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Expert Performance Reporter

CLIENT USER'S GUIDE

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Expert Performance Reporter

Client User's Guide

Release 6.1

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About this Book

Overview

This book describes how to set up and use the ExPR PC reporting applications.

Audience

This book is intended for storage administrators and others who will use the ExPR PC applications to display ExPR real-time monitors and to construct historical graphical reports to track system performance over time and analyze trends.

Organization

This book is organized as follows:

Chapter 1 – *The ExPR GUI* describes the ExPR web-based browser interface, ExPR GUI, and how you use it to generate and display browser-based reports and monitors within your internal network.

Chapter 2 – *Graphical Reports* describes how to construct graphical reports from historical data in the ExPR mainframe database.

Chapter 3 – *Monitors* describes ExPR's real-time VSM, Nearline, and Device monitors.

Chapter 4 – *TAPECAT GUI Reports* describes ExPR's tape catalog reporting facility.

Chapter 5 – ExPR Host Configuration describes the ExPR GUI host configuration option.

Chapter 6 – ExPR Monitor Service describes the ExPR GUI monitor service downloads option.

Appendix A – *ExPR PC Component* describes how to install the ExPR PC component client software on a PC and set up connections with the MVS host server system or systems. This installation is only required if you are *not* using the ExPR GUI web-based browser or if you want to display Host Reports and Host Messages monitor, which are not currently supported by ExPR GUI.

Related Documentation

- *Introduction to ExPR*
- *ExPR Installation, Configuration, and Administration Guide*
- *ExPR Mainframe User's Guide*
- *ExPR Messages Guide*

- *ExPR MONTAPE/MONREPT Utility Guide*

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: Getting Started

Overview

This chapter describes the ExPR web-based browser interface (ExPR GUI) and how you use it to generate and display browser-based reports and monitors within your internal network.

What is ExPR GUI?

ExPR GUI is a tool for producing web-based ExPR reports and monitors inside your site's intranet using a web browser. You simply point your browser to the assigned URL for the ExPR GUI and you can run and manage monitor applications and generate historical graphs at your PC or workstation.

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.

The optionally-installed 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.

ExPR GUI supports all ExPR graph reports, TAPECAT GUI, host configuration, and the VSM, Nearline, and Device monitors.

ExPR GUI does not currently support the tabular Host Reports and Host Messages Monitor applications; these functions are accessible with the ExPR PC component as before. Host Reports may also be produced directly by the ExPR mainframe component.

Getting Started with ExPR GUI

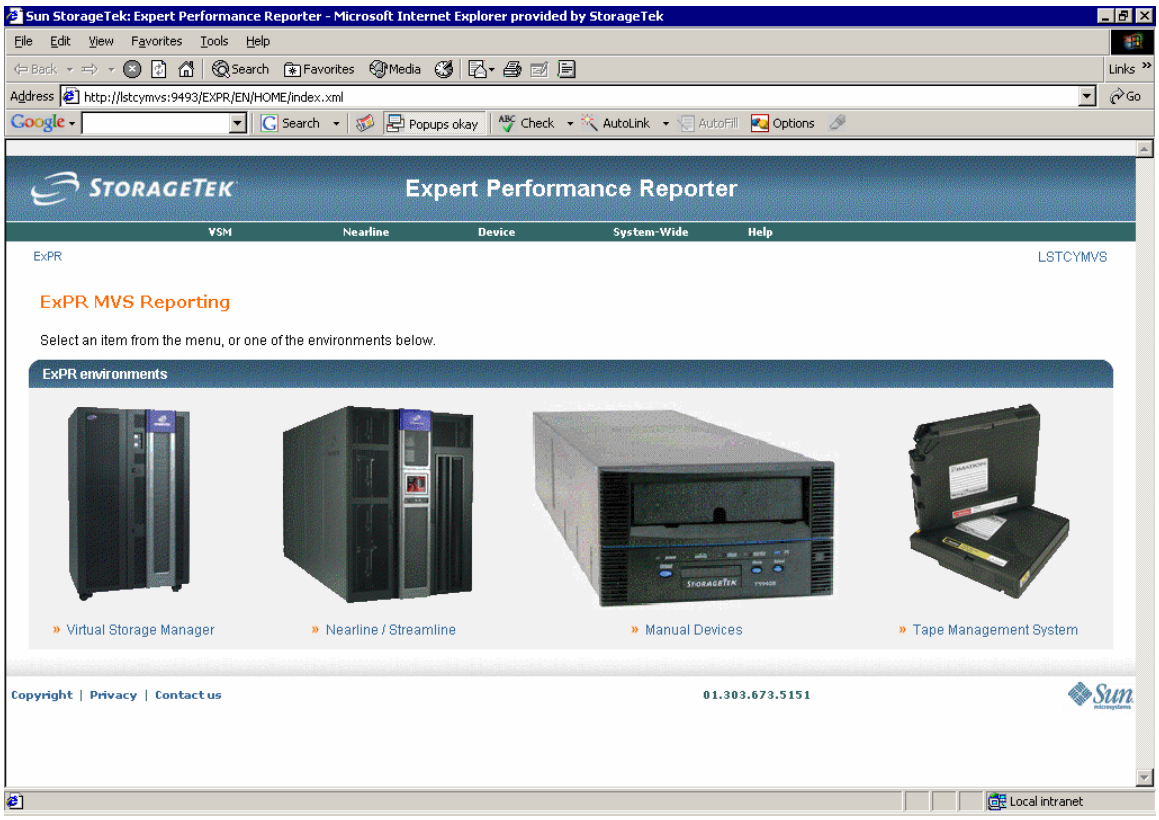
1. Specify the URL of the server in the browser window. For example, to connect to the web server if it is running MVS system `abcde` in the `fghijk` domain on port 8888, the URL is:

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

   To connect to this server using default port 80:

   http://abcde.fghijk.com/

   The ExPR MVS Reporting page is initially displayed.



Browser Popup Setting

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

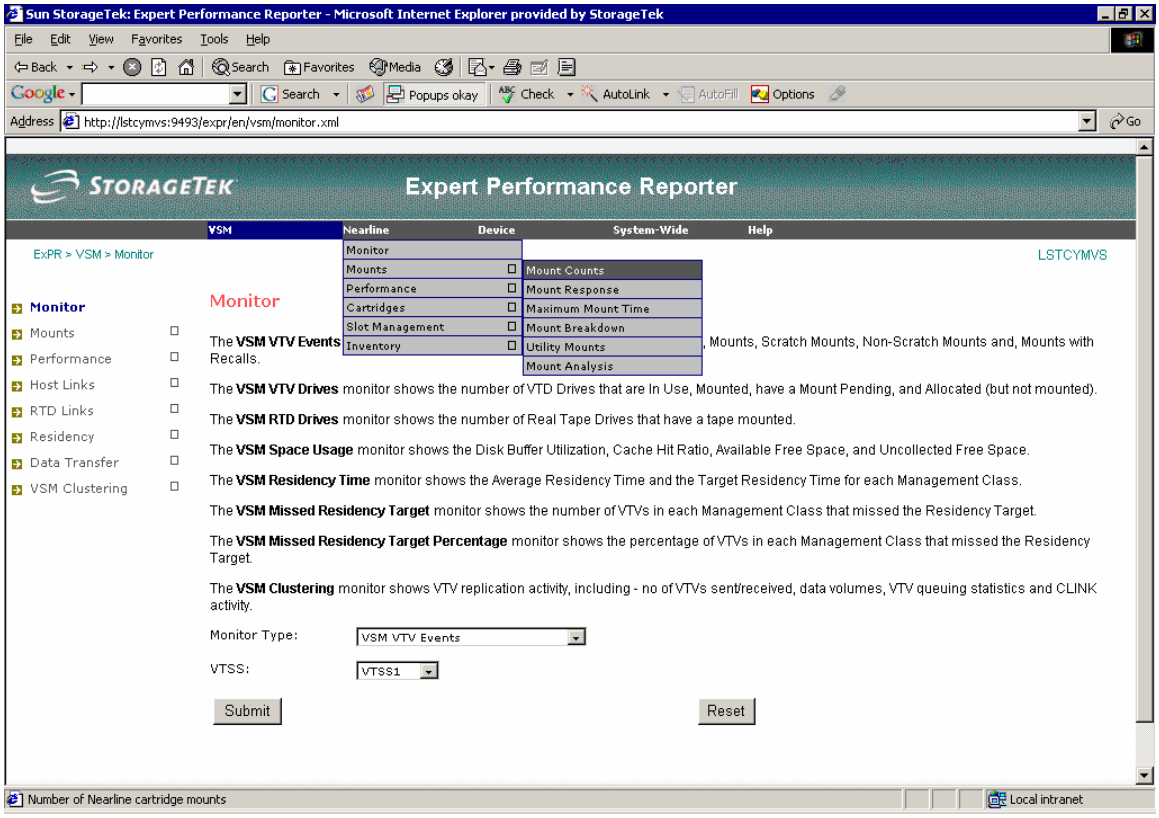
ExPR GUI Certificate

ExPR GUI sends a certificate to your browser. When the Java applet has loaded, a Warning – Security message box appears asking if you want to trust the signed applet. Trusting this applet is required for ExPR GUI functions. You should answer **Always** to trust this applet each time you open ExPR GUI, or Yes to trust this signed applet for this session only.

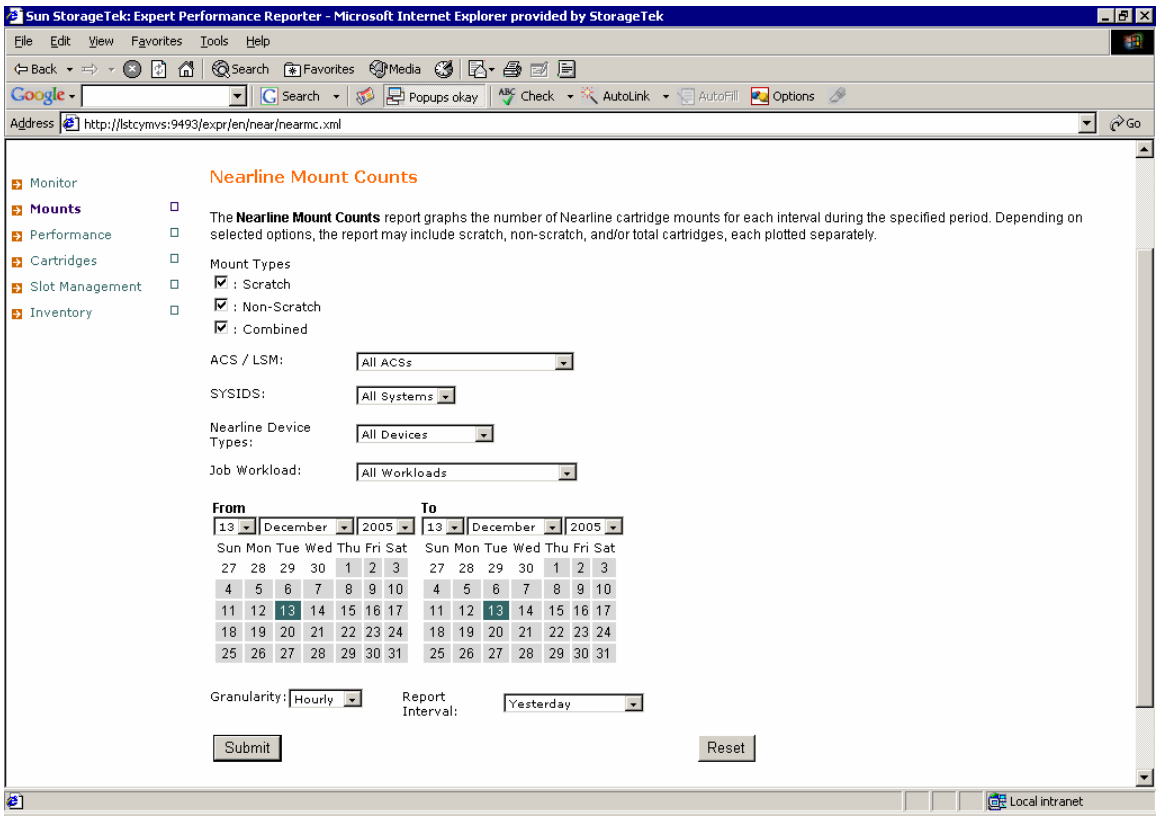
Select a Report or Monitor

The ExPR MVS Reports main page is initially displayed in the browser:

1. Click an icon in the main panel or use the pulldowns at the top of the panel to select a function.



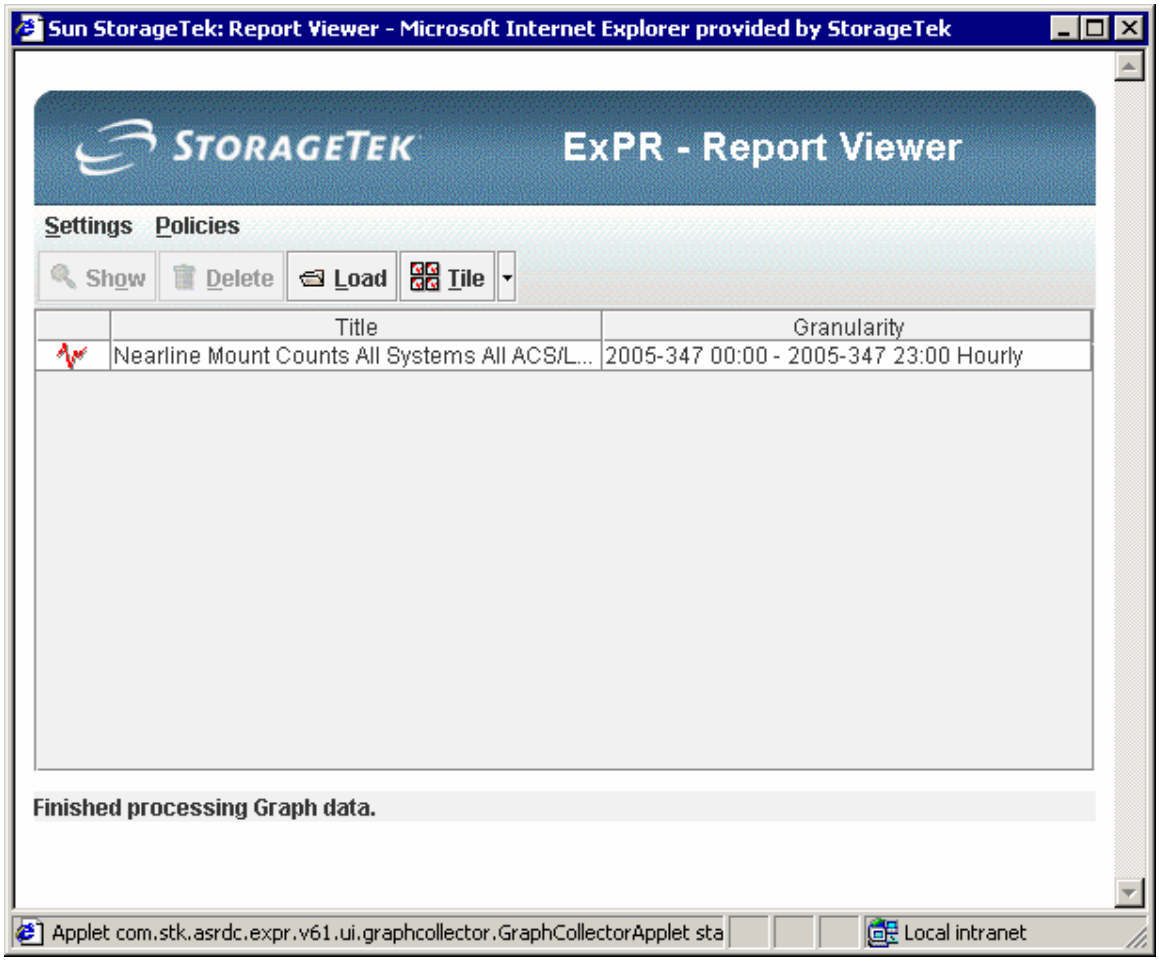
2. Select the report type and then select the report to generate from the pulldown menu. For example, select **Mounts** and then select **Mount Counts**.
3. The selected report page is displayed. This page describes the report you have selected and is where you identify the report criteria (mount types, VTSS, date range, granularity, host system, etc.) for the report. Note that report criteria you will enter may vary with each type of report you select.



4. Select the report criteria and then click **Submit**.
5. The requested graph is listed in the Report Viewer window when it is ready for display.

Display a Report or Monitor

When the submitted report or monitor is ready for display, the report title and granularity are shown in the list of available reports in the ExPR Report Viewer window.



You can display a graph by double-clicking its title in the Report Viewer window.

Use the Report Viewer pulldowns and buttons to manage reports:

Settings

- Select Julian date or Gregorian date format for report data.
- Automatically open new graphs as they arrive in the Report Viewer list of available reports (instead of simply listing them as available).
- Show exception overlays on monitors to enhance visual analysis while monitor data is rolling across the screen.

Policies

- Manage Rules – sets exception thresholds and alarms and email alerts for ExPR monitors (see *Using the Rules Manager* in this chapter).
- Manage Favorites – lists defined favorite reports with options for generating all or selected favorite reports, editing favorite report properties, or deleting favorite reports (see *Using Favorite Reports* in this chapter).
- Generate Favorites –generates all of the defined favorite reports.

Show
Click **Show** to display the selected graph. The graph is displayed in a separate window.
Note: You can also just double-click the report title to display the graph.

Delete
Click **Delete** to delete the selected report from the Report Viewer.

Load
Click **Load** to display a graph you have saved as a file.

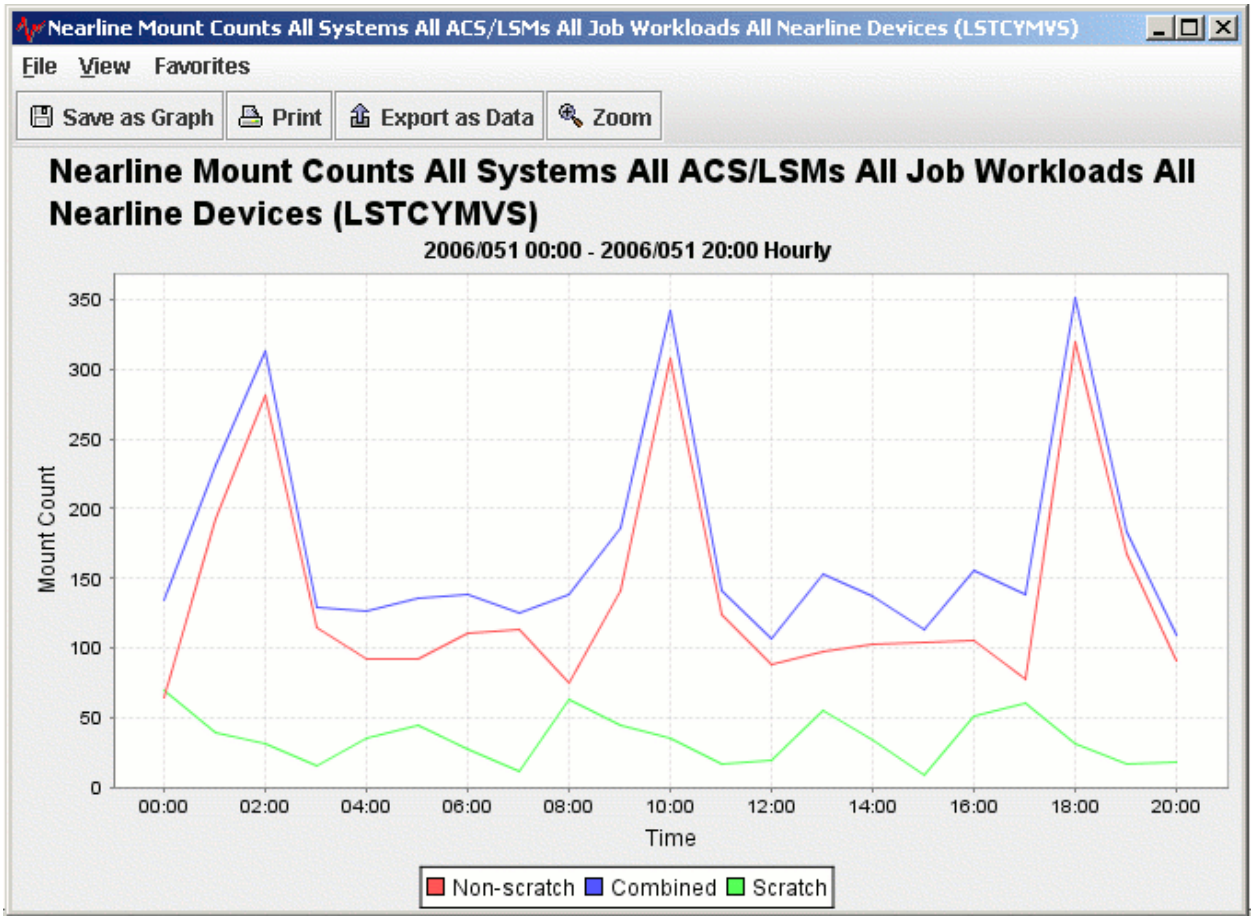
Tile
Click **Tile** to arrange multiple graphs for viewing on the screen.

View, Print, Copy, Export, Manage Reports

Graphs are displayed in a separate window after you select them in the Report Viewer.

Use the buttons at the top of the graph window to manipulate the displayed graph

Graph Options

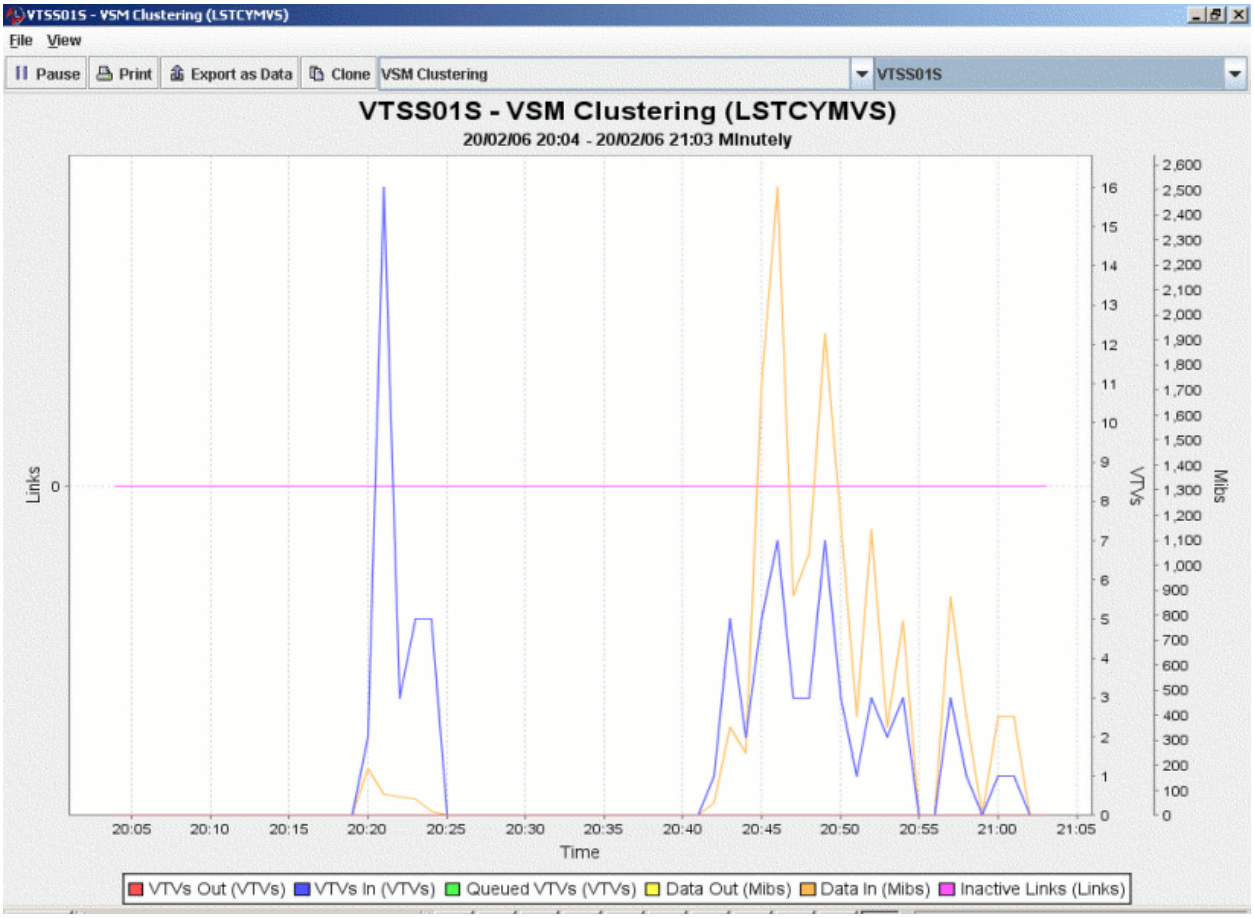


- **File** – close the graph.
- **View** – displays the data "behind the graph" in a separate window.
- **Favorites** – add the graph to your list of favorite reports to be regenerated using relative time periods (see *Using Favorite Reports* in this chapter).
- **Save as graph** – saves the graph as a graphics file.
- **Print** – prints the graph on a printer.
- **Export as Data** – copies the data behind the graph to the Windows Clipboard to be pasted into an application (e.g., Excel, Word, etc.).
- **Zoom** – allows you to generate a new graph showing a subset of an existing graph (see *Using the Zoom Feature* in this chapter).

Notes:

- When you move your cursor over a legend item, that part of the graph is highlighted.
- If you click on a legend item in the graph, the item will toggle on or off.

Monitor Options



- **Pause** – stops the flow of data across the screen
- **Print** – prints the graph on a printer.
- **Export as data** – copies the data behind the graph to the Windows Clipboard to be pasted into an application (e.g., Excel, Word, etc.).
- **Clone** – creates a copy of the graph in a separate report window.
- ***Report*** – select a different monitor to display from the pulldown.
- ***System*** – select a different system to monitor from the pulldown.

Using the Rules Manager

Exception thresholds can be locally set for the ExPR monitors. Exception processing is controlled with the Rules Manager in the ExPR Report Viewer.

The Rules Manager allows you to set exception threshold values that are logged and optionally trigger an alarm or an email if they occur. These rules are typically in the format "if the last x number of observations were (pick one) greater than or less than y, then do z."

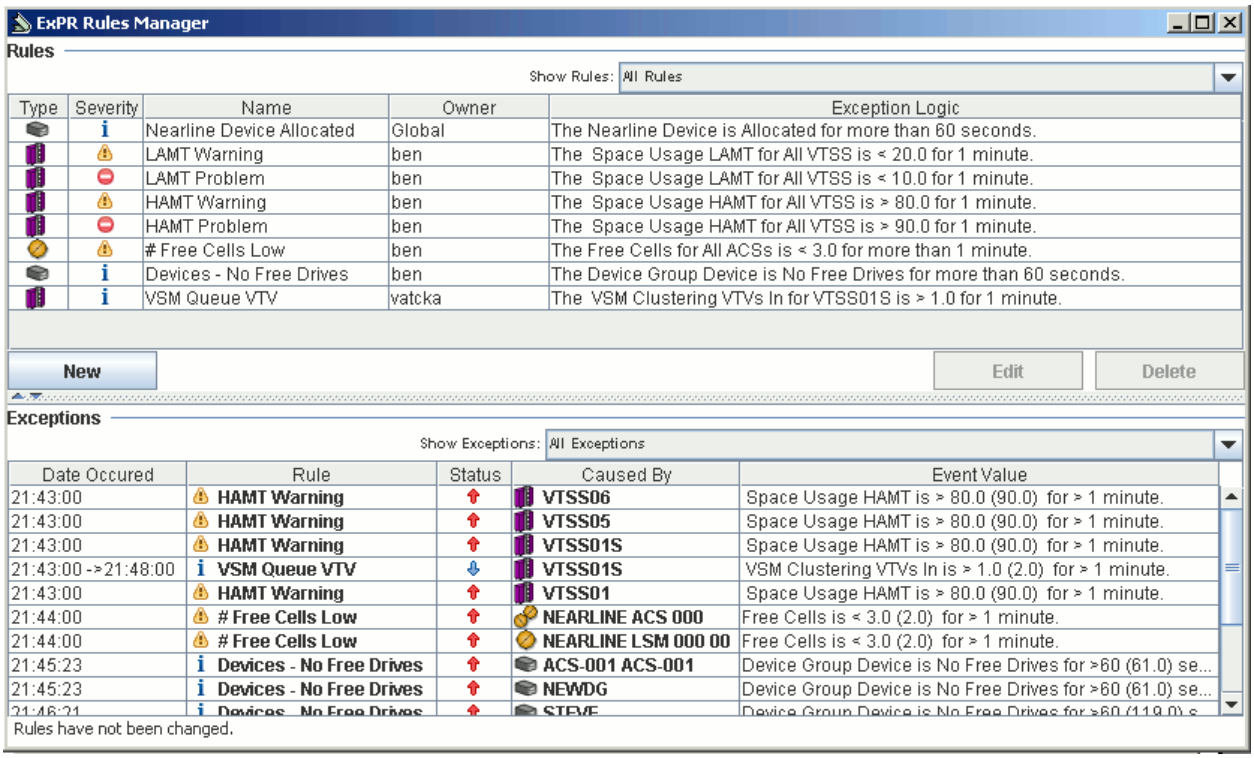
Alerts can be defined for each rule so that, when an exception occurs, a sound is initiated or an E-mail is sent or a console message is sent.

Notes:

- E-mail and console alerts can only be sent if the ExPR Monitor Service is installed and running on an open system platform (such as Windows, Solaris or Linux). Refer to chapter 6, *ExPR Monitor Service* for more details.
- Alerts can be delivered via SMS by using a third party company that converts E-mails to SMSs. E-mail notifications directed to the E-mail address provided by the third party are converted to and delivered as SMSs. E-mail notifications with attached graphs will be delivered as MMSs, provided the third party provides this capability. Additional conditions, fees and charges could be incurred during the use of the services provided by the third party.

To open the Rules Manager:

1. In the Report Viewer window, select **Policies** and then **Manage Rules**. The Rules Manager is displayed in a separate window.



Rules are owned by a specific user, and that user is specified in the "Owner" column in the table of rules. The username relates to the username/password authorization specified for the HTTP Server (see *ExPR Installation, Configuration, and Administration Guide (ICAG*) under chapter 6, *ExPR GUI Installation and Configuration*).

When creating a rule, the username used to own the rule is the same username entered for authorization when the ExPR Web GUI starts. If HTTP Server authorization isn't used, then the username is set to "Global". The rules table can be filtered to view all the rules or just the current user's rules.

Alert Exceptions are categorized into three groups:

- Raised – the conditions for that rule breaking are still currently active
- Lowered – the rule was broken but the conditions have changed so that the alert is no longer active
- Superceded – an alert occurred but it was superceded by a higher priority rule that had the "Stop processing rules of a lower priority" checked

Notes:

- The time and date that the alert was raised and lowered can be seen in the "Date Occurred" column.
- The alert exceptions table can be filtered by status via the Show Exceptions pull down.

To create a new rule:

1. Select **New**.
2. Select the rule type from the pulldown.
3. Enter the rule name and select its severity and priority from the pulldowns.
4. Select whether to stop processing lower priority exceptions when this rule is exceeded, and whether to show exceptions to all users.
5. In the Rule logic box, click each element and select its setting from the dialog.
6. For alert notification, Click **Add**, select the notification type from the pulldown, and click **OK**.

   Notes on Notifications:

   - Sound notifications – the ExPR Monitor Service does not play sound notifications.
   - Console notifications – the ExPR Monitor Service must be running to receive console notifications. The console message id will be made up of XPR + code + a character representing the severity of the rule (E – Error, W – Warning, I – Information). The description of the console notification will be the description of the alert.
   - Email notifications – the ExPR Monitor Service must be running to receive email notifications. Multiple email addresses are separated by a comma. Graphs can not be attached to emails for Device rules.

7. Click **Save Rules** to accept the rule definition.
8. The new rule appears in the Rules Manager. Use the buttons below the table of rules to create more rules and to edit or delete rules.
9. Close the Rules Manager when you are finished.

To edit an existing rule:

1. Select the rule to edit.
2. Click **Edit**.
3. Follow the dialog as described above.

Note: If the rules logic is edited then the exceptions associated for that rule are deleted.

To delete an existing rule:

1. Select the rule to delete.
2. Click **Delete**.
3. Follow the dialog to delete the rule.

Note: All exceptions associated with this rule are also deleted.

Using "Favorite" Reports

ExPR graphical reports can be constructed and saved as "Favorite" Reports with selection criteria predefined. This effectively creates a template for reports you want to reproduce at regular intervals.

The date range you select for a favorite report is converted to a relative period and applied each time you generate the report in the future. For example, if your selected date range converts to thirty consecutive days prior to today, then all future iterations of the report will be for thirty consecutive days prior to the run date.

Individual favorite reports can be generated automatically or they can be generated on demand from the ExPR Report Viewer at any time.

To create a favorite report:

1. With the generated report displayed, select **Favorites** and then **Add to Favorites** from the pulldown.
2. In the dialog, select from the pulldown the relative period to associate with the favorite report.
3. Select whether to automatically generate the graph for display each time the Report Viewer is opened, and click **OK**.

To generate a favorite report:

1. In the ExPR Report Viewer, select **Policies** and then select **Manage Favorites** from the pulldown.
2. In the Favorites Manager, select the favorite report to generate and click **Generate Favorite**.
3. The generated favorite report will appear in the Report Viewer for display.

To generate all favorite reports:

1. In the ExPR Report Viewer, select **Policies** and then select **Generate Favorites** from the pulldown. Alternatively, in the Favorites Manager, select **Generate Favorites**.
2. The generated favorite reports will appear in the Report Viewer for display.

To edit or delete a favorite report:

1. In the ExPR Report Viewer, select **Policies** and then select **Manage Favorites** from the pulldown.
2. In the Favorites Manager, select the favorite report to edit and then click **Edit.**
3. In the dialog, edit the favorite report properties and then click **OK**.
4. To delete a favorite report, select the report and then click **Delete**.

Using the Zoom Feature

The Zoom feature allows you to generate a new graph showing a subset of an existing graph.

You can either select a single point on the graph or drag a box around a portion of the graph:

- If you drag a box around a portion of the graph, the new graph will plot just the area that you boxed in the original graph, resized to fit the graph display panel.
- If you select a single point (or if the area you box contains just a single point), the new graph will plot details for that point at the next lower level of granularity. For example, you can zoom a point on a weekly graph to see daily details for the selected week and zoom a point on a daily graph to show hourly details for a selected day. The new graph will also include the day or week on either side of the selected day or week.

To zoom a graph:

1. Click **Zoom** on the report window to activate the zoom mode.
2. Move the cursor over the graph. The normal cursor is replaced with a "+" when zoom mode is active.
3. Position the cursor at the point on the graph you wish to zoom and click the mouse, or leave the mouse depressed and move the cursor over the graph to draw a box around the portion of the graph you wish to zoom.
    - If you selected a single point (or if your box contained only a single point), a new graph report with the next level of granularity for the selected day or week will be generated. The graph will also include the day or week on either side of the selected day or week.
    - If your box included more than one point, the new graph will plot just those points and the granularity will remain the same.
4. Click **Zoom** again to deactivate the zoom mode.
5. Select the new report from the Report Viewer when it appears in the list of titles.

Chapter 2: Graphical Reports

Overview

This chapter describes how to use the ExPR Graphical Reports application.

Graphical reports are generated from historical data in the ExPR mainframe database. When you select a Graphical Report, a request is made to the primary host system to produce the report. The results are then made available to the PC for graphical display.

List of Available Graphical Reports

ExPR graphical reports are organized as Nearline reports, VSM/VTSS reports, Manual Device reports, Control Units reports, Tape Errors reports, and System-Wide reports.

VSM/VTSS Reports

VSM/VTSS reports provide graphical analysis of activities within the Virtual Storage Management (VSM) system's Virtual Tape Subsystems (VTSSs) for the period and selection criteria defined in General Preferences.

VSM/VTSS reports are organized as VTSS Mounts reports, VTSS Performance reports, Host Links reports, RTD Links reports, Residency reports, and Data Transfer reports.

Mounts Reports

VTSS Mounts reports provide information about VTSS VTD and RTD mount activities originating from all hosts or a selected host for each interval during the selected period.

VTD Mount Counts Report

The number of Virtual Tape Volumes (VTVs) that were mounted in the Virtual Tape Drives (VTDs) associated with the selected VTSSs. Depending on selected options, the report may include scratch, non-scratch, and/or total VTVs.

VTD Mount Response Report

The average time in seconds to mount Virtual Tape Volumes (VTVs) in the Virtual Tape Drives (VTDs) associated with the selected VTSSs. Depending on selected options, the report may include scratch, non-scratch, and/or total VTVs.

VTD Maximum Mount Time Report

The maximum time in seconds to mount a Virtual Tape Volume (VTV) in the Virtual Tape Drives (VTDs) associated with the selected VTSSs. Depending on selected options, the report may include scratch and/or non-scratch VTVs.

RTD Mounts Report

The number of mounts that occurred in the Real Tape Drives (RTDs) associated with the selected VTSSs. Depending on selected options, the report may include RTD mounts for migrates, recalls, and/or combined RTD mounts.

VSM Mount Analysis (VTSS)

Depending on selected options, the total number of VSM mounts and total data read, total data written, and/or total data transferred due to those mounts.

Performance Reports

VSM/VTSS Performance reports provide information about general VTSS performance for each interval during the selected period.

VTD Utilization Report

The average percentage of time that each band of drives was in use for each period. Bands are associated with Virtual Tape Drives (VTDs) on all or selected VTSSs.

VTSS Concurrent VTDs Report

The maximum number of VTDs in use concurrently in all or selected VTSSs for each period.

VTSS Maximum Disk Buffer Utilization Report

The maximum disk buffer utilization percentage for all or selected VTSSs for each period.

VTSS Throughput Report

The throughput (staged, destaged, and/or total) for all or selected VTSSs for each period, shown either as a percentage of total throughput or as total megabytes. This statistic is only available for sites using NCS 4.0 or higher; otherwise the statistic will always be displayed as zero.

VTV Movements Report

The number of Virtual Tape Volumes (VTVs) that were recalled from the disk buffer, migrated to Nearline, and/or reclaimed from Nearline for each period.

Cache Hit Ratio Report

The percentage of cache hits for all or selected VTSSs based on the number of successful read requests from the buffer for each period. This statistic is only available for sites using NCS 4.0 or higher; otherwise the statistic will always be displayed as zero.

Scratch Compression Ratio Report

The scratch volume compression percentage for scratch volumes in all or selected VTSSs for each period.

Host Links Reports

VSM/VTSS Host Links reports measure host interface activity.

Host Interface Busy Percentage Report

The percentage of time the internal VTSS Host channel interfaces are busy, as measured internally by the VTSS microcode.

Host Interface Total I/O Report

The total number of I/Os on the internal VTSS Host channel interfaces, as measured internally by the VTSS microcode.

Host Interface Busy Time Report

The time in seconds that the internal VTSS Host channel interfaces are busy, as measured internally by the VTSS microcode.

RTD Links Reports

VSM/VTSS RTD Links reports measure RTD interface activity on the selected VTSS.

RTD Interface Busy Percentage Report

The percentage of time that the internal VTSS RTD channel interfaces are busy, as measured internally by the VTSS microcode.

RTD Interface Total I/O Report

The total number of I/Os on the internal VTSS RTD channel interfaces, as measured internally by the VTSS microcode.

RTD Interface Busy Time Report

The time in seconds that the internal VTSS RTD channel interfaces are busy, as measured internally by the VTSS microcode.

Residency Reports

VSM/VTSS Residency reports measure activity in the disk buffer on the selected VTSS.

Number of Migrated VTVs Deleted Report

The number of VTVs migrated then deleted for a selected management class, all management classes, or all VTVs. NCS 4.0 or higher is required for management classes.

Average Residency Migrated VTVs Report

The average over each PERIOD for the difference between the time of migration and the last referenced time for VTVs which are migrated then deleted from the buffer. This does not include VTVs deleted for reclaims. If there are no such VTVs migrated within each period, zero is displayed. A datum line on the graph shows the residency target

value. Graphs can be produced for a selected management class, all management classes, or all VTVs. NCS 4.0 or higher is required for management classes.

Idle in Buffer Time Migrated Report

The total amount of time migrated VTVs were idle in the buffer. Graphs can be produced for a selected management class, all management classes, or all VTVs. NCS 4.0 or higher is required for management classes.

VTVs That Missed Residency Target Report

The number of VTVs that were migrated before the residency target specified in the ExPR configuration was reached. Graphs can produced for a selected management class, all management classes, or all VTVs. NCS 4.0 or higher is required for management classes.

Percentage VTVs That Missed Residency Target Report

The percentage of VTVs that were migrated before the residency target specified in the ExPR configuration was reached. Graphs can be produced for a selected management class, all management classes, or all VTVs. NCS 4.0 or higher is required for management classes.

Number of VTVs Cycled in Buffer Report

The number of VTVs that were cycled in the buffer for all or selected VTSSs.

Number of VTVs Scratched Report

The number of VTVs that were scratched for all or selected VTSSs.

Scratched VTVs Cycled in Buffer

The percentage of scratched VTVs that were cycled in the buffer for all or selected VTSSs.

Data Transfer Reports

VTSS Data Transfer reports analyze the data transfer performance of a VTSS.

VTSS Data Transfer Summary Report

The total throughput in megabytes for all or selected VTSSs, shown separately for application activity, system activity, and/or combined.

VTSS Data Transfer Application Detail Report

The total application throughput in megabytes for all or selected VTSSs, shown separately for data read or written by the mainframe, read for recall, and written for migration.

VTSS Data Transfer System Detail Report

The total system throughput in megabytes for all or selected VTSSs, shown separately for free space collection and reclaims.

VSM Clustering Reports

VSM Clustering Throughput Overview

This report is calculated from the total amount of data being transmitted or received for VTV replication as a primary or secondary VTSS. The number of VTVs replicated is also shown. The data moved for replication is also included in the overall VTSS throughput data bandwidth graphs.

VSM Clustering Busy Percentage

This CLINK Interface report displays the busy percentage of time for those VTSS interfaces defined for VTSS replication of VTVs, as measured internally by the VTSS microcode.

VSM Clustering Total IO

This CLINK Interface report displays the total number of I/O operations initiated or received across those VTSS interfaces defined for VTSS replication of VTVs, as measured internally by the VTSS microcode.

VSM Clustering Busy Time

This CLINK Interface report displays the busy time in seconds for those VTSS interfaces defined for VTSS replication of VTVs, as measured internally by the VTSS microcode.

VSM Clustering Replication Timings

This report displays replication timings that are calculated for the originating VTSS.

There are three elements:

- Queuing Time: the time from VTV dismount until replication starts on a CLINK
- Transmission Time: the actual time to transmit the VTV image to the partner VTSS
- Replication Time: the total of the preceding two measurements

VSM Clustering Interface Throughput

This CLINK Interface report displays the throughput in megabytes for all operations initiated or received across those VTSS interfaces defined for VTSS replication of VTVs, as measured internally by the VTSS microcode.

VSM Clustering Interface Replication Timing

This CLINK Interface report displays the replication timings for operations initiated or received across those VTSS interfaces defined for VTSS replication of VTVs, as measured internally by the VTSS microcode.

Nearline Reports

Nearline reports provide graphical analysis of activities within the Nearline system for the period and selection criteria defined on the Granularity tab. Nearline reports are organized as Mounts reports, Performance reports, Cartridges reports, Slot Management reports, and Inventory reports.

Mounts Reports

Mounts reports provide statistics about cartridge mounts during the selected period. Reports can be generated to include all LSMs in all ACSs, all LSMs in a specified ACS, or a specific LSM. Optionally, these reports can be generated for a single jobname workload group.

Mount Counts Report

This report graphs the number of Nearline cartridge mounts for each interval during the specified period. Depending on selected options, the report may include scratch, non-scratch, and/or total cartridges, each plotted separately.

Mount Response Report

This report graphs the average time in seconds it took to mount Nearline cartridges for each interval during the specified period. The elapsed time measurement is taken from the time when the mount message is issued to the point at which the device is READY. Depending on selected options, the report may include scratch, non-scratch, and/or total cartridges, each plotted separately.

Maximum Mount Time Report

This report graphs the maximum time in seconds it took to mount a Nearline cartridge for each interval during the specified period. Depending on selected options, the report may include scratch, non-scratch, and/or total cartridges, each plotted separately.

Mount Breakdown Report

This report graphs a series of mount-time components that show how much elapsed Nearline mount time was attributable to each component for each interval during the specified period. The elapsed time measurement is the same as that reported in the Mount Response report. Depending on the selected option, the report may include either scratch, non-scratch, or total cartridges.

The following mount breakdown components may be graphed:

- Drive Wait Time: The duration of drive tape threading/loading.
- Robotics Destination Time: The time the robotics arm was busy/moving.

- Robotics Destination Queue Time: The time awaiting the robotics arm to become free.
- Robotics Other Time: The time the robotics arm in the adjacent LSM was busy.
- Robotics Other Queue Time: The time awaiting the robotics arm in the adjacent LSM.
- Robotics Passthru Time: The time cartridges were traveling between LSMs.
- Robotics Passthru Queue Time: The time awaiting the passthrough port to become free.
- Other Time: The time spent while HSC processed other events. HSC queue time will be present, for example, if a cartridge currently located in the target drive needs to be returned to its cell.

Utility Mounts Report

This report graphs the total number of Nearline utility cartridge volumes (not attributable to user-initiated jobs, such as cleaning cartridges) were mounted for each interval during the specified period.

Nearline Mount Analysis Report

This report graphs the total number of Nearline mounts for each interval during the specified period, and depending on the selected options, the total amount of data that was read, written, and/or transferred, each plotted separately.

Performance Reports

Performance reports provide information about the utilization of various Nearline hardware components and other external hardware during the specified period. Reports can be generated to include all LSMs in all ACSs, all LSMs in a specified ACS, or just a specific LSM.

Drive Utilization Report

This report graphs the average percentage of time that Nearline cartridge drives were in use for each interval during the specified period. Scratch and non-scratch percentages are shown separately.

Concurrent Drives in Use Report

This report graphs the percentage of time a given number of Nearline cartridge drives were in use in a selected LSM for each interval during the specified period. The report is color-coded to indicate how many drives were in use for each percentage that is graphed. You can specify the maximum number of color-coded bands to include in the report.

No Free Units Report

This report graphs the percentage of time when all Nearline cartridge drives were in use in the selected LSM for each interval during the specified period.

Nearline Allocation Recovery Event Summary Report

This report graphs the total number of allocation recovery events in the Nearline environment and the total batch throughput time in seconds that was lost as a result for each interval during the specified period.

Nearline Allocation Recovery Action Analysis

This report graphs the total number of operator replies to allocation recovery events in the Nearline environment and the total number of WAITs serviced for each interval during the specified period.

Nearline Allocation Recovery Delay Analysis Report

This report graphs the longest reply time and the longest wait time related to allocation recovery events in the Nearline environment in seconds for each interval during the specified period.

Cartridges Reports

Cartridges reports measure the movement of cartridges into or between LSMs during the selected period. Reports can be generated to include all LSMs in all ACSs, all LSMs in a specified ACS, or a specific LSM.

Cartridge Movements Report

This report graphs the total number of Nearline cartridges that were (depending on cart movement option selections) entered, ejected, passed through, and/or demand entered into the selected LSM for each interval during the specified period.

Passthrough Analysis Report

This report graphs the total number of passthroughs that occurred and the average mount time in seconds for Nearline cartridges that were passed to a different LSM for mounting for each interval during the specified period.

Slot Management Reports

Slot Management reports detail available scratch volumes and free cells during the selected period. Reports can be generated to include all LSMs in all ACSs, all LSMs in a specified ACS, or a specific LSM.

Scratch Profile Report

This report graphs the number of available Nearline scratch cartridges in the selected LSMs for each interval during the specified period. Depending on selected options, the report may indicate the lowest, highest, and/or average number of available scratch cartridges. The report can also be generated for a selected scratch subpool.

Free Cell Profile Report

This report graphs the number of available free cells in a selected LSM for each interval during the specified period. Depending on selected options, the report may indicate the lowest, highest, and/or average number of available free cells.

Total Available Scratch Report

This report graphs the total number of scratch cartridges that were available in all selected LSMs for a selected system.

Total Free Cells Report

The total number of free cells that were available in all selected LSMs for a selected system.

Scratch Availability Report

The total number of scratch cartridges that were available in all selected LSMs for a selected system. It also shows the site-defined exception threshold for scratch cartridge availability. The threshold is established in the ExPR MVS exception processing JCL.

Free Cell Availability Report

The total number of free cells that were available in all selected LSMs for a selected system. It also shows the site-defined exception threshold for free cell availability. The threshold is established in the ExPR MVS exception processing JCL.

Inventory Reports

Inventory reports use data obtained from your mainframe tape management catalog system to generate graphs for a single system. These graphs profile the data held on cartridge volumes in your libraries for each interval during the selected period. Inventory reports can be produced using all data or for just a specified dataset workload group.

Cartridges Stacked Report

The percentage of cartridge volumes that contain more than one dataset.

Cartridges Multi-Volume Report

The percentage of cartridge volumes that hold part of a multi-volume dataset.

Cartridge Last Reference Bands Report

The number of cartridges in each ageband. Agebands are user-specified in the ExPR MVS configuration on the host system.

Oldest Last Reference Date Report

The single oldest last reference date found for each interval during the specified period.

Cartridge Utilization Estimate Report

An estimate of the average "fullness" of cartridges in the selected LSM(s) or dataset workload group(s).

Cartridge Utilization Bands Report

An estimate of the amount of tape that is utilized by the cartridges in the selected LSM(s) or dataset workload groups(s). The graph is divided into percentage bands and the number of cartridges in each band is reported.

Device Group Reports

Device Group reports provide graphical analysis information about a specified device group during the selected period:

Device Group Mounts Report

For the selected device group, the total number of cartridge volumes that were mounted in the selected LSMs. Depending on selected options, the report may include scratch, non-scratch, and/or total cartridges.

Note: This report was called the Manual-Mounts report in earlier versions of ExPR.

Device Group Utilization Report

For the selected device group, the percentage of time that devices mapped by the selected device group were being utilized. The report is categorized by scratch or non-scratch activity.

Note: This report was called the Manual-Utilization report in earlier versions of ExPR.

Data Transfer Report

For the selected device group, the total data read, total data written, and total data transferred.

Concurrent Drives in Use Report

For the selected device group, the percentage of time a given number of drives were in use for each interval during the specified period. The report is color-coded to indicate how many drives were in use for each percentage that is graphed.

System-Wide Reports

Control Units Reports

Control Units reports provide device-level statistics about control unit performance for each interval during the specified period.

Control Unit Load Report

The average percentage load and the high load point for the selected control unit. These figures are based on the combined average disconnect time for all the drives attached to the control unit, and the single highest recorded figure for the control unit.

Device Disconnect Summary Report

The number of drives that exceeded the percentage threshold specified for device disconnect time. The threshold percentage can be used to detect high control unit loading as a result of device disconnect time. For example, 70% disconnected represents a point at which bottlenecks occur, so a threshold of 50% or 60% could be used to issue a warning.

Device Disconnect Detail Report

The average and high percentage value for disconnect time for the selected drive.

Start Subchannel Commands Report

The number of start subchannel commands that were issued for the selected control unit.

Control Unit Busy Report

The average percentage of disconnected time for the selected control unit. These figures are based on the combined average disconnect time for all the drives attached to the control unit, and the single highest recorded figure for the control unit.

Tape Errors Reports

Tape Errors reports provide information about the errors that occurred. Permanent or temporary errors (or both) can be included in the reports. Nearline or non-Nearline (or both) can also be selected to further isolate error information for each interval during the selected period.

Tape Error Events Report

For the selected error type, the number of tape errors (read, write, or both) that occurred in each period.

Volumes with Errors Report

For the selected error type, the number of volumes that were recorded as having errors in each period.

System-Wide Reports

System-Wide reports provide information from each system about the total tape environment, including Nearline, VSM, and manual activity.

Channel Busy Report

For each interval during the selected period, a percentage busy figure for channel groups. These groups are defined in the ExPR mainframe software at your installation to logically organize sets of channels that you wish to analyze together.

Total Mount Analysis Report

For each interval during the selected period, the total number of cartridge mounts that were processed system-wide and the total transferred data. Depending on selected

options, the report may include Nearline, VSM, and device group mounts or any combination of the three.

Chapter 3: Monitors

Overview

This chapter describes the ExPR Monitor application, which provides “real-time” monitoring of VSM, Nearline, and Device activity.

VSM Monitor Report Types

The VSM Monitor displays the following reports:

VTV Events

VTV Events monitors the following VTV activity:

- Migrates: Count of HSC subtype 18 SMF records. This includes all movements from the VTSS to an MVC (including those for reclaim or consolidate processing).
- Recalls: Count of HSC subtype 19 SMF records. This includes all movements from an MVC to the VTSS (including reclaim processing).
- Reclaims: Count of HSC subtype 26 SMF records. For a reclaim, HSC will write a recall, migrate, and reclaim record.
- Mounts: Count of HSC subtype 13 records. Mounts include both scratch and non-scratch mounts.
- Scr Mounts: Count of HSC subtype 13 records for scratch mounts.
- Nonscr Mounts: Count of HSC subtype 13 records for non-scratch mounts.
- Mounts with Recall: Count of mounts requiring recall.

VTD Drives

VTD Drives monitors the UCBs of all VTDs and displays the highest values for drives in each state for each minute.

VTD drive activity includes the following:

- In Use: A VTD is in use if the UCB has the allocated bit set.
- Mounted: A VTD is mounted if the allocated and mount pending bits are set.
- Mount Pending: A VTD is mount pending if the allocated and mount pending bits are set.
- Alloc’d Not Mounted: A VTD is allocated but not mounted if the allocated bit is set, but the mounted bit is not set.

RTD Drives

RTD Drives monitors HSC subtype 16 SMF records for RTD mounts.

Space usage

Space Usage monitors HSC subtype 10 SMF records and displays the following information:

- Disk Buffer Utilization, including lines for the High and Low Auto Migration Thresholds (HAMT and LAMT respectively), calculated as: 100 - (collected free space / total back end capacity) * 100
- Uncollected Free, calculated as: (total free space - collected free space) / total back end capacity * 100
- Available Free Space, calculated as: 100 - disk buffer utilization
- Cache Hit Ratio, based on the number of successful read requests from the buffer (requires NCS 4.0 or higher; otherwise the graph will show all zeros).

Note: Subtype 10 records are written by HSC every 15 minutes. Consequently, the graph only changes every 15 minutes.

Residency Time

Residency Time monitors the Average Residency Time, defined as the average of the difference between the time of migration and the last referenced time for each VTV that is migrated and then deleted (except VTVs deleted for reclaims). If there are no such VTVs migrated within the minute, zero is displayed. All VTSSs or all or specific management classes can be monitored. NCS 4.0 or higher is required if management classes are monitored.

Missed Residency Target

Missed Residency Target monitors VTVs that missed the residency target, defined as the number of VTVs migrated that remain resident for less than the specified residency target.

Missed Residency Target Percentage

Missed Residency Target Percentage is the percentage of VTVs that missed the residency target, defined as the number of VTVs that missed residency target as a percentage of all VTVs deleted.

VSM Clustering

VSM Clustering monitors VTSS clustering by extracting data from the VTCS SMF records associated with clustering, including VTVs in/out/queued, data in/out, and inactive links.

Nearline Monitor Report Types

The Nearline Monitor displays free cell, scratch volume, and scratch subpool information.

Free Cells

Free Cells monitors the number of available free cells in the selected ACS or specific LSM.

Scratch Volumes

Scratch Volumes monitors the number of available scratch volumes in the selected ACS or specific LSM.

Scratch Subpools

Scratch Subpools monitors the number of available scratch volumes in the selected scratch subpool.

Device Monitor

The Device Monitor displays current device status summaries at the ACS, LSM, device group, and individual device level, complete with graphical recent history reports for each device.

Chapter 4: TAPECAT GUI Reports

Overview

This chapter describes the ExPR TAPECAT GUI reporting function, which allows you to display and sort any of the existing TAPECAT Volume/Dataset details. TAPECAT information is extracted from the host tape catalog extract by ExPR mainframe processes.

The Special MVC TAPECAT Report

The Special MVC TAPECAT report allows you to display and sort TAPECAT Volume details.

To run the SPECIAL MVC TAPECAT Report:

1. Put the cursor on the **System-Wide** tab.
2. Select **TAPECAT Reports** from the pulldown and then select **Special MVC TAPECAT Report**.
3. Enter a title for the report in the **Report Title** box.
4. Click **Show/Hide** next to **TAPECAT Report Selection Criteria** to display options. Two sets of options are displayed, **Volsers Selection Criteria** and **Other Selection Criteria**.
5. Click **Show/Hide** next to **Volsers Selection Criteria**.
6. Select filtering criteria for the report, including the base Volser and ranges of Volsers or specific Volsers to include or exclude.
7. Click **Show/Hide** next to **Other Selection Criteria**.
8. Define filtering criteria for the report, including media types, dataset size and volume data size criteria, number of records to return, and whether to include scratch volumes or include only manually racked volumes.
9. Click **Submit** when you are finished.
10. The report will be displayed in the ExPR Report Viewer window.

Customize TAPECAT Reporting

TAPECAT reports can be customized to display and sort Volume or Dataset details.

To create a customized report:

1. Put the cursor on the **System-Wide** tab.

2. Select **TAPECAT Reports** from the pulldown and then select **Customize TAPECAT Reporting**.
3. Enter a title for the report in the **Report Title** box.
4. Click **Show/Hide** next to **TAPECAT Report Columns** to display options.
5. Select the data columns to include in the report.
6. Click **Show/Hide** next to **TAPECAT Report Selection Criteria**.
7. Define your selection filtering criteria for the report by clicking **Show/Hide** next to the selection criteria categories and entering filtering criteria as required for your report:
    - Creation Details
    - Last Access Details
    - JCL Parameters
    - TMS
    - VSM
    - HSC
    - Volsers
    - Other
8. Click **Submit** when you are finished.
9. The report will be displayed in the ExPR Report Viewer window.

Special Considerations When Displaying TAPECAT GUI Fields

When using the TAPECAT GUI feature to display volume and dataset fields, you should be aware that some of the supported Tape Management Systems do not store all data items within their respective catalogs.

The unsupported fields are:

- CA-1 – Last ref/use step name (always set to blanks)
- CA-TLMS – Last ref/use program name (may be set to creation program name or blanks) and Last ref/use step name (may be set to creation step name or blanks)
- DF/SMSrmm – Last ref/use time (always set to 00:00)
- Control-T – None
- ASG-Zara – SMS management class (always set to blanks)

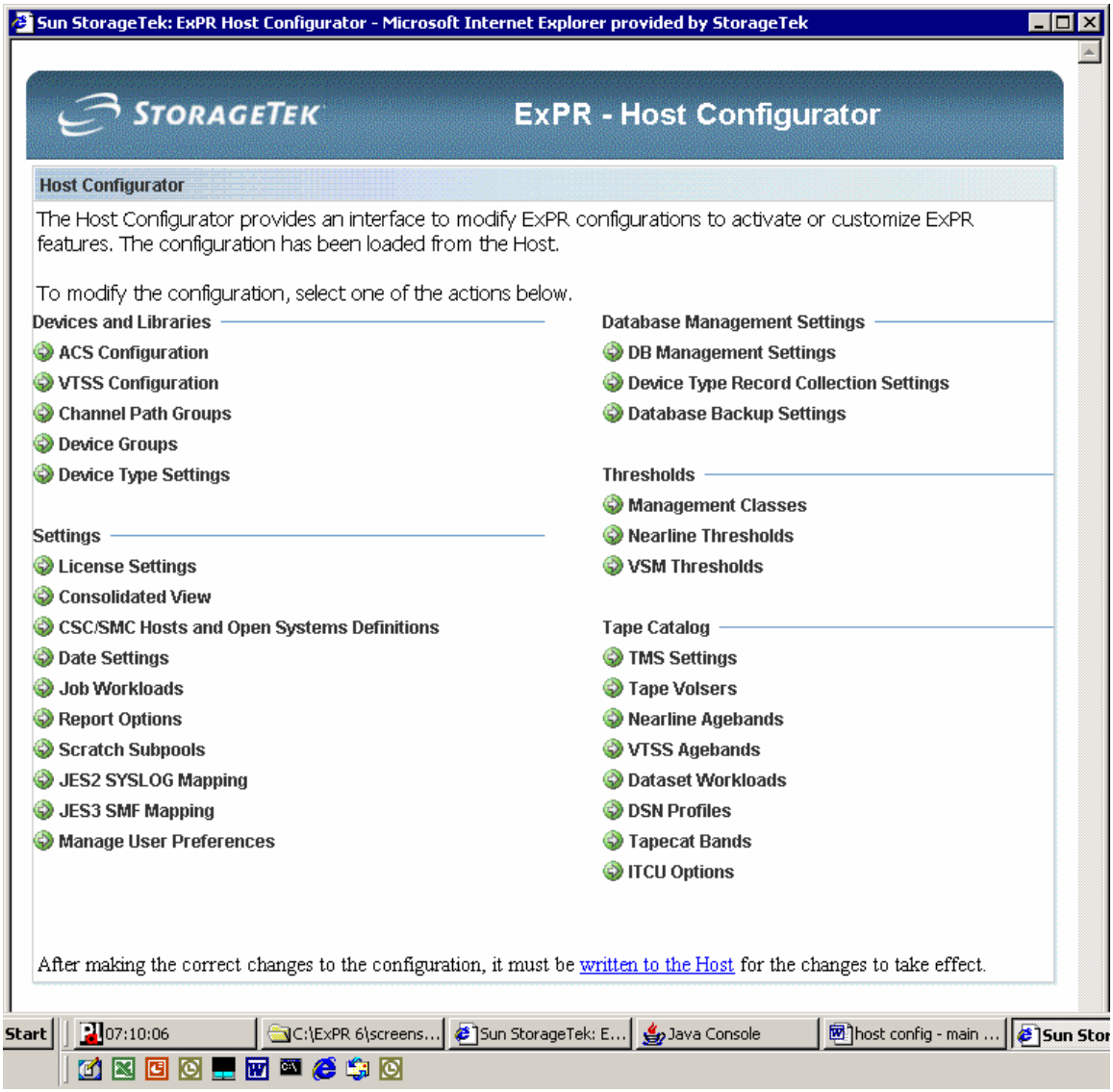
All other fields are populated by all of the supported TMS systems. You should not specify selection/filtering criteria based on fields that are set to blanks. If you do, then the search will return no matching volumes or datasets.

Chapter 5: ExPR 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 application can be found under the System-Wide menu of the ExPR GUI application.



For information about each of the configuration options displayed on the Host Configuration panel, see the *ExPR Installation, Configuration, and Administration Guide (ICAG)* under chapter 7, *Host Configuration*, or use the ExPR GUI help system.

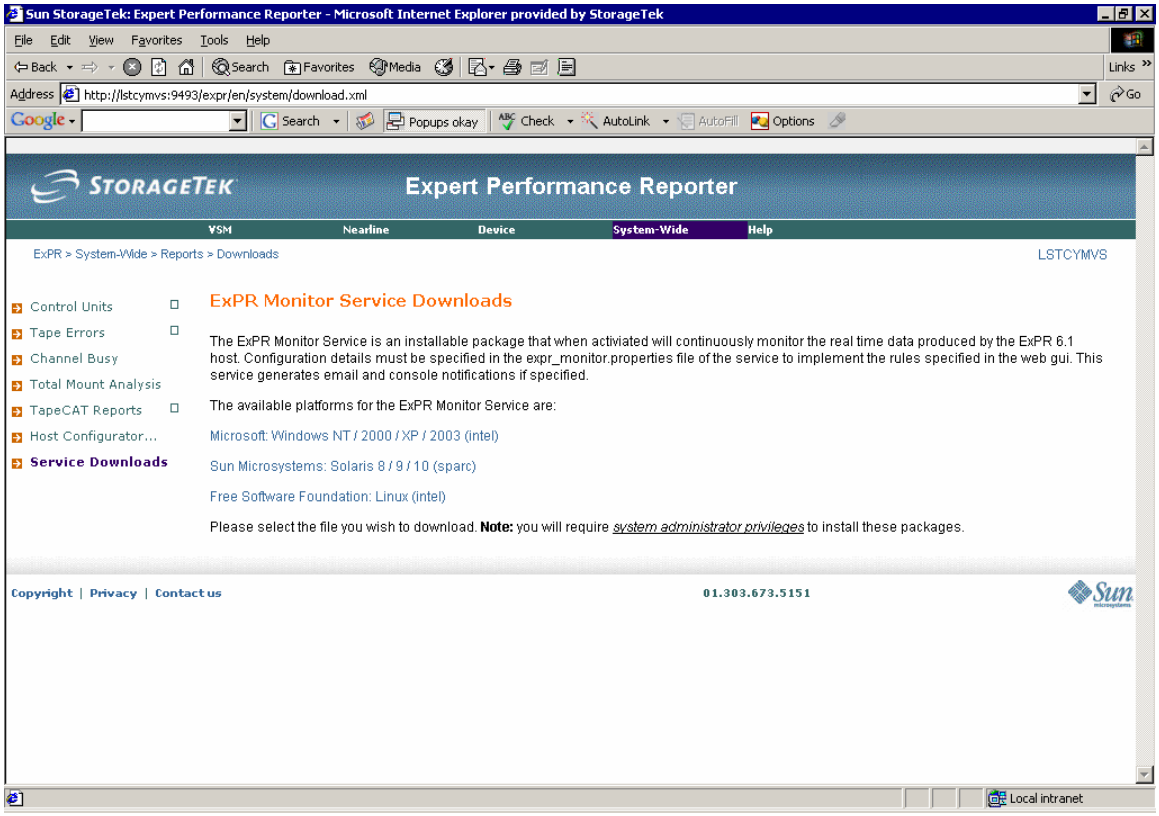
For information about using the ExPR PC component instead of ExPR GUI to perform host configuration, see appendix A, *ExPR PC Component*., or use the PC Host Configurator help system.

Note: ExPR host configuration access requires system administrator privileges.

Chapter 6: ExPR Monitor Service

The optionally-installed 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.

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-Wide menu of the ExPR GUI application.



Refer to the *ExPR Installation, Configuration, and Administration Guide (ICAG)* under chapter 9, *ExPR Monitor Service* for additional details about installing and configuring the service.

Note: ExPR Monitor Services installation and configuration require system administrator privileges.

Appendix A: ExPR PC Component

Overview

This appendix describes how to install the ExPR PC Component client software on a PC and set up connections with MVS host server systems to retrieve data for display in the ExPR PC reporting and monitoring applications.

Most of the features and functions of the ExPR PC Component are now replicated by the ExPR GUI web-based browser application. The exceptions are ExPR Host reports and the ExPR Host Messages monitor, which are not currently supported by ExPR GUI.

Be aware that the focus of ExPR product development continues to be ExPR GUI migration and that the ExPR PC Component will be withdrawn in a future release when all features and functions have been replicated in the ExPR GUI.

PC Hardware and Software Requirement

The ExPR PC component can be installed on a Microsoft Windows-capable PC Windows 2000/XP or 95/98/Me/NT4) with a TCP/IP stack capability and at least 128Mb RAM and 25Mb hard disk available.

Recommended Monitor Specification

A monitor resolution of at least 1024x768 is recommended, and the display must be set to Small Fonts. Both of these settings are in the Display parameters of the Windows Control Panel.

Note: On heavily loaded systems, some components may give errors such as "ImageList must be initialized before use." Reducing system load cures these problems.

Installing ExPR on the PC

The ExPR PC component can be installed on any number of PCs. As a rule, ExPR applications are not shared across a network however, because required run-time DLLs and related files must still be installed on each PC. If you want to share ExPR resources across a network, you should use the ExPR GUI application.

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 ExPR 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. ExPR .exe executable files are in the ExPR directory (the suggested installation default directory was c:\Program Files\StorageTek\ExPR*x*..., where *x* is the version number). 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.

Getting Help

In addition to this book, the following help is available while using this application:

- For general help, click **Help** at the right-hand side of the menu bar and select **Help Topics**.
- For screen help, click the **What's This?** toolbar icon and then click the item on the screen for which you want help.

Configuring Network Host Connections on 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.

To connect with the host systems, you need to define the host connections to the ExPR PC software. The ExPR Network Configurator application on the PC performs this function.

Configuration Tip

The network configuration process described below produces a local configuration file on the PC (filename *expr.xml*). Since you have already built this file on the PC where you

performed ExPR host configuration during the installation process, you could copy that file to the directory where ExPR is installed on each PC instead of configuring each machine manually.

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 with the Monitor applications.

Information You Need to Supply

You will need the following site-specific information to define your host connections:

✓ For each host your PC will connect to, you need to supply the host description, IP address, and the assigned port number where the ExPR PC will connect to the host. **Note:** Optionally, and depending on how your network is configured, the host domain name can be entered instead of the IP address.

✓ You also need to know which host is designated as the *primary* host in the ExPR mainframe environment. In multi-site or very large environments, there may be more than one host group (see previous page) and thus more than one primary host. You need to identify each primary host you will connect to from this PC.

Your system programmer or network administrator should be able to provide this information to you.

Setting up the Connections

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.)

Note: Existing ExPR sites should see their current network configuration already displayed when the Network Configurator application opens. If not, refer to *ExPR Conversion Note* below for instructions.

Note: Functions can be accessed by selecting an object in the navigation tree and then clicking a pull-down menu at the top of the window, or from the toolbar below the pull-down menus, or by right-clicking the mouse to display a menu. In this book, the pull-down 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**.

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.

Testing the Host Connections

You can test your host connection by starting one of the ExPR reporting applications that will automatically attempt to connect to a host system at startup.

To test the connection to the primary host:

1. Open the ExPR Graphical Reports application.
2. If prompted, select the primary host to connect to. (This prompt only appears if you have multiple host groups.)
3. The display panel messages will tell you when the host is connected. If you cannot connect to the host, refer to *Troubleshooting Host Connections* below.

   Note: The status bar message "Host Version:" indicates the version of the ExPR started task that is running on the connected host system.
4. Close the application by clicking **File** and then **Exit**.
5. Repeat this test for each primary host you will connect to from this PC.

To test the connection to a secondary host:

1. Open the ExPR Nearline Monitor application.
2. When prompted, select a secondary host to connect to.
3. The display panel messages will tell you when the host is connected. If you cannot connect to the host, refer to *Troubleshooting Host Connections* below.
4. Close the application by clicking **File** and then **Exit**.
5. Repeat this test for each secondary host you will connect to from this PC.

Troubleshooting Host Connections

If you cannot connect to the host system (i.e., the message "Connection Refused" appears in the status bar at the bottom of the application window), you need to ensure that:

- You have correctly identified the IP address and port number for the host.
- The mainframe TCP/IP software has been correctly configured to allow such communication.
- The host is running the ExPR started task.
- Your PC has all necessary communication hardware and software installed and correctly configured to allow TCP/IP communication with the host.

Your system programmer or network administrator should assist you in troubleshooting these issues.

Running ExPR Host Component Reports and Monitors

Historical reports and real-time monitors that can be displayed with the ExPR PR component are the same reports and monitors that are available with ExPR GUI. Refer to the previous chapters for information about the reports and monitors you can display.

For information about using the ExPR PC component instead of ExPR GUI to generate and display reports and monitors, use the PC component's help system.

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