configuration*
- Chapter 6, *ExPR GUI Installation and Configuration*
- Chapter 7, *Host Configuration*
- Chapter 9, *ExPR Monitor Service* (optional)

To summarize the process: the ExPR MVS component is installed from its distribution tape using standardized SMP/E processes. Once the ExPR install libraries are received and accepted, you will allocate and initialize the ExPR datasets and tailor the ExPR procedure. Then you activate the ExPR license key for your site and install the ExPR started task, optional MONTAPE, and optional SMF and Security exits. Finally, you

install the HTTP Server and ExPR GUI components and use the ExPR GUI Host
Configurator application to perform ExPR host configuration.

If you wish to enable E-mail or MVS console alerts for ExPR events, you will need to
install and configure the ExPR Monitor Service on a separate open system platform that
can communicate with the ExPR started task and a host that can service E-mail requests.

Hardware and Software Functional Requirements

Note: See *Execution Environment* in chapter 1, *Introduction* for a complete list of
required and supported hardware and software.

Hardware and software functional requirements for using ExPR include:

1. The ExPR MVS component must be installed on an MVS/ESA, OS/390, or z/OS
   system. The ExPR database will be built and maintained on this host system.

2. The continually running ExPR started task must be installed on each HSC/VTCS-
   resident host system and all CSC/SMC client MVS systems that access the
   ACS/VSM hardware. These systems must be capable of connecting to each other
   via TCP/IP. The started task is run as an MVS STC.

3. ExPR requires read access to the HSC control dataset (CDS), except for secondary
   ExPR started tasks running on CSC/SMC MVS client hosts.

4. The ExPR HTTP Server must be installed to use the ExPR GUI web-based
   application. In addition to producing historical reports and real-time monitors, ExPR
   GUI is used for performing host configuration tasks through a web browser on a
   workstation or PC.

   Note: Alternatively, host configuration can be performed and reports and monitors
   displayed using the ExPR PC component. For information about the ExPR PC
   component, refer to appendix F, *ExPR PC Component Installation and
   Configuration*.

5. TCP/IP communication capability is required on any PC or workstation where ExPR
   PC-based reporting applications or the ExPR Web GUI are to be used.

A Functional Overview of ExPR

ExPR is a client/server product, where the client is a PC or workstation and the server is
an MVS or MSP host system running HSC/VTCS.

ExPR collects data from a number of MVS and HSC/VTCS sources and generates
performance reports in a number of different formats. These include real-time activity
and monitors, historical activity, and tape management system data.

The ExPR Started Task

The ExPR started task is a continually running task in your MVS system. The started
task JCL is copied to your PROCLIB concatenation as part of the initial configuration
process. The task should be set to start automatically at each IPL.

ExPR functions that are controlled by the started task are described in the table below.

Started Task Function	Description
RTM – Real-Time Monitor	The Real-Time Monitor (RTM) function provides immediate identification of outstanding mount requests and shortages of free LSM cells or available scratches upon the system console; this is achieved via the CMF sub-feature. For VSM, the RTM monitors virtual mounts and internal VSM activities, including migrates, reclaims, recalls, disk buffer utilization, VTV residency, clustering replication, and overall VTSS throughput. The RTM also generates mount and dismount tracking records for manual drives. RTM is a pre-requisite to the PC real-time monitors. RTM requires installation of the ExPR-supplied SMF exit.
TCP/IP – The ExPR Client/Server Connection	The ExPR client and server components communicate using the TCP/IP protocol. This feature also allows the started task to recognize and accept web browser requests from the MVS HTTP server for ExPR web-based reporting. TCP/IP is also used for communication from the secondary systems to the primary. If the ExPR PC component is used, data is retrieved to the PC from the server via the TCP/IP function of the started task.
PGMI – Collection of Scratch Volume and Free Cell Statistics	The PGMI collector function uses the HSC programmatic interface (known as PGMI) to gather counts of free cells and available scratch volumes within the ACS complex. This feature also collects statistics on HSC scratch subpools, VTSS HAMT/LAMT changes, and VTV replication queues.
Direct SMF Data Collection and Database Update	The optional DirectSMF update feature intercepts required SMF/RMF records as they are generated by MVS and continuously collects them in the PGMIDATA file. Once an hour the collected data is written to the ExPR database as hourly summary records. The collection function runs on all started tasks, whereas the SMF update processes only run on the primary system. The collection function requires that the ExPR-supplied SMF exit be active. The automatic database backup, file reorganization and Auto-Delete features are run as part of the real-time SMF update processes. Reorganization occurs shortly after midnight by default or at a predefined user-specified time.
Primary Host and Secondary Host Identification	In a multi-host environment, the started task is installed on each system and the hosts communicate with each other via TCP/IP. The host where the ExPR database resides is identified in its ExPR started task as the primary host. The rest of the host systems are each identified in their ExPR started task as secondary systems. These systems collect local data into an intermediate PGMIDATA collection file and then once per minute each system connects to the primary host and transfers the contents of its collection file. This transmission includes SMF records from MVS and HSC/VTCS, plus status packets about devices currently being used by jobs on the secondary system. This allows the primary started task to maintain a global view of activity within the ACS/VSM complex.

Started Task Function	Description
ITCU and TAPECAT GUI Interface Server	The Integrated Tape Catalog Update (ITCU) feature integrates the full batch TAPECAT facilities into the started task. The TAPECAT GUI feature can inquire on volumes and datasets in the TMS catalog and HSC CDS. More than 25 user-selectable fields are available as filtering criteria and also as display data. The TAPECAT GUI server supports these requests. The TAPECAT GUI will normally only need to be run on the primary started task. However, if your site has multiple TMS catalogs, then you can run additional TAPECAT GUI functions on secondary systems.

MONTAPE

The MONTAPE feature consists of two parts. The first is a started task or batch job, separate from the ExPR started task that is used to collect the data. The second part reports on the data collected. The data collection process uses the same JCL procedure as the main ExPR started task, with those datasets not required by MONTAPE replaced by DD DUMMY statements. This is so the same license key, stored in the configuration dataset, may be used by both the ExPR started task and the MONTAPE collector. A separate instance of the MONTAPE data collection runs on each system that requires data to be collected.

Batch and Direct SMF Data Collection

ExPR can collect SMF data either through a batch process (PERFORM SMF-UPDATE) that post-processes archived SYS1.MANx SMF/RMF files or directly (DirectSMF) by intercepting required SMF/RMF records as they are generated by MVS .

Note: The DirectSMF update method is controlled by the ExPR started task and requires use of an ExPR-supplied SMF exit.

Consolidating Data for Multiple System/LPAR Sites

With the Consolidated View feature, ExPR can consolidate data collected from individual systems into a consolidated view under the guise of a pseudo-system. This is done in real-time as the data is collected. ExPR automatically collects an "ALL Hosts" consolidated view. Additionally, you can define views that consolidate data from any combination of systems to suit your particular needs (for example, production LPARs, testing LPARs, application-specific LPARs, subsidiary company LPARs, etc.).

Dynamic Auto-Configuration

Much of the information that is specific to your installation is collected automatically by ExPR from the HSC control dataset (CDS) and input to the configuration process as pre-formatted control statements in the automatically generated CDSCONF dataset.

The automatic Config generator feature is invoked automatically by ExPR whenever ExPR is executed, and also whenever an HSC/VTCS NCO reconfiguration occurs.

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During initialization, ExPR extracts the customer hardware configuration. NCS 6.1 Near Continuous Operation (NCO) supports the dynamic/on-the-fly addition and removal of hardware (including ACS/LSM/VTSS/drives/panels/etc.) and dynamically rebuilds its view of the hardware when a change is made. Without NCO support, it would be necessary to restart ExPR to detect any changes to the hardware configuration.

Note: VSM configuration information is collected by ExPR from the VTCS SWSADMIN utility and not from the HSC CDS. Therefore, it is important that the SWSADMIN module is located in a library that is accessible to ExPR.

ExPR Host Configurator Application

Site data that cannot be automatically collected is supplied to ExPR during the user configuration process. This is done with the ExPR Host Configurator application on the ExPR GUI or PC component.

The Host Configurator is used for entering configuration details and activating ExPR features. The submitted data is internally converted to control statements and sent to the host system, where the statements are validated and saved to the CONFIG DD (the previous CONFIG is copied and saved in CONFIGX during initialization of the started task).

ExPR Run-Time Control Statements

Run-time control statements specify ExPR functions to execute in the MVS jobstreams. These are constructed by modifying model control statements and JCL supplied in various members of *usrprfx*.CNTL. ExPR run-time control statements are described in the *ExPR Mainframe User's Guide*.

Order of Statement Processing

ExPR interprets control statements in the following sequence:

1. First, it looks to the CDSCONF DD for automatically generated control statements that define your hardware configuration.

2. Then it looks to the CONFIG DD for additional user-defined configuration-related control statements that specify ExPR features and user option settings.

3. Finally, it looks to the UPRIN DD for run-time statements submitted from *usrprfx*.CNTL members.

ExPR Data Collection Sources

ExPR collects data from the following sources:

- MVS SMF record type 21 (tape error statistics and volume dismount)

- MVS RMF record type 73 and 74 (channel and CU statistics including SSCH counts)

- HSC SMF records (HSC subtypes 4 and 7 for Nearline activity and VTCS subtypes 10, 11, 13-19, 21, 26, 27 and 28 for VSM/VTSS activity)

- MVS system log (JES2 or JES3 console output messages for allocation recovery analysis)

- HSC PGMI and HSC CDS (scratch and free cell statistics)

- Manual mount activity (collected by the started task online monitor)

- Tape catalog data (optional process to produce tape usage statistics)

MVS SMF Records

ExPR uses standard MVS SMF type 21 records to extract external tape statistics and media error information. Input datasets containing the SMF records are identified in the JCL, with ExPR parameters providing controls for date range. When running in real-time DirectSMF mode, ExPR dynamically intercepts all of its required SMF/RMF records as they are created by MVS, RMF, HSC and VTCS.

MVS RMF Records

RMF records are used to identify Nearline/VTSS channel and control unit activity and SSCH (start subchannel) counts. Configuration information is cross-referenced to identify the specific hardware components. Record types 73 and 74 are used.

HSC / VTCS SMF Records

The HSC User SMF record provides the primary input source for ExPR. Data is classified by ACS/LSM, VTSS, manual group, device type, and by user-defined jobname workload groups. HSC subtype 4 and subtype 7 records are used for Nearline activity, and VTCS subtypes 10, 11, 13-19, 21, 26, 27 and 28 are used for VSM/VTSS reporting.

MVS System Log

Some events that are useful in diagnosing performance problems in a tape environment are not available through SMF-based reporting. An example of this is MVS allocation recovery. ExPR uses the external writer SYSLOG file generated by JES2 or JES3 containing all console messages for this information.

HSC PGMI Records

The HSC Programmatic Interface (PGMI) is used by the ExPR started task, which directs its output to the PGMIDATA collection file for input to the ExPR database. Collected data includes cell count, free scratch statistics, scratch subpool statistics, VTSS HAMT/LAMT, and VTV clustering replication queue depths.

Manual Mount Activity

The ExPR started task RTM function collects details of manual device mount activity and stores them in the PGMIDATA collection file for input to the ExPR database. Manual devices would include any non-ACS/non-VSM tape units, such as free-standing drives which are manually mounted by operators.

Tape Catalog Information

Selected fields can be extracted from your tape catalog. This catalog is first cross-referenced with the HSC CDS, which contains an inventory of cartridges residing in the LSM/VSM library complex. Optionally, you can specify that the entire tape catalog is read without cross-reference against the CDS. Processing normally takes place on a daily "snapshot" basis to minimize the overhead of reading both the CDS and tape catalog. However, the ExPR database structure allows you to record tape catalog aging and utilization data on a more frequent basis if required. The ExPR TAPECAT extraction can be run as a batch job or as a component of the started task. Reports can also be run in batch or as interactive queries via the ExPR GUI or PC component interfaces.

Database Update Processes

Database updates can be done either in batch processing or through the optional DirectSMF update feature. If batch processing is used, the database should be updated as part of the same housekeeping procedure as SMF, RMF, and HSC SMF processing.

The figure below illustrates the various update paths taken by different data sources:

- System performance statistics are derived by reading SMF records. The SMF batch update process merges and sorts the data and then accumulates it for each hour before writing database records which summarize each hour's activity for each event. SMF data can optionally be collected directly by the DirectSMF update feature.

- The HSC CDS is queried via PGMI by the ExPR started task on a regular basis. Scratch and free cell information is collected. The CDS is also used for cross-reference purposes during tape catalog processing to identify volumes under LSM/VSM control.

- Device status information is collected by scanning UCBs. This process is invoked by the ExPR started task.

- MVS allocation recovery message sequences in the JES2/JES3 SYSLOG are read based on the positional message id. The External Writer output or third party product output can be processed. This data is written directly to the ExPR database.

- The installation's Tape Management System catalog can be optionally read and merged with the HSC CDS contents. Volume and dataset records are extracted and summary database records generated. The volume and dataset records can be saved in a generation data group for later historical processing.
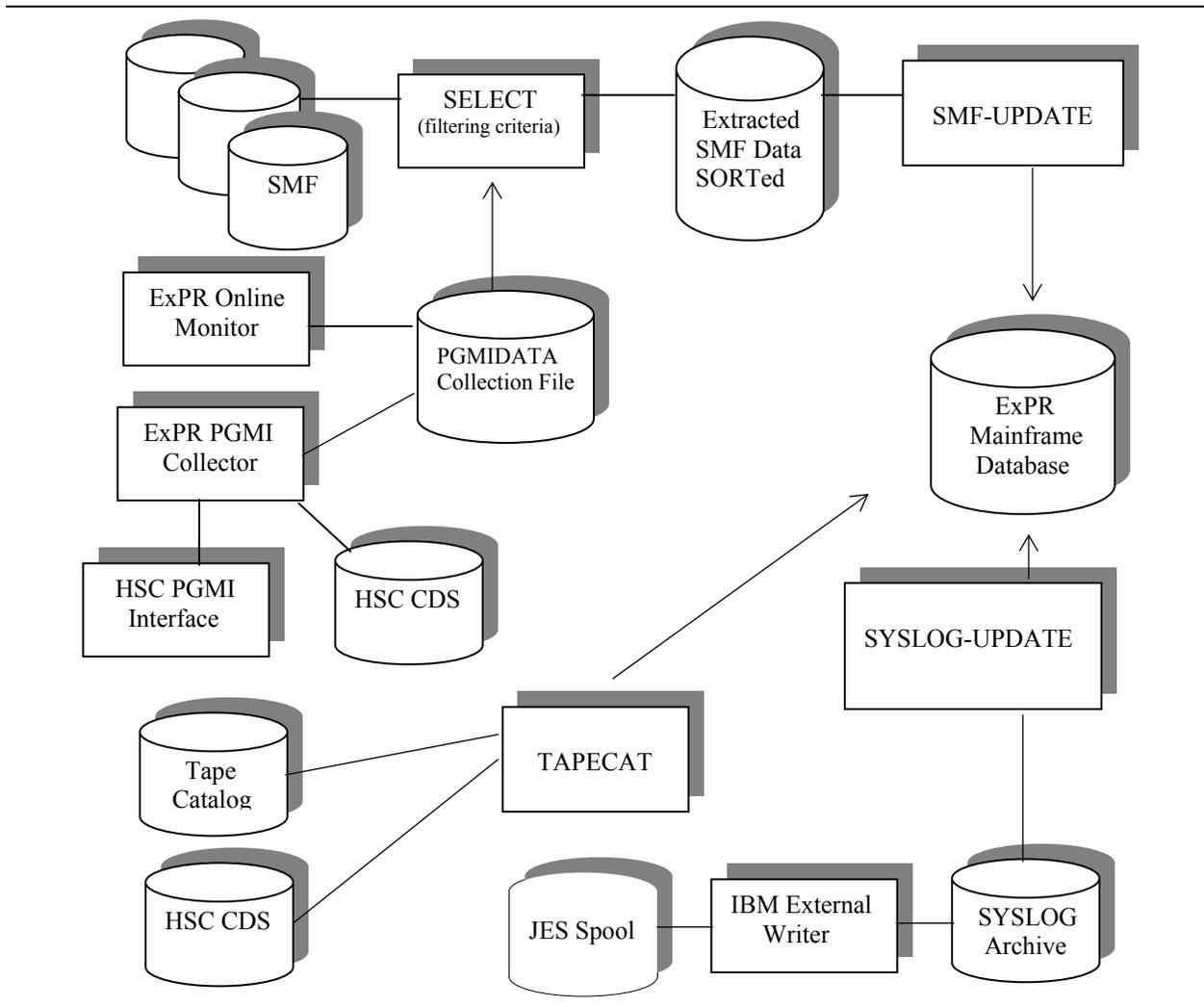
ExPR Data Update Paths

JES3 Installations

JES3 sites should review appendix C, *JES3 Installation Notes*.

MSP Installations

MSP sites should review appendix B, *Special Considerations for MSP Installations*.

Shared Hardware Environments

In most data centers, the ACS/LSM/VTSS complex is usually shared between multiple MVS hosts. The shared environment can take many forms:

- Multiple hosts running in separate LPARS

- Multiple hosts running on separate processor complexes

- MVS hosts running as VM guests

- MVS/JES2 hosts running on a shared MAS or JesPlex

- MVS/JES3 hosts running as a global/local complex

- MVS hosts running as CSC/SMC clients

- Any combination of the above

In all cases, the sharing of an ACS/LSM/VTSS complex requires access to tape drives from the various MVS hosts and shared DASD for the HSC CDS file to reside upon. Each MVS system also needs to run the HSC software component, except those operating as CSC or SMC clients.

One of the started tasks must be designated as the primary system. This is the host where the ExPR database and configuration are stored. The other MVS systems are considered as secondary systems for the purpose of ExPR. ExPR collection files are located on each secondary host; the required files are allocated for each system during the installation. A secondary ExPR started task should exist for each MVS system (except the primary system), including all CSC/SMC client MVS system. Do not attempt to share these run-time data files among started tasks.

The primary system stores database records for all systems in its database. Once data has been collected in the primary database, it can be viewed and reported on by the ExPR GUI, the ExPR PC component, or the host batch reports.

The primary task receives device usage information, VTSS activity statistics, real-time monitor data and SMF records from the secondary systems. These records are sent to the primary system via TCP/IP every minute. Shortly after initializing, secondary started tasks will attempt to logon to the primary system. Communication is always initiated by the secondary systems.

ExPR applications on the ExPR GUI or ExPR PC component connect to the primary system to retrieve database record information for any or all systems to display in historical reports. Monitor applications will connect directly to any host to collect current statistics, or to the primary host for its current system statistics or for a system-wide view.

If you have a very large or multi-site installation, you may have more than one discrete shared hardware environment. How you configure ExPR will be determined by the number of HSC CDSs in your complex. As a rule, if you have more than one CDS and thus more than one shared hardware environment, you will create a separate ExPR environment for each shared complex.

Each ExPR environment will represent all systems and devices that share a CDS. Each ExPR environment will have its own primary and secondary started tasks, database, and

host configuration. ExPR GUI or PC component users can connect to any of the started tasks or be restricted by host group definitions at each PC and/or the ExPR Security exit.

The figure below illustrates how ExPR works in a shared hardware environment:

- The primary system in this example is IP01 on the left.

- The two secondary systems send collected data to the primary system via TCP/IP once per minute. The primary system holds this data in a collection file and updates the database once each hour.

- Note that the DirectSMF update and RTM Monitor applications are used in the example, so each MVS host must also have the ExPR SMF exit installed.
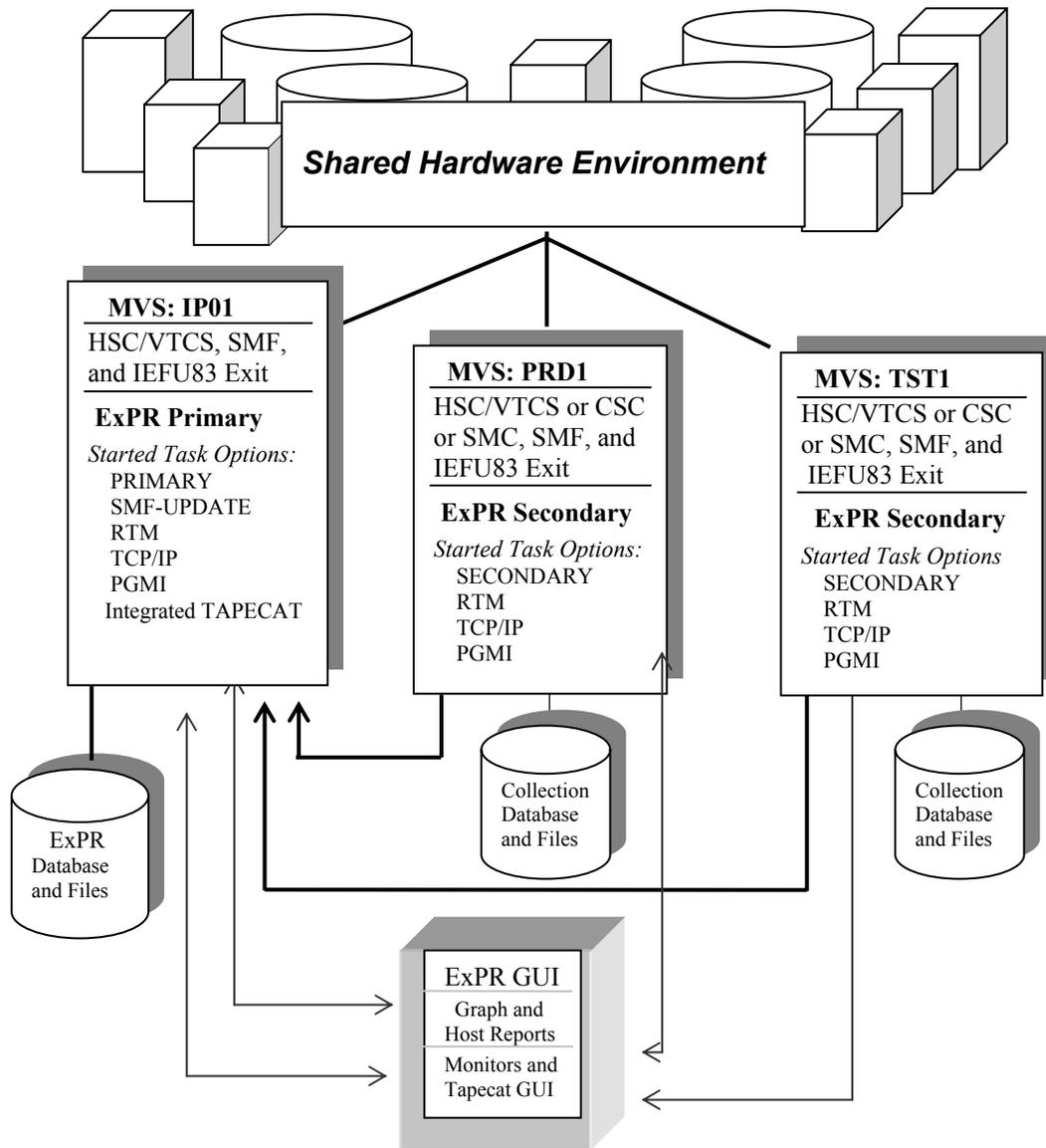
Sample Shared Hardware Environment

Site Planning Requirements

MVS library modifications may be required to define how ExPR fits into your mainframe environment. Specifically, changes to SYS1.PARMLIB and SYS1.PROCLIB may be required to reflect site parameters and how ExPR interacts with other products in your MVS operating environment. These steps may require the assistance of your systems programming department.

Review SYS1.PARMLIB System Initialization Members

A general review of SMF/RMF record collection is recommended. You should ask your systems programmer to look at members SMFPRM*nn* and ERBRMF*nn* in SYS1.PARMLIB and refer to the IBM manuals *System Management Facility* and *RMF User's Guide*.

The MVS SMF, HSC SMF, and MVS RMF record types described above are all derived from the MVS SMF. RMF records are in fact SMF records in the range 70 through 79, and the HSC data is written to a user-defined SMF record.

The HSC SMF is usually assigned 255. However, this may not be the case; ExPR will automatically determine the HSC SMF number from the auto-configuration process.

The following SMF record types and subtypes are required by ExPR:

- SMF type 21

- RMF type 73

- RMF type 74

- SMF user record (HSC subtypes 4 and 7 for Nearline activity)

- SMF user record (VTCS subtypes 10, 11, 13-19, 21, 26, 27 and 28 for VSM activity)

RMF 73 and 74 records are controlled by the RMF Monitor I options CHAN and DEVICE(TAPE) respectively. These are *not* default options for RMF and *must* be specified in the ERBRMF*nn* member.

Collection of the SMF record types and subtypes is controlled by the SMFPRMnn PARMLIB member. It is essential that the required HSC SMF record and its subtypes are correctly specified in SMFPRM*nn*.

Additionally, ExPR may require activation of its supplied SMF IEFU83 exit and will require APF authorization of the started task. These items are detailed in chapter 5, *ExPR Mainframe Installation and Configuration Tasks* and may affect SYS1.PARMLIB members PROGnn, IEAAPFnn, and COMMNDnn.

SMF Housekeeping Procedures

If you intend to run ExPR SMF collection as batch jobs, current housekeeping procedures should be examined to identify the best place and time to run ExPR data collection and update procedures. If running DirectSMF collection, ExPR will dynamically intercept the required SMF data.

SMF, RMF, and the HSC SMF records are collected by MVS into a single system file named SYS1.MAN*x*. This file will fill up on a regular basis and be automatically switched to the next file in sequence. Procedures will be established for offloading these files on a regular basis before the sequence of files is all full. If the files are all full, data collection ceases.

The recommended approach is to extract the required record types using an IBM supplied SMF utility called IFASMFDP. Information can be found in the IBM document *System Management Facility*. In most installations similar processing takes place for other products. Where possible, ExPR processing should be integrated at this processing point to avoid reading the main SMF/RMF collection file unnecessarily.

Note: The installation offload procedure usually moves the data to a daily GDG file which in turn will be moved into a weekly and then monthly GDG cycle. Theoretically, this entire system-wide file could be input to ExPR and only the required record types would be selected for processing by the product. However, this is very inefficient and would normally involve a huge number of cartridge mounts.

APF Authorization Requirement for ExPR Loadlib

ExPR must be run as an APF-authorized program. The procedure for achieving this requirement is described in chapter 5, *ExPR Mainframe Installation and Configuration Tasks* under *Task 6: Install the ExPR Started Task.*

The APF authorization is only required by the ExPR started task and the batch reorganization function. It is used for the following specific purposes:

- During started task initialization, ExPR determines the initial status of all RTDs via an MVS console issuing a "VT D RTD" command. This MVS function requires APF authorization.

- The RTM and SMF-COLLECTOR functions use the MVS SETLOCK CMS/LOCAL locking mechanism to synchronize with the ExPR IEFU83 SMF exit. SETLOCK requires APF authorization.

- The batch PERFORM REORGANIZATION function requires authorization because certain levels of DF/SMS IDCAMS may fail if it is not APF authorized.

- Certain ExPR started task command responses use privileged console messaging options.

In the first two cases, ExPR enters privileged mode only for the required function and then immediately switches back to application mode. This minimizes any potential exposure. The third case is strictly for IDCAMS internal purposes. The ExPR console commands – HOSTS, SOCKETS, and STORAGE – will cause an abend if not authorized.

ExPR SMF Exit Considerations

The optional DirectSMF and RTM features require the activation of an ExPR-supplied SMF IEFU83 exit module. It is recommended that this exit is installed using the MVS Dynamic Exit Facility.

The exit collects SMF/RMF records that are required by ExPR and queues them into an ECSA subpool. The ExPR started task SMF collector function retrieves the copies of the SMF/RMF records from the ECSA, writes them to the PGMIDATA file, and passes them to the RTM routines.

The exit does not delete or modify the SMF/RMF records, which continue to be written in the normal manner to the SYS1.MAN*x* collection files. The exit retains a copied record in the ECSA for several minutes and then purges (freemains) it to prevent ECSA saturation/shortage occurring. The exit does this regardless of the status of the ExPR started task and the SMF-collector/RTM function.

During initialization, the started task creates a control/anchor area that is used by the exit and the SMF collector function to synchronize their activities. This control area is allocated in the ECSA as a means of communication between started task and exit. The address of the control area is stored using a dynamic entry within the MVS subsystem names table; this entry is called EXPR.

Users of the BMC CMF product (a replacement for RMF) who wish to collect RMF 73/74 type records for ExPR must activate the SMF IEFU84 exit. This is the same load module as supplied for IEFU83. Exit IEFU84 is activated in the same manner as IEFU83. This is described in chapter 5, *ExPR Mainframe Installation and Configuration Tasks* under *Task 8: Install the ExPR SMF Exit and the HSC SEN Exit*.

The exit has been written to comply with the programming specification of IEFU83/IEU834 as documented by IBM. Internally, the exit uses a CMS/LOCAL lock mechanism for synchronizing multi-engine processor complexes. The ExPR exit always returns with a return code of zero. Further details of SMF exit coding conventions can be found in the IBM publication *MVS Installation Exits* for the release of MVS, OS/390 or z/OS that you are using.

The ExPR SMF exit(s) should be activated under the MVS Dynamic Exits Facility using the SETPROG command or PROGxx member of SYS1.PARMLIB. This is described in chapter 5, *ExPR Mainframe Installation and Configuration Tasks* under *Task8: Install the ExPR SMF Exit and the HSC SEN Exit*.

ExPR Datasets

Datasets that are created by ExPR are listed below. Size estimates (based on 3390 devices) are also listed where appropriate. Default file sizes are proposed in the *usrprfx*.CNTL members during the configuration process. At a later stage, you could return here and size the files to more accurately meet your installation's needs.

Do not remove any DDs from the supplied JCL procedures, even if you believe that a dataset will not be used in your installation.

CDSCONF

This temporary file contains automatically generated configuration statements from the HSC CDS. This file is required by the ExPR auto-configuration generation routines.

CDSPRIM/CDSCOPY

These two DDnames should normally point at the same active HSC CDS:

- CDSPRIM is used by the started task PGMI and TAPECAT UPDATE processes

- CDSCOPY is used by the ExPR auto-Config feature to build the ACS/LSM/VSM hardware environment definition statements in the CDSCONF dataset

The HSC CDS is read-only to ExPR.

CONFIG

This file contains ExPR configuration data that is created by the Host Configurator application on the ExPR GUI or PC component and stored on the host.

CONFIGX

This file contains a backup copy of your most recent CONFIG DD as it was prior to its last modifications by the Host Configurator application.   This backup copy is only created at ExPR started task initialization.

DATABASE

The ExPR database is a VSAM KSDS file containing a number of different record types. DASD requirements for the database depend on the size of the Nearline system being reported on and other factors. See the subsequent section *Sizing DATABASE and PGMIDATA* for details of how to calculate DASD space requirements.

Note: A cylinder of 3380 will hold approximately 700K of ExPR database, and a 3390 cylinder will hold approximately 800K.

DATASTOR

This VSAM KSDS cluster is used solely for internal storage by the ExPR GUI web-based browser application.

EXPRORF

This VSAM KSDS cluster is used to store batch report output for subsequent retrieval and viewing via the PC Host Reports feature.

PGMIDATA

This file contains SMF record images collected by the ExPR started task. The size of the file depends on the number of days set for the Auto-Delete function. See the subsequent section *Sizing DATABASE and PGMIDATA* for details of how to calculate DASD space requirements.

RMMEXTR

This file is only required by DF/SMSrmm and ASG-Zara installations. It is a VB/1024-byte file and should be blocked at the maximum one-half track blocksize. This dataset is used by the RMM EDGHSKP and Zara utilities to create a catalog extract file.

There are two types of RMMEXTR files, one for batch processes and for each primary and secondary started task. These additional RMMEXTR files support the ITCU and TAPECAT GUI functions.

RMMMESS

Same as RMMEXTR, but for DF/SMSrmm only (not ASG-Zara).

TMC

The TMC DD is used by the TAPECAT processes to obtain details of the tape management system volumes and datasets. This DD, which is read-only to ExPR, points at a different file, depending on which TMS is installed:

- CA-1 – the active CA-1 TMC

- CA-TLMS – the VMF dataset

- Control-T – the name of the media database data file (MDBD)

- DF/SMSrmm – the catalog extract file RMMEXTR (data extraction is invoked dynamically via the IBM EDGHSKP utility program)

- ASG-Zara – the catalog extract file RMMEXTR (data extraction is via the ZARA utility program, described in *usrprfx*.CNTL members ZARAEXTR and ZARAEXT2)

TMCHIST

This file is created each time you run the TAPECAT UPDATE or ITCU extraction function. It contains information on each volume in the CDS/tape catalog. Sizing information for the TMCHIST file can be found below in the Temporary SYSDA Work Files table. The TAPECATU procedure automatically releases unused space from TMCHIST generation. A second version of this file exists for each primary and secondary started task to support the TAPECAT GUI function. The started task file must not be allocated as a multi-volume DASD dataset as this causes errors in the TAPECAT GUI function.

UDCFILE

This user data collection file is for the collection of drive utilization samples for subsequent user-written program analysis. The frequency of sampling is controlled by the DUSINT parameter in the ExPR started task control stream. The file is a VSAM KSDS cluster.

VSMVTCS

This file is used by the SWSADMIN program for installations with VSM/VTSS installed. Details of MVCs and VTVs are written to this file and subsequently read by the TAPECAT UPDATE function. This file will increase as the VSM/VTSS environment expands. A second version of this file exists for each primary and secondary started task to support the ITCU and TAPECAT GUI function.

Temporary Work Files

The EXPR procedure member includes work DDs defining four pairs of temporary files that are used by the TAPECAT function and its called sorts. Larger installations may need to increase the space allocation for these files, which should always be blocked at the maximum half-track capacity for your DASD type. CDSTEMP and CDSTEMPX are also used as workfiles by other ExPR functions. These two files are variously used as FB or VB workfiles by different ExPR functions. For this reason, they have a blocksize of 23320 assigned in the EXPR procedure. This is a common blocksize for FB/VB records on both 3380 and 3390 devices; it should not be changed.

The table below describes the characteristics and usage of these files. Records-per-track are for 3380/3390 type devices, assuming maximum half-track blocking (except for CDSTEMP/CDSTEMPX).

SYSDA Work Files

File	Type / Size	Description	Records per Track Based Upon Optimum Half-Track Blocking	
			3380	**3390**
CDSTEMP CDSTEMPX	FB 40 bytes	One record per volume defined in the HSC CDS and/or one per VSM VTV or MVC.	1166	1166
TMCTEMP TMCTEMPX	VBS 233 bytes. LRECL must be 32756.	One record per volume in the TMS catalog, plus 171 bytes per secondary dataset. Also, two records per VSM VTV or MVC. Simple guideline – allow 233 bytes for each volume or secondary dataset.	200	240
TMCDSN TMCDSNX	FB 170-250 bytes - size varies.	One record per secondary dataset in the TMS catalog. Simple guideline – allow 200 bytes for each secondary dataset. Not used in ASG-Zara installations.	234	280
TMCVOL TMCVOLX	FB 340 bytes	One record per volume in the TMS catalog. Not used in DF/SMSrmm and ASG-Zara installations.	136	164
TMCHIST TMCHISTX	FB 270 bytes	One record per volume or secondary dataset in the TMS catalog or HSC CDS, plus five records per VTV and one per MVC. Used in conjunction with the TMCHIST GDG file, which has the same attributes.	172	206

Given the above values, the following example shows how to size workfiles for TAPECAT. This example assumes that there are 250,000 real cartridges, 50,000 VTVs, and 500 MVCs in a tape library, and that there are 100,000 secondary datasets:

- CDSTEMPs would each require 300,500 records – 250,000 + 50,000 + 500

- TMCTEMPs would each require 451,000 records – 250,000 + 50,000*2 + 500*2 + 100,000

- TMCDSNs would each require 100,000 records – 100,000

- TMCVOLs would each require 300,000 records – 250,000 + 50,000

- TMCHISTs would each require 600,500 records – 250,000 + 50,000*5 + 500 + 100,000

You should always allow the system to calculate the optimum half-track block size by omitting the DD block size specification as shipped in the EXPR procedure (except for CDSTEMP/CDSTEMPX). Allow for an extra 20% above the values calculated for these files.

Sizing DATABASE and PGMIDATA

Part of the customization and setup of ExPR requires calculating the size of the main ExPR database and the PGMIDATA SMF collection files. This has proven to be an area of difficulty for many customers.

A simple Excel spreadsheet is now provided on the ExPR distribution CD to assist you with this calculation. Inputs to the calculation including number of LSMs, VTSSs, device groups, hosts, and workloads can be entered directly in to the spreadsheet instead of using them for manual calculation.

The spreadsheet basically follows the formula outlined below to provide an estimate of the requirements for the ExPR primary database:

1. Calculates the total of the following items:

   - Number of LSMs installed

   - Number of VSM VTSSs installed

   - Number of device groups you have defined

   - Number of individual device types installed

   - Number of jobname based workload groups you have defined

   - Number of HSC scratch subpools

   - Number of VSM management classes

2. Takes the total above and multiplies this figure by 250 bytes (this is the space requirement for one hour of SMF activity for one MVS system).

3. Multiplies this hourly figure by 24 to obtain a daily value for one MVS system.

4. Multiplies this daily figure by the number of MVS systems defined in the HSC CDS, plus the number of consolidated view and CSC/SMC hosts that you have defined. This gives you a daily requirement for all systems.

5. Multiplies this value by the number of days that you wish to hold hourly data within the database, as defined in the Auto-Delete settings.

6. Adds 30% to the final value. This allows for under-estimation and space for weekly and monthly records.

7. To calculate the number of 3390 tracks required, divides the total by 49152. For 3380, divides by 40960.

Databases for secondary systems do not need sizing as no data is collected in them.

The sizing of the PGMIDATA file is somewhat more difficult. If you have chosen to use the DirectSMF feature, then the primary PGMIDATA needs to hold all of the SMF records required by ExPR. This includes records from the primary and all secondary systems. The PGMIDATA file at each secondary system needs to hold the SMF records generated on that system. It is strongly recommended that you activate the Auto-Delete function and set the PGMIDATA aging to the minimum (two days).

The spreadsheet basically follows the formula outlined below to provide an estimate of the requirements for a secondary PGMIDATA file sufficient to hold a days worth of activity:

1. Calculates the total of the following items:

    - The number of real carts mounted by HSC within LSMs multiplied by 320

    - The number of VTV mounts multiplied by 420

    - The number of VTV migrates multiplied by 280

    - The number of VTV recalls multiplied by 140

    - The number of VTV reclaims multiplied by 80

    - The number of MVC mounts multiplied by 250

2. Multiplies this total in bytes by the number of days that you wish to keep PGMIDATA.

3. Adds 25% to the final total.

4. To calculate the number of 3390 tracks required, divides the total by 49152. For 3380, divides by 40960.

5. Performs a similar calculation for the primary system's PGMIDATA file, then adds the totals of all the secondary systems to arrive at the final size.

It is very important to activate the file reorganization and Auto-Delete functions for PGMIDATA; otherwise the file will grow in a very short time.

For both Database and PGMIDATA, you should always have a secondary allocation defined that represents at least 20% of the primary allocation space.

When allocating the Database and PGMIDATA files, it is also necessary to consider disk space for the file reorganization and Auto-Delete functions. If your installation uses SMS-managed storage, the files must be allocated within a class that has sufficient free space for the reorganization copy steps to execute. Non-SMS installations must allocate the files on a volume that has sufficient free space for the copy process.

Chapter 4: Installation Overview and Checklist

Overview

ExPR installation tasks are numbered sequentially and should be performed sequentially:

- The ExPR installation begins with the mainframe component. Chapter 5, *ExPR Mainframe Installation and Configuration*, provides instructions for installing and configuring ExPR in the mainframe environment.

- When the mainframe component is up and running, the ExPR GUI component and HTTP Server are installed in your network. Chapter 6, *ExPR GUI Installation and Configuration*, provides instructions for installing and configuring the ExPR GUI software and StorageTek HTTP Server on a host system in your network.

- Once installed, the ExPR GUI is used to perform ExPR host configuration. Chapter 7, *Host Configuration*, provides instructions for configuring ExPR using the ExPR GUI Host Configurator application.

  Note: Alternatively, host configuration can be performed and reports and monitors displayed using the ExPR PC component. For information about the ExPR PC component, refer to appendix F, *ExPR PC Component Installation and Configuration*.

- Chapter 8, *Database Update and Installation Verification*, provides post-installation instructions for existing users to copy their previous version data to the new datasets, and a procedure for all sites to run that verifies that ExPR is running and collecting data.

- Chapter 9. *ExPR Monitor Service*, provides instructions for installing and configuring the optional ExPR alert monitor service on an open system platform. The ExPR Monitor Service will send E-mail and/or MVS console alerts according the event rule that was defined and triggered.

ExPR Installation Checklist

Use the installation checklist below to track your progress as you install and configure ExPR.

√	Task	Description	Chapter in this Book
	Task 1	Perform SMP/E Installation	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 2	Define ExPR Datasets	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 3	Tailor the ExPR Procedure	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 4	Initialize ExPR Datasets	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 5	Activate the ExPR License Key	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 6	Install the ExPR Started Task	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 7	Install MONTAPE (Optional)	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 8	Install the ExPR SMF Exit and the HSC SEN Exit (Optional)	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 9	Install the ExPR Security Exit (Optional)	Chapter 5: *ExPR Mainframe Installation and Configuration*
	Task 10	Install and Configure the ExPR GUI Web Browser Interface	Chapter 6: *ExPR GUI Installation and Configuration*
	Task 11	Perform Host Configuration	Chapter 7: *Host Configuration*
	Task 12	Copy Previous Version Data to New Datasets	Chapter 8: *Database Update and Installation Verification*
	Task 13	Perform Installation Verification Procedures	Chapter 8: *Database Update and Installation Verification*
	Task 14	Install and Configure ExPR Monitor Service (Optional)	Chapter 9, *ExPR Monitor Service*

Chapter 5: ExPR Mainframe Installation and Configuration

Overview

This chapter provides instructions for installing and configuring ExPR in the mainframe environment. The instructions are presented as a set of sequential tasks.

Before You Start

Perform the steps below before you begin the installation.

1. Get License Key from StorageTek Software Manufacturing Distribution (SMD)

A software license key is required to activate ExPR features your site has purchased. License keys are issued by StorageTek Software Manufacturing Distribution (SMD).

Important Note for All ExPR Users:

Under normal circumstances you cannot successfully activate ExPR without first obtaining a license key from StorageTek SMD. The key is entered into the ExPR configuration during the installation process and is used to activate ExPR features that your site has purchased. License keys from releases prior to ExPR 6.1 WILL NOT WORK with ExPR 6.1 - you must obtain a new license key.

However, for the purposes of release migration and product trials and evaluation, ExPR now offers a limited time period whereby it will operate without any license key. This trial is limited to 75 calendar days from the *first date of execution without a license key*. During this period, all ExPR features will be enabled. Existing customers must remove any old LICENSE/LICENSE1 statements from the ExPR CONFIG dataset to trigger the no-license period. The trial period will not commence if an invalid or old license key is present.

This feature is solely intended to expedite migration to this release of ExPR, or for new customers who wish to evaluate ExPR. If you have a new license key, you should use it and not trigger the 75-day trial period unnecessarily. Once triggered, the trial period will cease 75 calendar days later. You will only have one 75-day trial period per release of ExPR.

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2. Perform MVS Housekeeping

MVS library modifications may be required to define how ExPR fits into your mainframe environment. Specifically, changes to SYS1.PARMLIB and SYS1.PROCLIB may be required to reflect site parameters and how ExPR interacts with other products in your MVS operating environment.

Be sure that your system programmer has reviewed chapter 2, *Installation Plan for Existing ExPR Sites* or chapter 3, *Installation Plan for New ExPR Sites* before you attempt the installation tasks in this chapter.

3. Get Site-Specific Information

The following information will be required during the installation and configuration processes. If it is not familiar to you, ask someone before you begin:

- Dataset name standards to be used for ExPR datasets

- PROCLIB for the ExPR cataloged procedures

- Procedure to add a Start command to IEACMDnn SYS1.PARMLIB member

- Name of the MVS TCP/IP address space and a port number to be used by ExPR for each host system

- ACS/LSM and VTSS informal site names (if used)

- Exact details of which models of VTSS are installed

4. Get Latest Product Information from StorageTek Customer Services

StorageTek Software Support maintains information about known ExPR problems and their corrections. During installation planning and again just before installing this product, please call StorageTek Software Support for the latest information available concerning product updates (documentation, known problems, PTFs, etc.) and possible IBM APARS required for MVS and TCP/IP. You must provide your site location number when calling.

SMP/E Installation Note for MSP Sites

ExPR has two product variants: one for MVS and another for MSP. Each has its own FMID and a separate base product installation tape. It is critical to order and install the correct product for your operating system.

- MVS users must order FMID SUPR610, which is distributed on a volume labelled UPR610.

- MSP users must order FMID SUPR61F, which is distributed on a volume labelled UPR61F.

The product installation jobs are set up for installation on MVS systems. Therefore, when installing ExPR on MSP, you must substitute the tape volume serial of UPR610 with UPR61F and the product FMID of SUPR610 with SUPR61F.

Task 1: Perform SMP/E Installation

ExPR is distributed on a standard label data cartridge that contains a set of SMP/E installation jobs designed to implement a basic installation.

These jobs perform the following functions:

- Create and allocate target and distribution libraries

- Create, prime, and initialize CSI

- SMP/E RECEIVE, APPLY, and ACCEPT ExPR.

The ExPR distribution tape (volser number UPR610) is in SMP/E RELFILE format and includes the following files:

ExPR Install Tape Contents for MVS

File	Dataset Name	Description
1	SMPMCS	SMP/E control statements
2	SUPR610.F1	SUPR610 JCLIN
3	SUPR610.F2	SUPRSAMP in IEBCOPY unload format
4	SUPR610.F3	SUPR610 load modules

Note: ExPR must be installed with SMP/E Release 8 or higher.

Installation Prerequisites

The instructions below assume that you will use all of the JCL decks supplied with the product to complete the installation.   However, if you intend to use your own in-house procedures, the following minimum prerequisites must be satisfied.

Note: The recommended install method is to use the jobs supplied with the product, in which case these three prerequisites are automatically handled.

1. Allocate the required ExPR target and distribution libraries:

Target and Distribution Libraries

Dataset Name	DSORG	RECFM	LRECL	BLKSIZE	Cyls	Dir Blocks
tgtprfx.SUPRLINK	PO	U	0	32760	5	20
dlbprfx.AUPRLINK	PO	U	0	32760	5	50
tgtprfx.SUPRSAMP	PO	FB	80	Half track	2	20
dlbprfx.AUPRSAMP	PO	FB	80	Half track	2	20

2. Ensure that the required DD statements are present:

ExPR SMP/E DD Statement Requirements

DDname	Dataset
SUPRLINK	*tgtprfx*.SUPRLINK
AUPRLINK	*dlbprfx*.AUPRLINK
SUPRSAMP	*tgtprfx*.SUPRSAMP
AUPRSAMP	*dlbprfx*.AUPRSAMP

3. Set SMP/E DSSPACE space parameters to at least (50,25,50).

Note: Again, the recommended install method is to use the jobs supplied with the product, in which case these prerequisites are automatically handled.

Load the ExPR Install Dataset

Use the JCL below to load the install members of SUPRSAMP from file 4 of the distribution tape. Make the following changes before submitting the job:

1. Replace the JOB card with one which is valid for your installation.

2. Globally change the following strings to match your installation standards.

   - *tapeunit* – The name of the tape unit for the product tape.

   - *usrprfx* – The high level qualifier(s) of the CNTL library. Note that the *usrprfx*.CNTL file should not exist prior to running the job.

   - *usrvol* – A DASD volume serial number upon which the usrprfx.CNTL library will be allocated.

   Be sure to enter the CAPS ON command before changing model data.

3. Submit the job.

```
//jobname  JOB  ...                                        ←
//COPY       EXEC PGM=IEBCOPY
//SYSPRINT  DD   SYSOUT=*
//F2         DD   DISP=OLD,
//               DSN=SUPR610.F2,
//               LABEL=(3,SL),
//               UNIT=tapeunit,                            ←
//               VOL=SER=UPR610
//CNTL       DD DSN=usrprfx.CNTL,                          ←
//               DISP=(NEW,CATLG,DELETE),
//               SPACE=(TRK,(10,10,20)),
//               UNIT=SYSALLDA,
//               DCB=(BLKSIZE=3120,RECFM=FB,LRECL=80),
//               VOL=SER=usrvol                            ←
//SYSIN      DD  *
 COPY OUTDD=CNTL,INDD=F2
 SELECT MEMBER=UPRINST1
 SELECT MEMBER=UPRINST2
 SELECT MEMBER=UPRINST3
 SELECT MEMBER=UPRINST4
 SELECT MEMBER=UPRINST5
 SELECT MEMBER=UPRINST6
 SELECT MEMBER=UPRINST7
 /*
```

JCL to load the ExPR Install Dataset

Run the ExPR Install Jobs

ExPR provides a series of SMP/E jobs, UPRINST1-7, which were downloaded into the *usrprfx*.CNTL library with the previous JCL.

These jobs need to be run consecutively to install the base product, with the exception of jobs UPRINST4-6, which only need to be run if PTF maintenance is required.

The install jobs perform the following functions:

Install Job	Function
UPRINST1	Allocate and initialize SMP/E libraries and datasets
UPRINST2	Define target and distribution libraries and DDDEF entries
UPRINST3	SMP/E RECEIVE, APPLY, ACCEPT functions
UPRINST4 **	RECEIVE cumulative service (if any)
UPRINST5 **	APPLY cumulative service (if UPRINST4 was run)
UPRINST6 **	ACCEPT cumulative service (optional)
UPRINST7	Copy SUPRSAMP members to *usrprfx*.CNTL

** **Important: UPRINST4-6 only need to be run if PTF maintenance is required.**

Notes:

1. The install jobs include tailoring instructions as well as comments and further instructions for the installer. Be sure to follow all of the instructions in the jobs.

2. To ensure that the jobs proceed successfully, do not make any changes other than those described in the instructions. Changes to the logic of any job could cause the installation to fail.

3. When tailoring the install jobs, be sure to enter the CAPS ON command before changing model data.

Migration note: Users of previous versions should read the notes in DSNINIT regarding the last step, INITCONF. These notes pertain to the copying of existing configuration parameters and options to the new *usrprfx*.CONFIG dataset.

Installation Dataset Contents

When ExPR has been successfully applied, the SMP/E target libraries will contain the following:

SMP/E Target Library Contents

Dataset Name	Contents
tgtprfx.SUPRLINK	Load modules required for ExPR execution
tgtprfx.SUPRSAMP	Sample jobstreams for use with ExPR

When ExPR has been successfully accepted, the SMP/E distribution libraries will contain the following:

SMP/E Distribution Library Contents

Dataset Name	Contents
dlbprfx.AUPRLINK	ExPR modules
dlbprfx.AUPRSAMP	DLIB version of sample jobstreams

The usrprfx.CNTL Dataset

The *usrprfx*.CNTL dataset created during the SMP/E process contains sample jobs that you will update and submit in your MVS jobstream to run ExPR jobs. Subsequent PTFs will modify the SMP/E libraries, which you will need to merge into *usrprfx*.CNTL. Do <u>not</u> update the SMP/E versions.

Task 2: Define ExPR Datasets

This task allocates the required ExPR datasets:

- Tailor *usrprfx*.CNTL member DSNDEFP for the primary host system.

- Tailor *usrprfx*.CNTL member DSNDEFS for each secondary host system if you intend to operate ExPR in real-time DirectSMF mode.

- Submit the jobs.

CA-Hyper-Buf Note: Sites with the Computer Associates CA-Hyper-Buf product (now part of the CA-BrightStor solution) installed should ensure that all ExPR VSAM files are excluded from its optimization. Errors have been known to occur when ExPR files are controlled by CA-Hyper-Buf.

FASTVSAM Note: Users of the FASTVSAM product should be aware that this may cause errors during the file reorganization process. ExPR VSAM Files should be excluded from the control of FASTVSAM.

CSC/SMC MVS Note: Secondary started tasks on CSC or SMC MVS systems each require that member DSNDEFS be run if you intend to operate ExPR in real-time DirectSMF mode.

Task 3: Tailor the ExPR Procedure

This task customizes the standard ExPR procedure with your dataset names and places it in the appropriate PROCLIB.

- Tailor *usrprfx*.CNTL member EXPR.

- Copy member EXPR to your PROCLIB.

- CSC users must also tailor member EXPRCSC and SMC users must tailor EXPRSMC if ExPR is to be operated in real-time DirectSMF mode.

Important: Ensure that you always use the new JCL samples as shipped. DO NOT use JCL from a previous release to run this version of ExPR.

Task 4: Initialize ExPR Datasets

This task initializes the ExPR datasets.

1. Tailor *usrprfx*.CNTL member DSNINIT for the primary host system and for each secondary host system (including CSC and SMC client hosts).

2. Existing users migrating from an earlier version of ExPR must uncomment and run the last step of this job (stepname INITCONF). This migrates existing configuration options to the new release.   This only needs to be done for the primary host system. If running ExPR in batch SMF-UPDATE mode, you must also perform this step. Be sure to read the notes within the DSNINIT job about step INITCONF.

3. Submit the job.

Task 5: Activate the ExPR License Key

All ExPR sites must edit *usrprfx*.CONFIG and add or amend the LICENSE statement, as documented below. The statement can be inserted anywhere within the file; however it is recommended that you add it at the beginning.

Important Note for All ExPR Users:

Under normal circumstances you cannot successfully activate ExPR without first obtaining a license key from StorageTek SMD. The key is entered into the ExPR configuration during the installation process and is used to activate ExPR features that your site has purchased. License keys from releases prior to ExPR 6.1 WILL NOT WORK with ExPR 6.1 - you must obtain a new license key.

However, for the purposes of release migration and product trials and evaluation, ExPR now offers a limited time period whereby it will operate without any license key. This trial is limited to 75 calendar days from the *first date of execution without a license key*. During this period, all ExPR features will be enabled. Existing customers must remove any old LICENSE/LICENSE1 statements from the ExPR CONFIG dataset to trigger the no-license period. The trial period will not commence if an invalid or old license key is present.

This feature is solely intended to expedite migration to this release of ExPR, or for new customers who wish to evaluate ExPR. If you have a new license key, you should use it and not trigger the 75-day trial period unnecessarily. Once triggered, the trial period will cease 75 calendar days later. You will only have one 75-day trial period per release of ExPR.

LICENSE or LICENSE1 Control Statement Syntax

Example: **LICENSE**
                        CUSTNAME('ACME WIDGET CO. LTD')
                        SITENUM('1234')
                        EXPIRY('2003378')
                        KEY('1A1AAAA111A')
                        PRODUCT('EXPR61') ;

CONFIG DD Statement	Description
**LICENSE	LICENSE1**	This statement defines your site's license key information to ExPR. Either the LICENSE or LICENSE1 keyword, or both as two separate statements, must be present. The requirement for one or both keywords is included in your site-specific license key instructions provided by SMD.
CUSTNAME('cccccccc')	The customer name, where '*cccccccc*' is the name. The name must be enclosed in single quote marks within the parentheses. It must be entered exactly as specified in the site-specific license key instructions provided by SMD.
SITENUM('sssss')	The customer site number, where '*sssss*' is the number. The number must be enclosed in single quote marks within the parentheses. It must be entered exactly as specified in the site-specific license key instructions provided by SMD.
EXPIRY('yyyyddd')	The license key expiry date, where '*yyyyddd*' is the date in MVS Julian date format. The number must be enclosed in single quote marks within the parentheses. It must be entered exactly as specified in the site-specific license key instructions provided by SMD.
KEY('kkkkkkkkkkkk')	The license key, where '*kkkkkkkkkkkk*' is the alphanumeric key provided by SMD. The key must be enclosed in single quote marks within the parentheses. It must be entered exactly as specified in the site-specific license key instructions provided by SMD.
PRODUCT('pppppp') ;	The ExPR product identier, where '*pppppp*' is the alphanumeric identifier provided by SMD. The id must be enclosed in single quote marks within the parentheses (for ExPR 6.1, this is always 'EXPR61'). It must be entered exactly as specified in the site-specific license key instructions provided by SMD. **Note:** The previous ExPR5.0 keyword will not work with ExPR 6.1.

Task 6: Install the ExPR Started Task

This task installs the ExPR started task for your primary host system and each secondary host system.

- Tailor *usrprfx*.CNTL member STCPARMP for the primary host system.

- Tailor *usrprfx*.CNTL member STCPARMS for each secondary host system.

- Tailor usrprfx.CNTL member STCPARMC for secondary systems on CSC MVS client hosts. See also appendix E, *Setting-up ExPR Started Tasks on CSC/SMC MVS Client Systems*.

- Tailor usrprfx.CNTL member STCPARMM for secondary systems on SMC MVS client hosts. See also appendix E, *Setting-up ExPR Started Tasks on CSC/SMC MVS Client Systems*.

Complete syntax information about control statements in the various STCPARM*x* members can be found in appendix A, *ExPR Started Task Control Statements*.

Default START Options

By default, the START control statement options PRIMARY, TCP/IP, and PGMI are activated in STCPARMP.   This identifies the task as the primary started task, activates TCP/IP communications with PCs, web browsers, and secondary systems. It also activates PGMI data collection. In STCPARMS, STCPARMC and STCPARMM, only SECONDARY and TCP/IP are activated.

Selecting TCP-Interface Protocol

Review the TCPIP-PARMS statement TCP-INTERFACE parameter in appendix A, *ExPR Started Task Control Statements* for details of how to select the correct TCP-interface protocol for your site. There are two options for MVS users, TCP1 and TCP2. MSP users must select TCP3. It is very important that you select the correct protocol.

Activating DirectSMF Update Processing

If you intend to use the DirectSMF update feature, you must uncomment the START option SMF-UPDATE for the primary started task. SMF-UPDATE invokes the SMF-COLLECTOR function and therefore also requires the ExPR SMF Exit (described in the next task).

SMF-COLLECTOR is also required for each secondary started task, but SMF-UPDATE is not. However, if you also activate Real-Time Monitor processing below, the SMF-COLLECTOR function is invoked automatically by the RTM option. Thus, you only have to specify SMF-COLLECTOR for secondary tasks if RTM is not activated.

An Important Consideration for SMF Update Processes

When running the SMF update processes, either in batch or real-time DirectSMF, it is important to ensure that the SMF data for all MVS hosts (including CSC/SMC client systems) is included in a single update pass. The running of individual updates on a system by system or piecemeal basis will prevent ExPR from collecting and analyzing relevant data in the context of all other parallel activity. This is particularly important when you define ExPR consolidated views. All data must be handled in a single process to ensure that the global view of activity is correctly calculated.

Under real-time DirectSMF, this means that all secondary started tasks must be active and connected to the primary system. For the batch SMF-UPDATE function, you must input all SMF archive data, for a given date range, into a single batch execution. The various SMF files can be concatenated together and you can use the ExPR INPUT statement. The date/time/system order of the SMF input does not matter, as ExPR will sort the data. Also, in batch, you should always input whole days of SMF archive data, not partial days.

Additionally, for batch updates, the inputting of duplicate SMF records from multiple SMF archives is not a problem. Internally, ExPR sorts all SMF records into date/time/system sequence. Duplicate SMF records are detected and eliminated.

Activating Real-Time Monitor Processing

If you intend to use the ExPR Monitor applications, you must uncomment the START option RTM for the primary started task and each secondary started task. RTM invokes the SMF-COLLECTOR function and therefore requires the ExPR SMF Exit (described in the next task).

Activating the Integrated TAPECAT UPDATE (ITCU) and TAPECAT GUI Feature

The TAPECAT GUI feature provides interactive volume and dataset inquiry capability against your TMS and HSC CDS. This feature should only be activated after reviewing *Task 11: Perform Host Configuration* under *Tape Catalog Processing*. Instructions for activating these features are included with that task.

Authorizing the Started Task for OS/390 or z/OS Unix System Services

Under OS/390 or z/OS Unix System Services, the ExPR started task requires RACF authority to interface with TCP/IP. Your system programmer or security administrator must review the following steps to determine if you already have procedures in place or if they need to implement these steps:

1. Create a RACF group with an OMVS segment and GID for the ExPR started task.

The RACF statement syntax is:

RDEFINE STARTED expr.* STDATA(USER(*userid*) GROUP(*groupname*))

ADDGROUP *groupname* OMVS(GID(*groupid*))

where *expr* is the name of the started task procedure, *userid* is the RACF userid to be associated with the started task, and *groupname* is the RACF group associated.

2. Create a RACF userid with an OMVS segment and UID for the ExPR started task.

    The RACF statement syntax is:

ADDUSER *userid* DFLTGRP(*groupname*) OMVS(UID(*uid*))

Note: Failure to correctly authorize the ExPR started task will result in an error during initialization of the TCP/IP interface. See message XPR0735W in the separate book *ExPR Messages Guide*.

Assigning APF Authorization to ExPR

As previously discussed, the ExPR load library requires APF authorization to use certain MVS facilities.

APF authorization is required due to the following reasons:

- VSM being present in your system.

- SMF-COLLECTOR, SMF-UPDATE, or RTM are in your START TASKS statement.

- You intend to use the batch PERFORM REORGANIZATION function.

- ExPR's use of authorized console messaging facilities.

There are three methods of authorizing the ExPR load library (*tgtprfx*.SUPRLINK):

- Add the name/volser of the library to the IEAAPFnn member in SYS1.PARMLIB.

- Issue the following MVS command (or add it to the COMMNDnn member in SYS1.PARMLIB:

    SETPROG APF,ADD,DSNAME=*tgtprfx*.SUPRLINK,SMS

- Add the library to the PROGnn member in SYS1.PARMLIB.

Your MVS system programmer will need to review this and implement APF authorization.

Starting the Started Task

Use the following MVS console command to start the started task:

```
S EXPR
```

If you are using a shared PROCLIB library for your primary and secondary ExPR systems, the supplied EXPR proc takes a SYSID parameter so that the same proc can be used for multiple systems. In this case, you should specify the primary system name for variable *sysn*, and STCPARMP for *parmmem*. Then, when starting the started task on a secondary system, specify:

```
S EXPR,SYSID=sysn,MEMBER=STCPARMS
```

For CSC secondary systems, use MEMBER STCPARMC and for SMC system use member STCPARMM.

Note: Licensed ExPR features that are controlled by the started task will not be initially available until you have also activated the ExPR license key. (This was done in Task 5: *Activate the ExPR License Key*.) If you do not have a license key, ExPR will commence its 75-day no license trail period. However, this will only happen if no license information is present. An invalid or expired license will prevent the 75-day trial period from starting.

Stopping the Started Task

Use the following MVS console command to stop the started task at any time:

```
P EXPR
```

Task 7: Install MONTAPE (Optional)

This optional task installs the MONTAPE started task or batch job to allow the collection of data, and the MONTAPE reporting batch job to report on the collected data. You can skip this step if you do not intend to use MONTAPE. Note that MONTAPE is a separately licensed feature of ExPR; a new license key may be required to activate it.

To install MONTAPE:

1. Tailor *usrprfx*.CNTL member MONTAPE.

    This is for the data collection part of MONTAPE. It is set up as a batch job, but it can be modified to run as a started task if needed. Note that the OUTPUT DD is only needed if SMF output is not being produced. SMF output will be produced if the MONRECNUM option specifies a value other than 0.

2. Tailor *usrprfx*.CNTL member MONREPT.

    This is for the reporting part of MONTAPE.

See the separate *MONTAPE/MONREPT Utility Guide* for further details of how to use MONTAPE.

Task 8: Install the ExPR SMF Exit and the HSC SEN Exit (Optional)

This optional task installs the ExPR SMF exit that is required for the DirectSMF update and RTM Monitor applications and for support of NCO in HSC/VTCS 6.1 and above. You can skip this task if you do not intend to use any of these features.

Upgrade Note: If you have already installed the ExPR SMF exit in a previous version and do not wish to run the ExPR versions in parallel, you need to remove any existing ExPR IEFU83 exits from the previous version prior to performing the steps below. (If you do wish to run the ExPR versions in parallel, see *Running the SMF Exit in Parallel to a Previous ExPR Release* below.)

The HSC SEN Exit

When activating the ExPR SMF Exit, an internal HSC SEN exit is also activated if you are using HSC 6.1 or higher. The SEN exit code is included within the SMF exit load module. ExPR utilizes the HSC SEN exit facility to "listen" for HSC/VTCS Near Continuous Operation (NCO) configuration changes. When ExPR detects such an event, it dynamically re-invokes its configuration processes.

Activation of the ExPR listener occurs automatically when activating the ExPR SMF exit. You do not need to explicitly activate the SEN exit. However, you must ensure that the HSC SEN facility is enabled at HSC startup or by the HSC operator command. Non-activation of SEN means ExPR will not see configuration changes until its next startup.

If you do not wish to activate the HSC SEN facility (and therefore ExPR's NCO reconfiguration feature), you must specify NOSEN on the started task START TASKS control statement.

To Install the ExPR SMF Exit

The following steps are based on use of the MVS Dynamic Exits Facility:

1. Stop the started task.

2. Check your SMFPRM*xx* PARMLIB member to ensure that you are calling exit IEFU83 for all subsystems. If the EXITS parameter is specified on the SYS statement (or on any SUBSYS statement), then IEFU83 should be specified. Also, NOEXITS should not be specified on any SYS or SUBSYS statement.

3. Tailor *usrprfx*.CNTL member PROGXX and add it to your current PROG*xx* member of PARMLIB. This will cause the exit to be installed at the next IPL. These changes can also be effected immediately with the MVS system command "SET PROG=*xx*".

4. Restart the started task.

> **Note:** To install the IEFU83 exit point dynamically, you may issue the
>
> SET PROG=*xx*
>
> command, or issue the
>
> SETPROG EXIT,ADD,EXITNAME=SYS.IEFU83,MODNAME=UPRIEF83,DSNAME=*tgtprfx*.SUPRLINK
>
> And
>
> SETPROG EXIT,ADD,EXITNAME=SYS*xxxx*.IEFU83,MODNAME=UPRIEF83,DSNAME=*tgtprfx*.SUPRLINK
>
> commands for each subsystem *xxxx* for which EXITS(IEFU83) is explicitly specified or implied in the SMFPRMxx PARMLIB member.

Running the SMF Exit in Parallel to a Previous ExPR Release

Note: This section only applies if you wish to run older releases of the ExPR started task in parallel to the new release.

If you are running a previous release of ExPR and are using the supplied SMF IEFU83 exit, you may continue to run both the old and new exits concurrently (for example, if you want to run both releases of ExPR in parallel before cutting over to the new release).

To allow both exit modules to exist at the MVS IEFU83 exit point, it is necessary to have different module names. Thus, the ExPR exit module UPRIEF83 also has the alias name of UPR61X83.

In this scenario, when adding the ExPR exit module by means of the SETPROG EXIT command or the PROG*xx* member, use the alias name of UPR61X83 instead of the true name. In the examples that follow and in the supplied PROGXX member, substitute the alias to reflect the alternate name.

Note for Users of the BMC CMF Product

If you use CMF instead of RMF, you can optionally activate the ExPR-supplied SMF exit at the IEFU84 exit point. This will enable the ExPR started task to collect RMF 73/74 records for control unit/device busy and channel activity statistics. If you do not wish to collect type 73/74 records, this step can be omitted.

> **Note:** To install the IEFU84 exit point dynamically, you may issue the
>
> SET PROG=*xx*
>
> command, or issue the
>
> SETPROG EXIT,ADD,EXITNAME=SYS.IEFU84,MODNAME=UPRIEF83,DSNAME=*tgtprfx*.SUPRLINK
>
> and
>
> SETPROG EXIT,ADD,EXITNAME=SYS*xxxx*.IEFU84,MODNAME=UPRIEF83,DSNAME=*tgtprfx*.SUPRLINK
>
> commands for each subsystem *xxxx* for which EXITS(IEFU84) is explicitly specified or implied in the SMFPRMxx PARMLIB member.

Running Multiple Exits under MVS Dynamic Exits Facility

Your installation may already have its own in-house-written SMF IEFU83 exit, or an exit supplied by another software product. In earlier versions of MVS, this would have presented a problem. However, with the MVS Dynamic Exits Facility this is no longer the case. Under this facility it is possible to install multiple load modules at each of the standard MVS exit points, including SMF.

Below is a sample PROGxx member that installs three exit modules at the IEFU83 exit point:

- The ExPR supplied exit – load module UPRIEF83

- An in-house user-written exit – load module USERXT83

- An exit supplied by software product XYZ – XYZU83

These exit modules are each installed at the general system level (SYS.IEFU83), the general started tasks level (SYSSTC.IEFU83), and specifically for the HSC/VTCS started task subsystem SLS0 (SYSSLS0.IEFU83). These levels should match those defined in the SMFPRMxx member of SYS1.PARMLIB (i.e., any SYS or SUBSYS parameter with the IEFU83 exit specified). The SMF NOEXITS parameter should not be coded in SMFPRMxx.

Sample PROGxx Member

```
* Add the ExPR exit at the IEFU83 exit point for the general system:

        EXIT ADD
            EXITNAME(SYS.IEFU83)
            MODNAME(UPRIEF83)
            STATE(ACTIVE)
            DSNAME(tgtprfx.SUPRLINK)
* Add a user-written IEFU83 exit for the general system:

        EXIT ADD
            EXITNAME(SYS.IEFU83)
            MODNAME(USERXT83)
            STATE(ACTIVE)
            DSNAME(users.loadlib)


* Add product XYZ's IEFU83 exit for the general system:

        EXIT ADD
            EXITNAME(SYS.IEFU83)
            MODNAME(XYZU83)
            STATE(ACTIVE)
            DSNAME(XYZ.product.loadlib)


* Add the ExPR exit at the IEFU83 exit point for started tasks:

        EXIT ADD
            EXITNAME(SYSSTC.IEFU83)
            MODNAME(UPRIEF83)
            STATE(ACTIVE)
            DSNAME(tgtprfx.SUPRLINK)
```

* Add a user-written IEFU83 exit for started tasks:

    EXIT ADD
        EXITNAME(SYSSTC.IEFU83)
        MODNAME(USERXT83)
        STATE(ACTIVE)
        DSNAME(users.loadlib)

* Add product XYZ's IEFU83 exit for started tasks:

    EXIT ADD
        EXITNAME(SYSSTC.IEFFU83)
        MODNAME(XYZU83)
        STATE(ACTIVE)
        DSNAME(XYZ.product.loadlib)

* Add the ExPR exit at the IEFU83 exit point for the HSC SLS0 subsystem:

    EXIT ADD
        EXITNAME(SYSSLS0.IEFU83)
        MODNAME(UPRIEF83)
        STATE(ACTIVE)
        DSNAME(tgtprfx.SUPRLINK)

* Add a user-written IEFU83 exit for the HSC SLS0 subsystem:

    EXIT ADD
        EXITNAME(SYSSLS0.IEFU83)
        MODNAME(USERXT83)
        STATE(ACTIVE)
        DSNAME(users.loadlib)

* Add product XYZ's IEFU83 exit for the HSC SLS0 subsystem:

    EXIT ADD
        EXITNAME(SYSSLS0.IEFFU83)
        MODNAME(XYZU83)
        STATE(ACTIVE)
        DSNAME(XYZ.product.loadlib)

These definitions will activate the three load modules at the IEFU83 SMF exit point. Each time SMF invokes the exit, Dynamic Exits Facility will call each of the load modules in turn, with a copy of the SMF record. Each exit module would be unaware of the existence of the others and would perform its functions in isolation from them.

> **Important Note:**
>
> Some SMF exits may choose to delete the SMF record (i.e., it will not be written to the SYS1.MANx collection files). The ExPR supplied exit never does this. **If one of the SMF 83 exit modules at your installation deletes SMF records, then the ExPR supplied exit must be invoked BEFORE the other exit modules (use the FIRST parameter of EXIT ADD).**
>
> Similarly, great care must be taken if another SMF exit modifies the contents of an SMF record. **You should be fully aware of the effect of changing SMF records and should ensure that such changes are consistent and do not impact ExPR or any other installed product.**

Details of the Dynamic Exits Facility can be found in the IBM publications *MVS Initialization and Tuning Guide* and *MVS Initialization and Tuning Reference* for the release of MVS, OS/390 or z/OS that you are using.

Users of the BMC CMF product would need to additionally duplicate the above definitions for the IEFU84 exit point.

Note: A complete description of the ExPR supplied SMF IEFU83 exit is in chapter 3, *Installation Plan for New ExPR Sites* under *ExPR SMF Exit Considerations*.

Task 9: Install the ExPR Security Exit (Optional)

As supplied, any PC/browser running the ExPR client software can connect to the ExPR server, view reports and monitors, and retrieve and update configuration data. The ExPR security exit (UPRXT01) allows you to control the access which various ExPR clients have to the data and functions on the ExPR server.

When the ExPR started task initializes, it attempts to load UPRXT01. If it does not find it, then no further security checking is done. If UPRXT01 is loaded successfully, then further checks are made each time a PC or web browser client accesses the started task server.

Member UPRXT01 on *usrprfx*.CNTL contains the JCL to assemble and link a skeleton exit on to your *tgtprfx*.SUPRLINK library. If you wish to implement the exit, you should review this member, modify the code to suit your installation requirements, and submit it. The ExPR started task must be restarted to implement the security exit.

The mainframe portion of ExPR is now installed and running. In the next chapter, you will set up the ExPR GUI portion of ExPR.

Chapter 6: ExPR GUI Installation and Configuration

Overview

This chapter provides instructions for installing and configuring the ExPR GUI software and StorageTek HTTP Server on a host system in your network.

Note: This chapter is for the ExPR GUI browser-based interface. If you wish to use only the older ExPR PC component interface instead, skip this chapter.

What is the ExPR GUI?

ExPR GUI is a web-based tool that lets you produce and display ExPR historical graphical reports and the Nearline, VSM, and Device monitor applications throughout your network via a web-based browser interface.

ExPR GUI consists of a World Wide Web (WWW) application and a web server to provide network connectivity for WWW browsers. The server component is a multitasking StorageTek MVS HTTP content server that runs as an MVS started task. Unlike IBM's HTTP server, it does not require MVS OpenEdition as a prerequisite.

The ExPR GUI supports all ExPR 6.1 graph reports, TAPECAT GUI, host configuration, and the VSM, Nearline, and Device monitors. It does not currently support the Host Reports and Host Message Monitor applications. The ExPR GUI additionally does not have a Network Configurator application as this is not required for browser access.

The ExPR GUI also supports event notification via MVS console alerts, GUI alerts and E-mail if required. To support E-mail and MVS console alerts, a separate ExPR Monitor Service is required to be installed on an Open System. The supported platforms are Windows NT/2000/XP/2003, Solaris 7,8,9,10 sparc, and Linux i386-based systems. Refer to chapter 9, *ExPR Monitor Service* for additional details.

Task 10: Install and Configure the ExPR GUI Web Browser Interface

This task installs the ExPR GUI software and StorageTek HTTP Server on a host system in your network. This installation is required as ExPR host configuration is done through this interface. In addition to configuration management, the ExPR GUI provides access to the Nearline, VSM, and Device monitor applications and historical graphical reports for display across your network.

Use the steps below to install and configure the ExPR GUI software and HTTP server in your network.

Step 1: Verify ExPR GUI Hardware and Software Prerequisites

ExPR GUI 6.1 Hardware Requirements

Hardware Description	Minimum Requirement	Recommended System
System unit	Pentium II 400MHz, 128MB of memory, 60MB disk space	Pentium IV 1GHz, 512MB of memory, 60MB disk space (or workstation equivalent)
CD-ROM drive	present	present
Monitor	800 x 600 pixels with small fonts	1024 x 768 pixels with 256 colors
network card	present	present

ExPR GUI 6.1 Software Requirements

Software	Description
PC Windowing System	Microsoft Windows XP/2003 (preferred) or Windows 98/Me/NT4/2000. Sun Microsystems Solaris 10 (preferred) or Solaris 7, 8, 9. Linux based system with kernel 2.6 (preferred) or kernel 2.4 The operating systems must have appropriate software components to support a web browser.
PC TCP/IP for communications between the ExPR GUI PC component and the MVS HTTP server	The 32-bit WINSOCK TCP/IP supplied with the Windows versions listed above is required to enable the GUI to transfer configuration data between the workstation and the mainframe. Customers can also transfer configuration data using other facilities (external to the GUI) if desired.
Web Browser	Microsoft Internet Explorer V6.x with SP2 installed, Firefox, or Mozilla 1.4 or higher.
Java Browser Plugin	Java Runtime Environment 1.4 or above.
ExPR	ExPR 6.1 and prerequisites.
Popup Settings	**Popups must be allowed for ExPR GUI.**

Step 2: Verify Installation Materials

Before installing ExPR GUI, make sure you have the ExPR GUI 6.1 product tape.

Note: Contact StorageTek for the latest PTFs to both ExPR GUI 6.1 and ExPR before you install ExPR GUI. You can also download the PTFs from the StorageTek CRC.

ExPR GUI Installation Tape Contents

ExPR GUI is delivered on a product tape. The files included on the ExPR GUI 6.1 product tape are listed below.

ExPR GUI 6.1.0 Product Tape Contents

File	Data Set Name	Description
1	SMPMCS	SMP/E MCS statements
2	SSKY500.F1	HTTPD server JCLIN statements
3	SSKY500.F2	HTTPD LMODs
4	SSKY500.F3	HTTPD SAMPLIB
5	SSKY500.F4	HTTPD icons
6	ASAR700.F1	SAS/C runtime library JCLIN statements
7	ASAR700.F2	SAS/C runtime libraries
8	ASAR700.F3	SAS/C runtime libraries
9	ASAR700.F4	SAS/C runtime libraries
10	ASAR700.F5	SAS/C runtime libraries
11	SSKR610.F1	ExPR GUI JCLIN libraries
12	SSKR610.F2	ExPR GUI CGI LMODs
13	SSKR610.F3	ExPR GUI web content
14	SSKR610.F4	ExPR GUI web content
15	SSKR610.F5	ExPR GUI web content
16	SSKR610.F6	ExPR GUI web content
17	SSKR610.F7	ExPR GUI web content
18	SSKR610.F8	ExPR GUI web content
19	SSKR610.F9	ExPR GUI web content
20	SSKR610.F10	ExPR GUI web content
21	SSKR610.F11	ExPR GUI web content
22	SSKR610.F12	ExPR GUI web content
23	SSKR610.F13	ExPR GUI web content
24	SSKR610.F14	ExPR GUI web content
25	SSKR610.F15	ExPR GUI web content
26	SSKR610.F16	ExPR GUI web content
27	SSKR610.F17	ExPR GUI web content
28	SSKR610.F18	ExPR GUI web content
29	SSKR610.F19	ExPR GUI web content
30	SSKR610.F20	ExPR GUI web content

File	Data Set Name	Description
31	SSKR610.F21	ExPR GUI web content
32	SSKR610.F22	ExPR GUI web content
33	SSKR610.F23	ExPR GUI web content
34	SSKR610.F24	ExPR GUI web content
35	PTF.F1	ExPR GUI required PTFs
36	SMPE.JCL	IEBCOPY unloaded SMP/E install jobs

Note: The ExPR GUI installation automatically installs the ExPR GUI sample jobs in the ExPR GUI STKSAMP.

ExPR GUI FMIDs

The ExPR GUI software and selected components of the SAS/C runtime library are packaged in standard SMP/E format. The ExPR GUI 6.1 installation tape includes the following FMIDs:

SSKY500   HTTPD server base function

SSKR610   ExPR GUI base function

ASAR700   SAS/C selected components base function

Step 3: Unload the ExPR GUI SMP/E JCL Data Set

The ExPR GUI SMP/E JCL Data Set contains sample JCL members for the ExPR GUI. Use the JCL below to create a copy of the SMP/E JCL from file 38 of the distribution tape to help install the ExPR GUI.

```
//jobcard  JOB 'accounting information'
//*
//*    LOAD PDS FROM UNLOADED DATASET
//*
//       LOAD    EXEC PGM=IEBCOPY
//       SYSUT3   DD   UNIT=VIO,SPACE=(CYL,(20,3))
//       IN1      DD   DSN=SMPE.JCL,DISP=(OLD,KEEP),
//                     UNIT=3480,
//                     LABEL=(36,SL,EXPDT=98000),VOL=SER=SKRnnn
//       OUT1     DD   DSN=hlq.SMPEJCL,DISP=(,CATLG),
//                     UNIT=SYSDA,
//                     SPACE=(TRK,(10,2,10)),
//                     DCB=(RECFM=FB,LRECL=80,BLKSIZE=23440)
//       SYSPRINT DD   SYSOUT=*
//       SYSIN    DD   *
         COPY OUTDD=OUT1,INDD=IN1
/*
```

Step 4: Set Up the SMP/E Environment and Install the Software

Warning: Do not install the ExPR GUI and its supporting SAS/C functions in an SMP/E CSI containing other StorageTek products with SAS/C functions you want to preserve. Otherwise, unpredictable results may occur.

However, if you already have the VSM GUI installed: The ExPR GUI should be installed in the same SMP/E CSI so as to share the HTTPD server (the HTTPD server and SAS/C runtime library files are the same on both tapes). SMP/E will determine what needs to be installed.

Warning: ExPR GUI version 6.1 cannot coexist with ExPR GUI version 5 in the same SMPE CSI because of dataset conflicts.

Warning: Co-existing with VSM GUI for the same SMP/E environment will require the relevant VSM GUI maintenance patches (PTF) for the HTTPD server base function and SAS/C function.

Warning: The High Level Qualifiers you will use for the SMP/E dataset is restricted to no more than 18 characters. This is to ensure that all the datasets received for the product will comply with the 44 character maximum length data set name, imposed by the operating system.

The SMP/E JCL Data Set contains jobs to create the SMP/E environment (allocating data sets, setting SMP/E options, and so forth) in addition to the SMP/E RECEIVE, APPLY and ACCEPT jobs.

For more information, see the following members:

@@NOTES   General notes on installation process

@@TOC   Table of contents for the members

Each job also contain usage notes that describe what needs to be changed.

To set up the SMP/E environment and install the software:

1. Customize the installation jobs.

    You can do this manually with an editor, but StorageTek recommends that you use the provided ISPF edit macro @SKREDIT and @SKRRUN REXX exec for automated updates of an individual member or all members.

    Before use, first copy these two members to a library in your SYSPROC concatenation, then change the job settings in @SKREDIT to the appropriate settings for the site.   Then to update a member just invoke @SKREDIT within the member or to change all members, from TSO or ISPF Option 6 enter:

    @SKRRUN smpejcl_dataset_name @SKREDIT

    @SKREDIT contains information describing its use.

2. Build the SMP/E database.

    Run the following customized members:

    C1CSIBLD   Allocate and initialize the SMP/E data sets.

    C2ZONES   Define and update each zone.

C3DDDEFS	Define the required DDDEFs for each zone.
	Note: This job may end with return code 4.
	SMP/E warning code of GIM27701W is normal and expected for new SMP/E environments where there is no definition yet defined. The SMP/E Replace command will be changed to an Add command automatically.

3. Define DDDEFs and allocate the target and distribution data sets.

    Run the following customized members:

I1DDDEFS	Define the DDDEFs.
	Note: This job may end with return code 4.
	SMP/E warning code of GIM27701W is normal and expected for new SMP/E environments where there is no definition yet defined. The SMP/E Replace command will be changed to an Add command automatically.
I2ALLOC	Allocate the HTTPD target and distribution data sets.
	<u>Do not run this job if you already have the HTTPD server installed (e.g., as part of the VSM GUI).</u>
I3ALLOC	Allocate the ExPR Web content target and distribution data sets.

4. Run customized member I4RCV to RECEIVE the HTTPD, SAS/C and ExPR GUI FMIDs.

    <u>Modify this job to exclude the SSKY500 and ASAR700 FMIDs if you already have the HTTPD server and SAS/C run time received in your SMP/E environment.</u>

5. Run customized member I5RCV to RECEIVE the PTFs required for HTTPD and SAS/C FMIDs.

    - <u>Do not run this job if you already have the required PTFs already applied in your SMP/E environment.</u>

6. Run customized member I6APPLY to APPLY the HTTPD server and SAS/C FMIDs and required PTFs.

    - <u>Modify this job if you already have the HTTPD server and SAS/C run time applied in your SMP/E environment <u>but</u> do not have the required PTFs.</u>

    - <u>Do not run this job if you already have the required PTFs already applied in your SMP/E environment.</u>

Notes:

- By default this job will fail with return code 12, due to STOP instructions in the PTFs due to DELETE statements in the SMP/E commands. You will need to modify the job to allow the PTF DELETE commands to be processed with a BYPASS statement.

- This job will end with return code 4.

- SMP/E warning code of GIM24701W is normal and expected due to the LINK-EDIT parameters not obtained and using defaults.

- SMP/E warning code of GIM42001W is normal and expected due to BYPASS instruction in the SMP/E statement.

7. Run customized member I7APPLY to APPLY the ExPR GUI FMID.

Notes:

- This job will end with return code 4.

- SMP/E warning code of GIM23904W and GIM23903W is normal and expected due to the LINK-EDIT reporting incomplete load modules. These modules will get resolved by the HTTPD at run time.

When the APPLY is successful, the SMP/E target libraries contain the following data sets:

SMP/E Target Library Contents

Data Set Name	Contents
HTTPDCMN.ICONS	server icons
SSAROMOD	SAS/C LMODs
SSARRTNS	run time libraries
SSKRRTNS	FCD LMODs
SSKYRTNS	FCD LMODs
STKLOAD	load modules
STKSAMP	sample material
TRANS	web content file translations
EXPR.EN	web content
EXPR.EN.ABOUT	web content
EXPR.EN.CONFIG	web content
EXPR.EN.DEVICE	web content
EXPR.EN.DOCS	web content
EXPR.EN.DOCS.WHDATA	web content
EXPR.EN.DOCS.WHGDATA	web content
EXPR.EN.DOWNLOAD	web content
EXPR.EN.GRAPHV	web content

Data Set Name	Contents
EXPR.EN.HOME	web content
EXPR.EN.IMAGES	web content
EXPR.EN.NEAR	web content
EXPR.EN.SCRIPTS	web content
EXPR.EN.SOUNDS	web content
EXPR.EN.SYSTEM	web content
EXPR.EN.VSM	web content
EXPR.EN.XML	web content
EXPR.LIB.CALM@DEF1394	web content
EXPR.LIB.CALM.CORE	web content
EXPR.LIB.CALM.CORE.IMAGES	web content

.

8. Run customized member I8ACCEPT to ACCEPT the HTTPD server and SAS/C FMIDs and required PTFs.

   Notes:

   - By default this job will fail with return code 12, due to STOP instructions in the PTFs due to DELETE statements in the SMP/E commands. You will need to modify the job to allow the PTF DELETE commands to be processed with a BYPASS statement.

   - This job will end with return code 4.

   - SMP/E warning code of GIM24701W is normal and expected due to the LINK-EDIT parameters not obtained and using defaults.

   - SMP/E warning code of GIM42001W is normal and expected due to BYPASS instruction in the SMP/E statement.

   - SMP/E warning code of GIM61903W is normal and expected due to the previous APPLY statements having removed load modules from the DLIB.

9. Run customized member I9ACCEPT to ACCEPT the ExPR GUI FMID.

   When the ACCEPT is successful, the SMP/E distribution libraries contain following data sets:

SMP/E Distribution Library Contents

Data Set Name	Contents
ASAROMM	LMOD
ASAROSM	LMOD
ASARRTNS	LMOD
ASKRRTNS	LMOD
ASKYICNS	server icons
ASKYRTNS	LMOD
ASKYSAMP	sample material

Data Set Name	Contents
AUPRCDEF	web content
AUPRCIMG	web content
AUPRCORE	web content
AUPREABT	web content
AUPRECFG	web content
AUPREDEV	web content
AUPREDOC	web content
AUPREDOW	web content
AUPREDOG	web content
AUPREDNL	web content
AUPREEN	web content
AUPREGRP	web content
AUPREHME	web content
AUPREIMG	web content
AUPRENEA	web content
AUPRESCP	web content
AUPRESND	web content
AUPRESYS	web content
AUPREVSM	web content
AUPREXML	web content
AUPRSAMP	ExPR sample material
AUPRTRNS	web content file translations

10. Run the customized member S1COPY to copy the customizable members to a non-SMP/E controlled data set.

When the copy has successfully completed, there will be a new data set, STKPARM, to which you can apply your site customization. Refer to the dataset members SKRPROC and SKRPRM00 for sample templates to use.

Step 5: APF Authorize the ExPR GUI Libraries

In addition to the NCS libraries, APF authorize the ExPR GUI load library STKLOAD and the SSARRTNS library by any of the following methods:

- Dynamically authorize the load library by using the MVS SETPROG APF,ADD,DSNAME operator command.

- Dynamically authorize the load library by:

  o Adding the load library to the MVS parameter library PROG*xx* member. For example: SYS1.PARMLIB(PROG00)

  o Issuing the MVS SET PROG=*xx* operator command.

- (Recommended) Permanently authorize the load library by:

  o Adding the ExPR GUI load libraries to the MVS parameter library members IEAAPF*xx* or PROG*xx*. For example: SYS1.PARMLIB(IEAAPF00) or SYS1.PARMLIB(PROG00)

  o IPLing the system.

Step 6: Customize the ExPR GUI Startup Proc

To create the ExPR GUI startup procedure, modify STKPARM member SKRPROC as described in the JCL comments and add the procedure to the production PROCLIB.

Step 7: Customize the ExPR GUI Parameter File

The ExPR GUI sample startup proc SKRPROC calls the sample parameter file SKRPRM00 from the STKPARM data set . See the following sections for more information and modify the values in SKRPRM00 for your site's needs from the STKPARM data set.

ExPR GUI Server Configuration Parameters

setenv exprport *port*

where port is the port number that the ExPR primary started task is listening on, enclosed in quotes, e.g., "31000"

setenv exprip *ip*

where *ip* is the address of the host that the ExPR primary started task is running on, without quotes, e.g. 129.80.16.10 It is also possible to use the qualified hostname of the system running ExPR, e.g., "mvsa.xyz.com"

setenv exprname *name*

where *name* is the name of the ExPR system that will be displayed on the web pages and in the graph titles, e.g., "MVSA on Production VSM"

setenv loglvl *level*

where *level* is the ExPR GUI Applet program logging message level, iIn order of verbosity: INFO, WARNING, SEVERE, OFF. Logging information will appear in the client's browser java console window, if enabled.

gmtoffset *offset*

The system clock offset from GMT. Required if the system clock is not set to GMT. You can specify the offset in hours, minutes, and seconds. For example, 10 hours 30 minutes specifies ten and a half hours ahead of GMT.

loglevel *level*

The logging message level. Valid values are error, warning, info, and the default is warning. For example, if you specify info, you log only information messages. If you specify error, you log error, warning, and information messages.

serverbase *hlq*

The high level qualifier of the server data sets in the form `hlq`. This should be the same as the hlq used during the SMP/E install. This parameter is required. Please note that this cannot be longer that 18 characters to comply with dataset name length.

Network Parameters

servername *name*

The server name reported in responses. The default is the network host name.

serverdomain *domain*

The server domain name reported in responses; for example, `yourcompany.com`. The default is all blanks.

port *p*

The IP network port the HTTP Server listens on for connections. The default is port 80, the standard HTTP port.

Caution: The effective IP network port must be accessible for use by the server and it must not be reserved for use by another jobname (that is, by the TCP/IP PORT or PORTRANGE configuration statements). Also under OS/390 or z/OS, the server started task requires SAF authority to interface with TCP/IP or initialization errors will occur

For example, use the following procedure for RACF:

1. Create a RACF group with an OMVS segment and GID for the server started task:

   RDEFINE STARTED *http*.* STDATA(USER(*userid*) GROUP(*groupname*))
   ADDGROUP *groupname* OMVS(GID(*groupid*))

   Where:

   - http is the name of the server started task procedure
   - userid is the RACF userid to be associated with the started task
   - groupname is the RACF group associated

2. Create a RACF userid with an OMVS segment and UID for the server started task.

   ADDUSER *userid* DFLTGRP(*groupname*) OMVS(UID(*uid*))

Security Parameters

Security is enabled by the `security` parameter described below.

authname *title*

The authentication realm title, which appears on the browser userid/password prompt. The default is "`StorageTek Expert Performance Reporter`".

security {*file* | *saf*}

Specifies the userid verification method:

file

> Userid information is verified against the entries in the specified text file. The file entries take the format:
>
> userid *userid_name password [access_level]*

saf

> The specified system security package, which verifies userid and password information, and that valid users have access to the profile STKHTTPD in class FACILITY.

authuserfile *file*

Specifies the text data set containing the user information data set. The file reference can be of the following formats:

> DSN:*dsname*
>
> > data set name
>
> DDN:*ddname*
>
> > DDNAME in startup proc

The target data set can be a sequential data set or a PDS/PDSE member. The default is DDN:SKYPSWD which, in the sample startup proc SKYPROC, references the sample userlist in STKPARM.

Content Parameters

updated *date*

The date and time (gmt) when the web content was last updated in an installation or PTF update. This parameter is required. For example:

"fri, 06 dec 2002 3:54:00 gmt"

translationfile *file*

Specifies the data set containing the ExPR GUI data set name translations. The file reference can be of the following formats:

> DSN:*dsname*
>
> > data set name
>
> DDN:*ddname*
>
> > DDNAME in startup proc

The target data set can be a sequential data set or a PDS/PDSE member. The default is DDN:SKYTRSN which in the sample startup proc SKYPROC references the SMPE installed translation file.

Miscellaneous Parameters

allow *xxx.xxx.xxx.xxx* / *mm*

Specifies the ip address range allowed to connect to the server. xxx.xxx.xxx.xxx is the base ip address in dotted decimal notation and mm are the significant bits. For example:

10.117.186.0 / 24

Specifies that connections are allowed from addresses 10.117.186.*

authenticateexpiry *period*

The period entries will remain in the authentication cache. Period can be specified in any combination of hours, minutes or seconds and if no unit is given seconds are assumed. For example 6 hours. The default period is one hour.

bufferpool *number*

Sets the minimum number of request buffers. Allowed range is 0 to 400. Default is 200 buffers.

cgionly yes|no

Only allow CGI processing, default is no. Caution that this parameter MUST NOT be set to yes if using any GUI application as it will disable the GUI.

closetimeout *period*

Sets the request timeout (in seconds) on a client connection. The allowed range is 5 to 60 seconds, default is 30 seconds.

dirlists yes|no

Enables generation of virtual directory listings, default is yes.

deny *xxx.xxx.xxx.xxx* / *mm*

Specifies the ip address range forbidden to connect to the server.   Syntax as for allow.

expiry *period*

Specifies the default static content expiry period in seconds. Default is 21600 (i.e., 6 hours).

home "*url-string*"

Specifies the default home page for the server and is relative to the document root. For example: home "/expr/en/home/index.xml"

Note: Please ensure that the url-string begins with a forward slash "/", otherwise Microsoft Internet Explorer browser will not be able to resolve web page path names correctly.

keepalivetimeout *period*

> Sets the inactivity timeout (in seconds) on a persistent client connection. The allowed range is 15 to 300 seconds, default is 300 seconds.

linger *period*

> Sets the socket timeout (in seconds) on close before it is available for reuse. It can tuned to improve socket availability at high transaction rates but setting too low can cause connections to be disconnected before all data is delivered to the client. The default is the installation TCP/IP default.

loadmodule *module*

> Preloads the specified CGI module. The default is to dynamically load and unload such modules as required.

maxclients *number*

> Specifies the maximum number of worker tasks that can run.

maxrequestsperchild *number*

> Sets the maximum number of requests to be serviced by a worker task before it is restarted. The default is no limit.

order *check-order*

> Specifies the order in which a connection source ip address is checked against any allow and/or deny parameters. Allowable sequences:
>
> - allow-deny – Allow directives are checked before deny directives. Unmatched requests are denied.
>
> - deny-allow – Deny directives are checked before allow directives. Unmatched requests are allowed.
>
> - mutual-exclusion – Only requests that are allowed by an allow directive and are not forbidden by a deny directive are allowed.
>
> For example: order allow-deny
>
> The default order is deny-allow. Note that disallowed connections are silently dropped for security reasons. i.e., no error messages are returned to such connections.

receivebuffersize *value*

> Changes the TCP receive buffer size if authorized. Valid range is 4096 to 65536. Default is the TCP/IP stack default.

socktimeout *period*

> Specifies the socket timeout in seconds.

startservers *number*

> Specifies the default number of running worker tasks .

servername *name*

> The server name reported in responses. The default is the network host name.

secure *level*

> Specifies the directory levels under which security verification is required. It can be specified for each application but for efficiency it is recommended to have as few as possible. Default is /.

sendbuffersize *value*

> Changes the TCP send buffer size if authorized. Valid range is 4096 to 65536. Default is the TCP/IP stack default.

setenv name *text*

> Sets an environment variable accessible to cgi modules.

serversignature yes | no

> Specifies whether the server identification line should be included at the bottom of server-generated pages such as directory listings or error pages.   Default yes.

tcpipprefix *high_level_qualifier*

> Sets the system TCPIP high level qualifier. Default is TCPIP. Suggest also allocating the *<tcpipprefix>*.TCPIP.DATA dataset in the started task JCL with DD SYSTCPD.

tcpipdata *reference*

> Sets the reference to the TCPIP data dataset in the form DSN:dataset or DDN:ddname. Defaults to DDN:SYSTCPD

Step 8: Start the ExPR GUI Server

> To start the ExPR GUI HTTPD server, enter the following operator command.
>
> > START SKRPROC
>
> The server is up and running when the following message appears:
>
> > SKY003I HTTPD ready to accept requests

Step 9: Connect to the ExPR GUI Server

Specify the URL of the server in the browser window. For example, to connect to the web server running on the MVS system `abcde` in the `fghijk` domain on port 8888, the URL would be:

http://abcde.fghijk.com:8888/

To connect to this server using default port 80 would be:

http://abcde.fghijk.com/

Refer to the *ExPR Client User's Guide* for information about using the ExPR GUI.

Step 10: Controlling the ExPR GUI Server

By default, when the ExPR GUI server is started, it uses the SKRPRM00 member in STKPARM. You can stop the server by entering one of the following MVS commands:

P SKRPROC
F SKRPROC,SHUTDOWN

To display the status of the server, enter the following MVS command:

F SKRPROC,D S

The following shows a display status response:

SKY016I HTTPD Server 1.0.0 started at Fri Jan 24 06:51:35 2003
requests received 85
tasks default: 20 active: 20 limit:40
SKY053I Current active worker tasks: 0

This response shows an idle system with the default number of worker tasks, which handle client connections, idle waiting for work. At times of peak demand, the server can dynamically start additional tasks up to the limit.

To display the server connections, enter the following MVS command:

F SKRPROC,D C

The following shows a display connections response:

SKY031I Connections total: 114 max: 63/min
SKY032I Connection rates: 0/min   0/hour
SKY026I Task: 5 Requests: 1 Client: 199.117.186.54 : 36292

This response shows one client active whose IP address is 199.117.186.54 and using port 36292.

Chapter 7: Host Configuration

Overview

This chapter provides instructions for configuring ExPR using the ExPR GUI Host Configurator application.

Note: It is also possible to configure ExPR using the ExPR PC component's Host Configurator application. That method is described in appendix F, *ExPR PC Component Installation and Configuration*.

Task 11: Perform Host Configuration

ExPR collects most site configuration data from the HSC CDS automatically. For example, SYSIDs, ACS IDs, LSM IDs, VTSS IDs, device addresses, and device types are collected automatically and stored in the CDSCONF dataset each time ExPR processes are run on the MVS host.

Site information that the CDS does not know about (such as informal ACS and LSM names to appear in report headers, TAPECAT options, database management options, and extended data collection options) must be entered into the ExPR configuration manually with the Host Configurator. Additionally, the Host Configurator is used to activate and configure ExPR features.

The Host Configurator retrieves the ExPR configuration from the primary host for modification. After you modify definitions and settings for your site, you save the modified configuration back to the host system. Possible modifications are described below.

Note: Existing users migrating from an earlier version of ExPR should see their existing configuration options in the Host Configurator. Existing configuration options were migrated to the new release in Task 4, *Initialize ExPR Datasets* under the INITCONF job step.

Launching the Host Configurator

The Host Configurator application is accessed using the ExPR GUI:

Important Note:

- ExPR GUI uses popup windows. For this application to work correctly, you must set your browser to allow popups.

- ExPR GUI sends a certificate to your browser. For this application to work correctly, you must accept this certificate.

1. Specify the URL of the server in the browser window. For example, to connect to the web server if it is running MVS system `abcde` in the `fghijk` domain on port 8888, the URL would be:

   http://abcde.fghijk.com:8888/

   To connect to this server using default port 80 would be:

   http://abcde.fghijk.com/

2. Enter your network login ID and password when prompted

3. The ExPR MVS Reporting page is initially displayed.
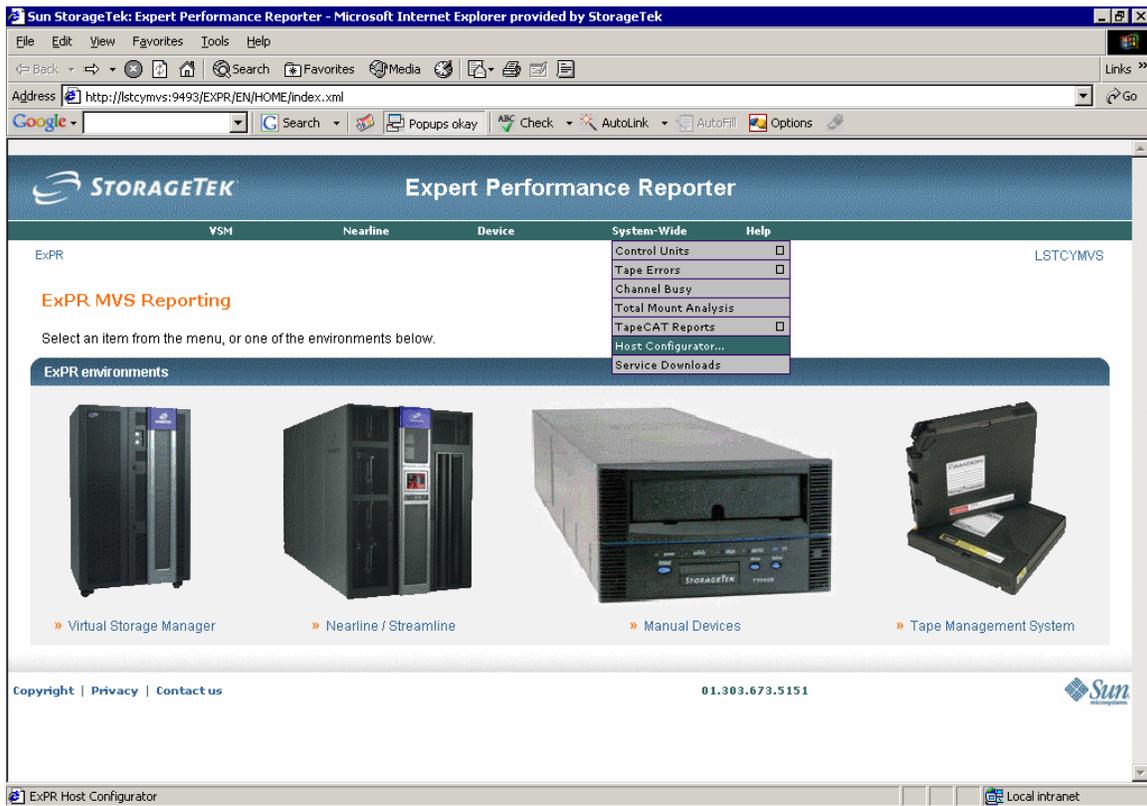
4. Put the cursor on the **System-Wide** tab and select **Host Configuration** from the pulldown.

5. The Host Configurator is displayed in a separate window. It may take several minutes to load initially as it retrieves Web content from the host HTTP server.
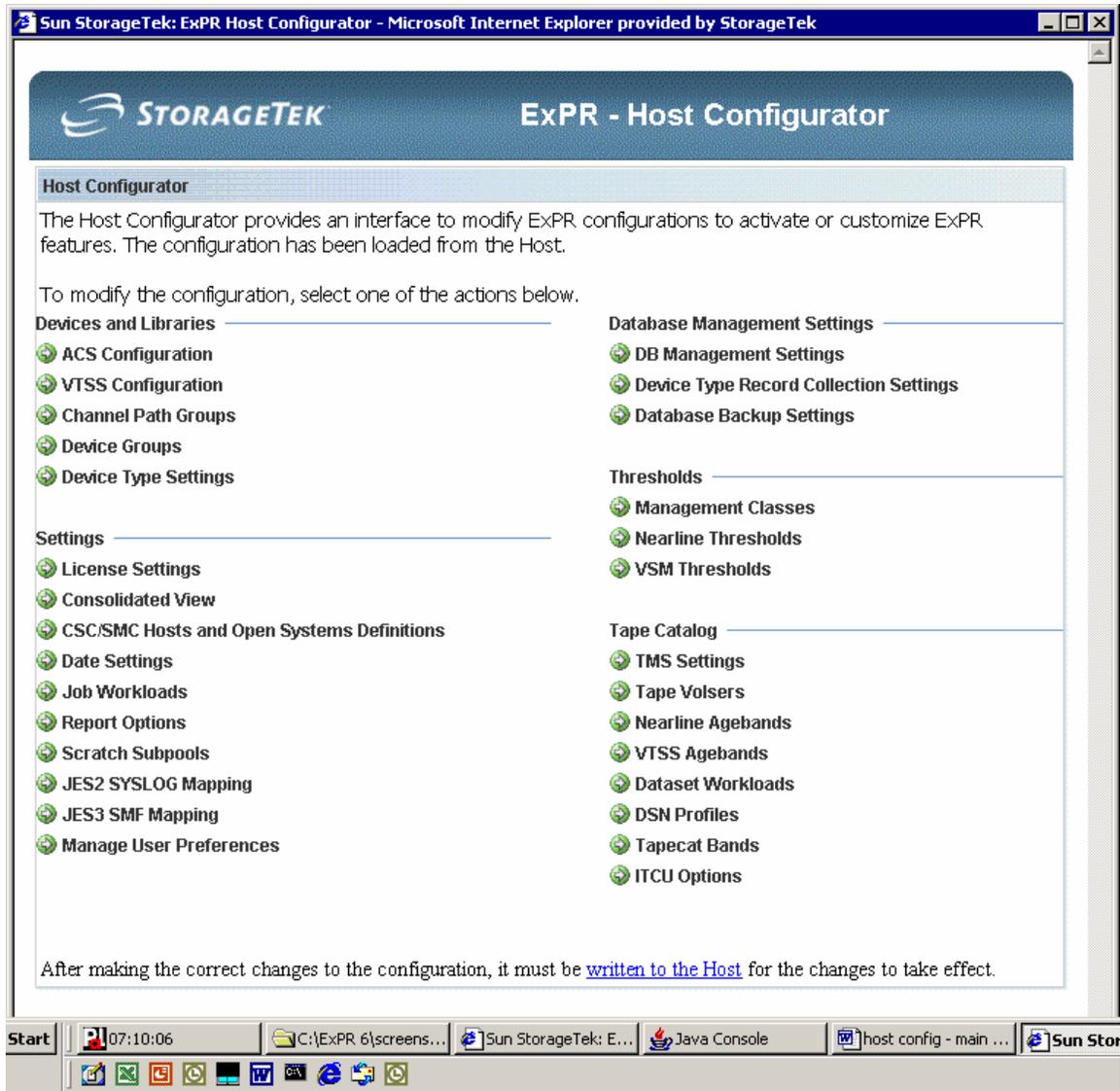
6. Click the item you want to configure. Configuration options are described below.

7. When you are finished with configuration changes, be sure to save the revised configuration back to the host. Otherwise, your changes will not be implemented.

Note: The rest of this chapter covers the ExPR GUI Host Configuration process. For information about using the ExPR GUI to display real-time monitors and historical graphical reports, refer to the separate book *ExPR Client User's Guide*.

Devices and Libraries

ACS Configuration

ACSs, LSMs, and device addresses are automatically detected and entered in the ExPR configuration during the Auto-config process. This configuration option defines informal ACS and LSM names that will appear in ExPR report headers. You can skip this step if you want ACS and LSM IDs to appear instead.

To define ACS and LSM names:

1. Click **ACS Configuration** on the Host Configurator. The selection is displayed in a separate window.
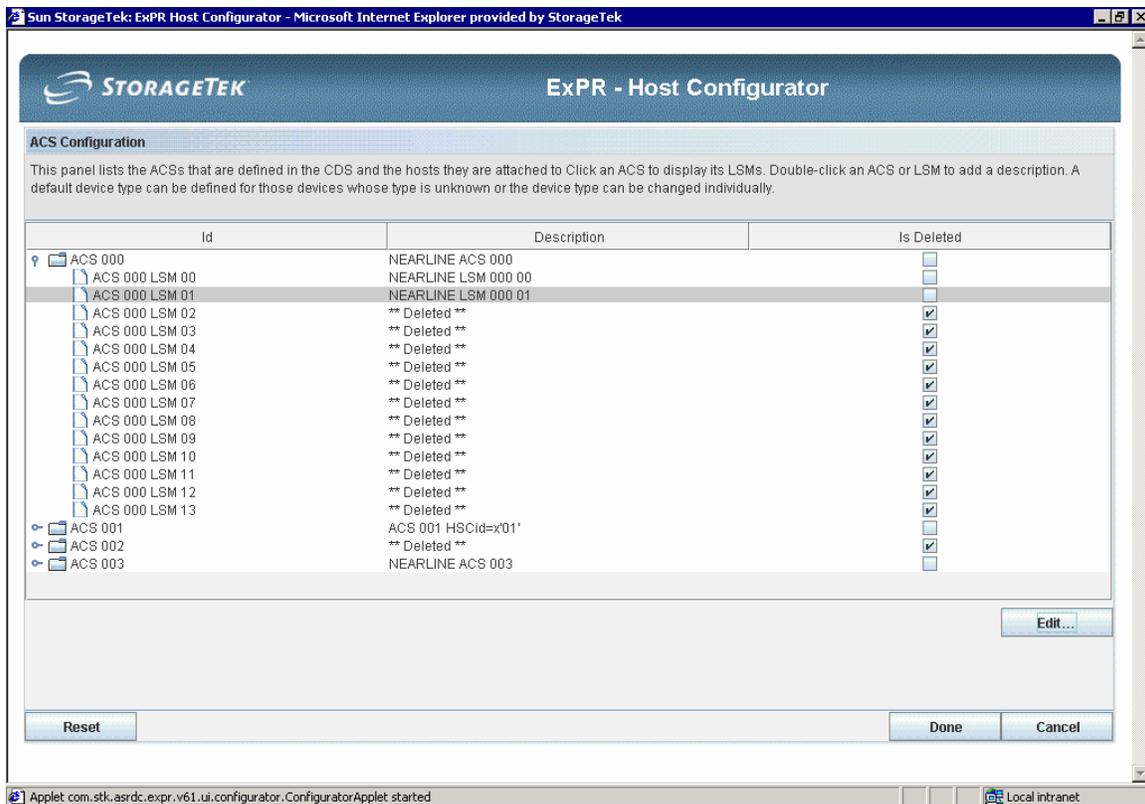
2. Double-click an ACS to display its LSMs.

3. Double-click an ACS or LSM (or use the **Edit** button) to enter or change the description.

4. In the dialog, enter the description and click **OK**.

5. Repeat until all ACS and LSM descriptions have been defined.

6. Click **Done** when you are finished.

VTSS Configuration

VTSSs and their associated RTDs and VTDs are automatically detected and entered in the ExPR configuration during the Auto-config process. This step defines informal VTSS names that will appear in ExPR report headers, and also the VTSS model number.

The model number is used by ExPR to determine the maximum data stage and destage rates within the VTSS (i.e., data being written to or read from the disk buffer). Each VTSS series and model VTSS has different performance characteristics, so it is important that you correctly identify the model.

To define VTSS names and model numbers:

1. Click **VTSS Configuration** on the Host Configurator. The selection is displayed in a separate window.
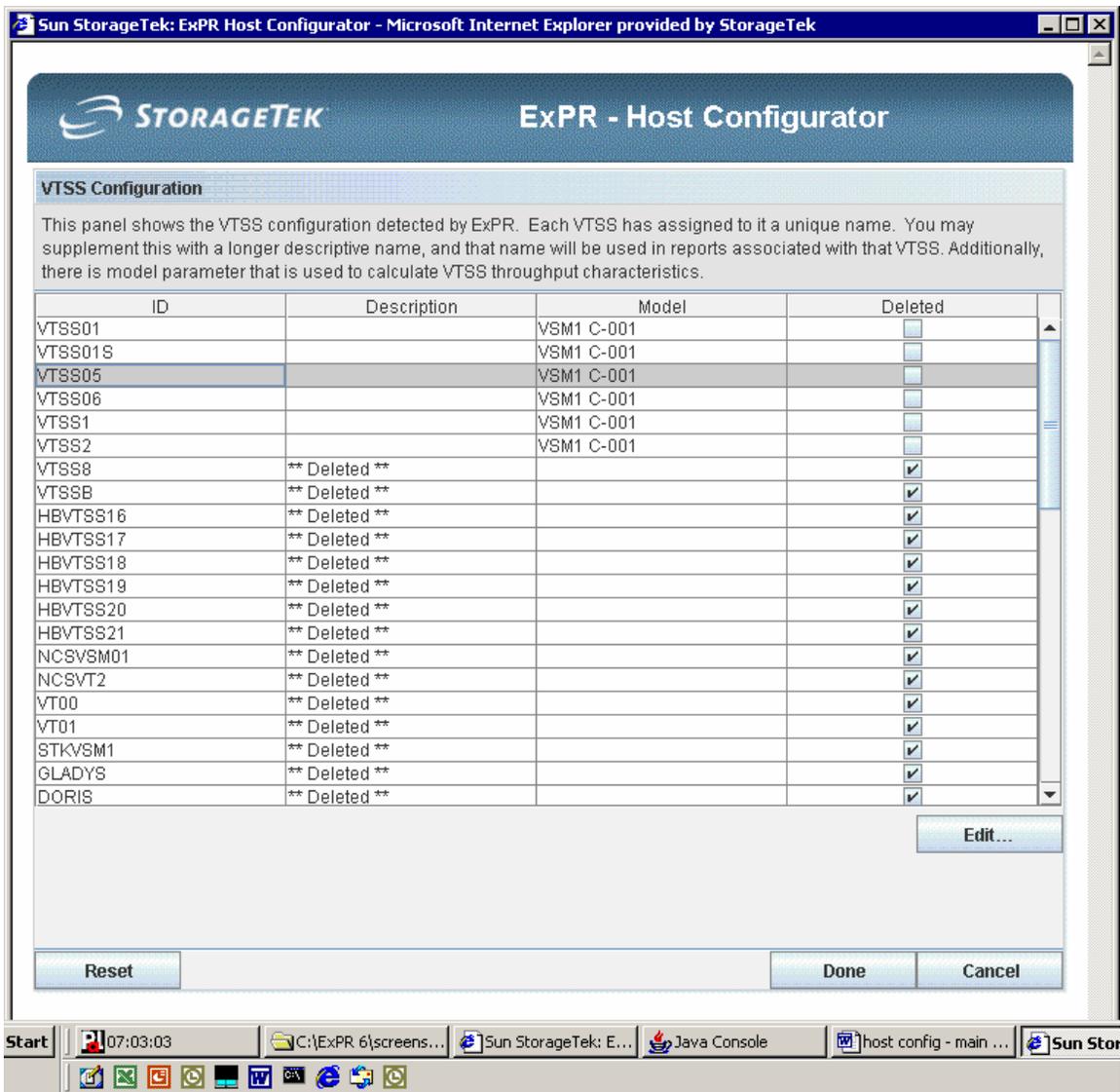
2. Double-click a VTSS (or use the **Edit** button) to enter or change the description to appear in reports and the model number that matches the VTSS.

3. In the dialog, enter the description and model number and click **OK**.

4. Repeat all steps until all VTSS information has been defined.

5. Click **Done** when you are finished.

Channel Path Groups

Note for MVS users: ExPR reports provide information about channel path activity related to your Nearline, VTSS, or manual device configuration. To use this feature effectively, you need to map your channel paths into logical groups that reflect how they are organized in your hardware IOCP/IOCDS configuration.

Note for MSP users: MSP does not generate the RMF data used by ExPR for channel path group data collection. Therefore, you should skip this step and not define any groups here.

Each channel path group is associated with a SYSID. A group may contain one or more channel paths and/or ranges of channel paths (for example 10, 20-29, 31-35, 40) whose activity should be reported on as a single unit. A channel path can be defined in more than one group.

To define channel path groups:

1. Click **Channel Path Groups** on the Host Configurator. The selection is displayed in a separate window.
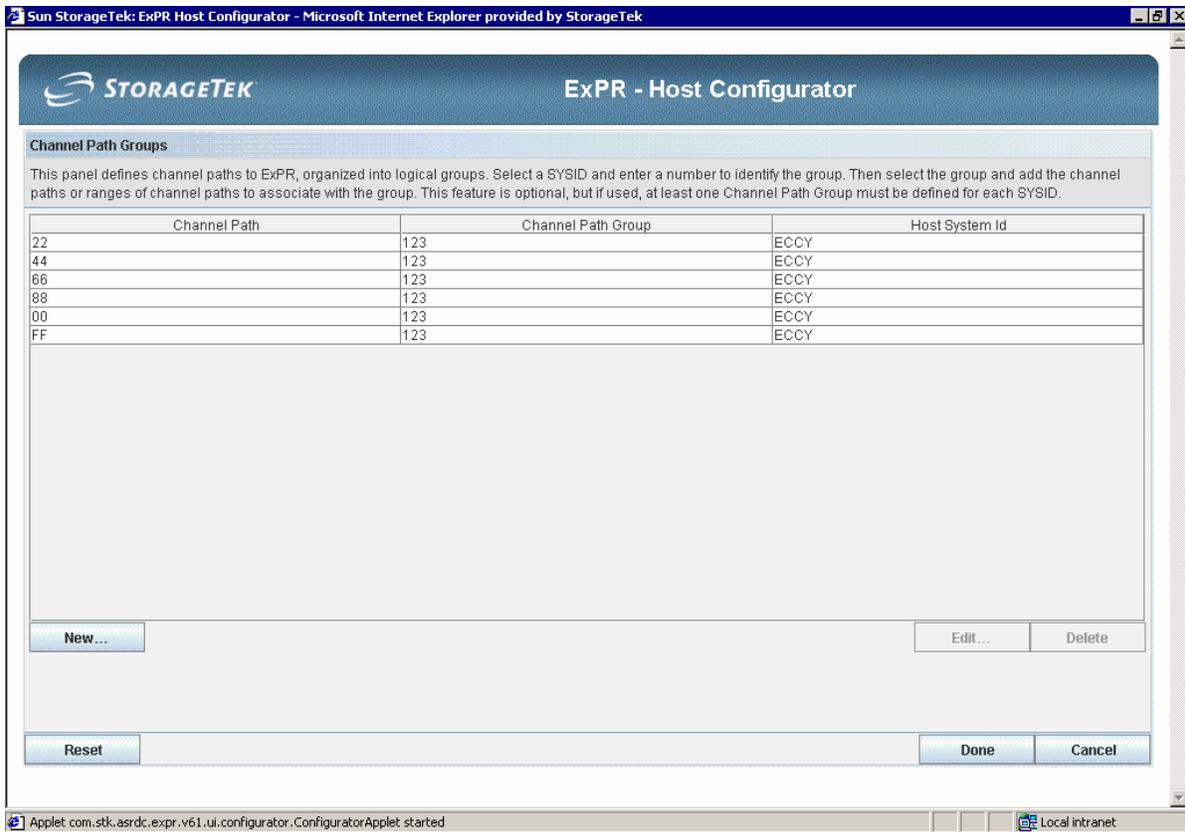
2. Click **New**.

3. In the dialog, enter a channel path (format 00-FF hex) or range of paths (separated by a hyphen) to include in the group.

4. Enter a number (format 0-255 decimal) to define the channel path group.

5. Select the host SYSID to define the channel path group for and click **OK**.

6. Repeat all steps until all channel path groups have been defined.

7. Click **Done** when you are finished.

To edit or delete a group, select an existing channel path group and use the **Edit** or **Delete** buttons.

Device Groups

Device groups provide a mechanism for reporting on user-specified lists of devices as single entities. Device groups can represent, for example, specific device types across ACS/LSMs, banks of manually racked devices, all of the devices in an entire ACS, or any combination of your choosing.

Important: When choosing a name for a device group, you **must not** use a name that is also the subsystem name of a VTSS.

You also cannot define device groups with the name "RTD-G*nn*" or "ACS-*nnn*" as these are reserved for ExPR internal use. RTD-G*nn* groups are automatically generated to

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represent the RTDs attached to each VTSS in your installation and are selectable for PC/GUI and mainframe device group reporting. ACS-*nnn* groups are automatically generated to create a device group for each ACS.

Another especially reserved device group name is "MANUAL". This name should be used to define a group of all manually operated tape drives (i.e., those not attached to an LSM or virtual drives). Drives in the MANUAL group will cause the manual mount counts to be incremented within ExPR when processing SMF data. These counts are produced in the SYSTEM-MOUNTS batch report. Drives defined in the MANUAL group can also be defined within other device groups. Failure to define all of your non-LSM/VSM drives in the MANUAL group will cause the MVS manual mounts to be reported incorrectly.

Up to 68 device groups can be specified (including the automatically generated RTD-G*nn*, ACS-*nnn* groups, and MANUAL groups), and each group can be for either all SYSIDs or for a specified SYSID. Any number of devices can be included in a group, including LSM-attached, virtual, or manually-racked devices. Also, a device can appear in more than one group.

ExPR will collect the same categories of information about device group activity as for Nearline and VSM, specifically:

- Scratch and non-scratch mount counts (from HSC/VTCS subtypes)

- Concurrent drive utilization (from HSC/VTCS subtypes) and bytes transferred

- Details of volume/drive errors (derived from SMF type 21 records)

- Details of allocation/recovery events (derived from MVS SYSLOG)

Important: The ExPR started task RTM option must be active to collect mount and drive utilization statistics for manual drives that are defined within device groups (i.e., drives that are not LSM-attached or VTD devices).

To define device groups:

1. Click **Device Groups** on the Host Configurator. The selection is displayed in a separate window.
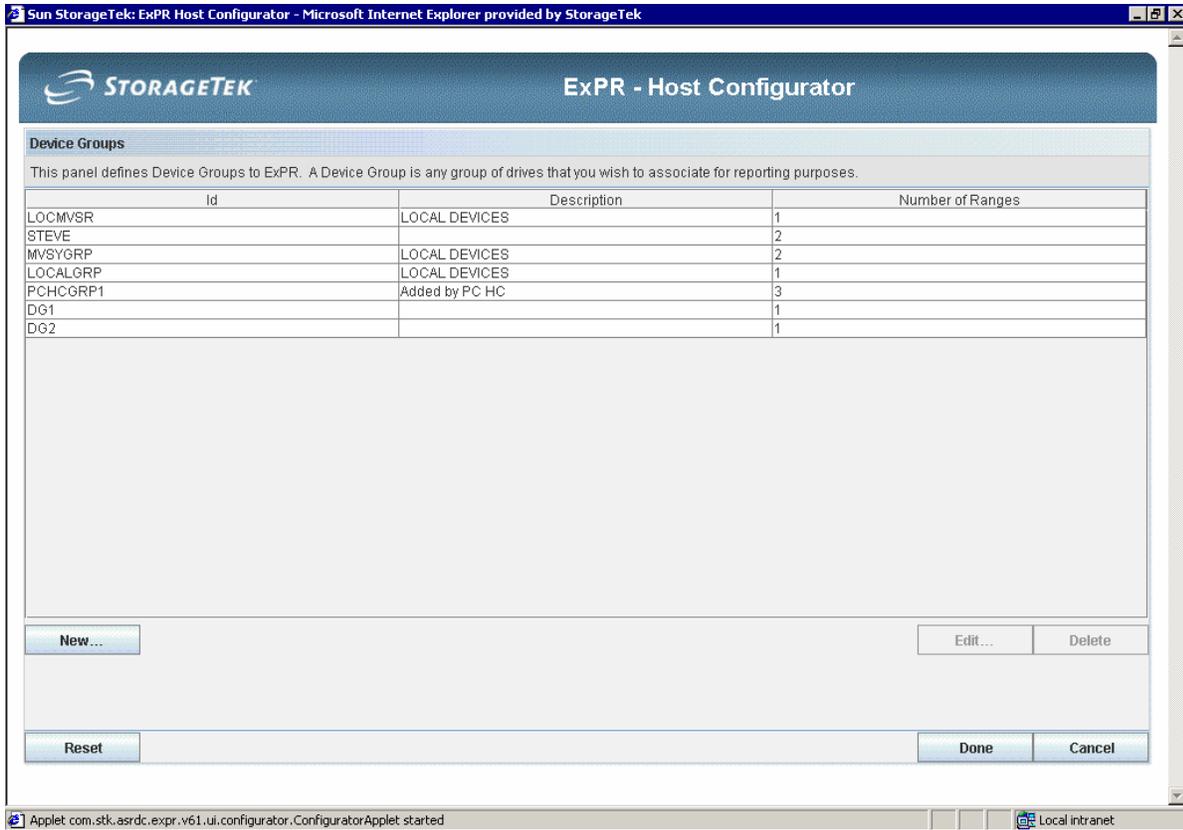
2. Click **New**.

3. In the dialog, enter an id and group name description for the device group. (An internal group number will be assigned by ExPR.)

4. Click **New** in the dialog.

5. In the dialog, enter a device address or range of addresses (hex format 0000-FFFF) and the SYSIDs to include in the group and then click **Ok**.

6. Click **Done** when you are finished.

To edit or delete a group, select an existing device group and use the **Edit** or **Delete** buttons.

Technical Note:

Generally, for Nearline activities, ExPR collects data at the individual LSM level, although some data is not related to a specific LSM. The data is stored in the host system database using the ACS/LSM numbers as part of the key structure.

For device group data collection, an ACS number is assigned internally solely for the groups of devices. This allows ExPR to think of device groups as a type of LSM internally and whenever possible use common routines to collect data.

ExPR has thus reserved ACS number 253 for this purpose and the device groups will be numbered internally as LSM 032-099 (i.e., 253-032 through 253-099). This is transparent to you except that during control statement processing and on various reports, ExPR will print the internal ACS/LSMid assigned to a particular group along with the group name.

Each group is treated by ExPR in the same manner as an LSMid or VTSSid. You can therefore also optionally define channel path groups for manual device groups in the same manner as for LSM/VTSS-attached devices.

Control unit information is collected along the traditional MVS S/370 lines, mapping 16 devices to one control unit in the same manner as LSM or VTSS attached devices. Volume/drive errors and allocation recovery events will be individually reported on and summarized at the group and MVS-system level, as will scratch and non-scratch mount counts.

Device group level detail is available in the following ExPR host reports:

- Scratch/non-scratch mount counts and timings – Device Group Mounts report

- Number of drives in use – Device Group Utilization report

- Details of volume and drive errors – Tape Errors report

- Details of allocation/recovery – MVS Allocation Recovery Update and Allocation Recovery reports for manual device groups

Details of individual events are also listed during batch SMF update processing within the SMF Exception Events report.

Device Type Settings

During ExPR initialization, the device type of each LSM-attached device is determined from HSC automatically. However, a few devices return a device type of NONE (i.e., HSC does not know the device type). This step allows you to assign device types to those devices that do not have one.

Note that it is not possible to change device types on devices whose type was determined by HSC.

If you choose not to add device types to those devices with NONE specified, be aware of the following:

- Certain LSM-based reports on the mainframe and PC may give what appear to be incorrect results. This applies to the MOUNTS-ACS, MOUNTS, and MOUNTS-DETAIL reports only.

- When a device is defined as NONE, it will only be counted in the "all devices" database record and not in any device specific database record. Thus when you compare the totals of all individual device types against the "all devices" values, they will not match. They will only match when every device has a device type.

 Note: If you choose to skip this step, you should also deactivate device type record collection (see *Define Device Type Record Collection* later in this chapter).

To assign a device type to a device:

1. Click **Device Type Settings** on the Host Configurator. The selection is displayed in a separate window.
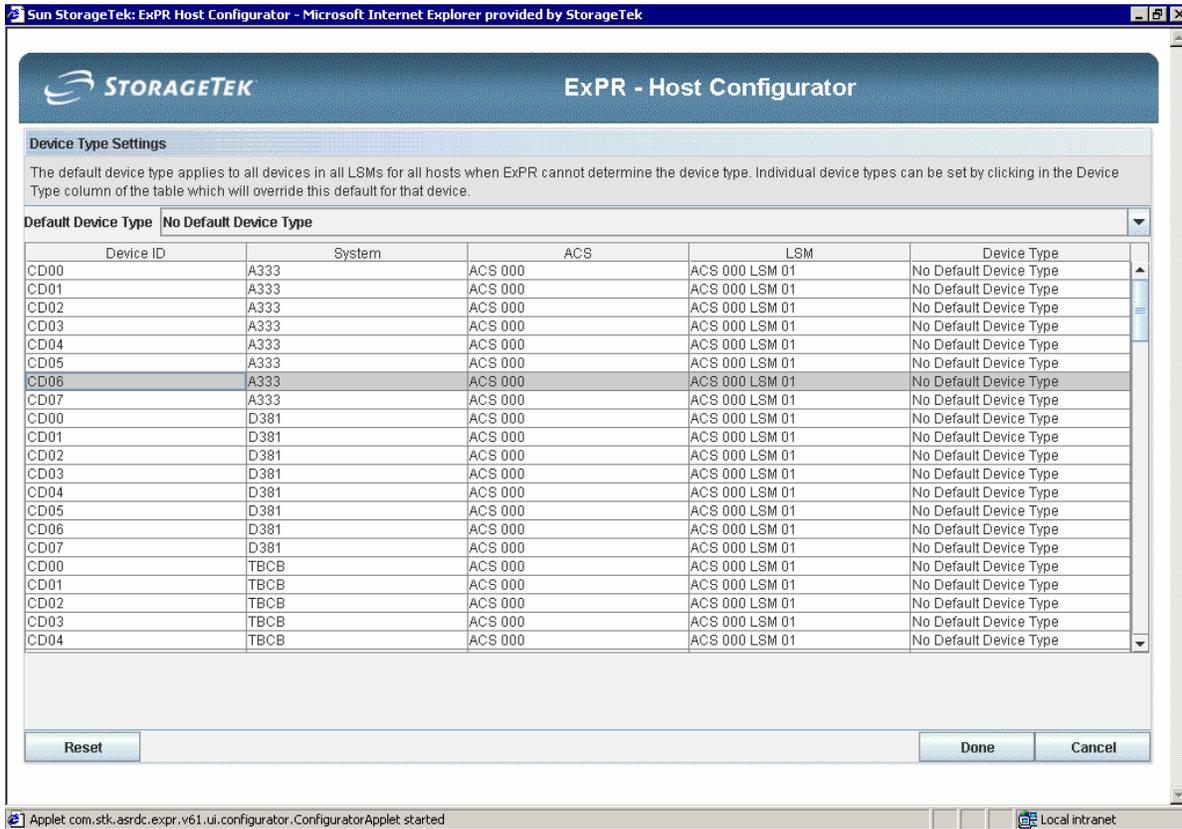
2. Select the Device Type column of the device to change.

3. Select the device type from the pulldown.

4. Repeat for each device you want to change.

5. Click **Done** when you are finished.

Note: The pulldown list may be empty if no devices have a device type of NONE.

Settings

License Settings

This configuration option is used if you ever need to modify ExPR license key information in your site's host configuration. (The license key for your site was activated initially earlier in this installation process at *Task 5: Activate the ExPR License Key*.)

To display or edit license settings:

1. Click **License Settings** on the Host Configurator. The selection is displayed in a separate window.

2. Enter new information directly in the license fields.

3. Click **Done** when you are finished.

Consolidated View

This configuration option defines Consolidated View for sites with multiple systems/LPARs. The Consolidated View feature allows you to consolidate data across multiple systems into a single view for reporting purposes. The Consolidated View feature consolidates the data *during* the database update process (either batch or DirectSMF).

Consolidated views are established by selecting the source SYSIDs and a pseudo-id to consolidate the data into. You can optionally indicate if source LPAR views should also be retained in the database.

Multiple views of the same data are allowed, so you could consolidate various combinations of the source data into separate pseudo-ids to meet your specific reporting requirements. Additionally and significantly, the ExPR Monitor applications can present current views of your operation using Consolidated View pseudo-ids.

Some examples of how you might choose to use consolidated views are:

- PROD sysid to include all production LPARs

- TEST sysid to include all testing LPARs

- SUB1 sysid to include all LPARs for subsidiary company number 1

- EURO sysid to include all LPARs for European operations

Note: ExPR automatically generates and dynamically maintains a consolidated view that includes all hosts. This view, pseudo-id "ALL", is automatically created by ExPR during the configuration process; you cannot amend it through the Host Configurator.

To define a Consolidated View pseudo-host:

1. Click **Consolidated View** on the Host Configurator. The selection is displayed in a separate window.
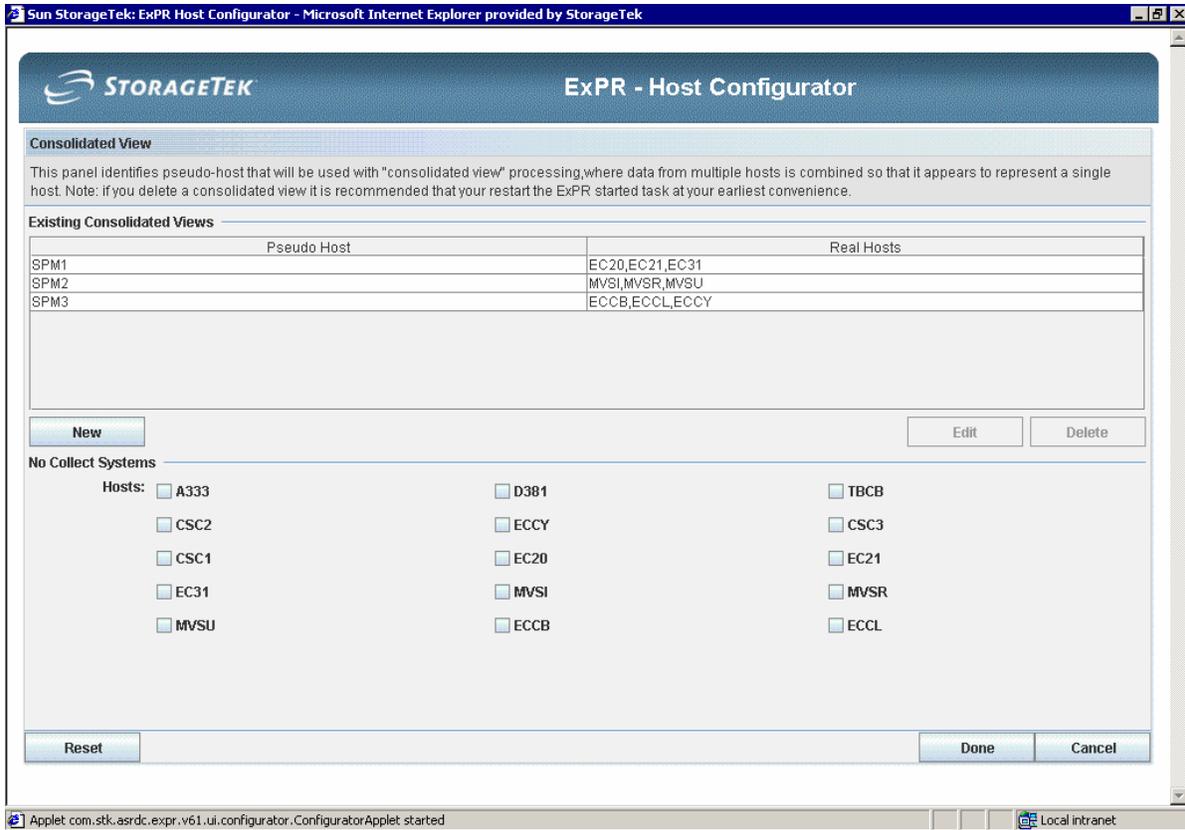
2. Click **New**.

3. In the dialog, enter a pseudo-host ID.

4. Select the SYSIDs to consolidate under the pseudo-host and then click **OK**.

5. Data is by default stored in the database for the pseudo-id *and* separately for each of the SYSIDs. If you do not want to separately collect and store data for individual SYSIDs, identify the systems to not store separately as No Collect Systems.

6. Click **Done** when you are finished.

To edit or delete a consolidated view, select an existing pseudo-host and use the **Edit** or **Delete** buttons.

Note: If you choose to delete a consolidated view, you should be aware that the definitions for that pseudo-system id will not be fully removed from the mainframe until the started task is restarted. This applies to both primary and secondary started tasks. The restart does not have to be done immediately but can be left until a convenient time.

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An Important Consideration for SMF Update Processes

When running the SMF update processes, either in batch or real-time DirectSMF, it is important to ensure that the SMF data for all MVS hosts (including CSC/SMC client systems) is included in a single update pass. The running of individual updates on a system by system or piecemeal basis will prevent ExPR from collecting and analyzing relevant data in the context of all other parallel activity. This is particularly important when you define ExPR consolidated views. All data must be handled in a single process to ensure that the global view of activity is correctly calculated.

Under real-time DirectSMF, this means that all secondary started tasks must be active and connected to the primary system. For the batch SMF-UPDATE function, you must input all SMF archive data, for a given date range, into a single batch execution. The various SMF files can be concatenated together and you can use the ExPR INPUT statement. The date/time/system order of the SMF input does not matter, as ExPR will sort the data. Also, in batch, you should always input whole days of SMF archive data, not partial days.

Additionally, for batch updates, the inputting of duplicate SMF records from multiple SMF archives is not a problem. Internally, ExPR sorts all SMF records into date/time/system sequence. Duplicate SMF records are detected and eliminated.

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CSC/SMC Hosts and Open Systems Definitions

This configuration option applies to users of MVS CSC with LibraryStation (LS) or MVS SMC clients. If you use HSC/LS to serve CSC client MVS systems, SMC to serve SMC client MVS systems, or open system mount requests, then you can collect mount activity from these systems via ExPR. To do this you must define each CSC/MVS client host and the LibraryStation pseudo-system id previously defined in the HSC LIBGEN process.

There are two distinct items to be defined here:

1. For open system mounts, you must identify the four-character LibraryStation pseudo-system id that you previously defined in the HSC LIBGEN process. This sysid will be used by ExPR to collect all open system mount statistics. The information will be summarized under this system id for all open system mount activity.

2. You must define the CSC/SMC MVS client hosts. These are not defined within the HSC CDS LIBGEN process. ExPR needs to know the four-character system id of each CSC/SMC MVS client and the system id of the HSC/VTCS/LS MVS host that normally services the request from the CSC/SMC client.

This pairing of system ids is used by ExPR to model an internal control block structure that represents the ACS/LSM/VSM hardware configuration attached to the CSC/SMC MVS client. If you use multiple HSC/LS server systems with switching and backup, it is not necessary to make multiple entries within the CSC hosts table. However, it is important that each CSC/SMC MVS host is defined with an HSC system id that has the same hardware configuration. This is usually the primary HSC/VTCS/LS server.

Once the CSC/SMC hosts and the open system host have been defined, they can be used for reporting in the same manner as any normal MVS HSC host. They can also be included within consolidated view definitions and will be automatically included in the "ALL" system id.

To define the open system pseudo-host:

1. Click **CSC/SMC Hosts and Open System Definitions** on the Host Configurator. The selection is displayed in a separate window.
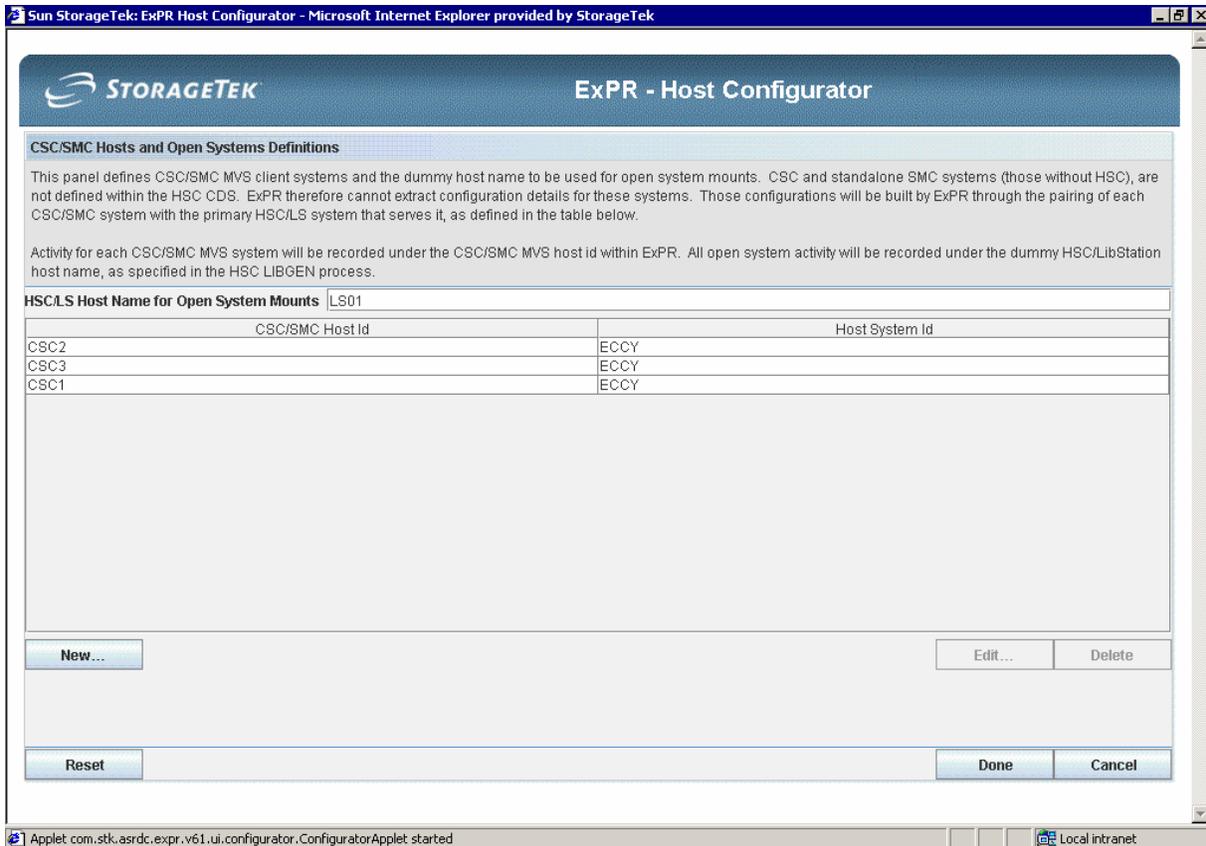
2. Enter the open host pseudo-system id in the **HSC/LS Host Name for Open System Mounts** field.

To define CSC/SMC MVS clients:

1. Click **New**.

2. In the dialog, enter the CSC/SMC Host Id and its matching HSC Model Host (normally the HSC/VTCS/LS server system) and then click the **OK** button.

3. Repeat all steps for each of the CSC/SMC MVS client hosts.

4. Click **Done** when you are finished.

To edit or delete a CSC/SMC MVS Host, select an existing hostid and use the **Edit** or **Delete** buttons.

Note: The open system mounts host id and list of CSC/SMC hosts are separate entities. Definition of one does not require that the other be defined.

Users of CSC/SMC MVS clients should also see appendix E, *Setting-up ExPR Started Tasks on CSC or SMC MVS Client Systems*.

Special Note to Support SMC Clients: If you wish to collect SMF data from SMC clients, it is necessary to ensure that the following HSC/VTCS PTFs are installed:

HSC/VTCS 6.0 – L1H12HW and L1H12HX

HSC/VTCS 6.1 – L1H12JH and L1H12JI

Date Settings

This configuration option allows you to change the default weekly and monthly period definition for data collection and to activate the collection of monthly summary records.

By default, ExPR holds three levels of granularity – hourly, daily, and weekly. You can also collect monthly database summary records. Additionally, you can select the start day for weekly collection (Monday is the default) and define the period for monthly collection (calendar month is the default).

To define date settings:

1. Click **Date Settings** on the Host Configurator. The selection is displayed in a separate window.

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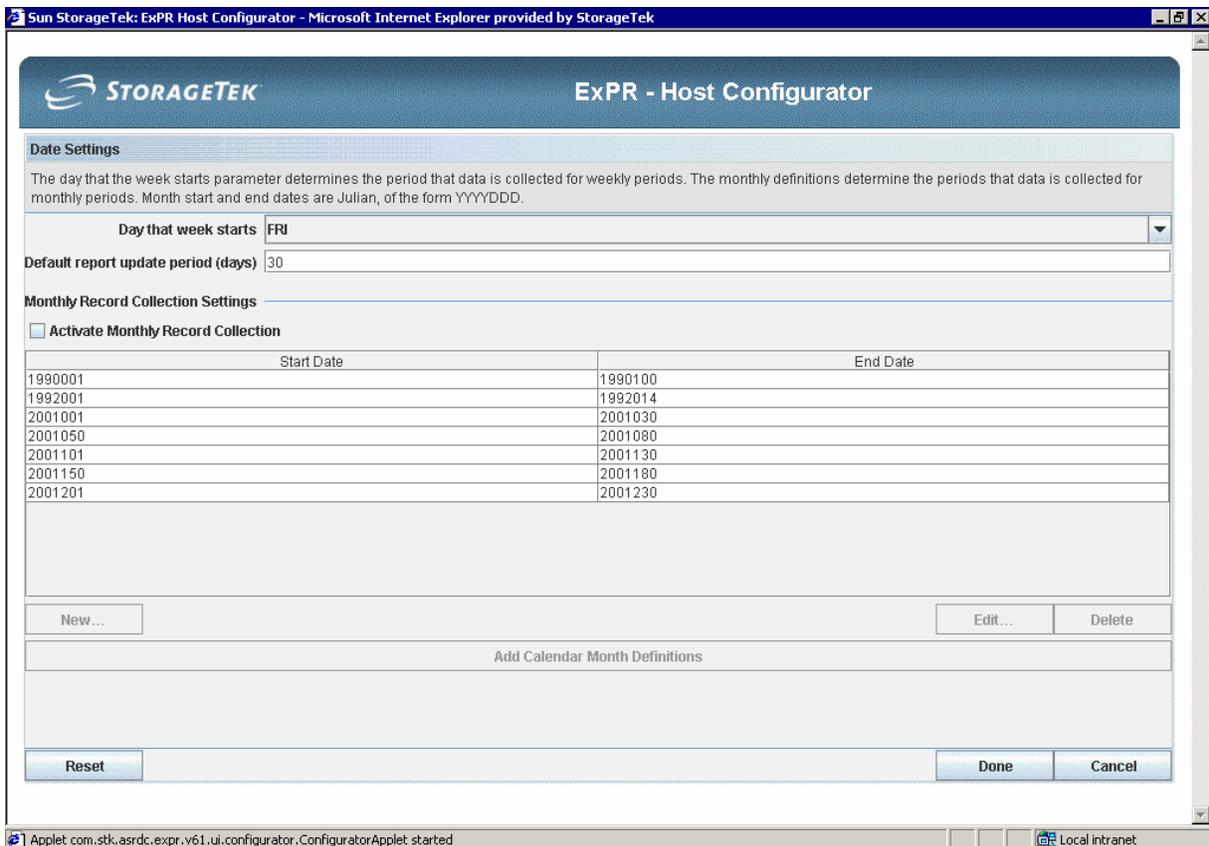
2. To change the first day of the week, select the new day from the pulldown.

3. To change the default batch SMF update period, type in the new number of days.

4. To collect monthly summary records, click **Activate Monthly Record Collection**.

5. If you activated monthly record collection, define the monthly periods in the dialog. Click **New** to define a calendar period, or select a period and use the **Edit** button to change its dates.

6. Click **Done** when you are finished.

This feature allows you to choose a "month" to match your business or technical needs. A "month" could actually be a whole quarter, for example. Monthly records are in Julian format (*yyyyddd*). A "month" can be any period of 14 to 100 days. Monthly definitions cannot overlap each other.

Note: Ensure that the auto-delete daily records deletion value allows records to remain in the database long enough for monthly consolidation to process them. Always allow for at least two months worth of daily records within the database. See *Database Management Settings* later in this chapter. It is necessary to ensure that your monthly definitions are kept current and defined well into the future.

Job Workloads

This configuration option defines jobname workload groups, which map Nearline, VTSS, and device group activity from specified jobnames into logical groups, typically defining activities generated by specific departments or functions.

The collection of data into jobname workload groups is performed during the SMF-UPDATE process. Jobname workload group reporting is available primarily through the ExPR Graphical Reports application. Reports for mount counts and mount response time can be generated by jobname workload group in that environment. Additionally, ExPR host reports can optionally produce jobname workload group information in some reports when the *usrprfx*.CNTL control statement REPORT-OPTIONS is also specified with the WORKLOADS parameter. See the *ExPR Mainframe User's Guide* for details.

Groups are specified by including one or more jobnames under a group ID. Masks and wildcard characters are used to select a range of jobnames for a group. The group ID can be A-Z or 0-9, which allows up to 36 user-defined groups. A group can include one or more jobnames, and jobnames can be mapped to more than one group.

To define job workload groups:

1. Click **Job Workloads** on the Host Configurator. The selection is displayed in a separate window.
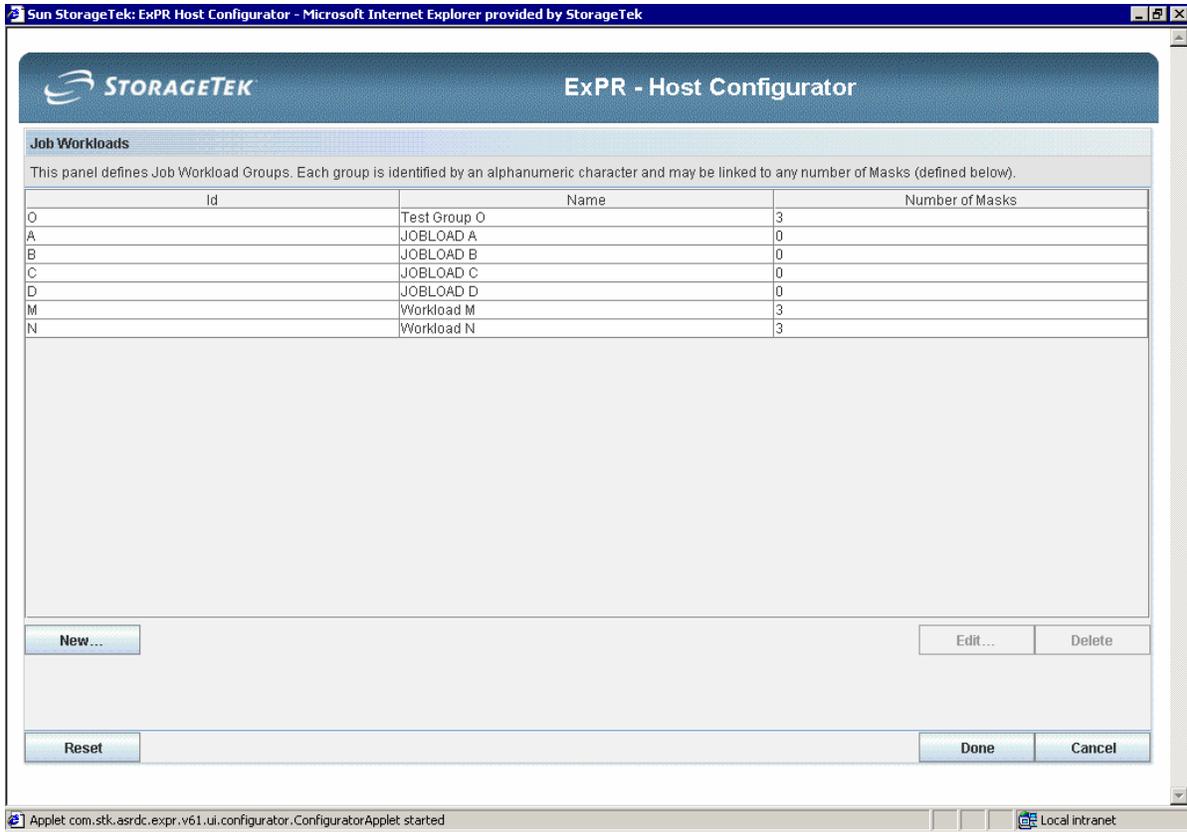
2. Click **New**.

3. In the dialog, enter a one-digit group ID (format 0-9, A-Z) and a description for the workload group.

4. Click **New** in the dialog.

5. In the dialog, enter a mask to be matched against job names.

The following masks can be used when constructing workload groups:

Jobname Workload Group Masks

? or %	Represents a wildcard character, one for one. Blanks are not allowed.
*	Represents a wildcard string of 1-8 characters.

Jobname Workload Group Mask Examples

JT100*	Any job starting with JT100.
*123	Any job ending with 123.
J*123	Any job starting with J and ending with 123.
J????123	Any job starting with J and ending with 123 with any alphanumeric characters in positions 2-5.

6.   Repeat step 4 for each mask you want to define in the current group.

7.   Repeat all steps for each workload group you want to define.

8.   Click **Done** when you are finished.

To edit or delete a group, select an existing job workload group and use the **Edit** or **Delete** buttons.

Report Options

This configuration option defines, for batch-generated host reports, the customer name to appear in report headings, number of lines to print per page, and default reporting period.

1.   Click **Report Options** on the Host Configurator. The selection is displayed in a separate window:

2. Define customer name for report headings. This step defines the name that appears in host report headings, such as your company name or site location. You can skip this step if you do not want a name to appear in report headers. Enter the name in the **Customer Name for Report Headings** box.

3. Define page size for reports. This step defines the number of lines to print on a page of ExPR UPRPRINT or UPRREPTS. The proposed default is 55 lines: the minimum is 20, the maximum is 255. Enter the number of lines to print per page.

4. Define period defaults for batch reports. This step defines the default number of days backward from today to include in ExPR batch reports (host reports). The proposed default is 30 days. You can override the default on an ad hoc basis with the *usrprfx*.CNTL control statement PERIOD. Enter the number of days backward from today to include when generating a batch report.

5. Click **Done** when you are finished.

Scratch Subpools

This configuration option defines scratch subpools to ExPR. Various scratch-related reports and monitor functions can display data by subpools identified here.

To identify scratch subpools to ExPR:

1. Click **Scratch Subpools** on the Host Configurator. The selection is displayed in a separate window.
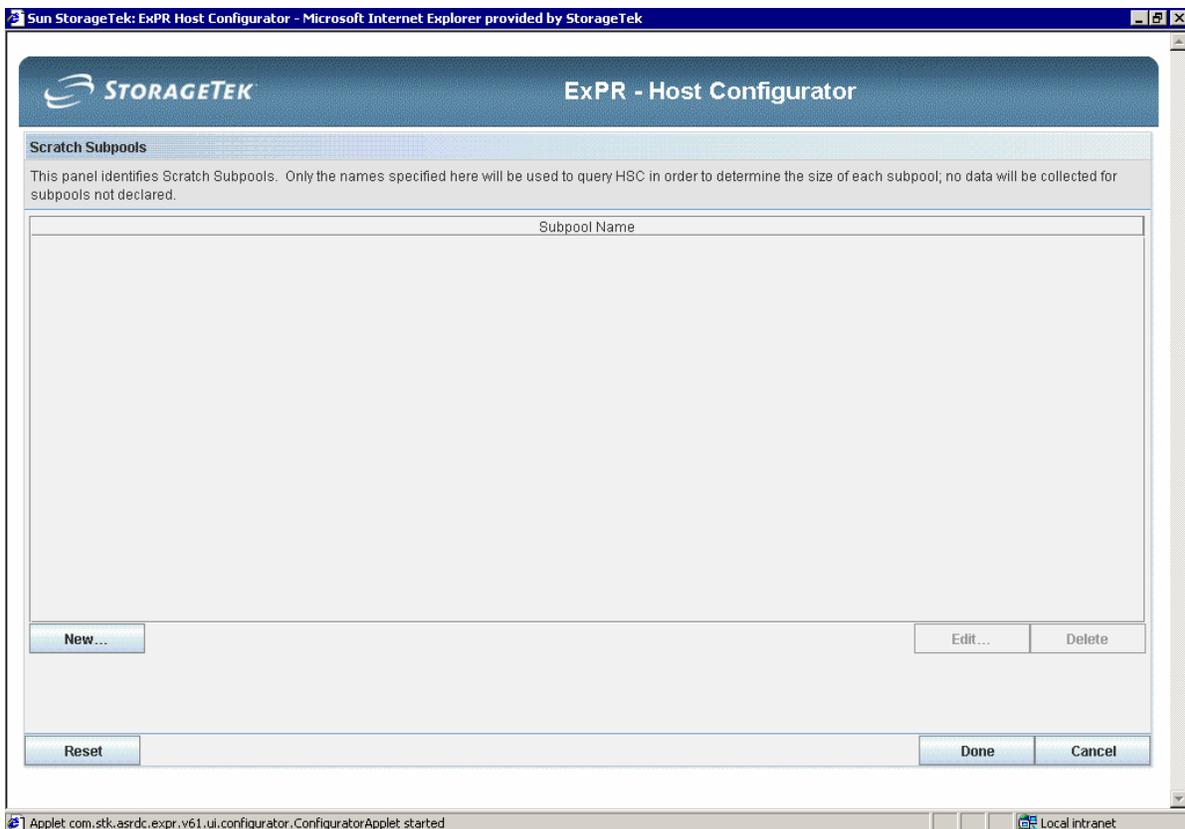
2. Click **New**.

3. In the dialog, enter an HSC subpool name and click **OK**.

4. Repeat until all subpools have been identified to ExPR.

5. Click **Done** when you are finished.

To edit or delete a scratch subpool, select an existing subpool and use the **Edit** or **Delete** buttons.

JES2 SYSLOG Mapping

This configuration option defines a JES2 system name for the SYSLOG-UPDATE function.

When running the SYSLOG-UPDATE function against a JES2 hardcopy file, it is necessary to relate the eight-character JES2 system name to the four-character SMFid used by HSC and ExPR.

This step is only required if the JES2 system name is different to the SMFid used by HSC and ExPR. If you do not relate these names, then ExPR will use only the first four characters of the JES2 system name.

To identify JES2 system names to ExPR:

1. Click **JES2 SYSLOG Mapping** on the Host Configurator. The selection is displayed in a separate window.
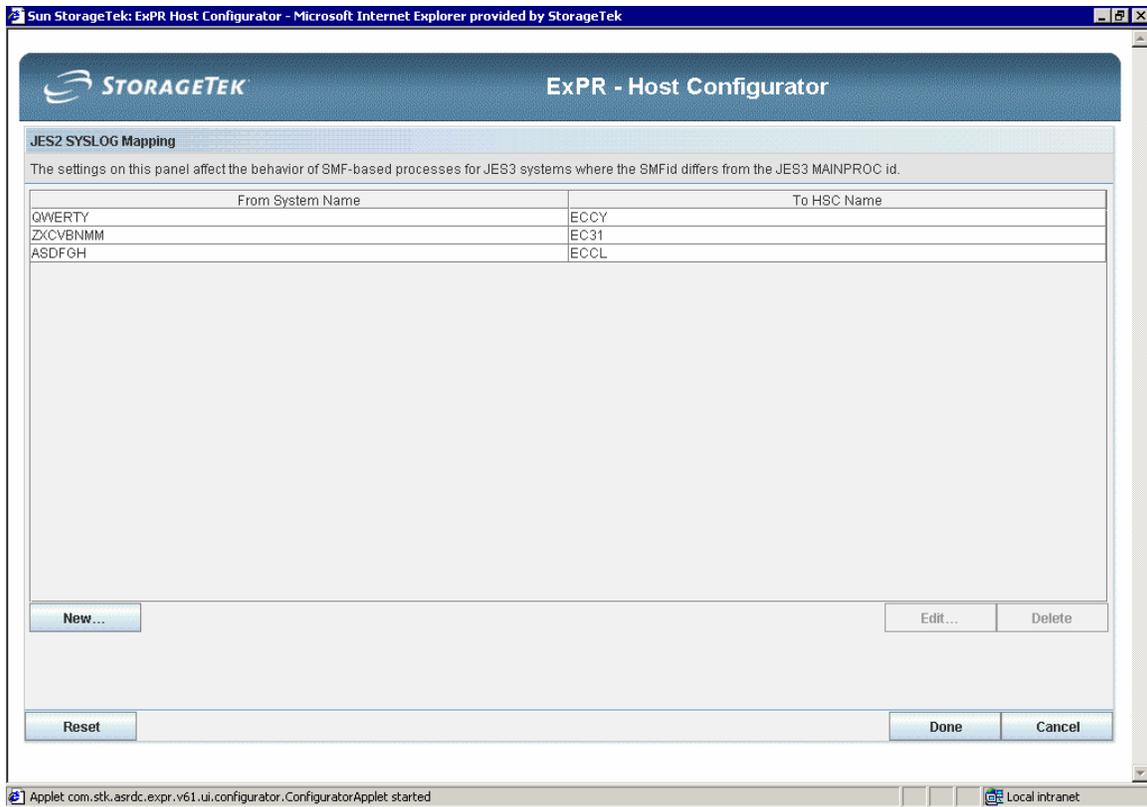
2. Click **New**.

3. In the dialog, enter the JES2 system name as it appears in the SYSLOG hardcopy file, select the associated HSC name from the pulldown list of system ids, and click **OK**.

4. Repeat for each JES2/MVS system.

5. Click **Done** when you are finished.

To edit or delete a map entry, select an existing entry and use the **Edit** or **Delete** buttons.

JES3 SMF Mapping

This configuration option defines a JES3 SMF subsystem name for the SMF-based processes.

When running the SMF-based processes of ExPR in a JES3 complex, it may be necessary to relate the four-character SMF subsystem id to the four-character MAINPROC id used by HSC and ExPR.

This step is only required if the JES3 MAINPROC id is different to the SMF subsystem id. If you do not relate these ids, then ExPR will reject the SMF/RMF data as being from an unknown MVS system.

To identify JES3 SMF subsystem ids to ExPR:

1. Click **JES3 SMF Mapping** on the Host Configurator. The selection is displayed in a separate window.
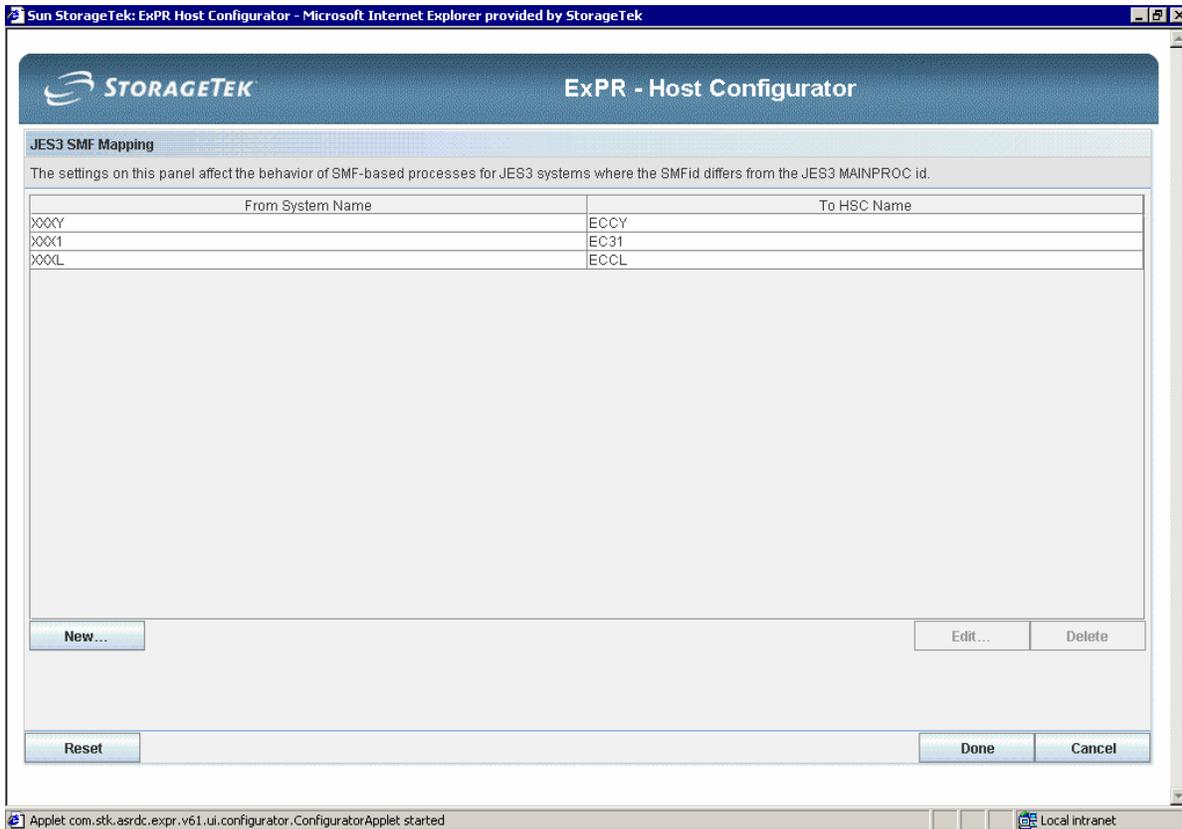
2. Click **New**.

3. In the dialog, enter the MVS SMF id as defined in the SMF initialization parameters, select the HSC name (JES3 MAINPROC) from the pulldown list of system ids, and click **OK**.

4. Repeat for each JES3/MVS system.

5. Click **Done** when you are finished.

To edit or delete a map entry, select an existing entry and use the **Edit** or **Delete** buttons.

Note: JES3 sites should review appendix C, *JES3 Installation Notes*.

Manage User Preferences

This configuration option provides a way to remove user-specific information that has been stored on the ExPR host.   Information that can be stored on the host includes favorite graphs, rules, and exceptions. When rules and favorites are written to the host, they are stored in the host with the user name.

For each user, the table displays a list of preference settings (if any) that have saved to the host for a user.

To manage user preferences:

1. Click **Manage User Preferences** on the Host Configurator. The selection is displayed in a separate window.
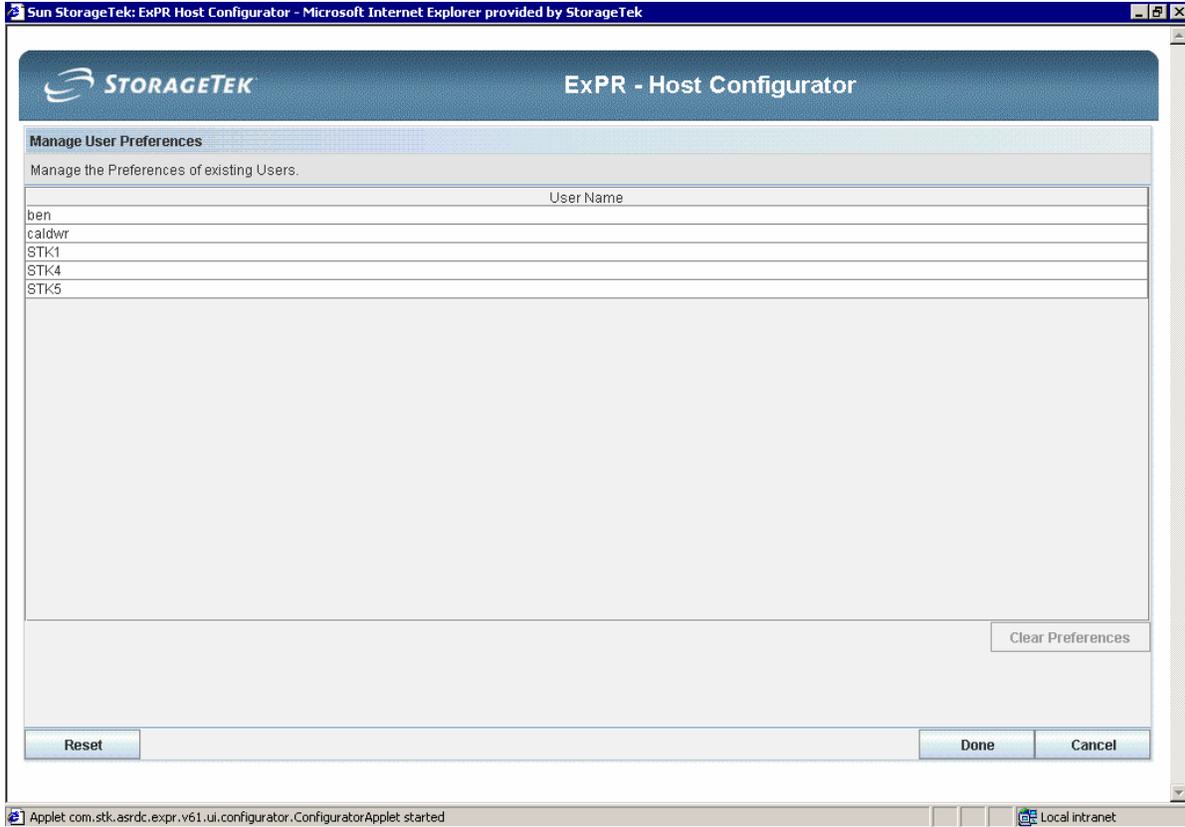
2. Select the user whose preferences you wish to display.

3. Select preferences to clear for the selected user.

4. Click **Clear**.

5. Select another user or click **Done** when you are finished.

Database Management Settings

DB Management Settings

This configuration option defines whether data will be automatically removed from the ExPR database and sets the number of days when various record types are eligible for deletion from ExPR VSAM files. You will also set the default number of days to include in batch SMF update database processes in this step.

During the ExPR file backup, reorganization and deletion process, ExPR will dynamically invoke the IBM IDCAMS VSAM management utility to clone the existing VSAM files and then copy data using from/to date key ranges. The new VSAM clusters

are internally 'tidy' in VSAM terms and old data is removed, thereby preventing the endless growth of the datasets.

When activating these Database Management Settings, please be aware that they will only run automatically as part of the ExPR started task, and that there is a hierarchy to execute these functions. The auto-delete and backup functions will only be invoked if the reorganization function has been activated – auto-delete and database backup run as subsidiary functions of the reorganization process.

On a primary started task, the START TASKS(SMF-UPDATE) function must be selected to activate any of the database management activities, otherwise none of them will be invoked. On a secondary started task, the PGMIDATA reorganization and auto-delete functions will be invoked automatically without the need to specify START TASKS(SMF-UPDATE). Users of batch SMF-UPDATE can use the PERFORM REORGANIZATION statement to invoke the database management functions.

Define File Reorganization Options

This step activates the File Reorganization function and sets parameters that control ExPR's VSAM file housekeeping procedures. VSAM files can become badly fragmented with many CI/CA splits and secondary allocations occurring. The reorganization feature automatically cleans up the various ExPR VSAM files.

When activated, this feature will regularly invoke the MVS IDCAMS utility to create new VSAM clusters for the ExPR Database, PGMIDATA, and EXPRORF files. This occurs shortly after midnight (or at a user-specified time) based on the daily frequency specified in the D/B Management Settings. The reorganization process involves the creation of a new cluster (DEFINE), copying of the existing data (REPRO), renaming of clusters (ALTER), and finally deletion of original clusters (DELETE).

The new cluster will be free of CI/CA splits and secondary allocations will be consolidated. Additionally, if the Auto-Delete feature is activated, old records will be dropped during the copy stage of reorganization.

To activate or change file reorganization settings:

1. Click **D/B Management Settings** on the Host Configurator. The selection is displayed in a separate window.

2. Click **Activate the File Reorganization Function**.

3. For each of the three supported files, enter a reorganization frequency in days.

4. If appropriate for your site, enter a re-org time (*hh*) other than the default 00 (midnight) in the **Hour of Day to Reorganize** field.

5. Enter the reorganization work dataset name. The high-level dataset nodes should match those of the other files used by ExPR in your installation to prevent ICF catalog structure problems. The work dataset name is created as part of the reorganization process by appending additional nodes to create a unique name.

   Note: It is most important that the work dataset name matches the names of the other ExPR VSAM files. The reorganization process may fail if the work dataset name does not match these files. This is a restriction of MVS ICF catalog structures, where a RENAME or ALTER function must relate to aliases within the same user catalog.

   Note for non-SMS Installations: When the reorganization function creates a new VSAM dataset, it makes use of the DEFINE MODEL parameter. This means that the new cluster will be allocated on the same volume(s) as the original cluster. You should ensure that sufficient space is available for this function.

To define Auto-Delete options:

This step activates the Auto-Delete function and sets parameters for various types of records that will be automatically deleted. If activated, Auto-Delete is run automatically as part of the File Reorganization function, which also must be activated.

1. Click **Activate the Auto-Delete Function.**

2. Change any default settings as required for your installation.

   • Hourly, daily, weekly and monthly records relate to the four levels of granularity in the ExPR database file. The setting for each is the age in days at which point records are deemed to be out of date and eligible for deletion by ExPR. The age is calculated backwards from the current execution run date. The proposed default values are 30, 60, and 737, and 737 days respectively, representing one month for hourly records, two months for daily records, and two years for weekly and monthly records.

   • EXPRORF defines the automatic deletion age in days for reports in the Online Report File (ORF). The proposed default value is 7 days.

   • PGMIDATA defines the automatic deletion age in days for SMF/RMF PGMI statistic records collected in the PGMIDATA file. The proposed default value is 2 days.

3. Click **Done** when you are finished.

Note: The minimum specification for PGMIDATA and EXPRORF is two days; for the Database records is seven days. To deactivate Auto-Delete for a specific record type or file, specify a value of zero days.

Warning messages will be issued if an aging value is less than the reorganization frequency of a particular file. Records are only auto-deleted during the reorganization process. The reorganization frequency may be longer than the deletion age.

Device Type Record Collection Settings

This step defines whether ExPR collects mount-related activity on a "per device-type basis" in addition to the overall LSM level.

To change the device type collection option for batch and real time SMF updates:

1. Click **Device Type Record Collection Settings** on the Host Configurator. The selection is displayed in a separate window.
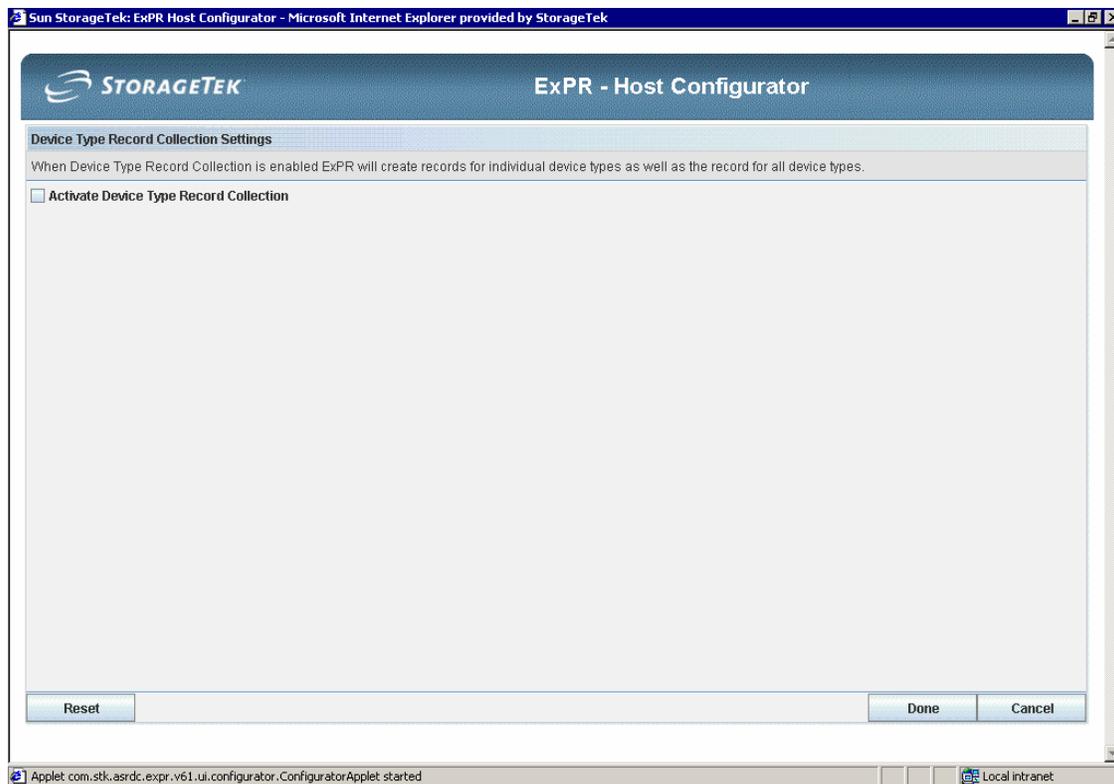
2. Click **Device Type Record Collection** to activate/deactivate the function.

Database Backup Settings

The original database cluster can be dynamically saved before the reorganization and auto-deletion process runs. This then provides a backup/checkpoint and the possibility to create a rolling GDG of database archives.

To activate database backup:

1. Click **Database Backup Settings** on the Host Configurator. The selection is displayed in a separate window.

2. Click **Activate Database Backup** to activate/deactivate the function.

3. Enter site-specific naming and allocation information.

4. Click **Done** when you are finished.

Thresholds

Thresholds represent the point at which an event is considered to be an exception. VSM thresholds are defined separately from Nearline thresholds. Thresholds can also be set for HSC-defined management classes (requires NCS 4.0 or higher); the VSM monitor can track exceptions for up to 25 management classes.

Data collected from HSC SMF records and MVS SMF/RMF records is eligible for exception processing. This processing takes place automatically during database update processing. Eligible fields are checked against the user-defined thresholds to determine if an exception event has been triggered.

There are two exception types:

- EVENT: Where an individual event triggers the exception, such as the mount time of a specific volume.

- INTERVAL: Where the number of events over a recorded period (usually an hour) triggers the exception, such as number of mounts per LSM/VTSS per hour.

Exception processing generates a report when thresholds have been exceeded, such as when the number of mounts or mount response time exceeds the specified value.

Exception reports are produced in tabular hardcopy format on the host. These reports include an event report that lists all individual SMF exception events and summary reports that provide hourly threshold exception totals by exception type.

Management Classes

To set exception thresholds for Management Classes:

1. Click **Management Class Thresholds** on the Host Configurator. The selection is displayed in a separate window.
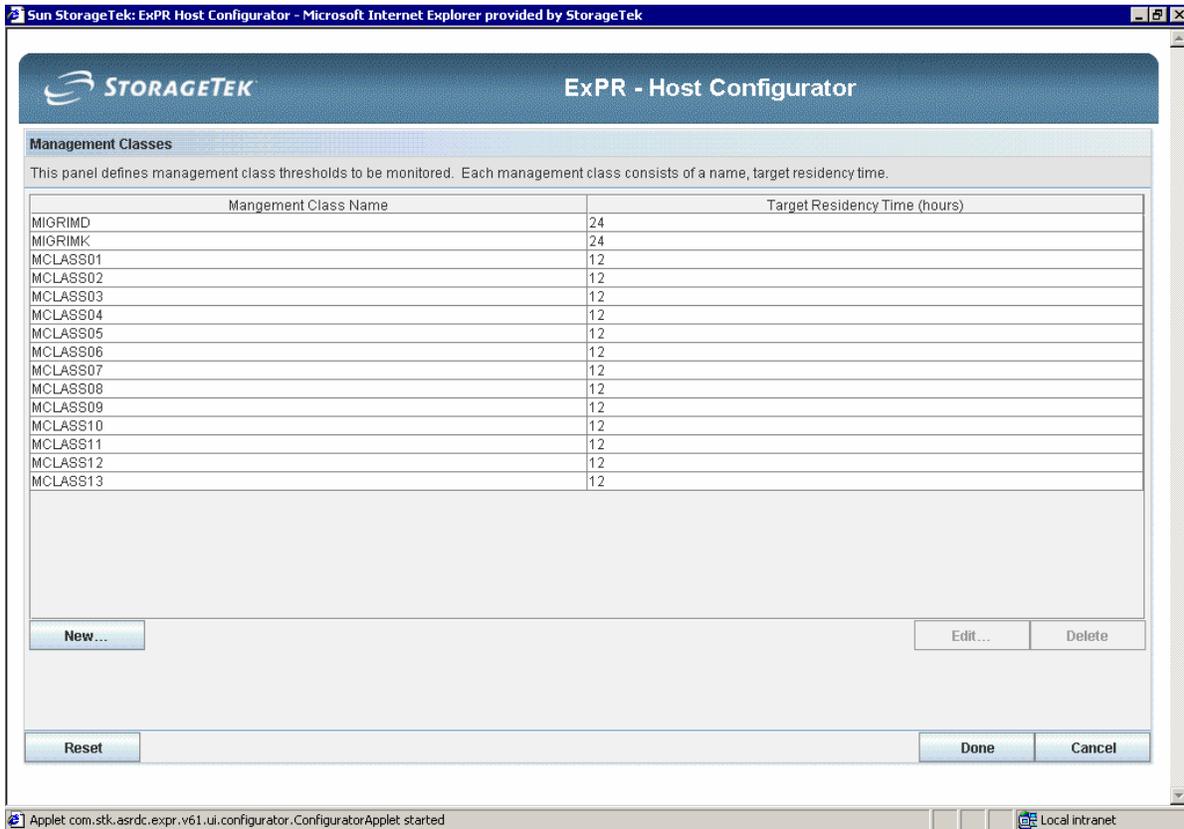
2. Click **New**.

3. In the dialog, enter the management class and target residency thresholds and click **OK**.

4. Repeat for each management class threshold you want to establish.

5. Click **Done** when you are finished.

To edit or delete a management class, select an existing entry and use the **Edit** or **Delete** buttons.

Nearline Thresholds

These thresholds are older batch-oriented features. It is strongly recommended that you use the ExPR GUI Exception Rules Manager in preference to these.

To set exception thresholds for Nearline events:

1. Click **Nearline Thresholds** on the Host Configurator. The selection is displayed in a separate window.

2. Enter a value for each threshold as required for your site. Use the table below as a reference.

3. Click **Done** when you are finished.

Note: The default setting of all exception thresholds is zero. When a threshold is set to zero, ExPR will not check for that particular exception event.

Nearline Threshold	Description
Scratch Mount Response	Maximum scratch mount time in seconds. This threshold highlights scratch mounts that have an unacceptable delay in their service time. Such delays can be caused by factors such as a high number of mounts/dismounts occurring simultaneously within an LSM, pass-throughs to/from other LSMs, or a demand enter requiring operator intervention. Experience with your installation's workload and configuration should guide you when choosing this value. The valid range for this exception threshold is 0-32767 seconds per mount event.
Non-Scratch Mount Response	Maximum non-scratch mount time in seconds. This threshold highlights non-scratch mounts that have an unacceptable delay in their service time. Such delays can be caused by factors such as a high number of mounts/dismounts occurring simultaneously within an LSM, pass-throughs to/from other LSMs, or a demand enter requiring operator intervention. Experience with your installation's workload and configuration should guide you when choosing this value. The non-scratch time should be higher than the scratch value to allow for the retrieval of a specific volume within the library complex. The valid range for this exception threshold is 0-32767 seconds per mount event.
Scratch Mount Count	Scratch mount count per LSM/hour. This threshold applies to the number of scratch mounts within an LSM per hour. It should be set at a level that allows for the physical ability of the robotic arm to handle the number of mount requests without being saturated, the normal hourly tape workload on the system, and your desire to only highlight extreme situations above the normal throughput. The valid range for this threshold is 0-32767 mounts per LSM/hour.
Non-Scratch Mount Count	Non-scratch mount count per LSM/hour. This threshold applies to the number of non-scratch mounts within an LSM per hour. It should be set at a level that allows for the physical ability of the robotic arm to handle the number of mount requests without being saturated, the normal hourly tape workload on the system, and your desire to only highlight extreme situations above the normal throughput. The valid range for this threshold is 0-32767 mounts per LSM/hour.
Cartridge Enters	Enter count. This threshold allows you to measure the amount of operator activity (per hour) required to cycle cartridges into an ACS. The valid range is 0-32767 per LSM/hour.

Nearline Threshold	Description
Cartridge Ejects	Eject count. This threshold allows you to measure the amount of operator activity (per hour) required to cycle cartridges from an ACS. The valid range is 0-32767 per LSM/hour.
Passthroughs	Pass-through count. This threshold allows you to gauge the amount of inter-LSM activity within an ACS by monitoring the number of pass-through actions per LSM/hour. Pass-through activity can be high if a particular LSM has no available drives, a low number of drives, or no free cells to store dismounted cartridges. The valid range is 0-32767 passthroughs per LSM/hour.
Control Unit Load	Control unit percentage disconnected. Control unit loading/activity statistics are derived from the RMF type 74 records. ExPR will automatically internally generate control unit definitions from the tape drive addresses in the configuration based on the S/370/390 architecture, whereby 16 devices are mapped to one control unit (i.e., devices x'0F40'-x'0F4F' are mapped to CU x'0F40'). ExPR will collect information by control unit and per individual device connected via the CU. There are several industry-wide figures at which control unit to channel disconnect time is considered to have a throughput impact; these are in the range 65-70%. When using 9490/Timberline, SD-3/RedWood, or 9840 devices, each device has its own integrated control unit. In this case, treat the individual device columns in the report as control units. The valid range is 0-100 percent, indicating CU to channel disconnected.
Available Scratch	Minimum number of available scratch cartridges. At regular intervals, the started task collects information from HSC about the availability of scratch cartridges within each LSM. A shortage of scratches may cause pass-throughs to other LSMs and an increase in mount/dismount times. The valid range is 0-32767 minimum available cells or scratches. This value is the acceptable <u>minimum</u>.
Free Cells	Minimum number of available free cells. At regular intervals, the started task collects information from HSC about the availability of free cells within each LSM. A shortage may cause pass-throughs to other LSMs and an increase in mount/dismount times. The valid range is 0-32767 minimum available cells. This value is the acceptable <u>minimum</u>.

Nearline Threshold	Description
Max Allocation Recovery	Maximum time in seconds for an allocation recovery to be serviced. This threshold is used by the SYSLOG-UPDATE function. An allocation recovery event can have two components in its duration, the time taken by the operator to answer the request (WAIT, CANCEL, *ccuu*) and the time for the system to allocate a drive when WAIT is entered. This threshold represents the number of seconds above which ExPR will highlight long allocation recovery events. The MVS allocation recovery mechanism is a single-thread function that can cause throughput delays; ideally, it should not occur, particularly in an automated operations environment. ExPR will report on allocation recovery events for non-tape devices in addition to library-attached drives. The valid range is 0-32767 maximum seconds to clear an event.
Drives in Use	Number of drives in use within an LSM. This threshold will be triggered whenever the number of in-use/mounted drives within an LSM exceeds the given value. You may choose to set this value at one or two below the number of drives attached to each LSM, thereby detecting incidences where you are approaching an "all drives in-use" situation. This may allow you to rework your batch job mix or predict future drive acquisitions. The valid range is 0-80 drives in-use at any moment in time.
Max LSMs Used	Maximum number of LSMs used in servicing a mount request (i.e., the length of pass-throughs). This threshold allows you to gauge the amount of inter-LSM activity within an ACS. All mount requests have an LSM count of at least one when the cartridge cell location and the destination drive are in the same LSM. The MAX-LSMS-USED exception will most probably be triggered along with the mount time exception for the same mount requests. The valid range is 0-15 LSMs used per mount respectively.

VSM Thresholds

These thresholds are older batch-oriented features. It is strongly recommended that you use the ExPR GUI Exception Rules Manager in preference to these.

To set exception thresholds for VSM events:

1. Click **VSM Thresholds** on the Host Configurator. The selection is displayed in a separate window.

2. Enter a value for each VSM threshold as required for your site. Use the table below as a reference.

3. Click **Done** when you are finished.

    Note: The default setting of all exception thresholds is zero. When a threshold is set to zero, ExPR will not check for that particular exception event.

VSM Threshold	Description
Scratch Mount Response	Maximum VTV scratch mount time in seconds. This threshold allows you to measure the response time of a VTSS to service a VTV scratch mount request. The valid range is 0-32767 seconds per VTV mount event.
Non-Scratch Mount Response	Maximum VTV non-scratch mount time in seconds. This threshold allows you to measure the response time of a VTSS to service a VTV non-scratch mount request. Normally, a virtual mount should be serviced in a short time if the VTV is resident within the VTSS. However, mounts for VTVs that have been migrated to an MVC and deleted from the VTSS will be longer due to the MVC mount and recall time. The valid range is 0-32767 seconds per VTV mount event.
Scratch Mount Count	VTV scratch mount count per VTSS/hour. This threshold applies to the number of virtual tape volume scratch mounts within a VTSS per hour. Unlike an LSM, it is not necessary to consider the physical ability of the machine to mount volumes (i.e., robotic arm, etc.). Choose a value that comfortably covers your predicted VTV activity and only triggers an exception on rare occasions. The valid range is 0-32767 VTV mounts per VTSS/hour.
Non-Scratch Mount Count	VTV non-scratch mount count per VTSS/hour. This threshold applies to the number of virtual tape volume non-scratch mounts within a VTSS per hour. Unlike an LSM, it is not necessary to consider the physical ability of the machine to mount volumes (i.e., robotic arm, etc.). Choose a value that comfortably covers your predicted VTV activity and only triggers an exception on rare occasions. The valid range is 0-32767 VTV mounts per VTSS/hour.
Channel Interface Busy	Percentage busy channel interfaces within a VTSS. This threshold allows you to monitor the percentage busy time of the VTSS channel interfaces to detect peaks in the data flow and anticipate potential saturation/overload conditions. This threshold uses information collected by the VTSS subsystem as it internally monitors the activity across its channel interfaces to the attached MVS hosts. This information is not RMF data but is written by the VSM component to the SMF files. The valid range is 0-100 percent busy channel interface.

VSM Threshold	Description
Control Unit Load	Virtual control unit percentage disconnected. This threshold is applied to virtual control units (as measured by RMF type 74 records) in the same manner as the Nearline Control Unit Load is applied to the real CUs. You may choose a different threshold due to the nature of a VTSS versus real CUs. The valid range for this exception threshold is 0-100 percent CU to channel disconnected.
Maximum DBU	Space availability within a VTSS's back-end RAID subsystem (Disk Buffer Utilization). This threshold tracks VTSS space utilization. Data within a VTSS is stored in a back-end RAID disk system in compressed format. The amount of used space within the VTSS is monitored by this threshold, which is a percentage of the maximum capacity. You can track VTSS utilization as more jobs are converted from real cartridges to virtual volumes through this threshold. Due to the internal RAID management and housekeeping processes, it is essential to ensure that the VTSS does not become 100% full. When full, a VTSS would stop completely and not accept new VTV data from the MVS host. The MVC migration and recall control parameters should ensure that a VTSS never becomes full. The valid range is 0-100 percent utilized RAID disk space; the recommended setting is 75%.
Maximum RTDs (VSM 1-3)	Maximum number of active/in-use RTDs per VTSS (for VSM Models 1, 2, and 3). This threshold can extend the control offered by the MVC Mounts threshold by specifically identifying incidents when multiple MVCs are required by a VTSS for VTV reclaim, recall, or migrate functions. An excessive burst of such activity may be triggered by certain job mixes or a particular time of day. A VTSS's use of RTDs may impact a sharing MVS host's access to the drives for real cartridge mounts. The valid range is 0-8 concurrently mounted/in-use RTDs per VTSS.
Maximum VTDs (VSM 1-3)	Maximum number of active/in-use VTDs per VTSS (for VSM Models 1, 2, and 3). This threshold is the VTSS equivalent of the LSM Drives in Use threshold. Normally, a VTSS appears as 64 virtual devices (VTDs) to an MVS host. As with real drives attached to an LSM, it is necessary to pre-empt a situation where all drives are in use and MVS jobs are delayed due to a lack of resources. This threshold allows you to rework your batch job mix or plan for future VTSS acquisitions. This threshold should be set at a value slightly below the number of VTDs defined to allow planning time before all VTDs become regularly in use (i.e., 56-60). The valid range is 0-64 concurrently mounted/in-use VTDs per VTSS.

VSM Threshold	Description
Maximum RTDs (VSM 4)	Maximum number of active/in-use RTDs per VTSS (for VSM Model 4). This threshold can extend the control offered by the MVC Mounts threshold by specifically identifying incidents when multiple MVCs are required by a VTSS for VTV reclaim, recall, or migrate functions. An excessive burst of such activity may be triggered by certain job mixes or a particular time of day. A VTSS's use of RTDs may impact a sharing MVS host's access to the drives for real cartridge mounts. The valid range is 0-16 concurrently mounted/in-use RTDs per VTSS.
Maximum VTDs (VSM 4)	Maximum number of active/in-use VTDs per VTSS (for VSM Model 4). This threshold is the VTSS equivalent of the LSM Drives in Use threshold. Normally, a VTSS appears as 256 virtual devices (VTDs) to an MVS host. As with real drives attached to an LSM, it is necessary to pre-empt a situation where all drives are in use and MVS jobs are delayed due to a lack of resources. This threshold allows you to rework your batch job mix or plan for future VTSS acquisitions. This threshold should be set at a value slightly below the number of VTDs defined to allow planning time before all VTDs become regularly in use (i.e., 240-250). The valid range is 0-256 concurrently mounted/in-use VTDs per VTSS.
VTV Recalls	VTV recalls from MVCs per VTSS/hour. This threshold allows you to monitor the excessive movement of VTVs recalled from the pool of MVCs. The internal RAID disk within a VTSS should hold the data most frequently required by the MVS host and its applications. An established VTSS will eventually begin to fill up with data that as time passes becomes less likely to be required by the mainframe. These old virtual volumes will be migrated to MVCs and possibly recalled in the future if required by a host user. Additionally, the VTSS internal management algorithms will minimize the number of MVCs through reclaim operations. Excessive activity in this area may imply incorrect archive parameter settings or overloading of the VTSS RAID capacity. The valid range is 0-32767 VTVs processed per VTSS/hour.
VTV Migrates	VTV migrates to MVCs per VTSS/hour. This threshold allows you to monitor the excessive movement of VTVs migrated to the pool of MVCs. The internal RAID disk within a VTSS should hold the data most frequently required by the MVS host and its applications. An established VTSS will eventually begin to fill up with data that as time passes becomes less likely to be required by the mainframe. These old virtual volumes will be migrated to MVCs and possibly recalled in the future if required by a host user. Additionally, the VTSS internal management algorithms will minimize the number of MVCs through reclaim operations. Excessive activity in this area may imply incorrect archive parameter settings or overloading of the VTSS RAID capacity. The valid range is 0-32767 VTVs processed per VTSS/hour.

VSM Threshold	Description
VTV Reclaims	VTV reclaims between MVCs per VTSS/hour. This threshold allows you to monitor the excessive movement of VTVs reclaimed within the pool of MVCs. The internal RAID disk within a VTSS should hold the data most frequently required by the MVS host and its applications. An established VTSS will eventually begin to fill up with data that as time passes becomes less likely to be required by the mainframe. These old virtual volumes will be migrated to MVCs and possibly recalled in the future if required by a host user. Additionally, the VTSS internal management algorithms will minimize the number of MVCs through reclaim operations. Excessive activity in this area may imply incorrect archive parameter settings or overloading of the VTSS RAID capacity. The valid range is 0-32767 VTVs processed per VTSS/hour.
VTV Residency	VTV residency time in the VTSS disk buffer. This threshold sets a target residency time in hours for VTVs to remain in the disk buffer before migration to tape. VTVs which are migrated before this number of hours has elapsed will be considered as residency misses. **Note:** Residency target calculations are done at SMF-UPDATE time only, so residency target is not a dynamic setting. If you wish to change the residency target and produce retrospective reports (i.e. before the change was made), then you will have to rerun SMF-UPDATE for the SMF records over that period.
MVC Mounts	Total MVC mounts per VTSS/hour. This threshold is effectively an overall value for the preceding three VTV controls. Reclaims, recalls, and migrations of VTVs all involve the mounting of MVCs on RTDs. However, the number of MVC mounts is likely to be less than the total of reclaim, recalls, and migrations, as multiple VTVs may be processed against a single MVC mounted volume. A VTSS's use of RTDs may impact an MVS host using the same drive in a shared environment. You can therefore monitor the amount of MVC and RTD usage with this threshold. The valid range for this exception threshold is 0-32767 MVCs mounted per VTSS/hour.

Tape Catalog Processing

Tape catalog processing is an optional ExPR feature (license required) that provides information you can use to determine which resources are using the Nearline and VSM libraries and how efficiently they are using them.

Where other input sources look at how the various hardware components are performing and identify processing trends and potential bottlenecks, tape catalog processing helps you account for who is occupying library slots and how efficiently the tape is being used. Additionally, tape catalog processing can provide historical comparisons of your tape catalog's contents.

ExPR tape catalog processing has a number of unique analysis features to help isolate tape catalog usage and trends, including dataset workload group analysis, tape utilization estimation analysis, user-specified age band analysis, comparative historical analysis, and media type analysis, including VTVs within the VSM system.

The figure below illustrates how ExPR processes tape catalog-based input.
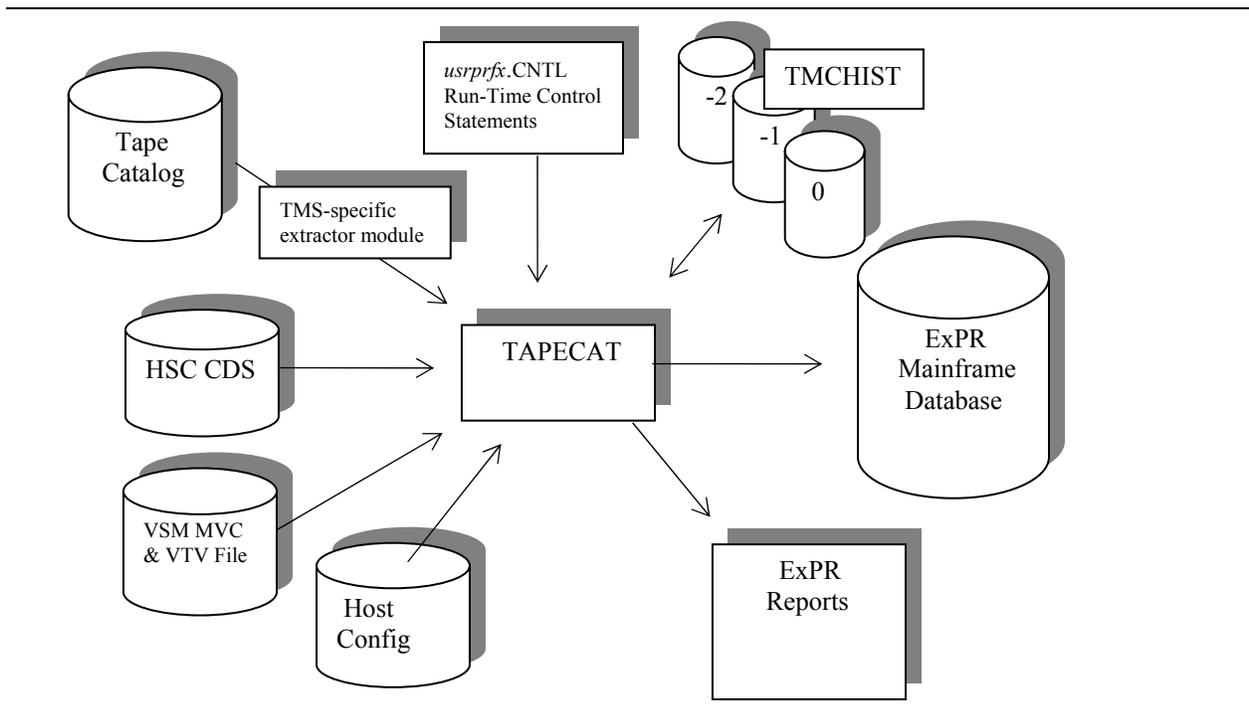
Tape Processing Data Flow

ExPR reads the HSC CDS and optionally the VTSS MVC/VTV flat files and builds a list of cartridge volumes in the libraries. This list is referenced against the tape catalog and the appropriate fields are extracted. Optionally, information about all cartridge volumes in the tape catalog can be extracted. ExPR then analyzes the collected data and generates two summary reports automatically. These reports analyze tape aging and utilization statistics at the ACS/LSM/VTSS and dataset workload group levels.

Unlike the other ExPR data sources, the tape catalog needs to be read only once a day under normal circumstances. This is to reduce the overhead of processing such a large file, and also because the profile of information contained within the tape catalog should not typically change significantly during each 24-hour cycle. If this is not the case at your installation, you can run this process more frequently; ExPR will then write additional database records and create extra generations of the history dataset.

Note: In a multiple MVS shared environment, ExPR tape catalog processing should only be run on the primary MVS host if all volumes are stored in a single CDS and tape catalog. If there are separate tape catalogs, then ExPR tape catalog processing should be run for each individual tape catalog that exists. Secondary systems can each "own" a separate tape catalog.

Defining Tape Catalog Processing for Your Site

Tape catalog processing is established with the ExPR Host Configurator application:

- TMS Settings identifies your tape management system.

- Tape Volsers defines default tape length values used in computing usage capacity, and ranges of volumes to include or exclude based on length, capacity, or media type.

- Nearline Agebands and VTSS Agebands specify a series of two to four numeric values each of which represents a number of days in a range. Agebands are used to report the relative ages of Nearline cartridges and virtual volumes based on their last use/reference date.

- Dataset Workloads define logical application-related groupings of cartridges within the total tape environment, based on dataset name masks.

- DSN Profiles supply information for ExPR to substitutes for missing or inaccurate fields within the tape catalog. This would apply to datasets produced by certain software products that may have zero blocksizes/lrecl, zero block counts, etc.

- Tapecat Bands define boundaries to use for the Tape-sizing function.

TMS Settings

This step identifies your TMS from the list of supported systems (including "none"). If you do not have a TMS, limited information can still be extracted from the CDS alone. This will include volume aging statistics, but no dataset or utilization information.

To identify your TMS:

1. Click **TMS Settings** on the Host Configurator. The selection is displayed in a separate window.
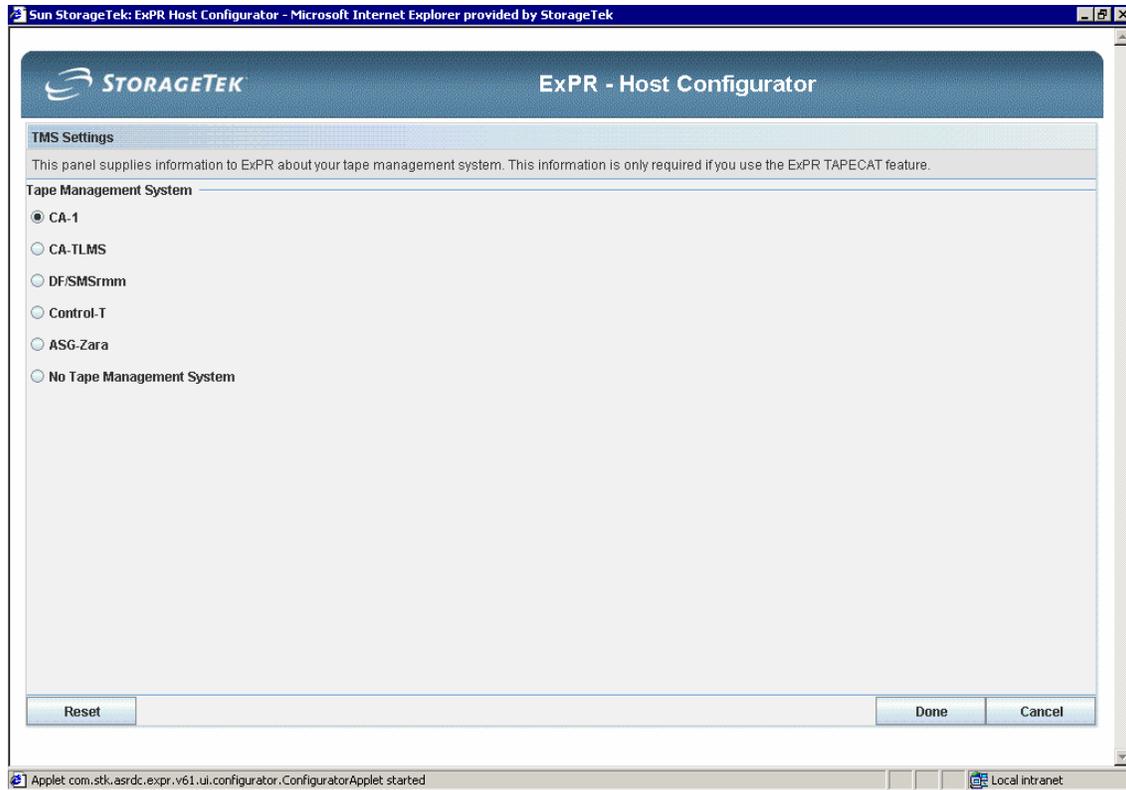
2. Click your tape management system from the TMS list.

    If you do not have a tape management system but still want to use ExPR tape catalog processing, click **None**.

    If you have written your own TMS interface, enter the module name.

3. Click **Done** when you are finished.

Tape Volsers

This step defines tape lengths and media types in your tape catalog and identifies volsers that you want ExPR to process (or not process).

> **Technical Note:**
>
> The ExPR tape utilization feature provides an estimation of the length of tape that has been used for groups of cartridges, defined by dataset workload groups, or for an LSM, VTSS, or for manually racked volumes. It should be stressed that this is an estimation tool only and many variable factors exist that can affect the accuracy of the information recorded.
>
> ExPR makes utilization estimates based on cartridge tape lengths, media type, and capacities (either default lengths or lengths you specify). If you require very precise information, it is recommended that you benchmark this feature against known cartridge capacities and data profiles before making any external processing decisions. ExPR takes into account factors such as HSM, variable and unblocked files, IDRC, hardware type,

media type, and tape lengths. However, in some cases, these rules are applied at a global level. For example, the maximum IDRC compression ratio for 3480/3490/RedWood cartridges is fixed at 4:1 against non-IDRC cartridges. For 9840 and 3590 cartridges, this ratio is increased to 7:1.

ExPR will also calculate the amount of data written to a tape in megabytes. Once again, the device type, recording technique, media type, and length of tape are taken into account. An average blocksize is calculated from catalog information about all datasets on a given volume.

The average blocksize and the number of blocks are used to determine if a volume's theoretical capacity has been exceeded (based on its length and recording technique). If the megabytes value exceeds the theoretical capacity, the volume's capacity will be capped. This reduces distortion caused by incorrectly stating cartridge lengths or, for multi-volume files, excessively large block counts stored in the tape catalog. Message XPR0097W will advise you how many volumes have been capped.

Note: Utilization and capacity calculations can only be performed for volumes with entries in the tape catalog.

Change Default Tape Lengths

A default tape length in feet is used to compute usage capacity for all standard 3480 or 3490 cartridges. Note that you can override the default for specific volsers or ranges of volsers in a later step.

1. Click **Tape Volsers** on the Host Configurator. The selection is displayed in a separate window.
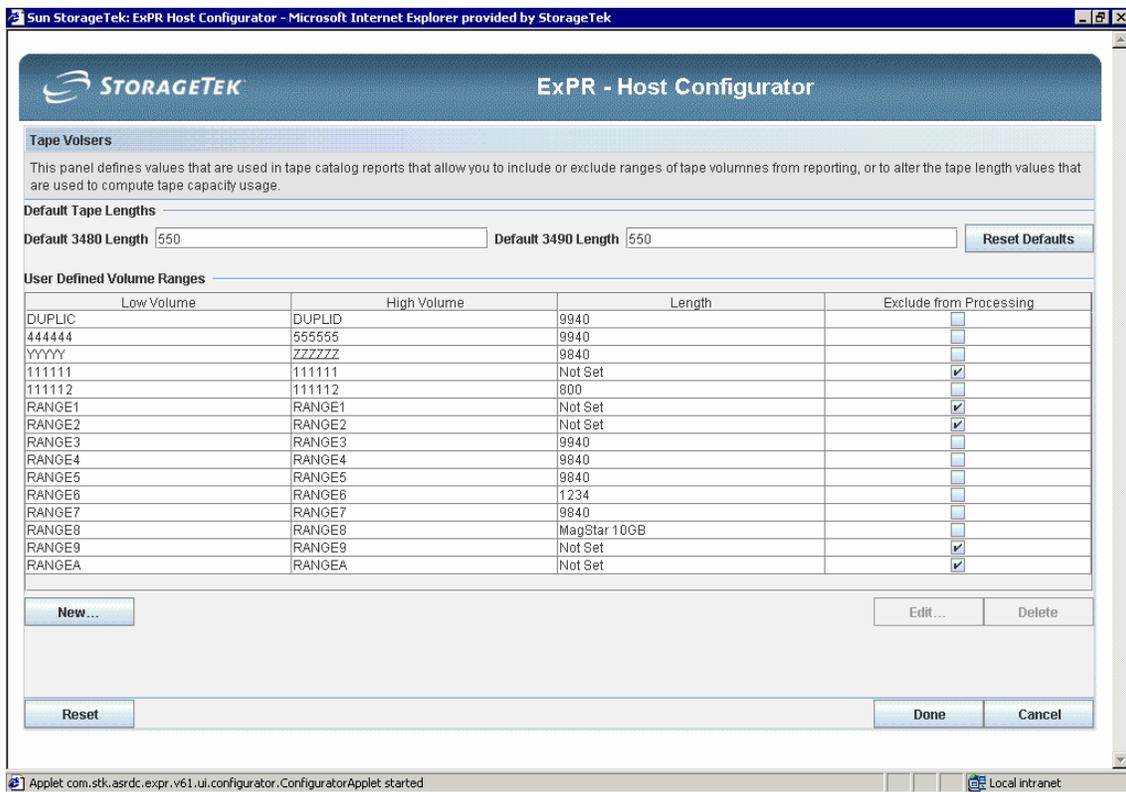
2. Change the default tape length for 3480 or 3490 cartridges to values between 1 and 2000 feet.

3. Click **Done** when you are finished.

Define Ranges of Volumes to Include or Exclude

Ranges of tape cartridges can be defined for tape catalog processing based on length, capacity, or proprietary media type. You can also exclude ranges of cartridges.

1. Click **Tape Volsers** on the Host Configurator. The selection is displayed in a separate window.

2. Click **New**.

3. In the dialog, enter the range of volsers and click **OK**.

4. Select **Exclude range from Tapecat processing** if you want to exclude this range.

5. Select whether you want to override the fault tape length. If you choose to override the default length, select the media type or enter the length in feet to use instead.

6. Repeat all steps for each range you want to establish.

7. Click **Done** when you are finished.

To edit or delete a range, select an existing entry and use the **Edit** or **Delete** buttons.

It is important to enter the correct media type and volser ranges for proprietary StorageTek cartridges. For volumes registered in the CDS, ExPR can automatically detect the media type. However, for ejected volumes, ExPR must refer to these volume ranges to determine the real media type.

Nearline Agebands

Nearline Agebands are used in tape catalog reporting of cartridge age distribution. Specifically, agebands are used to report the relative ages of Nearline volumes based on their last use/reference date by an MVS application (not creation date).

Values are sorted into descending order and can be in the range 1-32767 days. Four agebands can be defined, with a fifth "catch-all" band that automatically accounts for cartridges older than the oldest ageband.

Agebands classify last-referenced date information into concise groupings that show the distribution of data across a dataset workload group, LSM, entire ACS, or VTSS. For example, "365 183 91 31" would summarize cartridges into age groupings of up to one month, three months, six months, and one year since last being referenced/accessed by the host system.

The default ageband values are 91, 30, 14, and 7 days.

To change Nearline ageband values:

1. Click **Nearline Agebands** on the Host Configurator. The selection is displayed in a separate window.
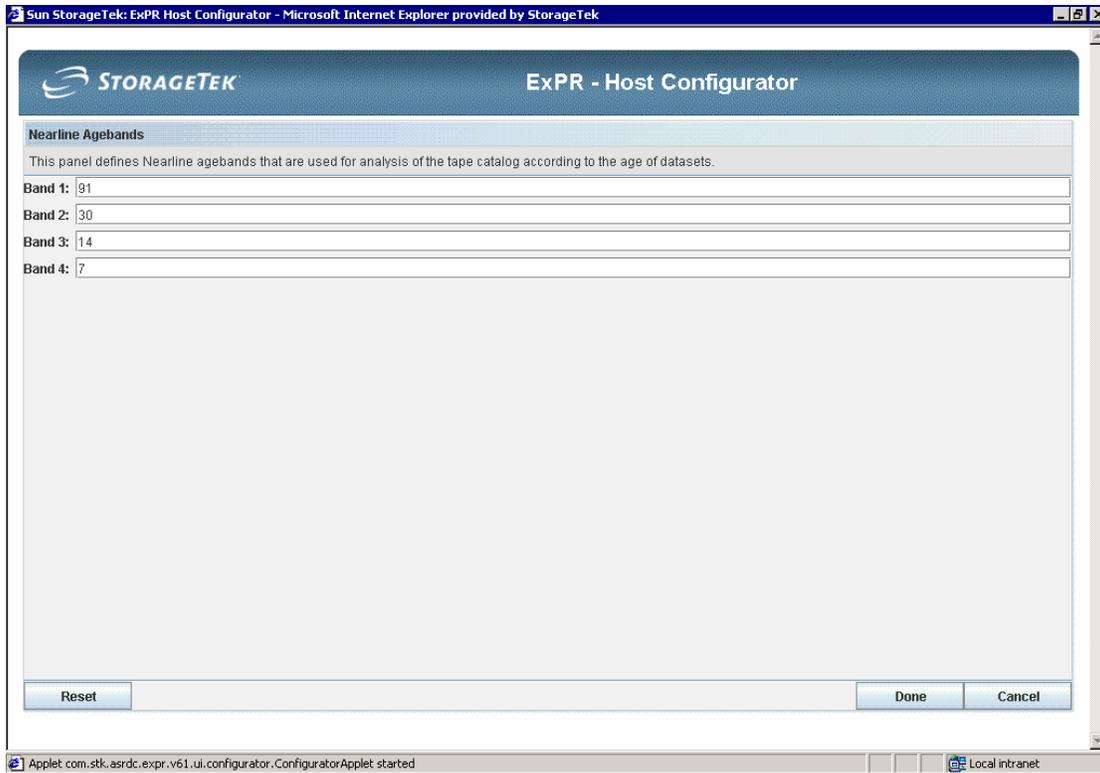
2. Enter the new ageband values.

3. Click **Done** when you are finished.

VTSS Agebands

VTSS Agebands are used in tape catalog reporting of cartridge age distribution. Specifically, agebands are used to report the relative ages of VSM VTVs based on their last use/reference date by an MVS application (not creation date).

Values are sorted into descending order and can be in the range 1-32767 days. Four agebands can be defined, with a fifth "catch-all" band that automatically accounts for cartridges older than the oldest ageband.

Agebands classify last-referenced date information into concise groupings that show the distribution of data across a dataset workload group, LSM, entire ACS, or VTSS. For example, "365 183 91 31" would summarize cartridges into age groupings of up to one month, three months, six months, and one year since last being referenced/accessed by the host system.

The default ageband values are 91, 30, 14, and 7 days.

To change VTSS ageband values:

1. Click **VTSS Agebands** on the Host Configurator. The selection is displayed in a separate window.

120
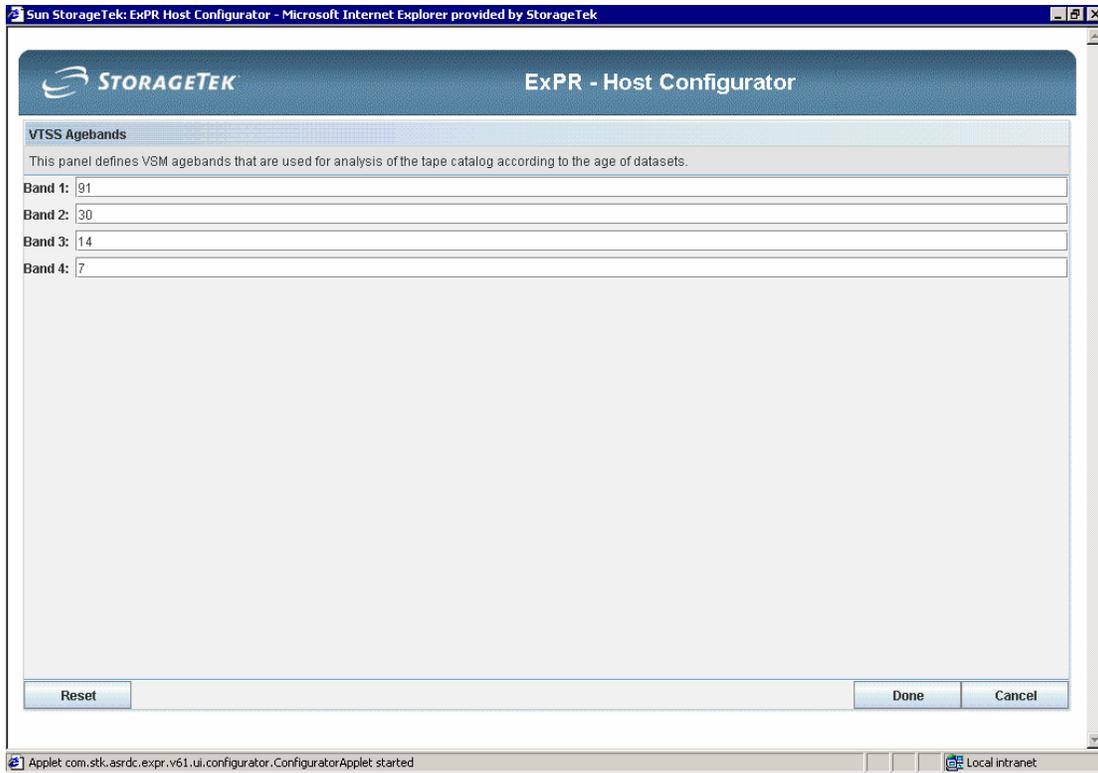
2. Enter the new ageband values.

3. Click **Done** when you are finished.

Dataset Workloads

Dataset workload groups define logical application-related groupings of cartridges within the total tape environment. A dataset workload group typically defines a critical application or system component, such as HSM

Used in conjunction with ExPR tape catalog processing, dataset workload groups provide a mechanism for logically mapping the contents of an ACS/LSM, VTSS, or the manually racked tape library to particular systems or applications based on a volume's primary (first file) dataset name. Statistics are recorded for cartridges whose primary dataset name matches a set of masks. The use of dataset workload groups requires the presence of a supported tape catalog.

You can define one or many groups to allow ExPR to report at an appropriate level of detail. However, unless clearly defined naming standards or existing workload specifications are in place at your site, you should not define overly complex groups.

Cartridges may appear in more than one dataset workload group. A duplicate entry message (XPR0087W) is automatically generated for each cartridge that is in more than one group. However, only the first matched group is recorded in the TMCHIST file for a particular volume.

The TAPECAT UPDATE report lists totals for each user-defined dataset workload group and LSM/VTSS, including those volumes that have been matched on two or more

groups. The TAPECAT SUMMARY report lists volume statistics based on the first matched dataset workload group only.

When using dataset workload groups, you may want to define a catch-all bucket group for volumes not matching any other group. For example, a group 999 named "Catch-All Bucket" with ** for a mask would catch anything that was not caught by the 998 groups that preceded it.   This is because ExPR checks against the lowest numbered dataset classes first and only writes the first group match in the TMCHIST file for a particular volume. (Therefore, you should attempt to define the dataset groups so that the broader less-selective dataset masks are always in higher class numbers than the more-specific selective masks.)

Dataset workload groups are specified by including one or more datasets under a user-selected group name. The mask that defines the group includes dataset qualifiers and wildcard characters. The rules and syntax for specifying workload groups are detailed below.

To define dataset workload groups:

1. Click **Dataset Workloads** on the Host Configurator. The selection is displayed in a separate window.
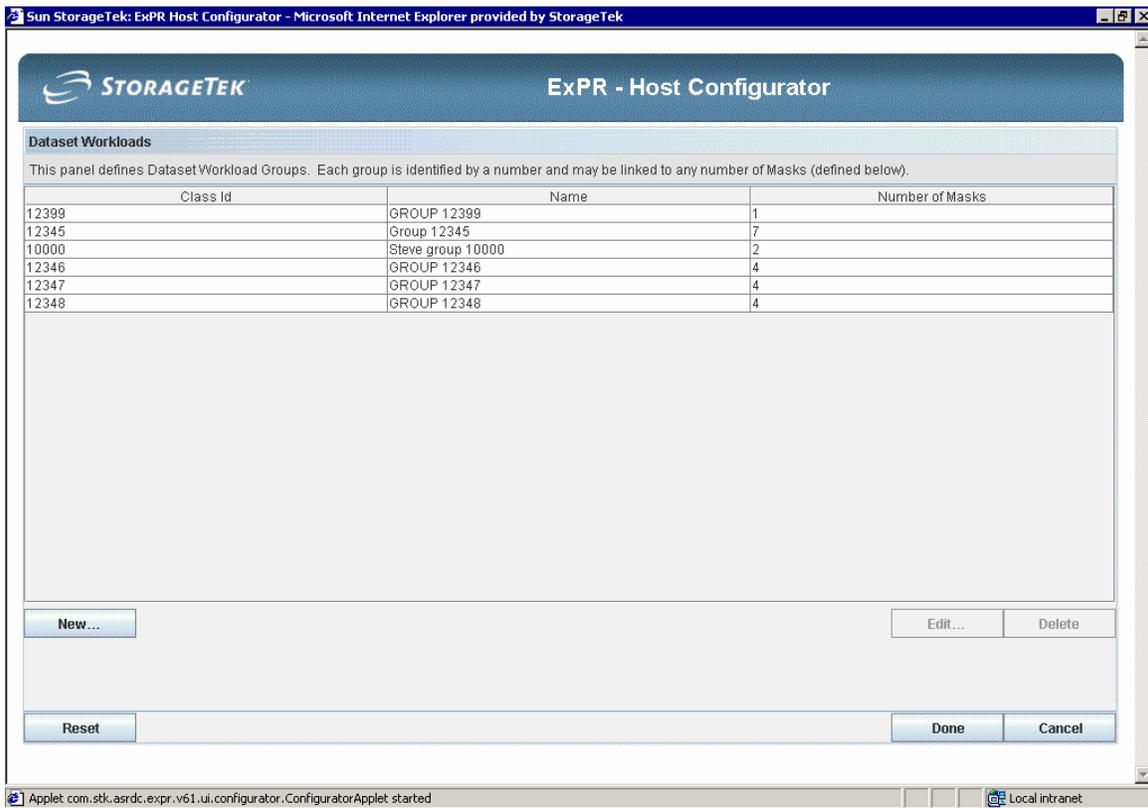
2. Click **New**.

3. In the dialog, enter a unique group ID (decimal 1-32767) and a description for the group and then click **OK**.

4. Click **New** in the dialog.

5. In the new dialog, enter a mask to be matched against dataset names.

   The following masks can be used when constructing dataset workload groups:

   Dataset Workload Group Masks

? or %	Represents a wildcard character, one for one. Blanks are not allowed.
*	Represents a wildcard single node prefix or suffix (1-8 characters). Can be used as either the prefix or suffix, or both.
**	Represents a wildcard single or multiple nodes up to 21 nodes long. Can be used as a prefix or suffix (but not both) or on its own.

   Dataset Workload Group Mask Examples

*.PROD?	SYS1.PROD1, SYS1.PROD2, and IPO1.PROD3 but not ACCOUNTS.DATA.PROD4 or IP01.SYSTEM.PROD3
SYS1.**.TEST	SYS1.LINKLIB.TEST and SYS1.LINKLIB.MVS1.TEST but not SYS2.LINKLIB.TEST or SYS1.LINKLIB.MVS1.PROD3
SYS1.BACKUP.*	SYS1.BACKUP.DAILY and SYS1.BACKUP.WEEKLY but not SYS1.BACKUP.DAILY.MONDAY or SYS2.BACKUP.WEEKLY
SYS2.BACKUP.**	SYS2.BACKUP.DAILY and SYS2.BACKUP.DAILY.MONDAY but not SYS1.BACKUP.DAILY or SYS2.DAILY.MONDAY

6. Click the resource this mask applies to and then click **OK**.

   The eligibility of a volume to be matched against a dataset mask is controlled by the resource parameter:

   - All ACS – applies the mask to volumes in all LSMs in all ACSs

   - ACS – applies the mask to volumes in all LSMs in the specified ACS

   - LSM – applies the mask to volumes in a specific LSM

   - All VTSS – applies the mask to volumes in VTSSs

   - VTSS – applies the mask to volumes in the specified VTSS

   - Manuals Only – applies the mask to volumes that are not in an LSM or VTSS (i.e., volumes in manual tape library racking

   - Global – applies the mask to all volumes regardless of where the volume resides (i.e., in an LSM, VTSS, or manual tape library racking)

7. Repeat steps 5 and 6 for each mask you want to define for the selected group.

8. Repeat all steps for each dataset workload group you want to define.

9. Click **Done** when you are finished.

To edit or delete a group, select an existing entry and use the **Edit** or **Delete** buttons.

DSN Profiles

This step supplies file and volume values and attributes for ExPR to substitute when incomplete information is held in the tape catalog.

The ExPR tape utilization and capacity calculations rely on the accuracy and completeness of the tape catalog entries for a given volume and its associated datasets. Sometimes the tape catalog doesn't always reflect the true status of a particular volume and may contain zero for blocksize or logical record length and a record format of undefined. Also, there are certain products in the MVS marketplace that perform their tape I/O in such a way that the tape catalog entry is incomplete or inaccurate.

It is possible to compensate for this by supplying ExPR tape catalog processing with details of the missing or inaccurate fields. DSN Profiles allow you to specify a dataset name mask to be matched against the tape catalog dataset names of products that you know to create inaccurate catalog entries. You can also supply overriding blocksize, logical record length, record formats, or percentage volume used values. These will only be applied when the value is not present in the tape catalog.

Various data backup products create inaccurate catalog entries, which can account for many thousands of volumes in the tape library. Without the DSN Profiles, these may appear to have no data in them, when in reality they are often full volumes. A common example of this is HSM/DFDSS with a blocksize greater than 32K (usually 64K). ExPR can only detect this condition when the TMS is CA-1.

To set DSN profiles:

1. Click **DSN Profiles** on the Host Configurator. The selection is displayed in a separate window.
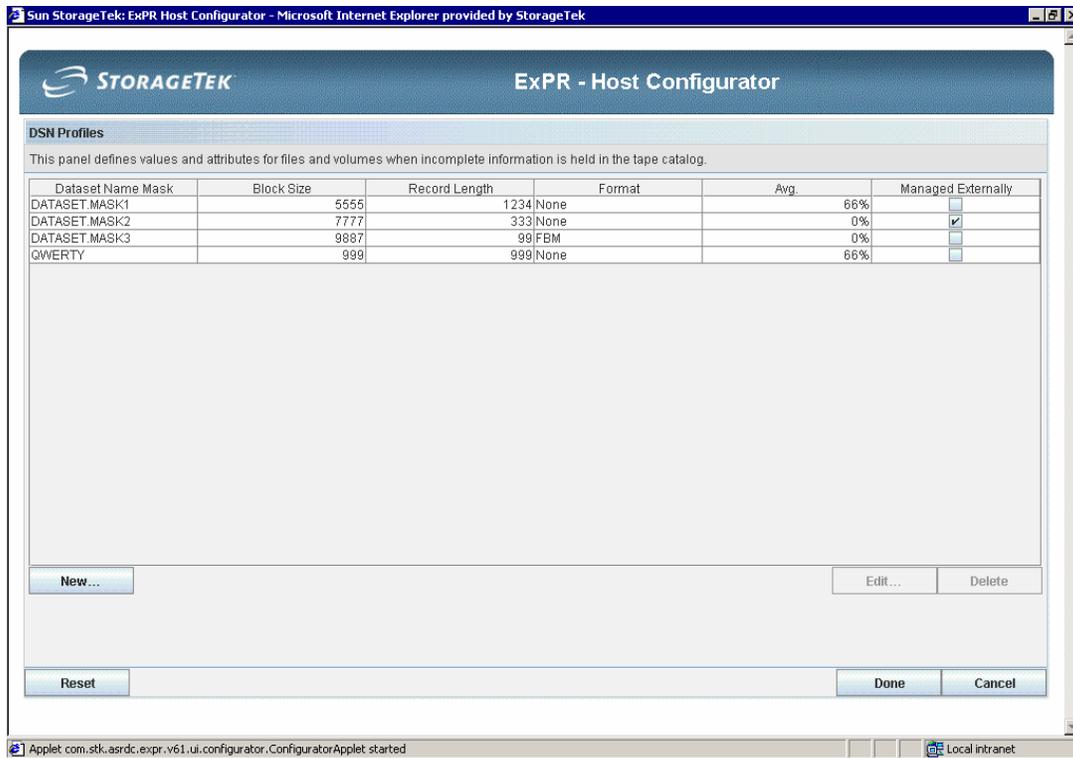
2.   Click **New**.

3.   In the dialog, enter a dataset name mask to apply attributes to. Rules for dataset masks are the same as for dataset workload group masks.

4.   Enter attributes to apply to this dataset name mask and then click **OK**:

Block Size – Specifies a tape block-size value to be applied to catalog entries with a block-size of zero. The valid range is 1-65536.

Record Length – Specifies a tape logical record length value to be applied to catalog entries with a record length of zero. The valid range is 1-65536.

Record Format – Specifies a record format (VBA, FBA, VBM, FBM, VBS, VB, FB, V, F, or U) to use when a catalog entry has an undefined format.

Average % Use – text allows user-specification of the percentage of a volume that is physically used for data. This can be used when the catalog entry contains a zero block count. The valid range is 0-100 per cent.

Is Managed Externally – Assigns the externally managed attribute to a volume in the TMCHIST file. Only CA-1 returns the externally managed flag; therefore, users of other tape management systems can use this parameter.

5.   Repeat all steps for each dataset name mask you want to define.

6.   Click **Done** when you are finished.

To edit or delete a mask, select an existing entry and use the **Edit** or **Delete** buttons

Tapecat Bands

The tape sizing function of tape catalog processing helps you determine the total quantity of data stored within the complete tape library. A TMCHIST file is read during tape catalog processing and calculations are performed based on the number of gigabytes of data stored on tape. This function also reads the database type 3 records to determine the peak eight-hour period for tape data activity based on the quantity of data transferred to and from the host.

Tape sizing uses a set of user-defined bands representing number of megabytes as boundaries for tape catalog breakdown analysis. Up to 15 bands can be defined. The default band setting is 1 10 25 50 100 200 400 1000.

To change tape-sizing band definitions:

1. Click **Tapecat Bands** on the Host Configurator. The selection is displayed in a separate window.
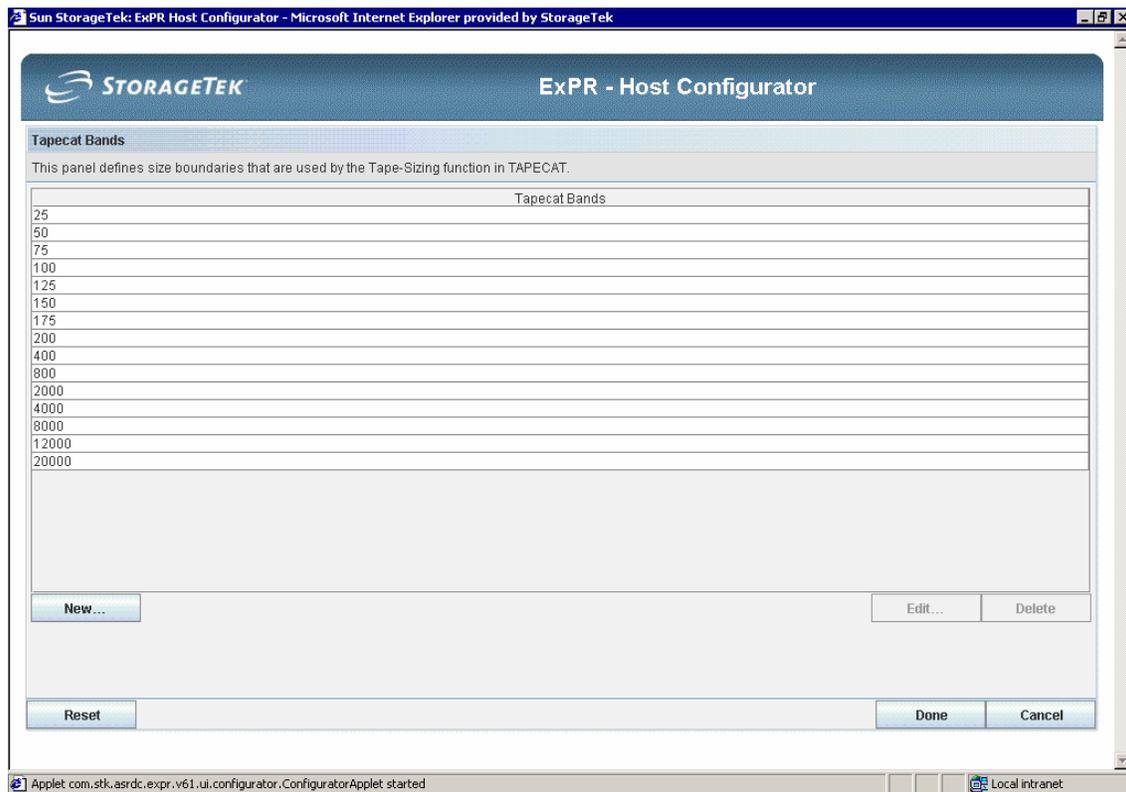
2. Click **New**.

3. In the dialog, enter a number and click **Ok**. Bands are automatically placed in the correct ascending sequence.

4. Click **Done** when you are finished.

To edit or delete a band, select an existing entry and use the **Edit** or **Delete** buttons

ITCU Options

The Integrated Tape Catalog Update (ITCU) function brings together the facilities of the batch TAPECAT function and the TAPECAT GUI function. The tape catalog extraction, creation of a history file, and database update can now be scheduled automatically within the ExPR started task. This eliminates the scheduling of batch TAPECAT updates and the associated synchronization of shared database updates.

The ITCU feature allows you to specify started task startup options and actions, and up to four regularly scheduled TAPECAT updates. These parameters can optionally allow you to create a new generation of the GDG-controlled TAPECAT History File.

To activate the ITCU facility, it is necessary to supply options that are equivalent to the JCL and control statements of the batch TAPECAT UPDATE function, as shipped in *usrprfx*.CNTL member TAPECATU. Those options and settings are specified via the ITCU options tab of the Tape Catalog section.

In addition to scheduling TAPECAT updates via ITCU and traditional batch updates, it is also possible to program your automated operations scheduling package to issue operator commands to the ExPR started task. These commands commence "ITCU" and can be found in the *ExPR Mainframe User's Guide*, Chapter 2: *Started Task Operator Commands*.

To define extraction options:

1. Click **ITCU Options** on the Host Configurator. The selection is displayed in a separate window.

Extraction Options Tab
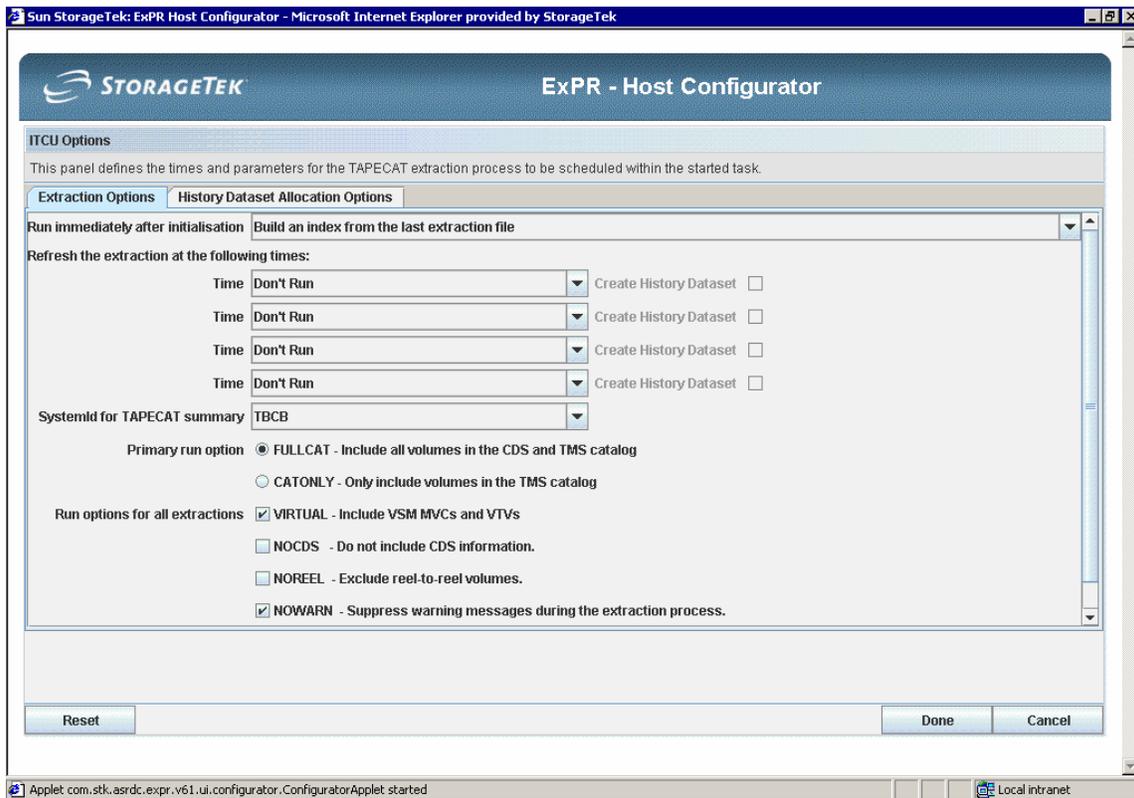
This panel defines the times and parameters for the TAPECAT extraction process to be scheduled within the started task:

"Run immediately after initialization" – specifies the action required immediately after the ExPR started task has initialized. There are for options:

- Do not activate interactive TAPECAT – the feature will not be activated

- Run an extraction and build an index – the current CDS and tape catalog are extracted and the internal index built for TAPECAT GUI enquiries

- Run an extraction, create a history file and index – the current CDS and tape catalog are extracted, the index built and a new GDG TMCHIST file is created

- Build an index from the last extraction file – the internal index is built based upon the previous CDS and tape catalog extraction

"Refresh the extraction at the following times" – allows you to request the automatic scheduling of the extraction process at regular intervals throughout the day. Each extraction can with or without the additional step of creating a new GDG-controlled TMCHIST file. The valid options are:

- Don't Run – do not schedule the CDS/tape catalog extraction

- 01, 02, … 23 – time of day to run the extraction. It is run on the hour selected

- Create History Dataset – creates a new GDG-controlled TAPECAT History File

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"System id for TAPECAT summary" – (select from pulldown list). This system id is used to write the TAPECAT update summary records to the main ExPR database. Normally this should be the system id of the primary ExPR started task. A specification of "Default" will cause the system id of the extracting started task to be used. This should be used when you have multiple tape catalogs attached to several ExPR started tasks. Generally a specification of "Default" should meet the requirements of most users.

"Primary run option" and "Run options for all TAPECAT extractions" – specify options to be used for the CDS/tape catalog extraction process; they are equivalent to those used on the batch TAPECAT UPDATE process.

- FULLCAT – include the complete contents of the TMS catalog in addition to volumes in the HSC CDS

- CATONLY – only include volumes in the TMS catalog that are not in the HSC CDS

  (FULLCAT and CATONLY are mutually exclusive; FULLCAT is recommended.)

- VIRTUAL – include details of all VSM MVCs and VTVs

- NOCDS – run the extraction without any reference to the HSC CDS

- NOREEL – exclude non-cartridge reel-to-reel volumes

- NOWARN – suppress warning messages in the range XPR0080W to XPR0087W

- NODBUP – do not update the ExPR database with the summary statistics

For the majority of installations, the following options should be selected:

FULLCAT, VIRTUAL (if VSM is installed), NOWARN

In addition to setting the ITCU options, you must also specify START TASKS(ITCU….) in the ExPR started task initialization statements.

History Dataset Allocation Options Tab

These options are used by ExPR to dynamically allocate the TMCHIST file when required. History Dataset – the name of the TMCHIST file GDG, i.e. EXPR.TAPECAT.HISTORY (+1) – as specified during the ExPR installation process in the IDCAMS DEFINEGDG statement.

- SMS DATACLAS – the SMS DATACLAS to used for allocation

- SMS MGMTCLAS – the SMS MGMTCLAS to be used for allocation

- SMS STORCLAS – the SMS STORCLAS to be used for allocation

- Non-SMS UNIT – for non-SMS installations, the UNIT to be used for allocation

- Non-SMS Volume – for non-SMS installations, volume serial to be used for allocation

- Primary Cylinders – primary extent number of cylinders to allocate

- Secondary Cylinders – secondary extent number of cylinders to allocate

If you have not chosen to create a history dataset, you do not need to specify these options.

Activating the PC TAPECAT GUI Function

If you have chosen to activate the ITCU function, the TAPECAT GUI will also automatically be activated. However, if you have not activated ITCU, then you should read this section about activating the TAPECAT GUI.

Having now defined your Tape Management System and the optional features associated with ExPR TAPECAT, you may choose to activate the interactive TAPECAT GUI feature. The TAPECAT GUI provides interactive volume and dataset inquiry capability against your TMS and HSC CDS.

The TAPECAT GUI runs within the ExPR started task and is controlled by the START TASKS control statement within the STCPARMP member of the *usrprfx*.CNTL library.

Note: Before activating the TAPECAT GUI feature, it is recommended that you run a batch TAPECAT UPDATE function first. This is not a necessary prerequisite but merely helps you familiarize yourself with the ExPR TAPECAT function.

To activate TAPECAT GUI:

1. Edit *usrprfx*.CNTL member STCPARMP.

2. Uncomment the TAPECAT-GUI line of the START TASKS statement and save the member.

3. Restart the ExPR started task.

Note: When an installation only has a single TMS catalog, it is only necessary to run the TAPECAT GUI function on the primary started task. However, when there are multiple TMS catalogs (e.g., production and test), you can run additional TAPECAT GUI functions on secondary started tasks. Each TMS catalog only needs one TAPECAT GUI task to make all the data within that catalog available. As with the batch TAPECAT functions, it is not possible to merge multiple TMS catalogs into a single ExPR extraction run.

Chapter 8: Database Update and Installation Verification

Overview

This chapter describes the two remaining tasks for a successful installation:

- Copying the previous version data to the new datasets

- Performing the installation verification procedure

Task 12: Copy Previous Version Data to New Datasets

If you are a new ExPR site, you can skip this task.

Note: The primary ExPR started task should be stopped prior to running this task and restarted upon completion.

Existing ExPR sites will copy (REPRO) data from the existing ExPR database and other files to the new version's files:

- Existing Version 5.0 sites run the copy steps in *usrprfx*.CNTL member V5MIGR.

- Existing Version 4.0/4.1 sites run the copy steps in *usrprfx*.CNTL member V4MIGR.

- Existing Version 3.0 sites run the copy steps in *usrprfx*.CNTL member V3MIGR.

- Repeat for each secondary MVS system, including CSC/SMC clients.

Task 13: Perform Installation Verification

This task tests the functionality of your installation. First, you will collect some data into the ExPR database and then you will generate a sample host report. The PC is not tested here because you have already successfully connected to the primary host with the Host Configurator application.

To verify the ExPR installation:

1. Update the ExPR database.

   - If you activated the DirectSMF update feature, data should be available in your database shortly after the start of the next hour after the started task was started.

   - If you did not activate DirectSMF update, or if it has not been running for the specified minimum time, update the database using the batch update process

shown below in the *usrprfx*.CNTL member SMFUPDAT sample. (The job should be set up to process a full day's worth of recent data.)

Note: The primary ExPR started task should release the database from update mode. This is achieved with the ExPR SMF SUSPEND console command. When the batch update has completed, the started task can continue with the SMF RESUME console command.

2.   Generate a MOUNTS report as shown in the *usrprfx*.CNTL member REPORTS sample.

```
PERIOD FROM(yyyyddd) TO(yyyyddd) ;                    [ usrprfx.CNTL Member SMFUPDAT ]
INPUT   DDNAME(PGMIDATA dd1 dd2 dd3 ...) ;
PERFORM SMF-UPDATE ;
  .
  .
PERIOD FROM(yyyyddd) TO(yyyyddd) ;                    [ usrprfx.CNTL Member REPORTS ]
REPORT NAME(MOUNTS) ;
```

Sample Control Statements to Populate the Database and Generate a Report

- PERIOD parameters specify the range of data to be updated (in the first instance) and reported on (in the second instance)

- INPUT parameter PGMIDATA instructs ExPR to include PGMI and Monitor data collected by the ExPR started task, if any.

- PERFORM SMF-UPDATE extracts the required SMF record types, writes them to a sequential file for input to the internally called SORT utility, and then updates the ExPR VSAM database file with the sorted output.

- REPORT NAME(MOUNTS) generates the MOUNTS report.

Refer to the separate book *ExPR Mainframe User's Guide* if you need additional information about the syntax for these run-time control statements and parameters.

An Important Consideration for SMF Update Processes

When running the SMF update processes, either in batch or real-time DirectSMF, it is important to ensure that the SMF data for all MVS hosts (including CSC/SMC client systems) is included in a single update pass. The running of individual updates on a system by system or piecemeal basis will prevent ExPR from collecting and analyzing relevant data in the context of all other parallel activity. This is particularly important when you define ExPR consolidated views. All data must be handled in a single process to ensure that the global view of activity is correctly calculated.

Under real-time DirectSMF, this means that all secondary started tasks must be active and connected to the primary system. For the batch SMF-UPDATE function, you must input all SMF archive data, for a given date range, into a single batch execution. The various SMF files can be concatenated together and you can use the ExPR INPUT statement. The date/time/system order of the SMF input does not matter, as ExPR will sort the data. Also, in batch, you should always input whole days of SMF archive data, not partial days.

Additionally, for batch updates, the inputting of duplicate SMF records from multiple SMF archives is not a problem. Internally, ExPR sorts all SMF records into date/time/system sequence. Duplicate SMF records are detected and eliminated.

Chapter 9: ExPR Monitor Service

Overview

This chapter describes how to install and configure the optionally-installed ExPR Monitor Service on an open system in your network. The ExPR Monitor Service is an integral part of the ExPR suite of products that provides automatic notification of scheduled ExPR reporting events as defined by the customer. Event notification can include E-mail and MVS console reported messages.

Task 14: Install and Configure ExPR Monitor Service (Optional)

The packaging software required for your platform of choice can be found on the ExPR software CDROM. Alternatively, the packaging software can be downloaded from the MVS web server once the ExPR GUI has been installed. The download location can be found under the System menu of the ExPR GUI application.
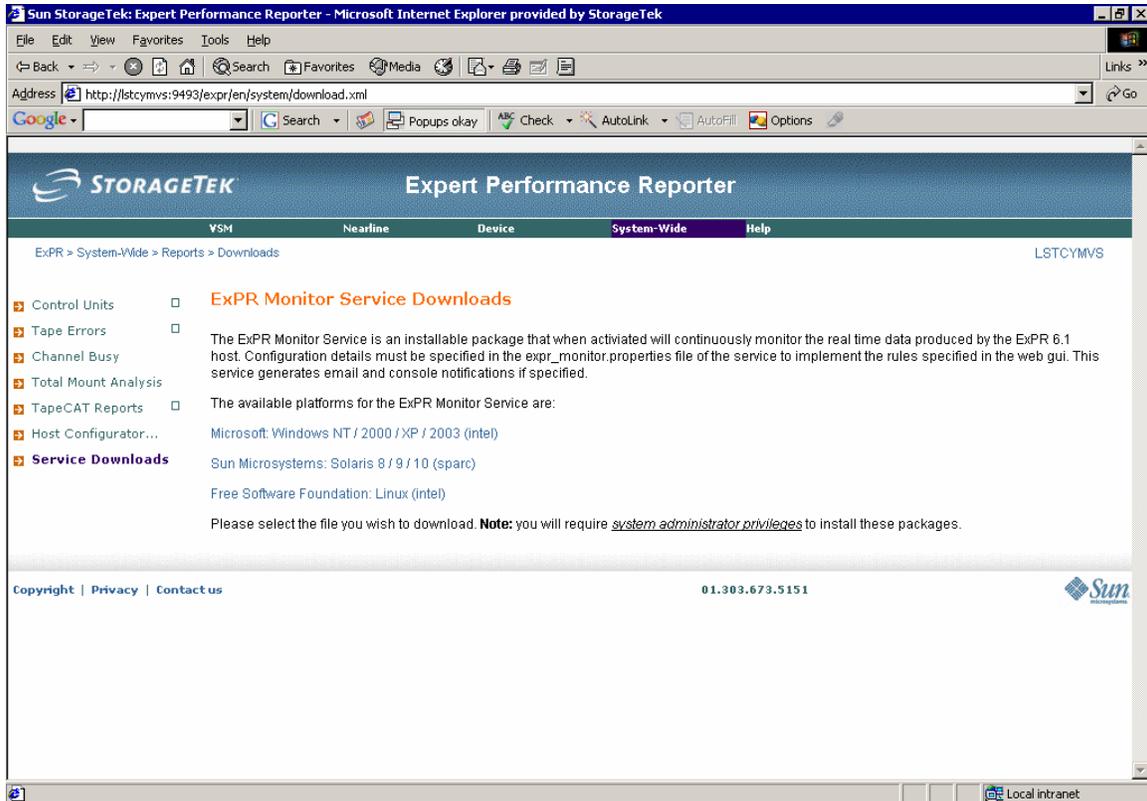
Hardware Requirements

The ExPR Monitor Service can be installed on any of the following platforms:

- Windows NT / 2000 / XP / 2003 system Intel based architecture
- Solaris 7 / 8 / 9 / 10 Sparc-based architecture
- Free Software Foundation Linux version supporting RedHat Package Manager (RPM) Intel-based architecture

Each of these platforms will require:

- Network connectivity to the MVS system running the ExPR started task
- Network connectivity to an E-mail server (if using E-mail event notification)
- Ideally the platform of choice should be available 24x7 for timely notification of ExPR events

ExPR Monitor Service installation requires appropriate system administrator privileges:

- For Windows, an account with Administrator rights to install software and system libraries
- For Solaris and Linux systems, the 'root' account

Software Requirements

The ExPR Monitor Service requires that the following software is already installed on your system:

- Java Runtime environment 1.4 or higher (download free at www.java.com)

Information You Will Need

Once you have the packaging software for the platform of choice, you will need to collect the following information before you begin the installation.

- The IP or DNS name of the MVS system that is hosting the ExPR started task
- The IP or DNS name of the E-mail system that will deliver E-mail event notifications
- The account name and password to use for accessing the E-mail account on the E-mail server to delivering E-mail notification
- The account name to receive E-mail alerts about any problems with starting or connecting the ExPR monitors service

You can refer to the appropriate installation notes for your chosen platform in the following section:

Windows NT / 2000 / XP / 2003 Installation

To install the ExPR monitor service software package, you will need to execute the package file.

1. Log in to an account that has the correct privileges to "install programs" and "install Windows system files" rights.

2. Execute the package program by selecting Windows **Start** and then **Run**.

3. Use **Browse** to locate the executable, or type the full folder path name and executable name in the open panel.

4. Click **Ok** to being the installation.

   A series of panels will appear on the screen to assist you with the installation.

5. Click **Next** to continue.

6. Answer the prompts with the appropriate information that is needed to implement the service. Click **Next** to continue.

7. Answer the prompts with the appropriate information that is needed to implement the
    service. Click **Next** to continue.
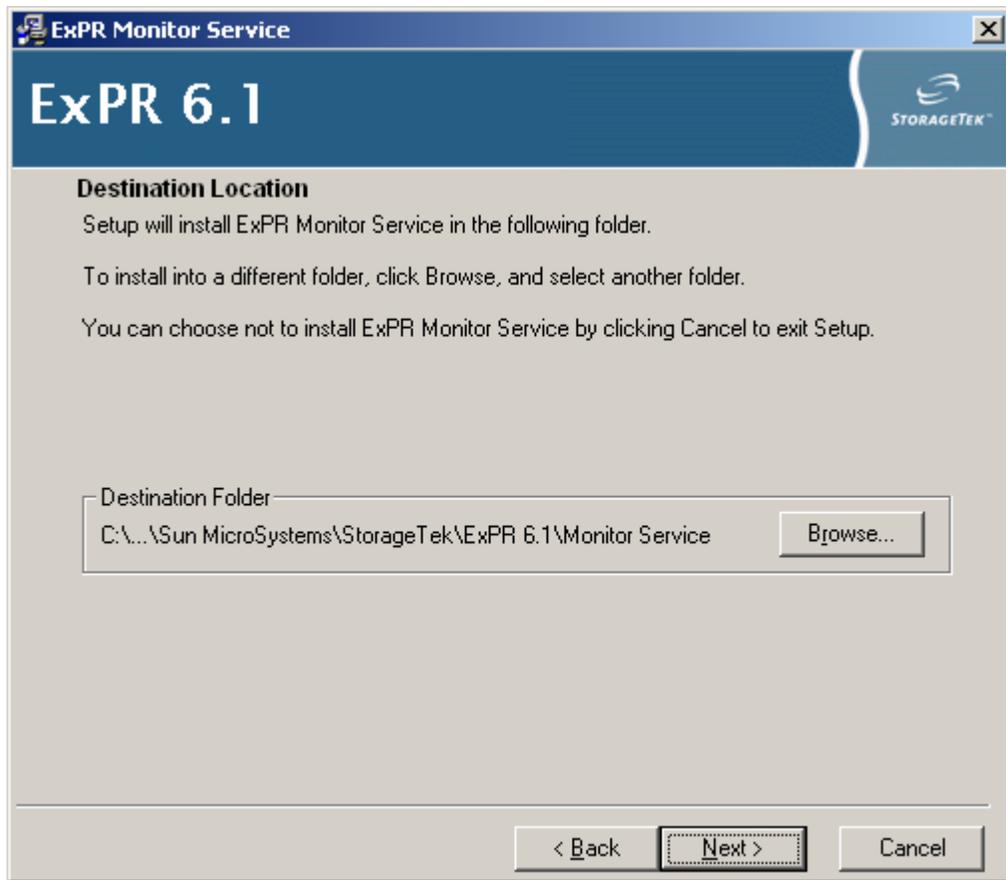
8. Click **Browse** if you wish to change the location of where the software will be installed. Otherwise, click **Next** to continue and accept the default.
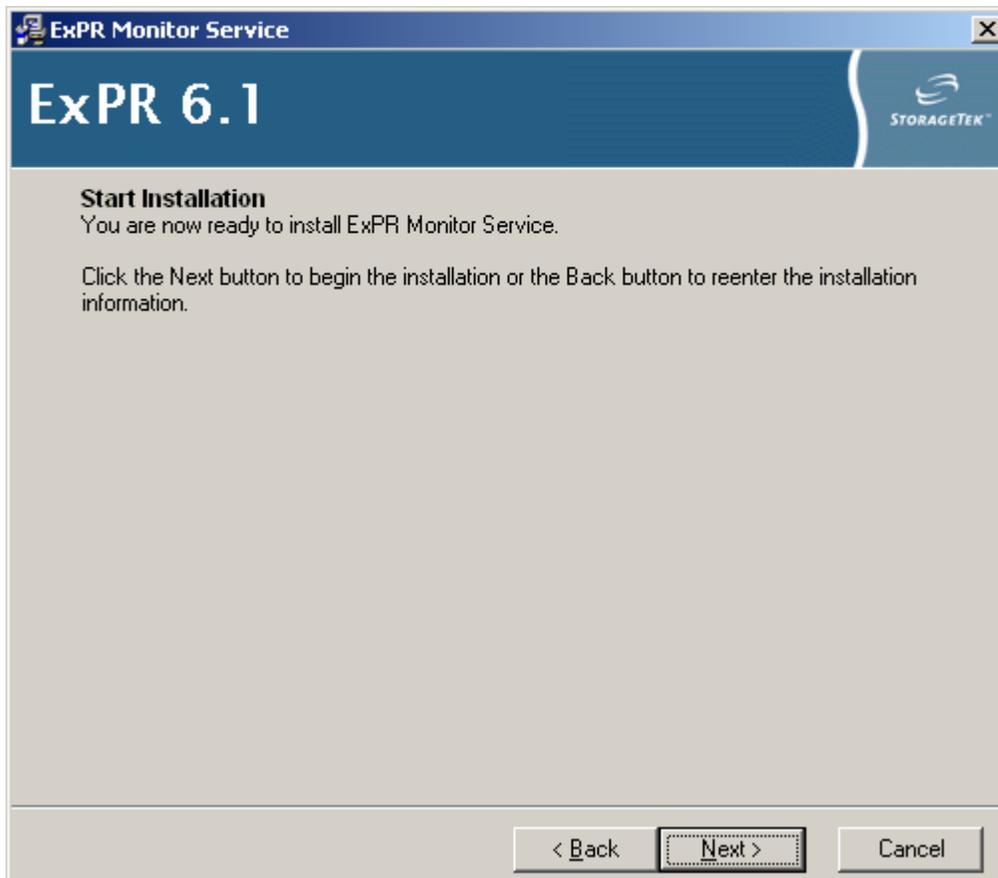
9.   Click **Next** to begin the installation of the file for the ExPR Monitor Service.
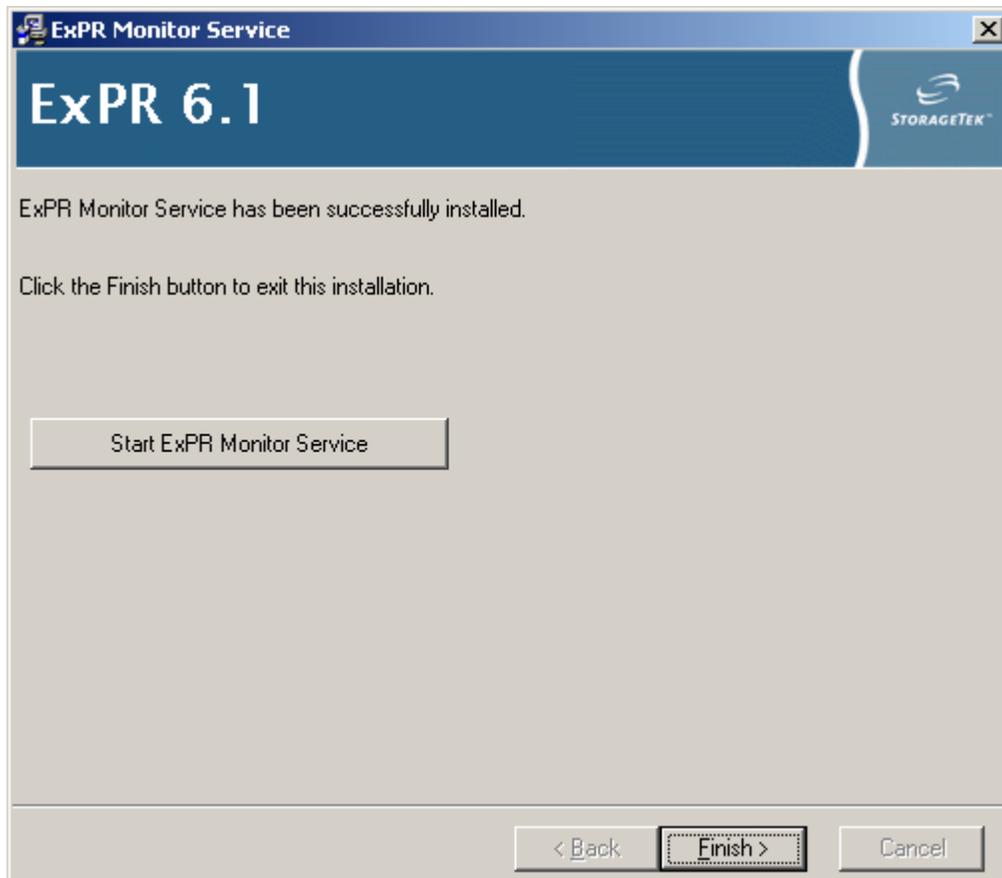
10. The ExPR Monitor Service will be registered in the Windows Services list. However, it will not start until the next reboot of the Windows system. Alternatively you can click **Start ExPR Monitor Service** to have the task started now.

11. Once completed, click **Finish** to conclude the installation.

Solaris 7 / 8 / 9 / 10 Installation

To install the ExPR Monitor Service software package, use either the command line method or the GUI method described below.

Command Line Install Method:

1. Log in to the "root" account.

2. At the shell prompt, issue the following command to install the package:

   pkgadd -d ./SUNWexprmon.pkg

3. Answer the prompts with the appropriate information that is needed to implement the service.

```
Admintool: Add Software                                                    _ □ ×

Processing package instance <SUNWexprmon> from </tmp/solaris>

ExPR 6.1 Monitor
(sparc) 6.1
#
# Copyright (c) 2005 Sun Microsystems, Inc.
#
# Expert Performance Service,
#
# All rights reserved. This product and related documentation is
# protected by copyright and distributed under licenses
# restricting its use, copying, distribution and decompilation.
# No part of this product or related documentation may be
# reproduced in any form by any means without prior written
# authorization of Sun Microsystems, Inc. and its licensors, if any.
#
Checking if this package has been previously installed..Ok.
Checking Java Runtime version installed..Ok.

Please enter the ExPR MVS Host name or Internet address to monitor. (Default
mvshost) [?]

Please enter the port number for the ExPR MVS Host to monitor. (Default
31000) [1024-99999,?]

Please enter the mail server Host name or Internet address to forward emails.
(Default localhost) [?]

Please enter the account name you wish to use for sending email notifications.
(Default bin) [?,q]

Please enter the pass word to use for the account to use for sending email
notifications. [?,q] q

Please enter the update interval in minutes to monitor. (Default
10) [2-43200,?]

Please enter the administrator account name you wish to use for receiving
email connection status. (Default root@localhost) [?]

Please enter the timeout interval in minutes to try a failed connection.
(Default -1 equals no limit) [-1-43200,?]
Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
   8 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWexprmon> [y,n,?]
```

GUI Install Method:

Alternatively you can use the "admintool" GUI program to install the package.

1. Open the Admintool GUI.
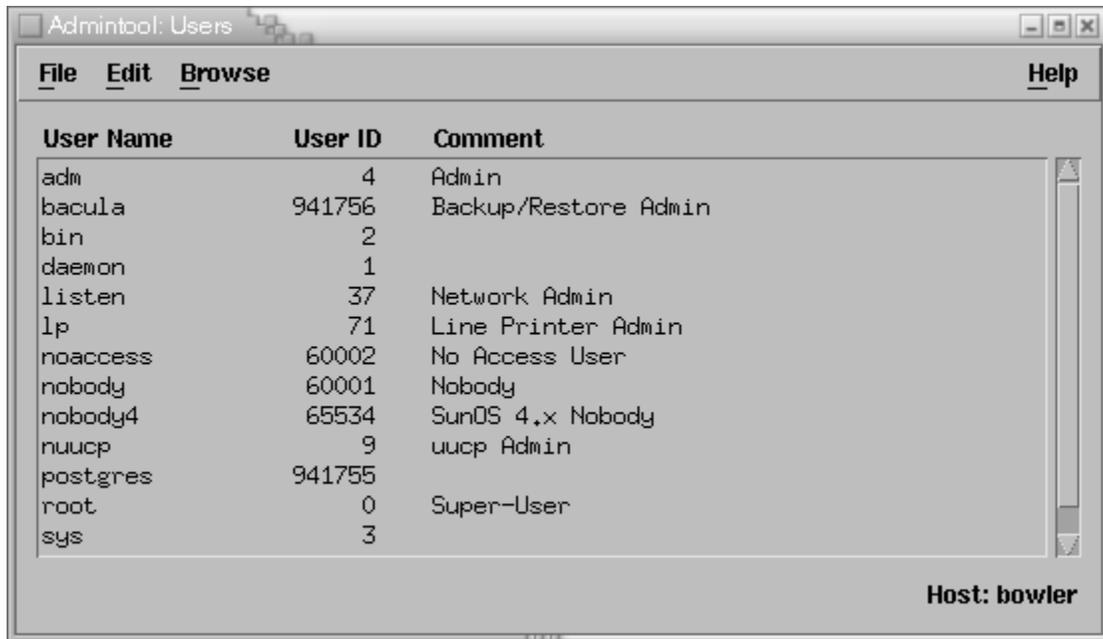
2. Select **Browse** and then select **Software** from the pulldown.
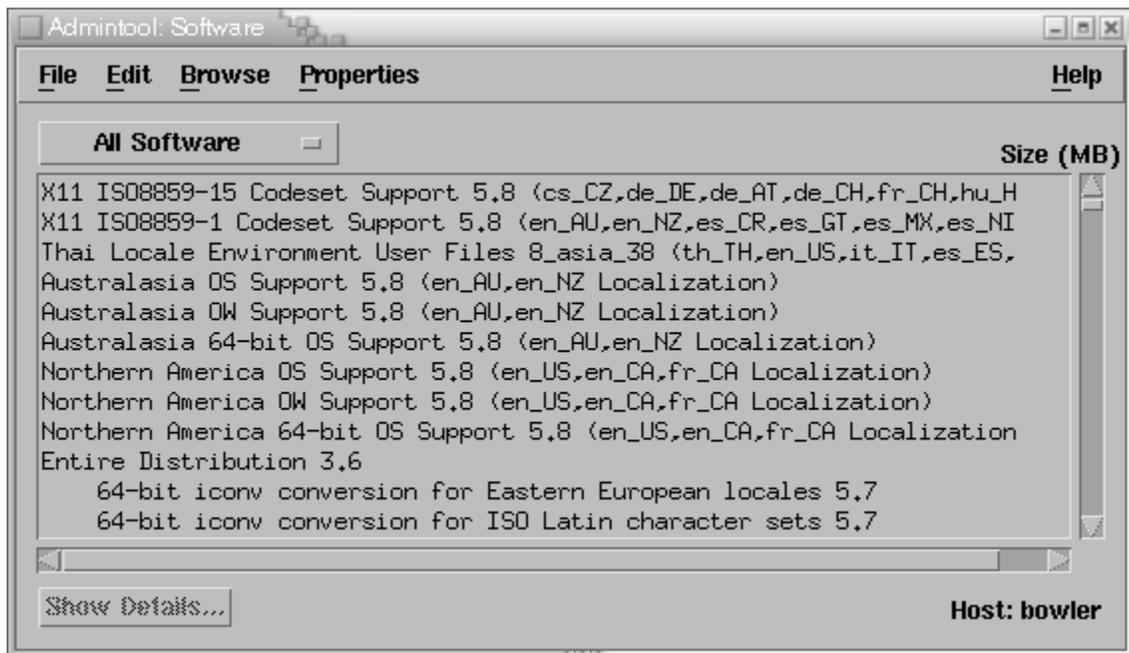
This will list all the packages currently installed on this platform.

3. Select **Edit** and then select **Add** from the pulldown.
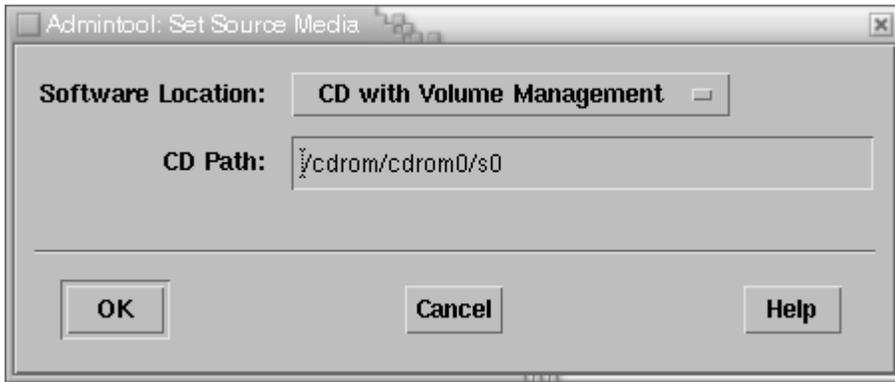
A window will appear asking you for the location of the software package. Select the appropriate location from the pulldown.

4.   Click **Ok** to review the list of packages to install.
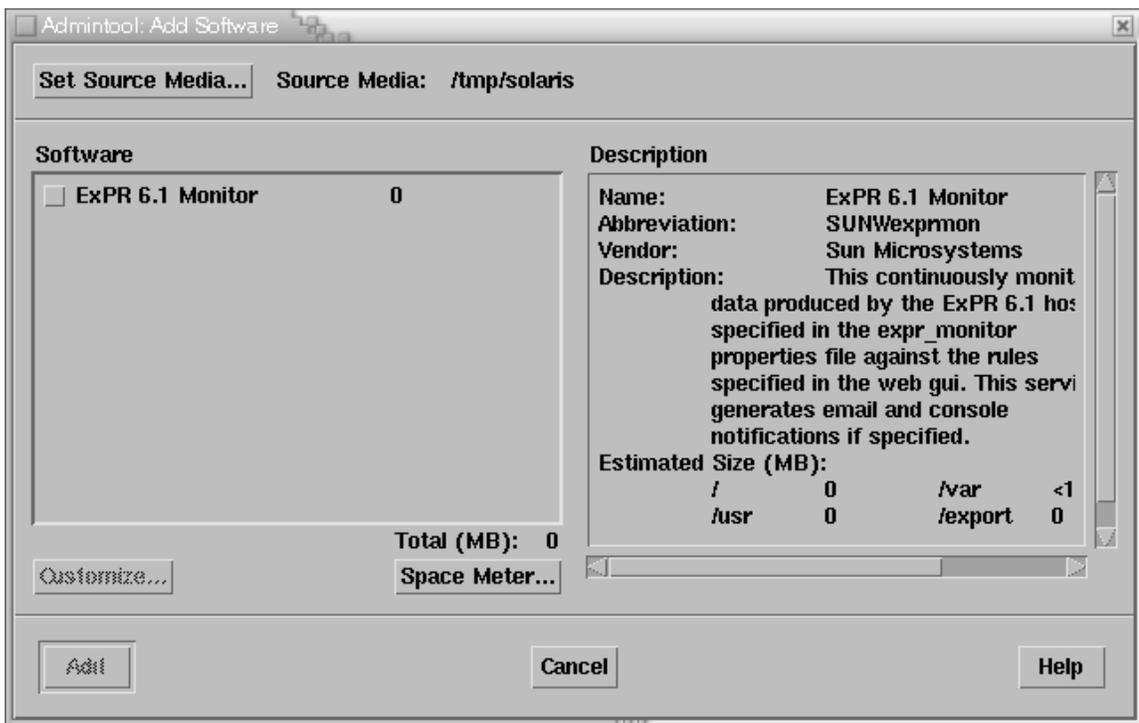
5.   Select the check box next to ExPR 6.1 Monitor

6.   Click **Add** to begin the installation.

```
Admintool: Add Software

Processing package instance <SUNWexprmon> from </tmp/solaris>

ExPR 6.1 Monitor
(sparc) 6.1
#
# Copyright (c) 2005 Sun Microsystems, Inc.
#
# Expert Performance Service,
#
# All rights reserved. This product and related documentation is
# protected by copyright and distributed under licenses
# restricting its use, copying, distribution and decompilation.
# No part of this product or related documentation may be
# reproduced in any form by any means without prior written
# authorization of Sun Microsystems, Inc. and its licensors, if any.
#
Checking if this package has been previously installed..Ok.
Checking Java Runtime version installed..Ok.

Please enter the ExPR MVS Host name or Internet address to monitor. (Default
mvshost) [?]

Please enter the port number for the ExPR MVS Host to monitor. (Default
31000) [1024-99999,?]

Please enter the mail server Host name or Internet address to forward emails.
(Default localhost) [?]

Please enter the account name you wish to use for sending email notifications.
(Default bin) [?,q]

Please enter the pass word to use for the account to use for sending email
notifications. [?,q] q

Please enter the update interval in minutes to monitor. (Default
10) [2-43200,?]

Please enter the administrator account name you wish to use for receiving
email connection status. (Default root@localhost) [?]

Please enter the timeout interval in minutes to try a failed connection.
(Default -1 equals no limit) [-1-43200,?]
Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
   8 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWexprmon> [y,n,?]
```

7. Answer the prompts with the appropriate information that is needed to implement the monitor service.

Linux Installation

To install the ExPR Monitor Service software package you will need to issue the RPM program.

1. Log in to the "root" account.

2. At the shell prompt you can issue the following command to install the package:

   rpm -ivh ./SUNWexprmon-6.1.i386.rpm

   [root@shortleg tmp]# rpm -ivh ./SUNWexprmon-6.1.i386.rpm

    Preparing...### [100%]

   Checking if this package has been previously installed..Ok.

   Checking Java Runtime version installed..Ok.

   1:SUNWexprmon ### [100%]

   Alternatively you can us the Window File Manager to locate the package file and double click on the RPM icon to install the package.

3. Once the package is installed, you will need to run a setup script to configure the parameter that the ExPR monitor Service will need to communicate correctly with the MVS ExPR task.

   /opt/SUNWexprmon/setup.sh

   [root@shortleg tmp]# /opt/SUNWexprmon/setup.sh

   Please enter the ExPR MVS Host name or Internet address to monitor. (Default mvshost) [?]

   Please enter the port number for the ExPR MVS Host to monitor. (Default 31000) [1024-99999,?]

   Please enter the mail server Host name or Internet address to forward emails. (Default localhost) [?]

   Please enter the account name you wish to use for sending email notifications. (Default bin) [?]

   Please enter the pass word to use for the account to use for sending email notifications. [?]

   Please enter the update interval in minutes to monitor. (Default 10) [2-43200,?]

   Please enter the administrator account name you wish to use for receiving email connection status. (Default root@localhost) [?]

   Please enter the timeout interval in minutes to try a failed connection. (Default -1 equals no limit) [(-1)-43200,?]

   Answer the prompts with the appropriate information that is needed to implement the monitor service.

4. To start up the ExPR monitor service issue the command:

   /etc/rc3.d/S85SUNWexprmon start

[root@shortleg tmp]# /etc/rc3.d/S85SUNWexprmon start

 Starting @ExPR61Monitor@...

[root@shortleg tmp]#

Determining the Status of the ExPR Monitor Service

Each of the different platforms has it own methods for starting, stopping and determining the status of the ExPR Monitor Service.

There is also a log file that can be viewed to determine the details of the ExPR Monitor Service.

Windows NT / 2000 / XP / 2003

To start, stop and determine the status of the ExPR service, refer to the "Service" module under the Control Panel.

The log files can be found in the directory where you installed the software under the logs directory. Typically this will be:

C:\Program Files\Sun Microsystems\StorageTek\ExPR 6.1\Monitor Service\logs

Solaris 7 / 8 / 9 / 10

To start, stop and determine the status of the ExPR service, issue the following command:

/etc/rc3.d/S55ExprMonitor {start|stop|status}

You will need root user privileges to start and stop the service.

The log files can be found in the directory /var/opt/SUNWexprmon/logs

Linux

To start, stop and determine the status of the ExPR service, issue the following commands:

/etc/rc3.d/S85SUNWexprmon {start|stop|status}

You will need root user privileges to start and stop the service.

The log files can be found in the directory /var/log

The expr_monitor.properties File

The ExPR Monitor Service uses a file, expr_monitor.properties, that contains parameter information you can change to alter the way the ExPR Monitor operates. The parameters in this file are initially set by the installation scripts.

The format of the expr_monitor.properties file is:

```
hostip =
hostport =
mailserver =
mailserveruser =
mailserverpassword =
```

```
minutesbetweenhostupdates =
adminemail =
timeoutlimit =
loglevel =
```

The file is located in the ExPR Monitor installation directory, inside the settings subdirectory.

The expr_monitor.properties file parameters are as follows:

Parameter	Description
hostip =	The location of the ExPR Started Task. This can either by the IP address (129.80.16.10) or the hostname(LSTCYMVS.stortek.com)
hostport =	The port of the ExPR Started Task.
mailserver =	The location of the mail server that will send the E-mails containing the alert exceptions and any E-mails indicating problems with the service. This can either be an IP address or a host name.
mailserveruser =	The username for the mailserver, if a the mail server requires authentication.
mailserverpassword =	The password for the user for the mailserver. This password is stored as plain text.
minutesbetweenhostupdates =	The number of minutes that the ExPR Monitor will wait before reading new rules from the ExPR Started Task repository and saving new alert exceptions that the ExPR Monitor has detected. The default is 5 minutes and it must be greater than 2 minutes otherwise the default is used.
adminemail =	If the service can't connect to the ExPR Started Task after the timeout period, an E-mail will be sent to the address specified by this parameter.
timeoutlimit =	The number of minutes that the ExPR Monitor will try to reconnect for until it gives up. If this is set to -1 then it will always keep trying. The default is 60 minutes.
loglevel =	The level of logging information that will be stored in the log files for the ExPR Monitor. The levels are SEVERE, WARNING, INFO. They are the same as the loglevel parameter in the configuration file for the HTTP server for the ExPR GUI. The default is SEVERE.

Chapter 10: User Interfacing Facilities

Overview

This chapter describes the ExPR Application Programming Interface (API) and the Drive Utilization Sampling feature.

ExPR API

The ExPR Application Programming Interface (API) is a programmer's tool for developing customized mainframe reporting applications.

ExPR mainframe reports have been developed to cover most common user information needs. However, it is understood that these reports may not adequately cover all requirements for all users. The ExPR API has been developed to assist you in developing reporting formats that meet your specifications.

The ExPR API provides consistent access to all database fields for user-written modules that create customized mainframe reports. The advantage of using the API for customized report development is that it provides a structured presentation of database records and offers common services for report line generation and record retrieval.

Specifically, the API provides the user module with an interface containing values that may be useful in creating a report, and also the addresses of routines that it may call to perform certain functions (such as getting database records or writing report lines).

The user module to be called is defined to ExPR as follows:

```
PERFORM REPORT MODNAME (usermod) SINGLE ;

or

PERFORM REPORT MODNAME(usermod) MULTIPLE ;

or

PERFORM REPORT MODNAME (usermod) ;
```

- If SINGLE is specified, the user module is only presented with records for a single LSM/VTSS/device group as it calls for database records. When it returns control to ExPR, it will have seen only records for a single LSM/VTSS/device group. ExPR will then invoke the user module again for the next LSM/VTSS/device group, and so on until all LSMs/VTSSs/device groups have been processed.

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- If MULTIPLE is specified (or if neither SINGLE nor MULTIPLE is specified), the database records are returned in their natural date/time LSM/VTSS/device group key sequence in the database, so for any given hourly interval, records for every LSM/VTSS/device group are returned to the caller.

ExPR cannot know which is the appropriate method to use for your report, so you must ensure that the SINGLE or MULTIPLE parameter is correctly specified.

You should be aware that not all ExPR database records are keyed by ACSid/LSMid/VTSSid/device group (for example, demand enters, tape errors, and global allocation recovery records). The ExPR API will always pass such records across regardless of the specification of the SINGLE/MULTIPLE parameter on the SELECT statement.

Normally, your report module will be called for each defined MVS system (including the open sysid, consolidate views, CSC and SMC client hosts). A system-based SELECT statement will however cause only those records for that system to be passed to the user module, such as SELECT SYSID(CPUA).

You must also be aware that device-type and workload-specific type-0 records will be passed across to your report module, in addition to the global record per LSM per hour. All record types are subject to filtering against the PERIOD FROM/TO criteria.

The following record types are *not* keyed by ACSid/LSMid/VTSSid/device group and will always be passed across. The ExPR database assembler DSECT (in *usrprfx*.CNTL member EXPRDB) gives details of the key values used for each record type.

Record Type	Description
Type 01	Control unit and device activity
Type 02	Global tape volume error counters
Type 03	Global tape mount counters
Type 05	Tape dataset group utilization information
Type 06	Tape dataset group aging information
Type 09	Channel path group data
Type 11	Tape error detail event
Type 12	Demand enter detail event
Type 13	Allocation recovery global statistics

ACTION:

For examples of how to code the API and the conventions used, refer to AUPRSAMP members APIDEMO, EXPRAPI, and EXPRDB.

UDCFILE Data Collection

ExPR provides a facility for collecting additional data for subsequent user reporting. If activated, collected data is stored in the UDCFILE by the ExPR started task RTM feature. Reporting and management of the UDCFILE is the user's responsibility; ExPR does not supply any facilities for this.

Currently, only the Drive Utilization Sampling feature writes data to the UDCFILE. This process is activated and configured with the MONITOR statement's DUSINT parameter. Refer to appendix A, *ExPR Started Task Control Statements* for more information about DUSINT and the MONITOR statement.

The usrprfx.SUPRSAMP member EXPRUDC contains an assembler dsect of the UDCFILE records.

Appendix A: ExPR Started Task Control Statements

Overview

Complete syntax information is listed below for each of the started task parameter control statements in *usrprfx*.CNTL members STCPARMP and STCPARMS.

MONITOR Statement

Example: MONITOR CMF(YES) ACTION-MSG(NO) DUSINT(NO) ;

Control Statement	Description
MONITOR	MONITOR defines the options to be used by the ExPR started task for the Real-Time Monitor (RTM) and Console Monitor Function (CMF).
CMF(YES | NO)	CMF activates or deactivates the ExPR started task Console Monitor Function. YES indicates that you want the ExPR started task to report exception events on the MVS console via messages XPR0721 through XPR0729. NO deactivates the Console Monitor Function. The default setting is YES.
ACTION-MSG(YES | NO)	ACTION-MSG controls the severity of the warning messages issued by the CMF. YES requests that the warning messages in the range XPR0721 through XPR0729 will be highlighted and held on the MVS console for operator attention and action. NO indicates that you do not wish to highlight these messages; they will roll off the console normally. The default setting is NO. **CAUTION:** When specifying ACTION-MSG(YES), many occurrences of the warning messages may flood and lock out the MVS console. Consult your systems programmer or operations management before using ACTION-MSG(YES).
DUSINT(NO | *nnn*) ;	DUSINT controls the sampling interval in minutes of the optional Drive Utilization Sampling feature of the Real-Time Monitor. At the specified interval (where *nnn* = number of minutes), a drive summary record will be written to the UDCFILE dataset for each LSM/VTSS and manual drive group. The default setting is NO, which deactivates this feature. **Note:** Activation of this feature requires that you write a program to process the generated records (see chapter 10, *ExPR User Interfacing Facilities*). You must also manage the housekeeping of the UDCFILE.

PRIMARY-STC

Example: PRIMARY-STC IP-ADDR(127.20.234.5) PORT-NO(6666) ;

Control Statement	Description
PRIMARY-STC	PRIMARY-STC identifies the primary started task to secondary systems in a host group. This information is used by the secondary systems to communicate with the primary system. The TCP/IP connection is always initiated by the secondary system.
IP-ADDR(*nnn.nnn.nnn.nnn* or *MVS.DNS.name)* PORT-NO(*nnnn*) ;	IP-ADDR defines the TCP/IP address of the MVS system where the primary ExPR started task is to execute. This can be the true IP address or an esoteric name to be resolved by a Domain Name Server. PORT-NO defines the remote port number of the primary ExPR started task in the MVS system addressed by IP-ADDR. The valid range is 1-32767. **Note:** PORT-NO <u>must</u> match the primary ExPR started task's TCPIP-PARMS HOST-PORT setting. Consult your site's network administrator or system programmer for the correct IP addresses and port numbers.

START Statement

Examples: START TASKS(PGMI PRIMARY RTM TCP/IP SMF) ;

START TASKS(PGMI SECONDARY RTM TCP/IP) ;

START TASKS(ALL PRIMARY) ;

Control Statement	Description
START	START controls the functions to be activated within the started task
TASKS(*tasklist*|ALL) ;	TASKS identifies the individual tasks or functions to be performed by the ExPR started task. *tasklist* can contain any of the following functions, separated by a space: • PGMI – invokes the HSC programmatic interface to collect LSM available cell/scratch statistics and also information about HSC scratch subpools. VTSS HAMT/LAMT and VTV replication queue information is also collected. This option is required only for the primary started task. • PRIMARY – defines this started task as the primary system within a host group. This host is where the ExPR database and configuration are located. In addition to collecting data from the primary host, this started task receives collected data from the secondary hosts via the TCP/IP connection and stores it in the ExPR database. • RTM – invokes Real-Time Monitor functions. RTM must be active if you want to collect manual mount data, display the Monitor applications, receive console alerts, or use the Drive Utilization Sampling feature. RTM invokes the SMF-COLLECTOR option and requires the ExPR SMF Exit. • SECONDARY – defines this ExPR started task as a secondary system within a host group. Each secondary started task sends its collected SMF records to the primary system via the TCP/IP connection. • SMF-COLLECTOR – invokes the automatic real-time collection of SMF/RMF records from the SMF address space via the ExPR SMF exit. SMF-COLLECTOR is invoked automatically by both SMF-UPDATE and RTM. SMF-COLLECTOR requires the ExPR SMF Exit. • SMF-UPDATE – invokes the DirectSMF update function to continually collect data and update the ExPR database. SMF-UPDATE invokes the SMF-COLLECTOR option and therefore requires the ExPR SMF Exit. SMF-UPDATE can be abbreviated to SMF. SMF-UPDATE should only be specified on the primary system. • TCP/IP – invokes the ExPR TCP/IP client/server function that is required for communication between ExPR MVS and PC components. Also allows the started task to accept web browser requests from the MVS HTTP server for web-based reporting.

Control Statement	Description
	• ITCU - activates the Integrated TAPECAT Update feature, as described in chapter 7, *Host Configuration*. The various options of the Integrated TAPECAT Update feature are described and entered within task 10. However, the feature will not actually be activated unless START TASKS(.... ITCU .....) is specified in the started task input stream. Normally you would only specify this in the primary started task, unless you have multiple Tape Management System catalogs. in which case secondary started tasks can each support a single, different tape catalog. • TAPECAT-GUI – activates the server function that supports PC TAPECAT inquiries. This option also schedules an extraction immediately after the started task has started. This option should only be selected if you have chosen not to activate the Integrated Tape Catalog Update (ITCU) feature in the host configuration (see chapter 7, *Host Configuration* under *Tape Catalog Processing*). • TGUI-RESTART – allows the TAPECAT GUI feature to be initialized without extracting the tape catalog. The existing TMCHIST file will be used and an index built to access the file. This option should only be selected if you have chosen not to activate the Integrated Tape Catalog Update (ITCU) feature in the host configuration (see chapter 7, *Host Configuration* under *Tape Catalog Processing*). • NOSEN – If specified on the ExPR primary system, this causes the HSC NCO "listener" within ExPR to not be activated with the ExPR SMF exit. • ALL – specifies that all started task functions are to be performed. This includes all tasks in the *tasklist* except (1) PRIMARY and SECONDARY, which are mutually exclusive, (2) TGUI-RESTART, and (3) NOSEN.
HSC-JOBNAME(hscjob)	HSC-JOBNAME(hscjob) – this optional parameter is only used if ExPR fails to determine the MVS subsystem command prefix for HSC. For completeness, it is recommended that you code the name of the HSC started task.

START-MONTAPE Statement

Control Statement	Description
START-MONTAPE	This command identifies the standalone MONTAPE started task.
PARM('....MONTAPE_parms....') ;	This optional parameter passes data to the MONTAPE initialization module, in the same manner as EXEC PARM= would have in the former standalone version of MONTAPE. If the value of MONTAPE_parms contains special characters, it must be enclosed in quotes. If it is enclosed in quotes, it remains as-is and is not translated to upper case. This means that if the value specified is case sensitive, e.g. a dataset name that must be in upper case, then the value of MONTAPE_parms needs to be entered in upper case. Typically this parameter is used to pass a dataset name to MONTAPE to be used instead of the OUTPUT DD statement. MONTAPE will then dynamically allocate the named dataset, which must be pre-allocated, e.g. - START-MONTAPE PARM('EXPR.MONTAPE.OUTPUT.DATASET') ; Note that the value of the PARM keyword, if specified, will override any value specified via the ExPR procedure EXEC parameter MONPARM= string. See *usrprfx*.CNTL member MONTAPE for further details.

TCPIP-PARMS Statement

Example: TCPIP-PARMS TCP-NAME(127.0.0.1) HOST-PORT(6666) ;

Control Statement	Description
TCPIP-PARMS	TCPIP-PARMS defines the user settings for the ExPR TCP/IP server.
TCP-NAME(*xxxxxxxx*)	TCP-NAME identifies the TCP/IP address space within MVS where the started task executes.
HOST-PORT(*nnnnn*)	HOST-PORT defines the local port address that the ExPR TCP/IP server is to use to connect to the named TCP/IP address space within MVS. The network administrator will assign a port for use by ExPR. The valid range is 1-32767 and the port must not be in use by any other TCP/IP application.
TCP-INTERFACE (TCP1|TCP2|TCP3) ;	TCP-INTERFACE identifies which TCP/IP interface protocol is to be used, for MVS either TCP1 (indicating the OS/390 v2 r7 eNetwork Communications Server HPNS interface) or TCP2 (indicating the MVS v5 TCP/IP 3.1 IUCV interface). For MSP, the identifier <u>must</u> be TCP3 for MSP TISP interface. The default is TCP2 for MVS systems and TCP3 for MSP systems.

Control Statement	Description
	Users of MVS/ESA and early OS/390 v1 should specify TCP2. Users of later OS/390 v2 and z/OS should specify TCP1. However, if TCP/IP initialization errors occur during ExPR startup, particularly on the INITAPI, BIND, and LISTEN functions, try using the other TCP/IP interface. Users of CA-TCPAccess should always specify TCP1. **Note:** You can determine the level of TCP/IP that is installed with the MVS console command "D TCPIP". However, be aware that the level of TCP/IP might not match the level of the operating system.

Appendix B: Special Considerations for MSP Installations

Overview

This appendix provides MSP installations with details of differences between the MVS and MSP variants of ExPR.

Product Distribution and FMIDs

ExPR has two product variants: one for MVS and another for MSP. Each has its own FMID and a separate base product installation tape. It is critical to order and install the correct product for your operating system.

- MVS users must order FMID SUPR610, which is distributed on a volume labelled UPR610.

- MSP users must order FMID SUPR61F, which is distributed on a volume labelled UPR61F.

SMP/E Installation Processes

The product installation jobs are set up for installation on MVS systems. Therefore, when installing ExPR on MSP, you must substitute the tape volume serial of UPR610 with UPR61F and the product FMID of SUPR610 with SUPR61F.

Data Not Collected On MSP Systems

MSP users should be aware that certain items of information are not available from the MSP operating system. These are:

- RMF device and control unit busy information (RMF 73 records)

- RMF channel busy information (RMF 74 records)

- Host data transferred by system/ACS/LSM/VTSS/etc, as extracted from the SMF 21 records.

TCP Interface Protocol

Where MVS users have a choice of TCP interfaces, MSP users can only select the TCP3 interface. This supports the MSP TISP TCP implementation.

General

With the exception of those items cited above, ExPR will operate in an identical manner on MSP to MVS. Unless otherwise stated, references to MVS should be taken to equally refer to MSP. However, you should be aware that the syntax of certain MVS system commands may be different on MSP systems.

Appendix C: JES3 Installation Notes

Overview

This appendix provides information about special situations and set-up issues pertaining specifically to JES3 installations.

Mapping SMF ids to JES3 MAINPROC ids

In chapter 7, *Host Configuration,* review *Define JES3 SMF Subsystem ids*.

Processing of SYSLOG for Allocation Recovery Statistics

In the *ExPR Mainframe User's Guide* in chapter 4, *ExPR Allocation Recovery Processing*, review *SYSLOG-UPDATE Support for JES3*.

Handling of ExPR Message XPR0233E Duplicate Host

Under certain circumstances, message XPR0233E may be issued by an ExPR batch job or started task. This will normally only occur during the first execution of ExPR or after HSC CDS maintenance via the LIBGEN process.

ExPR internally uses a four-character system id to identify each MVS host system. This is usually the SMF subsystem name, which normally matches the JES2 id.

However, a problem can occur with JES3 installations when the first four characters of the MAINPROC name are not unique. These MAINPROC names are stored in the HSC CDS during the LIBGEN process. When the ExPR auto-configuration process extracts details of the MVS hosts, duplicates may be found based on the first four characters alone. When detected, ExPR issues message XPR0233E and fails the execution with return code 8.

This situation may be overcome by coding a small Assembler language table that maps eight-character JES3 MAINPROC names to four-character internal system ids. The four-character id should be the same as the SMF subsystem id. A sample of this table is included in the *usrprfx*.SUPRSAMP library.

To create the mapping table:

1. Copy member UPRU001 from *usrprfx*.SUPRSAMP to *usrprfx*.CNTL.

2. Read and follow the instructions in UPRU001.

3. Submit the modified job to link the table into the ExPR load library *usrprfx*.SUPRLINK.

4. These steps will add a load module called UPRSYSMP to the ExPR load library as an SMP/E user modification called L1EU001.

After successful completion of the table building process, you should be able to rerun the ExPR job and not receive message XPR0233E.

Appendix D: Auto-Reorg Failure Recovery Procedures

Overview

This appendix provides failure recovery procedures for the automatic file reorganization feature and its associated database backup option.

The Reorganization Process

The ExPR automatic file reorganization function and its associated feature, Database Backup, make use of the DF/SMS IDCAMS utility. This is achieved through several dynamic calls to perform the various steps needed to create newly allocated VSM KSDS clusters with the original data safely copied across.

Under normal circumstances, each of the calls to IDCAMS should complete successfully. However, there may be situations beyond the control of ExPR, where the process fails.

Recovery Procedures

The table below details the various stages involved in copying each of the ExPR VSAM files, and the manual recovery actions (if any) required to ensure the integrity of your ExPR data. Each of the stages has comment statements to identify them within the generated IDCAMS control statements stream.

The whole reorganization process has been designed to ensure that you will never receive a failure that causes you to lose your data; the original data or the new copy will always be available.

However, great care should be taken when performing any manual recovery actions.

If the reorganization process fails within the invoked IDCAMS steps, ***do not*** request another file reorganization until you have reviewed the UPRPRINT output.

It will not be possible to perform further reorganizations after message XPR0798E has been issued unless you use the RESET option. This can be specified on the ExPR started task command REORG RESET or via the batch process PERFORM REOGANIZATION RESET. This prevents further started task or batch reorganizations from occurring until you have resolved the reason for the previous failure.

Caution: do not specify RESET unless you are recovering from a reorganization failure and are certain that you have resolved the original problem.

Reorganization Stages and Manual Recovery Actions

Stage Identifier	Function	Purpose	Manual Recovery Action
BACKUP LISTCAT	LISTCAT	Extract information about the existing database cluster size.	None, the existing database is still intact and the reorganization is bypassed. However, you must review the IDCAMS output to determine the nature of the failure. This may indicate that the cluster is damaged. The most probable cause is a lack of output dataset space for the copy dataset's primary allocation.
BACKUP REPRO	REPRO	Create a secure copy of the ExPR database before the REORG commences.	None, the existing database is still intact and the reorganization is bypassed. However, you must review the IDCAMS output to determine the nature of the failure. This may indicate that the cluster is damaged. The most probable cause is a lack of output dataset space for the copy dataset's primary allocation.
STAGE1A	DELETE	Cleanup previous workfile.	None, this will normally fail because the workfile does not exist. This error will be ignored and processing continues.
STAGE1B	DEFINE	Create new workfile.	None, however a failure may indicate a lack of candidate volume space for a primary allocation of the workfile.
STAGE2 (There can be multiple STAGE2s.)	REPRO	Copies the existing file.	None, however a failure may indicate a lack of candidate volume space for a secondary allocation of the workfile.
STAGE3A	ALTER	Renames the original dataset to a temporary holding name.	None, the original dataset stills exists under its original name and is available for use by ExPR.
STAGE3B	ALTER	Renames the newly created workfile to the original dataset name.	Either (1) rename the temporary dataset fromSTAGE3A back to the original name, or (2) try renaming the workfile to the original name. At this point ExPR has no matching dataset name with which to continue processing. File open errors are likely to occur. Stop

Stage Identifier	Function	Purpose	Manual Recovery Action
			the started task. Note that the data is not lost, it exists under the original or temporary name.
STAGE3C	DELETE	Removes the original dataset, as retained in STAGE3A under the temporary retaining name.	Attempt to manually delete the original dataset under its temporary retaining name, as created in STAGE3A. The new cluster should now be secure under the original dataset name.
STAGE4	---	Process completed successfully.	None.

The manual recovery actions described in this table do not attempt to cover all possible problems that might occur. They merely act to ensure that you do not lose your ExPR datasets. Environmental problems, such as disk space allocation, must be handled in accordance with the standard procedures within your installation

Note: If you do lose data, you should revert to the database backup copy created at the start of the reorganization process. If you lose PGMIDATA then you can revert to batch SMF-UPDATE to repopulate the database.

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Appendix E: Setting up ExPR Started Tasks on CSC or SMC MVS Systems

Overview

This appendix provides information for installations that use the StorageTek CSC or SMC client software component to communicate with an HSC/VTCS/LS server system. CSC or SMC allows installations to have more than 16 MVS systems sharing a StorageTek ACS/VSM hardware complex.

General Background

A CSC/SMC MVS client system may be within the main data center complex or may be a remote host. A CSC/SMC system does not require access to the StorageTek CDS dataset and often may not physically have shared DASD access with the HSC/VTCS/LS MVS systems. The CSC/SMC support within ExPR similarly does not require access to the HSC CDS or the ExPR CONFIG dataset that contains user options. Due to this consideration, ExPR can only operate as a secondary started task on a CSC/SMC MVS client system: it cannot operate as a primary started task. It is also not possible to run ExPR batch jobs on the CSC/SMC MVS systems.

Allocating Datasets for the CSC or SMC System

When allocating the ExPR datasets for a CSC or SMC MVS system, you should use the normal DSNDEFS JCL member, as supplied.

Customizing the CSC ExPR Secondary Tasked Task

Normally all ExPR batch and started tasks use the EXPR JCL procedure supplied with the product. However, this should not be used for a secondary ExPR started task on a CSC MVS system. The alternative EXPRCSC JCL procedure should be tailored and cataloged into a system PROCLIB on the CSC MVS system. Additionally, if the CSC system does not have access to the primary system's DASD pool, it is necessary to copy the STCPARMC member to a PARMLIB on the CSC host. The UPRIN DD within EXPRCSC needs to point at the library that contains STCPARMC.

The EXPRCSC and STCPARMC members should be tailored in line with the other members and the instructions imbedded therein.

Customizing the SMC ExPR Secondary Tasked Task

Normally all ExPR batch and started tasks use the EXPR JCL procedure supplied with the product. However, this should not be used for a secondary ExPR started task on a SMC MVS system. The alternative EXPRSMC JCL procedure should be tailored and cataloged into a system PROCLIB on the SMC MVS system. Additionally, if the SMC system does not have access to the primary system's DASD pool, it is necessary to copy the STCPARMM member to a PARMLIB on the SMC host. The UPRIN DD within EXPRSMC needs to point at the library that contains STCPARMM.

The EXPRSMC and STCPARMM members should be tailored in line with the other members and the instructions imbedded therein.

Running the CSC/SMC ExPR Secondary Started Task

The initialization stage of the ExPR secondary started task on a CSC or SMC MVS system differs to that of a normal secondary system with HSC present. The system console sequences for a CSC/SMC system are shown below.

```
IEF403I PRODCSC2 - STARTED - TIME=10.27.08
XPR0053I License not supplied, ExPR is quiesced
XPR0237I Warning messages issued during parameter file processing
XPR0715I ExPR 5.0 Started task initializing for system CSCY (as secondary)
XPR0720I ExPR Real Time Monitor Function started
XPR0716I ExPR SMF Collector Function started
XPR0066W ExPR feature DirectSMF/RTM quiesced until valid license supplied
XPR0066W ExPR feature RTM quiesced until valid license supplied
XPR0733I ExPR TCP/IP server started
XPR0751I Secondary system CSCY has logged-on to the primary system ECCY
XPR0063I Dynamic Configuration Update in progress
XPR0064I Dynamic Configuration Update completed successfully
XPR0179I SMF Record anchor table found   at 435DE5F8.
XPR0176I SMF Record anchor found  - V5.0 level=  2, at 420E40A8.
```

The CSC/MSC task has no license information or details of the ACS/VSM hardware environment or any user optional settings. However, when the secondary system initially contacts the primary started task (message XPR0751I), the primary system sends the required information to the CSC/SMC secondary started task. Once the secondary to primary contact has been made, the CSC/SMC secondary system will operate in the same manner as a normal HSC/VTCS secondary started task.

Special Note to Support SMC Clients: If you wish to collect SMF data from SMC clients, it is necessary to ensure that the following HSC/VTCS PTFs are installed:

HSC/VTCS 6.0 – L1H12HW and L1H12HX

HSC/VTCS 6.1 – L1H12JH and L1H12JI

Appendix F: ExPR PC Component Installation and Configuration

Overview

This appendix is provided for users who wish to use the ExPR PC component in addition to or instead of the ExPR GUI web-based application.

Important Note: Most ExPR PC functionality has already been replicated in the ExPR GUI. Currently, the PC-based Host Reports and Host Messages Monitor applications are the only ExPR PC functions that are not fully supported by ExPR GUI. It is expected that the ExPR PC component will be withdrawn from the product in a future release when its functionality is completely replicated in the ExPR GUI.

Install ExPR on a PC

The ExPR PC component can be installed on any number of PCs running Microsoft Windows 2000/XP (preferred) or Windows 95/98/Me/NT4 PC with at least 128Mb RAM and 32Mb disk space available. Internet Explorer 6.0 or higher is also required.

As a rule, ExPR PC applications are not shared across a network, because required run-time DLLs and related files must still be installed on each PC. (Note that the ExPR GUI web-based browser feature introduced in EXPR 5.0 marks the beginning of the product's evolution away from this limitation.)

Important Note for Existing ExPR Sites

If a previous version of ExPR is already installed on your PC, **DO NOT UNINSTALL** that version before installing ExPR 6.1. The ExPR setup program will search the previous version and automatically transfer network configuration and rules files to the new version.

To install the ExPR PC component:

1. Insert the ExPR CD in a PC's CD drive and follow the installation prompts.

2. If the setup program does not start automatically when you insert the CD (because your system is configured to prevent this, for example), browse to the CD drive and run the setup program.

How to Start ExPR Applications

Once the installation is complete, you can open ExPR PC applications using any of the following methods:

- If you selected the install option to create desktop icons, you can open the applications using those icons on your desktop.

- You can use the Windows Start menu or Windows Explorer. You can also create shortcuts to the ExPR applications using standard Windows desktop tools.

- You can use the ExPR Launcher application from its desktop icon (if you created it during the installation) or from the Windows Start menu or Windows Explorer. This application provides a graphical interface where you can select an application and the host to connect to or select a host to connect to and then an application. You can also save "favorites" that connect to a preselected host and launch a preselected application.

Note: Refer to the separate book *ExPR Client User's Guide* for information about using the ExPR PC component to display real-time monitors and historical graphical reports.

Define Network Connections to the PC

The ExPR PC applications communicate with the mainframe host systems via a TCP/IP connection, usually through your internal network but alternatively using a dial-up connection.

TCP/IP connections to your MVS host or hosts are defined to ExPR with the ExPR Network Configurator application on the PC. For each host, you need to supply the host name, IP address or domain name, and port number. Your system programmer or network administrator should provide this information to you.

Note: Each host you will communicate with must also be running the ExPR started task with appropriate START control statement options activated.

Organizing the Hosts into Host Groups

Hosts you will communicate with must be organized into host groups on your PC, with each group representing all hosts that share a common HSC CDS (and therefore a common ExPR configuration). If your site shares a single CDS among all hosts, you only need one host group.

The host system where the ExPR database and configuration reside must be designated on your PC as the *primary host* in the host group.

If your site has designated more than one primary host (indicating multiple ExPR configurations) and you want to be able to connect to those hosts, then you need to create a separate host group for each primary host that you will connect to.

The primary host in each host group is queried by the PC for information to generate graphical and tabular reports from the ExPR database and to obtain status information for the Monitor applications.

All other hosts in the host group are considered to be *secondary hosts*. These hosts are not queried directly by ExPR reporting applications because their collected data is stored in the ExPR database on the primary host. However, you can connect directly to these hosts to obtain Monitor status information if the system-wide view provided by the primary host does not meet your specific monitoring needs.

Setting up the Connection

Perform the following steps to set up your host connections:

1. Open the ExPR Network Configurator application. (See *How to Start ExPR Applications* in this chapter if you do not know how to do this.)

    Existing ExPR 5.0 sites should see their current network configuration already displayed when the Network Configurator application opens.

    Note: Functions can be accessed by selecting an object in the navigation tree and then clicking a pulldown menu at the top of the window, or from the toolbar below the pulldown menus, or by right-clicking the mouse to display a menu. In this book, the pulldown menus are generally used in the instructions but you could also use the toolbar or right-mouse for many tasks.

2. Click **File** and select **New Group**.

3. In the dialog box, enter a group name that is meaningful to you (e.g., the name of the CDS used by hosts in this group, the data center name, etc.) and click **OK**.

4. Select the host group you created above and then click **File** and **Group 'x'** (where '*x*' is the name you created) and select **Add New Host to Group**.

5. In the dialog box, enter the host description, IP address, and port number:

    *   The host description could be the MVS SYSID or informal host name.

    *   Optionally, and depending on how your network is configured, the host domain name can be entered instead of the IP address. To do this, enter the name in the IP address field, enclosed in square brackets, for example [*name*].

    *   The port number must match the port specification defined at the mainframe in the TCPIP-PARMS started task control statement for each host.

6. Repeat steps 4 and 5 for each host in the host group.

7. The first host you enter in each group is automatically designated as the primary host for that group. If this is not correct, click the icon for the host that will be the primary host and then right-mouse and select **Designate as Primary Host**.

8. If you determined in the previous section that you will need more than one host group, repeat these steps until all hosts in all host groups are defined.

9. When all hosts have been defined, click **File** and **Save** to save your network configuration on the PC.

10. To close the application, click **File** and select **Exit**.

Performing Host Configuration with the ExPR PC Application

If you choose to perform host configuration using the ExPR PC application instead of ExPR GUI, open the Host Configurator application on your PC using one of the methods described above and then use the help system for step-by-step instruction.

ExPR Login Security

If your site has activated the ExPR Security exit on the mainframe, you may be prompted for a login ID and password when you attempt to connect to the MVS host systems. Your system programmer or network administrator should be able to provide this information to you.

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