User's Guide

OMEGAMON II® for Mainframe Networks

Version 520

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Preface

About this document

This manual explains how to use OMEGAMON II® for Mainframe Networks (hereafter referred to as OMEGAMON II) to monitor your network and tune VTAM, your NCPs, your TCP/IP stack and the lines, PUs, and LUs connected to them. It is intended for several audiences:

- Version 520 of OMEGAMON II contains several new features and enhancements. Please see *What's New*, following this Preface, for a brief description of each feature.
- If you are new to OMEGAMON II, you can start by reading “Getting Started” on page 31 for an introduction to the CUA interface and then “Monitoring Network Performance” on page 57 for an overview of how OMEGAMON II monitors your network's performance (Part I).
- If you are familiar with OMEGAMON II, you can go directly to a chapter such as “Buffer Pool Analysis” on page 99. Each component on the main status panel is described in its own chapter. (Part II).
- For performance monitoring and tuning of your NCP resources, please see the *OMEGAMON II for Mainframe Networks NCP Monitoring Guide*.
- If you are responsible for administrating the product, you can refer to “Monitoring Options” on page 323 and “User Authorities” on page 353 (Part III).
- If you are interested in historical reporting or SMF record layouts, please refer to the *OMEGAMON II for Mainframe Networks Historical Reporting Guide*.

References

The tuning techniques described in this document are based on the recommendations of these IBM publications:

- *OS/390 eNetwork Communications Server: IP Configuration Guide*, SC31-8725
- *OS/390 eNetwork Communications Server: SNA Network Implementation Guide*, SC31-8563.

The companion configuration and customization guides are:

- *OS/390 eNetwork Communications Server: IP Configuration Reference*, SC31-8726
- *OS/390 eNetwork Communications Server: SNA Resource Definition Reference*, SC31-8565.

Adobe Portable Document Format

Introduction

Candle supplies documentation in the Adobe Portable Document Format (PDF). The Adobe Acrobat Reader prints PDF documents with the fonts, formatting, and graphics in the original document. To print a Candle document, do the following:

1. Specify the print options for your system. From the Acrobat Reader Menu bar, select **File > Print Setup...** and make your selections. A setting of 300 dpi is highly recommended as is duplex printing if your printer supports it.
2. To start printing, select **File > Print** on the Acrobat Reader Menu bar.
3. On the Print popup, select one of the **Print Range** options for
   - a single page
   - a range of pages
   - all of the document
4. (Optional) To fit oversize pages to the paper size currently loaded on your printer, select the **Shrink to Fit** option.

Printing problems?

Your printer ultimately determines the print quality of your output. Sometimes printing problems can occur. If you experience printing problems, potential areas to check are:

- settings for your printer and printer driver. (The dpi settings for both your driver and printer should be the same. A setting of 300 dpi is recommended.)
- the printer driver you are using. (You may need a different printer driver or the Universal Printer driver from Adobe. This free printer driver is available at www.adobe.com.)
- the halftone/graphics color adjustment for printing color on black and white printers. (Check the printer properties under **Start > Settings > Printer**. For more information, see the online help for the Acrobat Reader.)
- the amount of available memory in your printer. (Insufficient memory can cause a document or graphics to fail to print.)

For additional information on printing problems, refer to the documentation for your printer or contact your printer manufacturer.

Documentation Conventions

Introduction

Candle documentation adheres to accepted typographical conventions for command syntax. Conventions specific to Candle documentation are discussed in the following sections.

Panels and figures

The panels and figures in this document are representations. Actual product panels may differ.

Revision bars

Revision bars (|) may appear in the left margin to identify new or updated material.

Variables and literals

In examples of command syntax, uppercase letters are actual values (literals) that the user should type; lowercase letters are used for variables that represent data supplied by the user. Default values are underscored.

```
LOGON APPLID(cccccccc)
```

In the above example, you type **LOGON APPLID** followed by an application identifier (represented by *cccccccc*) within parentheses. The number of characters indicates the maximum allowable length of the variable.

Note: In ordinary text, variable names appear in italics.

Symbols

The following symbols may appear in command syntax.

Symbol	Usage
|	The 'or' symbol is used to denote a choice. Either the argument on the left or the argument on the right may be used. Example: `YES | NO` In this example, YES or NO may be specified.
[ ]	Denotes optional arguments. Those arguments not enclosed in square brackets are required. Example: `APPLDEST DEST [ALTDEST]` In this example, DEST is a required argument and ALTDEST is optional.

{ }	Some documents use braces to denote required arguments, or to group arguments for clarity. Example:
	
	`COMPARE {workload} -`
	`  REPORT={SUMMARY | HISTOGRAM}`
	
	The *workload* variable is required. The REPORT keyword must be specified with a value of SUMMARY or HISTOGRAM.

_	Default values are underscored. Example:
	
	`COPY infile outfile -`
	`  [COMPRESS={YES | NO}]`
	
	In this example, the COMPRESS keyword is optional. If specified, the only valid values are YES or NO. If omitted, the default is YES.

␣	The symbol ␣ indicates a blank space, when needed for clarity.

Documentation Set

Introduction

Candle provides a complete set of documentation for OMEGAMON II for Mainframe Networks. Each manual in this documentation set contains a specific type of information to help you use the product.

Candle welcomes your comments and suggestions for changes or additions to the documentation set. A user comment form, located at the back of each manual, provides simple instructions for communicating with Candle's Information Development department. You can also send email to **UserDoc@candle.com**. Please include the product name, version, and book title in the subject line. To order additional manuals, contact Candle Customer Support.

Online documentation

The following documents in the OMEGAMON II for Mainframe Networks Version 520 documentation set are available on the Technical Documentation CD-ROM:

- *OMEGAMON II for Mainframe Networks Configuration and Customization Guide*
- *OMEGAMON II for Mainframe Networks User's Guide*
- *OMEGAMON II for Mainframe Networks NCP Monitoring Guide*
- *OMEGAMON II for Mainframe Networks Historical Reporting Guide*
- *End-to-End Response Time Feature (ETE) Reference Manual*
- *Candle Products Messages Manual*

Printed documentation

The documentation listed in the following table is available for OMEGAMON II for Mainframe Networks. To order additional product manuals, contact your Candle Customer Support representative.

Table 1. OMEGAMON II for Mainframe Networks Documentation		
Document Number	**Document Name**	**Description**
ON51-6304	*OMEGAMON II for Mainframe Networks Configuration and Customization Guide*	Shows how to configure, verify, and customize OMEGAMON II for Mainframe Networks to your site's requirements.
ON54-6305	*OMEGAMON II for Mainframe Networks User's Guide*	Shows how to use OMEGAMON II for Mainframe Networks to monitor and tune your network.
ON99-6306	*OMEGAMON II for Mainframe Networks NCP Monitoring Guide*	Shows how to use OMEGAMON II for Mainframe Networks to monitor and tune your NCP resources.
ON99-6307	*OMEGAMON II for Mainframe Networks Historical Reporting Guide*	Shows how to produce reports and graphs from SMF records generated by OMEGAMON II and provides record layouts.
ET53-5586	*End-to-End Response Time Feature (ETE) Reference Manual*	Describes ETE and its commands.
WO52-6238, WO52-6239, WO52-6240, WO52-6256, WO52-6257	*Candle Products Messages Manual*	For OMEGAMON II, OMEGAVIEW, CT/Engine, and End-to-End Response Time Feature (ETE), lists messages issued, their explanations, and suggested responses.

These What's New pages summarize the new features of Version 520. You can find these pages after the preface in OMEGAMON II for Mainframe Networks (non-install) manuals.

New Product Name

This Candle product has a new name. It changed from OMEGAMON II for VTAM to OMEGAMON II for Mainframe Networks. The new name better expresses the monitoring scope of the product. This product supports monitoring of SNA ***and*** TCP/IP networks.

TCP/IP Support Enhanced

These are the enhancements to TCP/IP support in this release.

TCP/IP Console

- From any TCP/IP panel, F6 (Console) takes you to an extended MVS console panel where you can enter any TCP/IP or MVS command for which you are authorized.
- The Commands pulldown provides prompts of commands and parameters to help you build TCP/IP user, display, modify or vary commands.
- The Commands pulldown also includes a MIB browser. It provides prompts of nearly 1000 MIB variables. When you select a variable, a BULKWALK command is constructed for you.

TCP/IP Monitoring Options

- TCP/IP address space monitoring options are now divided into global options and exceptions panels.
- A new gateway exception alerts you when the link is down.
- Throughput exceptions specify whether the warning threshold should be less than or greater than the critical threshold.

TCP/IP Performance

- From the TCP/IP Status Summary panel, Action code S (Show Details) takes you to a new resource summary panel. In addition to information carried forward from the TCP/IP Status Summary panel, this panel displays information for the started task:
  - IP segments
  - IP discards
  - IP reassemblies and failures
  - IP fragmentation and failures
  - TCP retransmits
  - UDP discards

  The panel also shows whether the SNMP agent or subagent is down.
- The application and connection list panels are enhanced:
  - UDP datagram statistics are presented.
  - TCP retransmits are presented.
  - You can use the View Some selection on the View pulldown to filter the list.
  - You can use the Sort By selection on the View pulldown to sort by columns.
  - The Find key (F14) helps you find a specific object in a long list.
  - Using `M` in the command line, ISPF-like scrolling helps you reach a useful place in a long list.

Documentation

Online Documentation

With version 520, Candle Corporation has moved several manuals from IBM BookMaster to Adobe FrameMaker. The move was made to better enable us to address our customers' needs by providing tools that enhance productivity.

One of the results of the move is that it is no longer possible to create BookManager versions of the OMEGAMON II for Mainframe Networks manuals. However, the manuals remain available online in Adobe PDF format on CD-ROM and are also available on the Candle Corporation website at www.Candle.com.

The documentation CD provided with this release has robust and easy-to-use search capabilities. You can search for information in multiple versions and across products. The CD also provides easy setup of search indexes with a single click of the mouse.

If you want to order printed copies of the documentation, please contact your Candle Customer Support representative.

What's New

The Version Release Guide has been replaced by this What's New which appears after the preface in OMEGAMON II for Mainframe Networks (non-install) manuals.

User's Guide

- Enhancements to TCP/IP monitoring have been added to the TCP/IP chapter.
- TCP/IP monitoring options are described in the Monitoring Options chapter.
- The Exceptions appendix has been dropped because you can find the information online. The Exception Displays section in the Monitoring Network Performance chapter tells you how to access exceptions and exception recommendations online. Exceptions are generated when a threshold is exceeded. To view help for the threshold settings:
  - Select the Options pulldown from the Action Bar.

- Selection Monitoring Options.
- Select the type of monitoring option.
- Place the cursor on a threshold field.
- Press F1 (Help).
- The help panel explains the threshold.

Historical Reporting Guide

- TCP/IP SMF record layouts have been expanded.

Installing Candle Products

You can find software and DASD requirements in *Installing Candle Products on MVS*.

Configuration and Customization Guide

Includes the latest information on configuring OMEGAMON II for Mainframe Networks with CICAT and customizing outside of CICAT.

Candle Product Messages

You can find the messages generated by OMEGAMON II for Mainframe Networks, the End-to-End Response Time Feature and CT/Engine in a new composite messages manual, *Candle Products Messages Manual*.

Part I: Learning about OMEGAMON II

Chapter 1. Getting Started

Chapter Contents

Overview

This chapter introduces you to OMEGAMON II and to network tuning techniques. It summarizes the features of OMEGAMON II, explains approaches to tuning VTAM, and tells you how to navigate through OMEGAMON II's panels and use its interface most effectively.

Product Overview

OMEGAMON II gives you the tools to monitor and tune VTAM and the NCPs, lines, PUs, and LUs in your network. VTAM, which is started as an MVS subsystem in the host, consumes large amounts of host resources when the network is loaded. OMEGAMON II helps you analyze how VTAM is running. You can use OMEGAMON II's information in planning how to achieve and maintain network performance and availability levels.

Why Monitor VTAM?

Corporate computing needs place an increasingly heavy load on the network as LANs and distributed computing applications are added. Because the network has one of the highest availability requirements of all data center resources, it needs to be well tuned.

When network problems such as poor response time occur, most analysis tools look at front-end processor traces and queue lengths. In reality, VTAM slowdowns can cause those same response time symptoms. Often, it can be difficult to determine whether the problem originates in VTAM or elsewhere.

What OMEGAMON II Does

OMEGAMON II helps you determine whether short-term network problems are caused by VTAM, and also provides information that can help you plan a more efficient long-term network design and configuration.

OMEGAMON II guides you through the process of tuning VTAM and its communication with channel- and link-attached devices. These tuning techniques are based on the recommendations of two IBM documents: *VTAM Customization* and *VTAM Performance and Tuning*.

Because terminal response time is so closely related to network performance, OMEGAMON II includes an entire facility to monitor response time for terminals in session with host applications. OMEGAMON II also includes a

VTAM operator console interface and an interface with NetView or SOLVE:Netmaster.

OMEGAMON II gives you quick access to all its information through an easy-to-use SAA (Systems Application Architecture/Common User Access) interface. You can get online help for every facility, every panel, and input and output fields.

You can access the OMEGAMON II application directly through its own logon panel or through Candle's CL/SUPERSESSION®, CL/GATEWAY®, or OMEGAVIEW®.

Detecting NCP Resource Problems

Many large networks include NCPs to offload network management from the host. The OMEGAMON II NCP performance component enables you to tune your NCPs and also the SDLC and BSC lines, token-ring connections, PUs, and LUs connected to them. These are some of the problems that can degrade the performance of your network. OMEGAMON II can help you to detect them.

- NCP cycle shortage
- NCP storage shortage
- insufficient bandwidth
- high polling delays
- error retransmissions
- TIC congestion

Approaches to Tuning the Network

The basic objective of tuning your network is to avoid congestion by balancing the network's load among its resources. Network tuning generally involves compromises between actions that improve storage efficiency but increase the load on the processor, and actions that reduce the load on the processor but use more storage.

To improve storage efficiency, you can tune VTAM's buffer pools and control fluctuations in storage requirements. To reduce the load on the processor, you can minimize input/output interrupts and reduce the network overhead (for example, by preventing *thrashing*, which is a state of constant expansion and contraction of a buffer pool).

At your request, VTAM can supply tuning statistics for channel-to-channel adaptors (CTCs), network control programs (NCPs), and locally attached system network architecture (SNA) devices. VTAM attempts to schedule I/O to these devices in a way that reduces host overhead. By analyzing the tuning

statistics, OMEGAMON II calculates the amount of host overhead. For example, the tuning statistics may show that an NCP is interrupting the host too often. You can then make changes to VTAMLST to improve this condition.

Tuning VTAM to improve terminal response time requires a different technique. If OMEGAMON II finds that the majority of the terminal's response time is due to network delays outside VTAM, then changes to VTAM may not solve the problem. You need to examine response time to the terminal's subarea and along the network routes. Changing the session's virtual route or redistributing traffic by changing the class-of-service table may be the correct solution.

There are additional VTAM parameters monitored by OMEGAMON II, such as virtual route window size, that you can tune to improve network performance. The chapters that follow explain how you can tune VTAM by using the various kinds of information that OMEGAMON II provides. The rest of this chapter tells how to use OMEGAMON II's panels and navigation paths to access that information.

VTAM and NCP Versions Supported

OMEGAMON II supports the following releases:

- VTAM Versions 3.3 and above
- NCP Versions 4.3 and above

Earlier releases are not supported.

Standard User Interface

OMEGAMON II applies IBM's SAA/CUA standards to the user interface. SAA/CUA is a set of guidelines for how display panels should look and feel to display terminal users. IBM introduced CUA to encourage ease of use and consistency among software products developed for PCs, minicomputers, and mainframes. The following sections illustrate how these standards apply to OMEGAMON II.

Function Keys

Many of the tasks you perform with OMEGAMON II use the function keys, or F keys. These keys and their corresponding functions display at the bottom of each panel. For ease of use, function key assignments for all OMEGAMON II windows and menus are standardized. For example, pressing F1 at any OMEGAMON II panel causes a pop-up help window to appear, and pressing F5 refreshes the panel.

You will find that not all function key selections are available for every OMEGAMON II panel. Keys not relevant to the current panel are omitted. For example, panels with data that may continue over several panels display the backward and forward function keys, F7 and F8. Panels that don't require scrolling do not display these keys.

The following function key values are generally available throughout OMEGAMON II, although in some components they differ. The global function key selections are:

F1 Help Display help window for the current panel or field.

F2 Keys Toggle display of the function keys. From field help, display panel help. From panel help, display general help.

F3 Exit Exit the current panel, keeping all changes and additions made in any of the fields.

F4 Prompt Toggle through or display a list of valid input selections for a field. A plus (+) sign after an input field indicates that it is promptable.

F5 Refresh Clear and update the panel.

F6 Console Replace the current panel with the VTAM operator console. Upon exit from the console, the previous panel returns.

F7 Bkwd Scroll backward if more lines exist than can be displayed on the current panel.

F8 Fwd Scroll forward if more lines exist than can be displayed on the current panel.

F9 Retrieve Retrieve the last command issued and redisplay it on the command line. Press F9 repeatedly to retrieve up to 10 commands.

F10 Action bar	Move the cursor to the action bar entry field.
F11 Print	Capture the current OMEGAMON II panel for later printing.
F12 Cancel	Cancel the current panel, and erase any changes since you last pressed Enter. If you select several OMEGAMON II displays from a list with slash (/), then F12 displays the next panel in the sequence.
F14 Find	Move the cursor directly to a specified display entry.
F15 Status Display	Return to the OMEGAMON II main status panel.
F17 Clear counts	Clear and reset counts on response time panels.

Using the Action Bar

The action bar is the menu line at the top of the panel (the first line of Figure 1). You use it to make selections from pulldown menus, take shortcuts to other panels, and get help.

OMEGAMON II provides a standard set of action bar keyword choices. Some displays, such as the one shown below, contain the entire set, while others contain a subset of these choices.

```
____  Actions  Goto  View  Options  Help
--------------------------------------------------------------------------------
KONDAIDD           APPLIDs in Address Space $BDAPERA

Select with a "/"  or an action code.   Lines 1 to 7 of 7
   S=Sessions  A=Analysis  C=Control blocks  E=Exits  V=VTAM definition
+-------------------------------------------------------------------------------+
|             |              |              |          | ------Sessions-----  |
|   Applid    | State        | Status       | ACBNAME  |   Active    Pending  |
|-------------+--------------+--------------+----------+----------------------|
| _ BDAPA101  | ACTIVE       | READY        | BDAPA101 |        1 |         0 |
| _ BDAPA102  | ACTIVE       | READY        | BDAPA102 |        1 |         0 |
| _ BDAPA103  | ACTIVE       | READY        | BDAPA103 |        1 |         0 |
| _ BDAPA104  | ACTIVE       | READY        | BDAPA104 |        1 |         0 |
| _ BDAPA106  | ACTIVE       | READY        | BDAPA106 |        1 |         0 |
| _ BDAPA107  | ACTIVE       | READY        | BDAPA107 |        1 |         0 |
| _ COM1TSA1  | ACTIVE       | READY        | COM1TSA1 |        5 |         0 |
+-------------------------------------------------------------------------------+

Command ===> _____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 1. Standard Set of Action Bar Choices

The standard action bar choices are:

Actions Access the action codes applicable to the current panel.

Goto Navigate to different OMEGAMON II displays.

View Filter or sort the displayed data (see "Using the View Facility" on page 53).

Options Customize OMEGAMON II.

Help Access the various types of help available for OMEGAMON II (see "Using the Help Pulldown" on page 44).

To use the action bar, press F10 or the Home key to place the cursor in the action bar entry field. Enter the mnemonic for the action bar choice, which is the first letter of the choice.

Pulldown Menus

When you select a keyword choice from the action bar, OMEGAMON II displays a pulldown menu. A pulldown provides a list of further selections that you can make. The following figure shows a typical OMEGAMON II panel after **Actions** has been selected from the action bar.

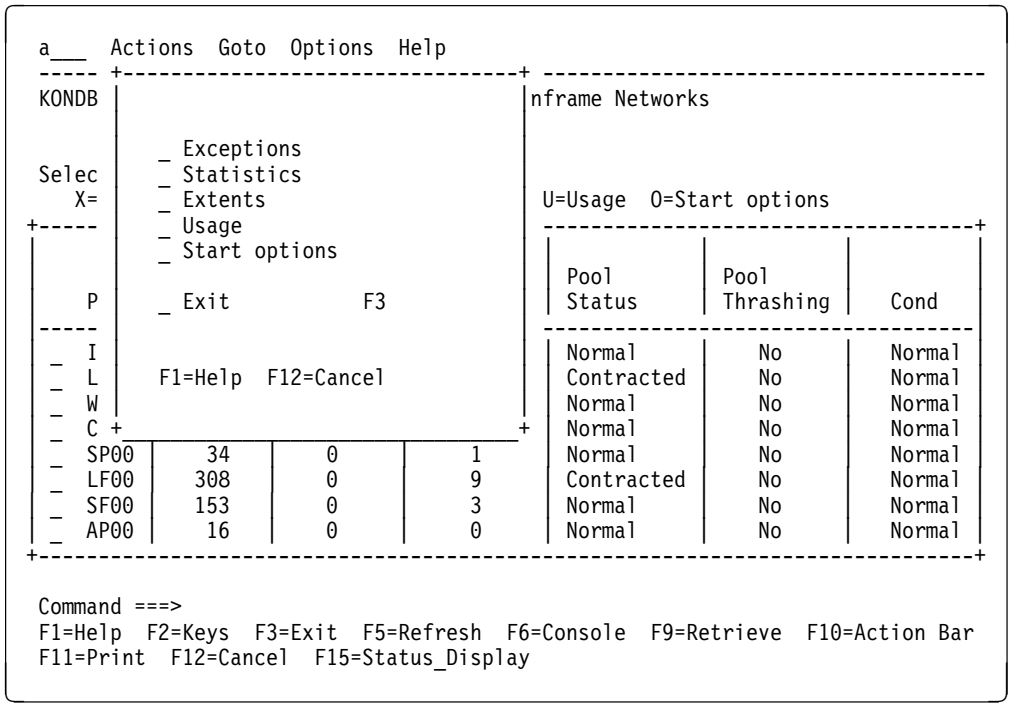


Figure 2. Panel with Actions Pulldown Menu

Although part of the underlying panel is visible, its selections and entry fields are unavailable. If you move the cursor outside the pulldown area and press a key, the cursor returns to the pulldown.

Pop-up Windows

Pop-up windows, as shown in the following figure, are small panels that are superimposed over the base panel. You invoke a pop-up by choosing a selection from a pulldown or by entering an action code. Pop-ups may prompt for further selections, provide alerts for possible error conditions, or display help or security information. Pop-ups can overlap each other, but you cannot use an underlying panel or window while a pop-up displays.

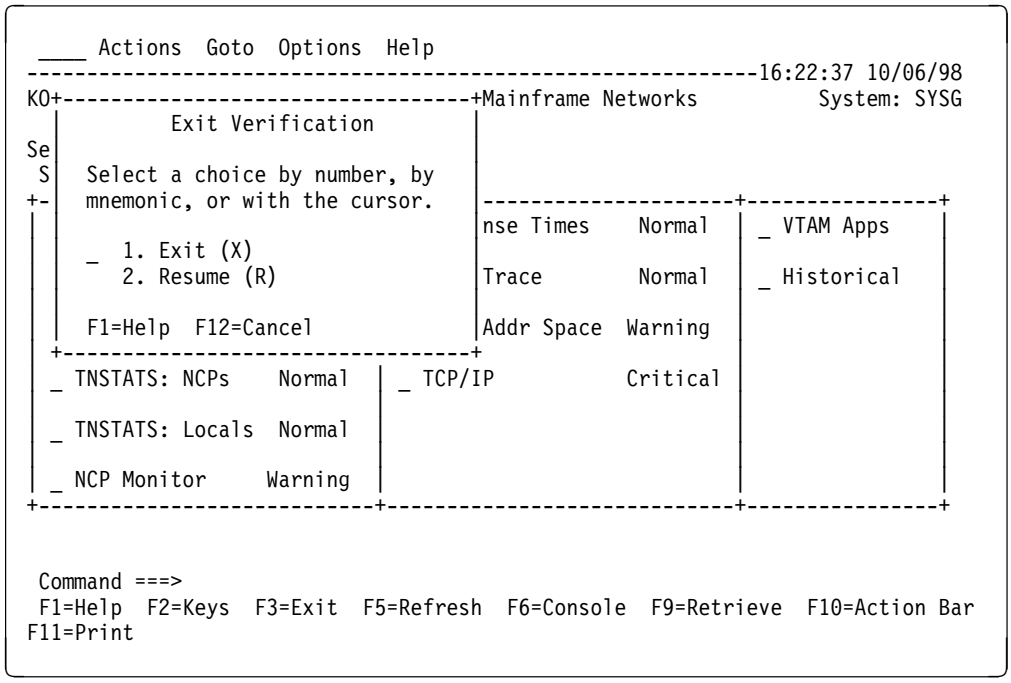


Figure 3. Panel with Pop-up Window

Selection Methods

OMEGAMON II provides several techniques for selecting items from panels, pulldowns, and pop-ups. The Exit Verification pop-up in Figure 3 on page 38 shows one set of techniques. On that pop-up, you can make a selection by any of the following methods:

- Enter the number of the desired selection.
- Enter the letter, or *mnemonic*, that represents the desired selection.
- Position the cursor to the left of the desired selection and press Enter.

These methods are available whenever you can select one and only one item from a list.

A different selection technique is available for selecting more than one item from a list. This involves typing a slash (/), to the left of each desired selection, and then pressing Enter. After the first selection displays, you use F12 to cycle through the rest of the selected displays.

For example, as shown in the following figure, when you select the Actions pulldown from the Buffer Pool Status Display, then select **Exceptions**, **Statistics**, and **Start Options** by typing a slash (/) next to each one, and then press Enter, OMEGAMON II displays the Buffer Pool Exceptions Display first. When you press F12 to cancel the Exceptions panel, the Buffer Pools Statistics Display appears. Similarly, the next time you press F12, the Buffer Pool Start Options Display appears. When you press F12 again, you return to the Buffer Pool Status Display, which is the underlying panel.

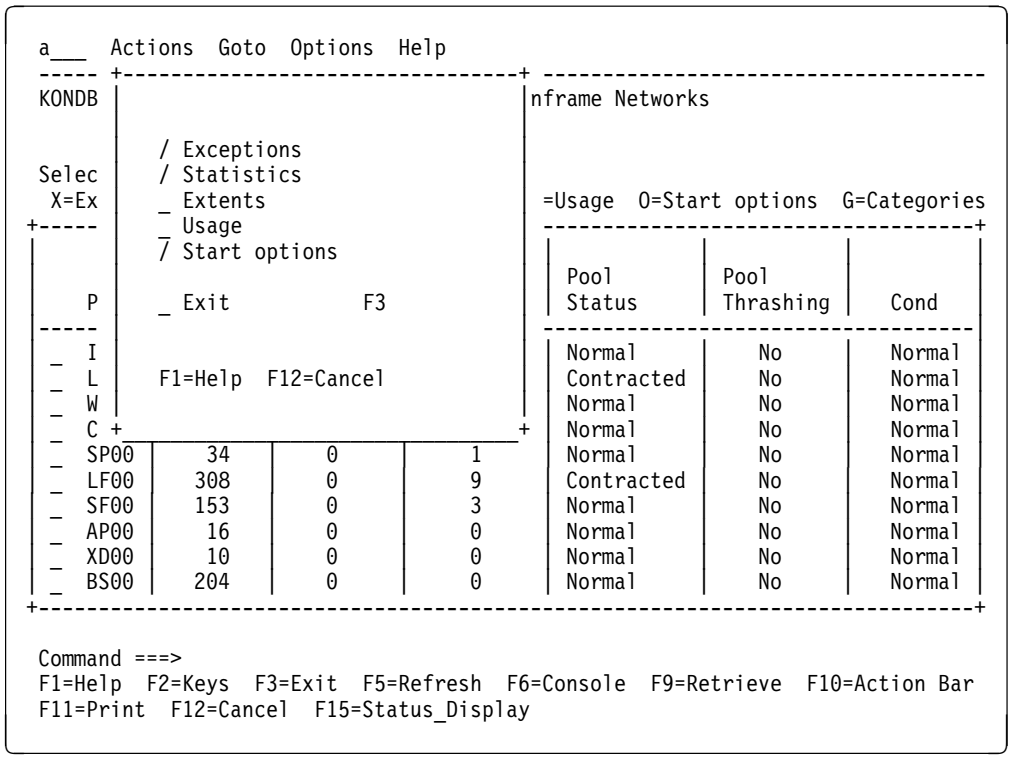


Figure 4. Selecting More than One Item from a List

Fastpath Methods

As an alternative, CUA provides *fastpath* methods for selecting pulldown menus and pop-up windows. For example, when selecting a pulldown, you can enter its letter code in the first field of the action bar (the input field to the left of the entire action bar).

As a further shortcut, you can enter the mnemonics that represent your choices for several levels of submenus at once. The OMEGAMON II limit is three levels of mnemonics.

These are some examples of fastpaths.

- To select **Exceptions** from the Goto pulldown and bypass the pulldown entirely, enter **GX** in the action bar entry field.
- To select Global Options from the Options pulldown and bypass the pulldown and its submenu, enter **OMO** in the action bar entry field.

Using Action Codes

You can use action codes to select panels without choosing them from the Actions pulldown. You tab to the selection you want on the panel and enter the action code. All available action codes display just above the data portion of each panel. Thus, entering **X** next to Buffer Pools displays buffer pool exceptions; entering **S** shows buffer pool details.

To choose *all* action codes for a selection:

1. Enter a plus sign (**+**) next to a display selection.
2. Press F12 once for each action, to cycle through all available actions

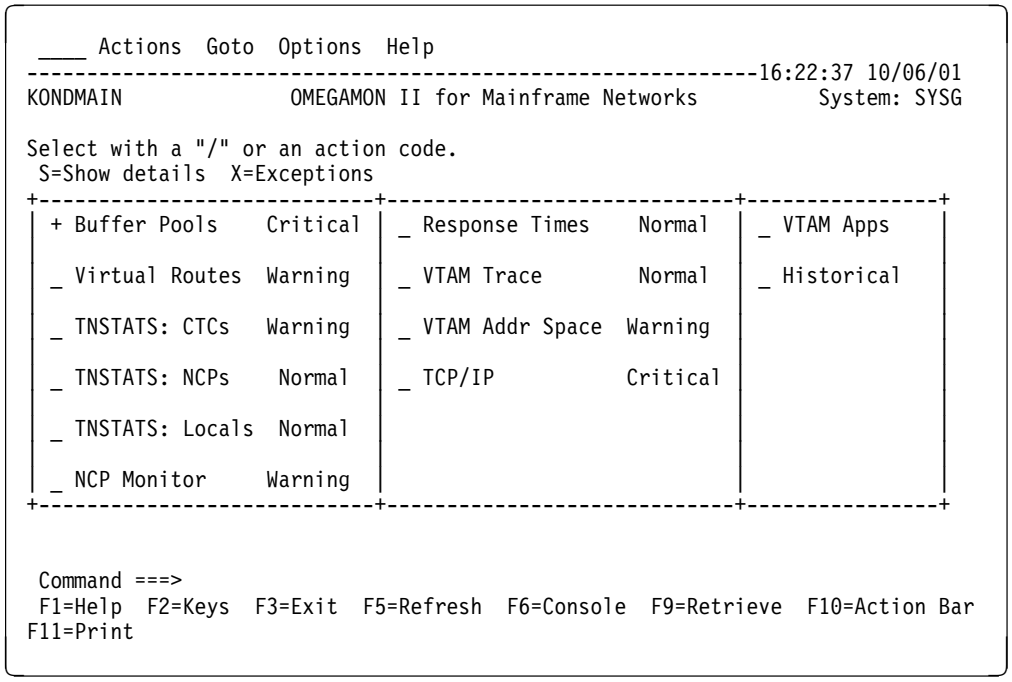


Figure 5. Selecting All Action Codes for Buffer Pools

This panel shows how to use the plus sign to select **all** action codes for the **Buffer Pools** selection on the main status panel. In this example, when you press Enter, you first see the Buffer Pool Exceptions panel (**X** action code). Then when you press F12, the Buffer Pools Status Display appears (**S** action code).

Panel Characteristics

The CUA-compliant conventions that OMEGAMON II panels follow are:

Attributes Color, highlighting, and underlining, as well as certain characters, identify types of text and fields. On a monochrome terminal, high intensity emphasizes fields. On a color terminal, yellow emphasizes fields. On some terminal types (such as 3290s), reverse video emphasizes fields.

Selection items On color terminals, white or blue text represents a selectable field. White indicates the field is available for selection; blue indicates the field is unavailable.

Fields Entry fields are underlined or highlighted. When a plus sign (+) follows an entry field, it is promptable. Asterisks (*) appear in output fields when information is unavailable.

Actions Actions selected from a menu take place immediately after you make the selection. However, when an ellipsis, or three dots, follows a menu selection, further information is required. You must choose from another submenu or add data in a pop-up window to complete the task.

Continuation notifiers If more than one window of information is required to complete a list, menu, or task, the word **More** appears near the upper right corner of the panel. Next to the word is either a **+** or a **-**. If **+** appears, press F8 to see the next panel. If **-** appears, press F7 to see the previous panel.

Empty panels If a panel displays for which there is no data, the data fields contain asterisks. For example, if VTAM has no local terminals attached, the Local TNSTATS panels show asterisks in all the data fields.

Using Panel and Field Help

OMEGAMON II provides help for every panel. To obtain help for the panel as a whole, position the cursor anywhere in the panel that is not an entry or display field and press F1 (Help). A help window displays information about that panel.

There is also context-sensitive help for many of the fields on each panel. To get help for a particular field (including output or read-only fields), move the cursor into the field and press F1. A help window displays information about that field as shown in the following figure.

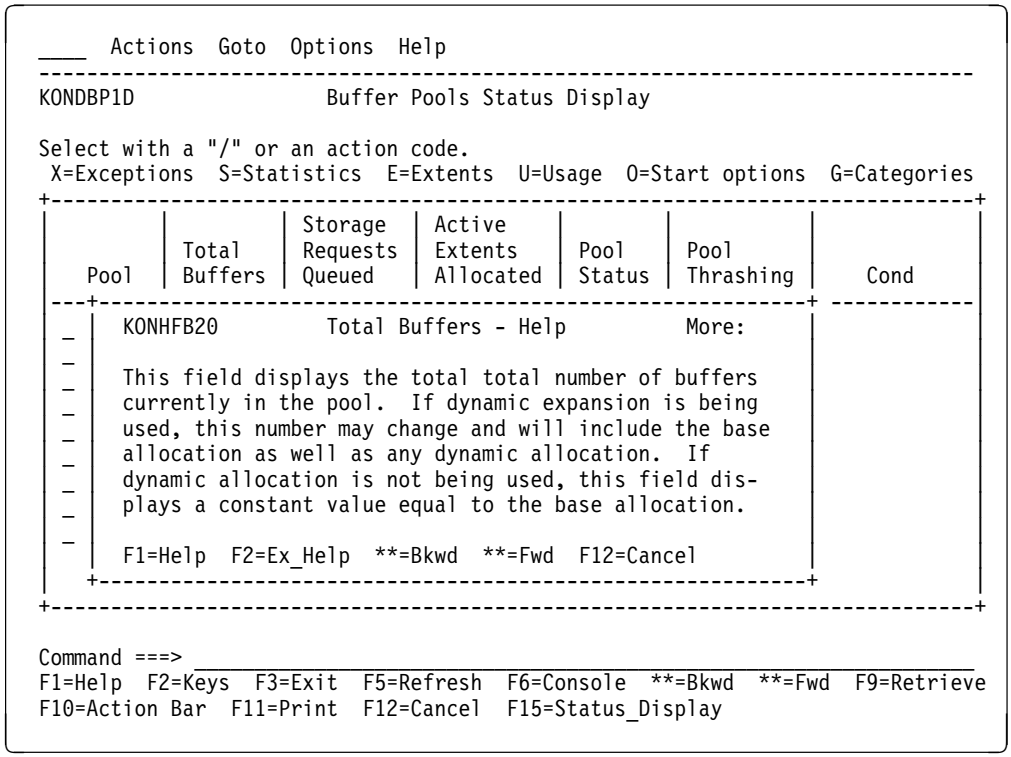


Figure 6. Field-Level Help

F1

Panel and field-level helps are more technically comprehensive and more detailed than the descriptions found in this document. To remind you that more technical information is available you will see this help icon throughout this document.

After you select field help, you can get extended help by pressing F2. Extended help provides additional information about the current panel as a whole. When you have finished viewing help, press F12 to return to the previous panel.

Using the Help Pulldown

You can select general help from any OMEGAMON II panel. Position the cursor next to the **Help** action bar choice and press Enter. A pulldown menu lists the types of help available as in the following figure.

To select a particular type of help, position the cursor to the left of the selection and press Enter.

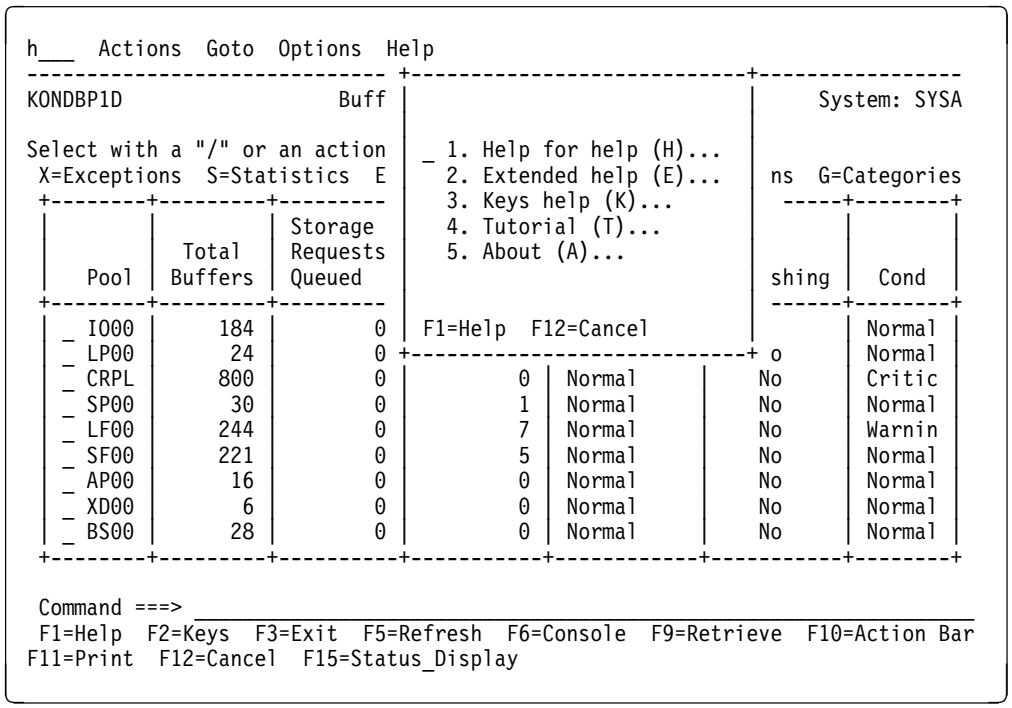


Figure 7. Help Pulldown Menu

The Help pulldown includes five selections:

Help for help Tells how to navigate through the help panels.

Extended help Describes the current panel as a whole.

Keys help Describes the function keys, as well as any other special purpose keys.

Tutorial Contains instructions and techniques for using the CUA interface.

About Shows logo, copyright, and product version information.

Exception Recommendations

On Exceptions displays, OMEGAMON II provides action code S (Show recommendations). If you enter **S** next to a selected exception, you can view an explanation of the exception and its implications, recommendations for how to improve the condition, background information, and how to modify thresholds. The following figure shows an example of an exception recommendation.

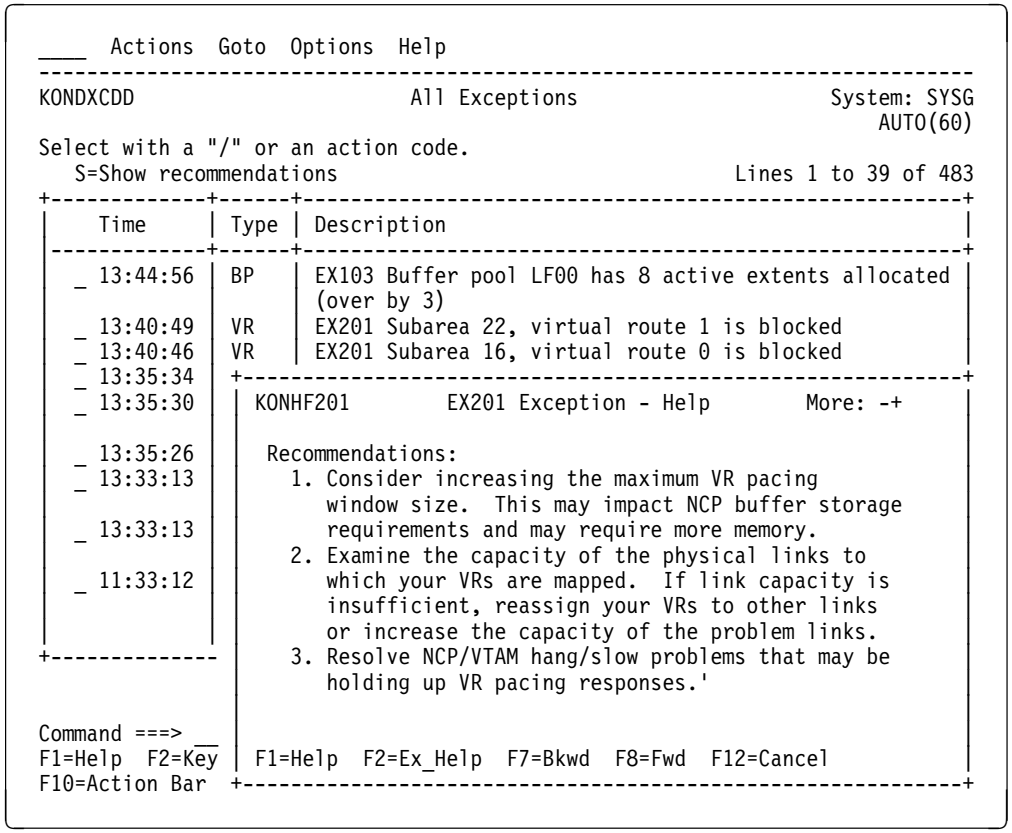


Figure 8. Exception Recommendation

Enter **0** (for Options) in the action bar entry field to customize various aspects of OMEGAMON II. The Options pulldown appears.

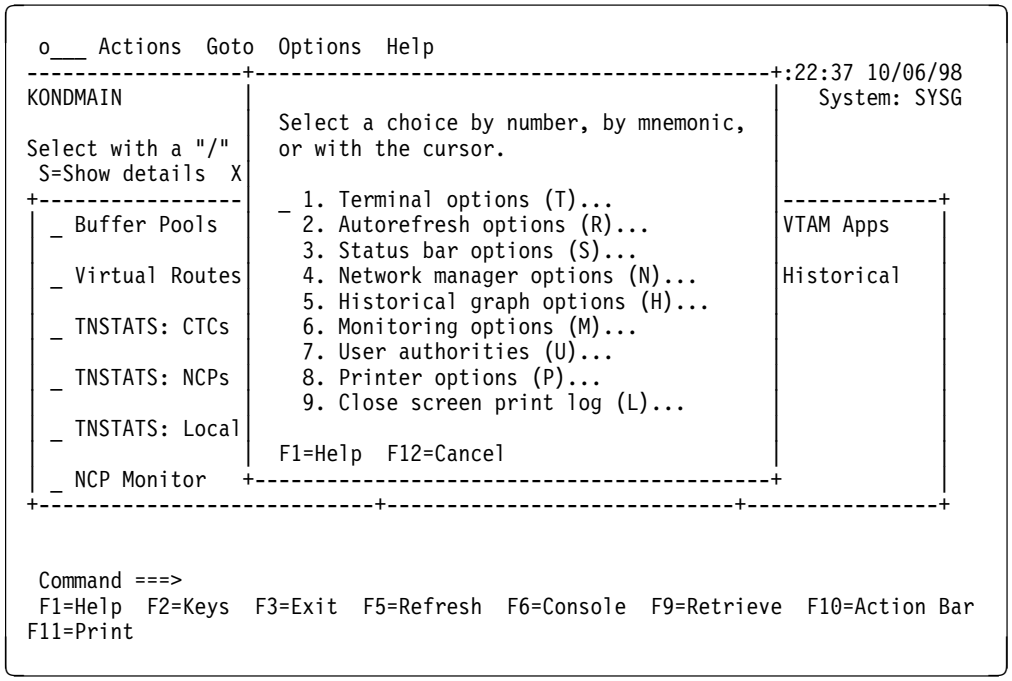


Figure 9. Options Pulldown

The Options pulldown selections fall into the following categories:

User defaults Use to customize your OMEGAMON II user interface, NetView or Netmaster access, and data refresh interval.

Historical graphs Use to setup display and print of color historical graphs. See the information about SAS reporting in the *OMEGAMON II for Mainframe Networks Historical Reporting Guide*.

Administrator functions

System administrators use these to set exception thresholds and levels of OMEGAMON II access. Those without administrator authority may browse these settings. See “Monitoring Options” on page 323 and “User Authorities” on page 353.

Print functions Use to specify printer options and print selected OMEGAMON II panels or VTAM traces.

Terminal Options

Select **Terminal Options** to modify OMEGAMON II panel characteristics. The default setting is **Yes** for all options. Press F4 (Prompt) to toggle the setting to **No**.

```
+---------------------------------------------+
|  KONDOTOD     Terminal Options              |
|                                             |
|  Type terminal options and press Enter.     |
|                                             |
|  Panel ids. . . . . . . . . Yes +  (Yes/No) |
|  Message ids. . . . . . . . Yes +  (Yes/No) |
|  Message beep . . . . . . . Yes +  (Yes/No) |
|  Action code instructions   Yes +  (Yes/No) |
|  Date and time. . . . . . . Yes +  (Yes/No) |
|  Display function keys. . . Yes +  (Yes/No) |
|  Implicit action. . . . . . Yes +  (Yes/No) |
|                                             |
|                                             |
|  F1=Help  F4=Prompt  F12=Cancel             |
+---------------------------------------------+
```

Figure 10. Terminal Options Pop-up

Option	*Default (Yes):*
Panel IDs	Display the panel name.
Message IDs	Display the message text with the message number.
Message beep	Accompany warning and critical messages with a beep.
Action code instructions	Display a reminder line that shows the valid action choices.
Date and time	Display the date and time.
Display function keys	Display function key settings at bottom of panel.
Implicit action	When the cursor is in an action entry field, use the default action code when you press Enter. The default action code is always the first one listed.

Autorefresh Options

Select **Autorefresh Options** to refresh some OMEGAMON II panels (for example, the response time panels) automatically, rather than manually with the F5 key. Use this panel to activate autorefresh and specify the refresh interval.

```
+--------------------------------------------+
|  KONDOARD     Autorefresh Options          |
|                                            |
|  Type autorefresh options and press Enter. |
|                                            |
|  Autorefresh active. . . . No +   (Yes/No) |
|  Autorefresh seconds . . . 60__   (10-3600)|
|                                            |
|                                            |
|  F1=Help  F4=Prompt  F12=Cancel            |
+--------------------------------------------+
```

Figure 11. Autorefresh Options Pop-up

If you set both the autorefresh and one or more of the main status beep options, you will know when VTAM exceptions are occurring without having to watch the terminal. The beep alerts you when any status light on the main status panel indicates a warning or critical condition. (See "Terminal Beep Option" on page 50.)

When you activate autorefresh, **AUTO** and the interval in seconds appears at the upper-right of any display that supports autorefresh. The following panel shows 60 seconds.

```
 ____ Actions  Goto  Options  Help
-------------------------------------------------------------16:22:37 04/18/01
KONDMAIN              OMEGAMON II for Mainframe Networks          System: SYSG
                                                                     AUTO (60)
Select with a "/" or an action code.
 S=Show details  X=Exceptions
+----------------------------+-----------------------------+----------------+
| _ Buffer Pools    Critical | _ Response Times    Normal  | _ VTAM Apps    |
| _ Virtual Routes  Warning  | _ VTAM Trace        Normal  | _ Historical   |
| _ TNSTATS: CTCs   Warning  | _ VTAM Addr Space  Warning  |                |
| _ TNSTATS: NCPs    Normal  | _ TCP/IP           Critical |                |
| _ TNSTATS: Locals  Normal  |                             |                |
| _ NCP Monitor     Warning  |                             |                |
+----------------------------+-----------------------------+----------------+


 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print
```

Figure 12. Autorefresh Indicator

Status Bar Options

Many OMEGAMON II panels display status lights that indicate the health of different parts of VTAM and the network. Based on thresholds set by the OMEGAMON II administrator, the status lights tell you whether an area is normal (green), may have a problem (yellow), or is in critical condition (red). A turquoise light may indicate that the monitor for that area is idle, response time monitoring is disabled, or the response time module is an incompatible version.

If you have a monochrome monitor or if you have impaired color vision, the text printed in the status light area tells you the current status. The default status text is:

Normal	If status light is green.
Warning	If status light is yellow.
Critical	If status light is red.
Idle	If status light is turquoise.

Note: The VTAM Trace status light is unlike the others and displays as follows:

Green	If one or more traces is running.
Yellow	If traces have completed.
Red	If traces have ended abnormally.
Turquoise	If no traces are active.

To change the text that appears in the status light area, select **`Status Bar Options`** from the Options pulldown. Modify the text for any status type.

For more information on the status lights, see “Monitoring Network Performance” on page 57. For information on setting thresholds, see “Monitoring Options” on page 323.

```
KONDOSBD     Status Bar Options

Type status bar options and press Enter.

Idle status text . . . . . Idle_____
Normal status text . . . . Normal___
Warning status text  . . . Warning__
Critical status text . . . Critical_

VTAM Status Display Beep
  Buffer pools . . . . . No_   +  (Yes/No)
  Virtual routes . . . . . No_   +  (Yes/No)
  Response times . . . . . No_   +  (Yes/No)
  VTAM environment . . . . No_   +  (Yes/No)
  TNSTATS for CTCs . . . . No_   +  (Yes/No)
  TNSTATS for NCPs . . . . No_   +  (Yes/No)
  TNSTATS for LOCALs . . . No_   +  (Yes/No)
  VTAM trace . . . . . No_   +  (Yes/No)
  NCP performance. . . . . No_   +  (Yes/No)

F1=Help  F4=Prompt  F12=Cancel
```

Figure 13. Status Bar Options Pop-up

Terminal Beep Option

The nine fields indented below VTAM Status Display Beep on this pop-up correspond to the nine status bar lights displayed on the main status panel. The values for the entry fields (Yes or No) control which of the status bar lights can cause the terminal to beep when the main status panel is displayed. If Yes is specified for a status bar, the terminal will beep when a warning or critical condition exists and the panel is refreshed.

The beep option is specific to each individual user and is activated only when the user requests it. These settings are saved across OMEGAMON II sessions.

Network Manager Interface Options

You can toggle between OMEGAMON II and NetView or SOLVE:Netmaster by defining **Network Manager Options** as follows:

```
+-----------------------------------------------+
|  KONDONMD     Network Manager Options         |
|                                               |
|  Type network manager options and press Enter.|
|                                               |
|  Network manager applid . . ________          |
|  Network manager hotkey . . _____ +           |
|  Network manager logmode. . ________          |
|                                               |
|                                               |
|  F1=Help  F4=Prompt  F12=Cancel               |
+-----------------------------------------------+
```

Figure 14. Network Manager Options Pop-up

Network Manager applid
Enter the NetView or Netmaster applid you want to use.

Network Manager hotkey
Enter the name of the key you want to use to toggle between the network manager and OMEGAMON II. For a list of valid key choices, move the cursor into the **Network manager hotkey** input field and press F4. Once the key is defined, you can toggle between OMEGAMON II and the network manager, and perform the network manager transactions.

If you access OMEGAMON II from Candle's CL/SUPERSESSION or CL/CONFERENCE, be sure the hotkey you specify does not conflict with any CL/SUPERSESSION or CL/CONFERENCE control keys.

Network Manager logmode
If you want to use a different terminal logmode to sign onto NetView or Netmaster than you used to sign onto OMEGAMON II, enter the logmode in this field. Otherwise, OMEGAMON II defaults to the current logmode.

Note: When using the historical graphs feature of OMEGAMON II (see the information about SAS reporting in the *OMEGAMON II for Mainframe Networks Historical Reporting Guide*), an active NetView or Netmaster session is automatically terminated. This is because OMEGAMON II defines the generating of historical graphs as a background session and only one such session is allowed to run under OMEGAMON II.

Printer Options

You can capture a panel for later printing by pressing the Print key, F11. When you elect to print the captured panels, OMEGAMON II allocates a SYSOUT dataset and puts the panel images on the dataset. The panel images appear on SYSOUT under the job name or started task name for the OMEGAMON II address space.

Select **Printer Options** to define SYSOUT, destination, copies, fold, form, hold, and routing information for printing screen images. These printer options are also used when printing VTAM trace reports. You must complete this panel before you can request a printout of OMEGAMON II panels or traces.

```
+-------------------------------------------------------------------+
|  KONDOPOD               Printer Options                           |
|                                                                   |
|  To reset a field to its default setting, clear the field.        |
|                                                                   |
|  Sysout class . . . . . A                                         |
|  Copies . . . . . 1_        (1-99)                                |
|  Destination. . . . . ________                                    |
|  Form name. . . . . ____                                          |
|  Hold output. . . . . No +       (Yes/No)                         |
|  Fold to uppercase. . . No +       (Yes/No)                       |
|  Routing information. . Send output to Linda Cummings__________   |
|                                                                   |
|                                                                   |
|  F1=Help  F4=Prompt  F12=Cancel                                   |
+-------------------------------------------------------------------+
```

Figure 15. Printer Options Pop-up

Close Screen Print Log Option

When you select this option, OMEGAMON II puts the panel images you have requested on the SYSOUT queue under the OMEGAMON II job or started task name. You receive a pop-up that tells you the number of panel captures that will be printed.

To print trace reports, see “Printing a Trace” on page 233.

Using the View Facility

Use the OMEGAMON II View facility to filter your VTAM data. You specify which data to display and in what order. When the view feature is available for a panel, the View choice appears on the action bar.

The figure below shows the choices available from the View pulldown for an Applications Analysis display (see "Applications Analysis" on page 297).

Note: The menu selections and some steps described below are specific to the Applications Analysis component of OMEGAMON II. The steps for using view in other components (i.e., virtual routes, historical graphs), may differ in details, but follow the same general procedure.

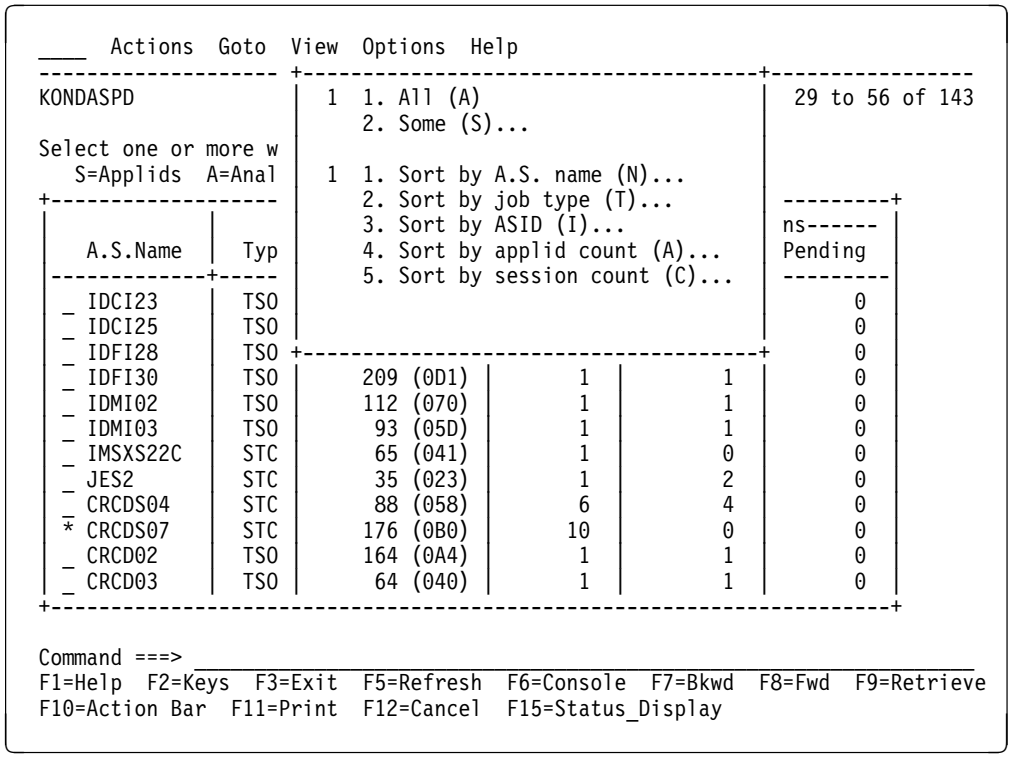


Figure 16. View Pulldown Selections for VTAM Application Data

View first asks you to choose whether you want to view All (the default) or Some (a selected subgroup) of the data.

To sort *all* data in a display, perform the following steps:

1. Select **All** from the View pulldown.
2. Then, move the cursor to the next group of menu selections and enter a sort option.
3. From the sort pop-up, enter whether to sort in ascending (the default) or descending order. The sorted information displays.

To sort a *subgroup* of data, perform the steps below.

1. Select **Some** from the View pulldown.
2. Then, move the cursor to the next group of menu selections, and enter a sort option. The View Some pop-up appears.

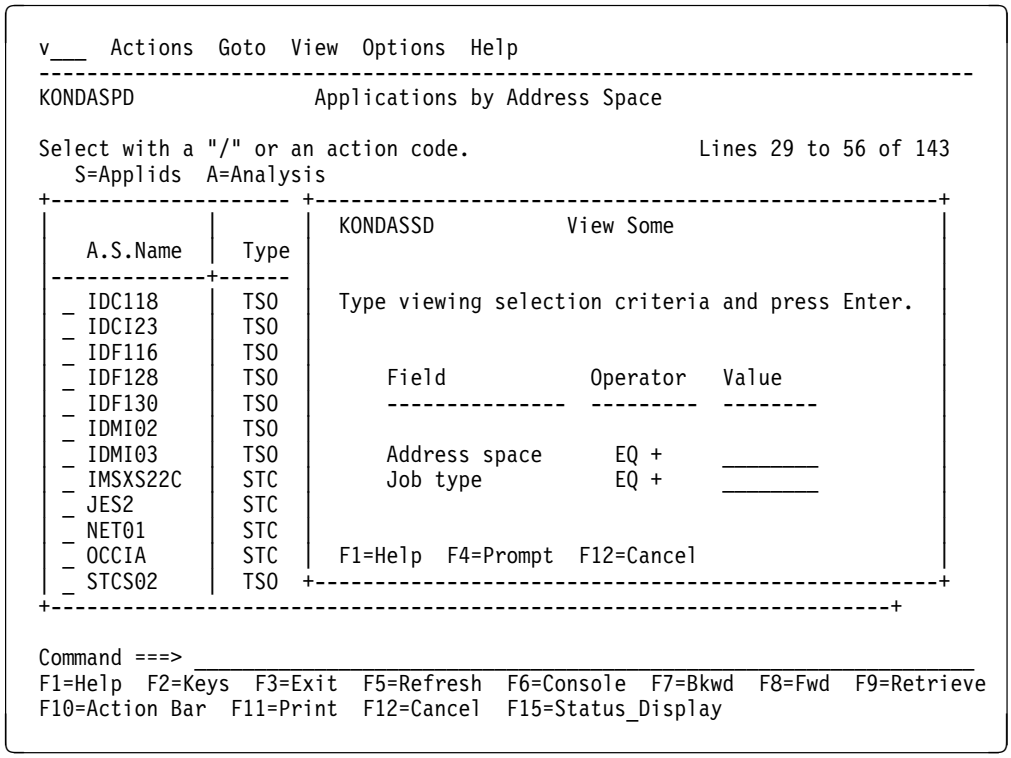


Figure 17. View Some Pop-up with Selection Criteria

The View Some pop-up contains the following selection criteria:

Field Type of data chosen as the sort option in the preceding step (in this example, address space). This field is read-only.

Operator Logical operator that acts on the value. The default is EQ, which means equal to the value entered. Press F4 to prompt for the five other logical operators available:

GT Greater than.
GE Greater than or equal to.
LT Less than.
LE Less than or equal to.
NE Not equal to.

For example, specify NE to select and sort any data *not* matching the value you entered in the Value field.

Value Subgroup key that you specify. To specify a generic value, enter the wildcard character asterisk(*) for the rest of the key value.

3. Enter whether to sort in ascending (the default) or descending order. The sorted data displays.

Issuing OMEGAMON II Commands

You can issue OMEGAMON II or VTAM commands in the **Command ===>** field at the bottom of every panel. Possible OMEGAMON II commands vary based on the current panel. For a description of available commands, press F1 or enter **Help** at the command line. Preface any VTAM command with **VTAM**.

These are some examples of OMEGAMON II commands.

ABENDS Display internal diagnostic information if an abend occurs.

Use this command under the direction of Candle Customer Support.

ANALYZE Invoke the resource analysis feature by specifying either an LU name or a network address. Use the following format to specify a resource name:

```
ANALYZE LU=luname
```

where *luname* is a valid logical unit name. An LU name can be an applid, a terminal, or a CDRSC.

Use the following format to specify a network address:

```
ANALYZE NA=addr
```

where *addr* is the base element address. (Enter in decimal format.) Be sure to enter the base element address of a resource that is defined within this VTAM's subarea.

KILLTSO Terminate the background session with TSO. Useful when finished viewing online historical graphs.

LOG Display the internal diagnostic information message log.

Use this command under the direction of Candle Customer Support.

SNAP *description*
Save a snapshot of the current panel, described by 1 to 40 characters, for later retrieval. For more details, see "Saving and Retrieving Panels" on page 69.

USERS Display current OMEGAMON II users.

VIEW *description*
Retrieve the panel captured and described by SNAP. For more details, see "Saving and Retrieving Panels" on page 69.

VTAM *command*
Issue the VTAM command without having to first select the VTAM console.

Exceptions and Messages

There are two kinds of OMEGAMON II messages:

Exceptions
From most panels, you can select the **Exceptions** action to display a list of exceptions, which describe current problems identified in the network for that component. You can then select an exception for which you can display an explanation and recommendations for resolving the problem.

An exception is generated when a threshold is exceeded. You can view online help for threshold settings under the Options pulldown. For more information about exceptions, see "Monitoring Network Performance" on page 57.

Product messages
OMEGAMON II generates messages to provide necessary information or alert you to an error.

The messages are found in the manual *Candle Products Messages Manual*.

Chapter 2.
Monitoring Network Performance

Chapter Contents

Overview

This chapter explains the facilities that OMEGAMON II uses to monitor performance. It begins by describing the OMEGAMON II main status panel, which provides status lights, exception detection, and navigation to the various OMEGAMON II data panels. The chapter then describes the exception monitoring facility, which displays a list of exceptions throughout the network. The chapter concludes with a description of OMEGAMON II's trending facility. This feature displays graphs of short-term trends for various kinds of network data.

Main Status Panel

After you log on, the main status panel appears (Figure 18).

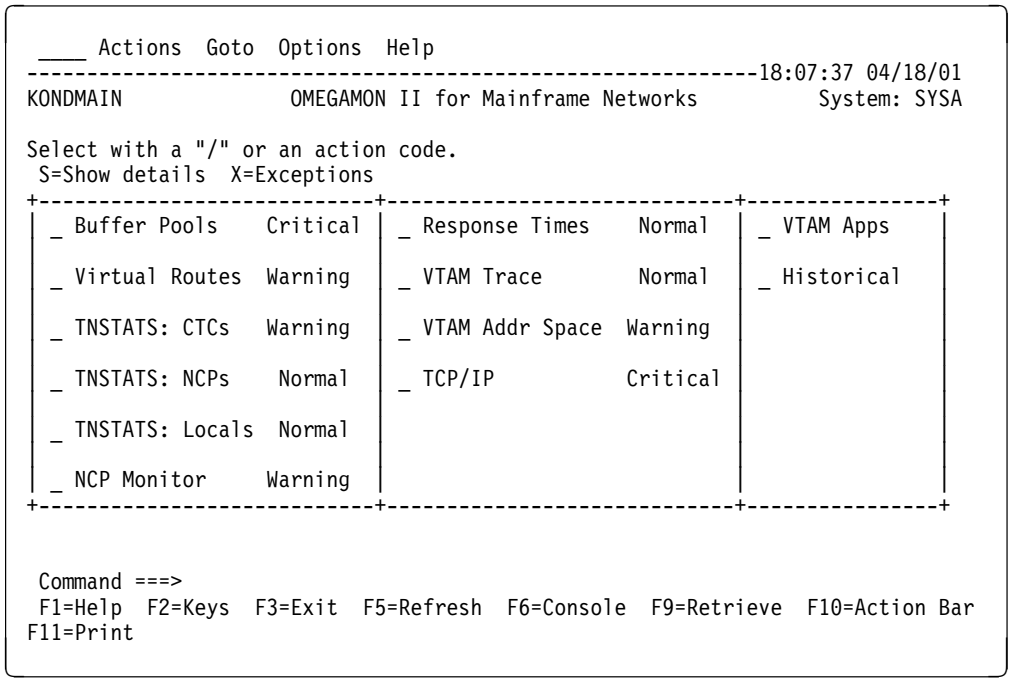


Figure 18. OMEGAMON II for Mainframe Networks Main Status Panel

The main status panel is the initial panel that appears after logon. Its two main purposes are to:

- display status lights indicating network conditions or problems
- serve as a central navigation point

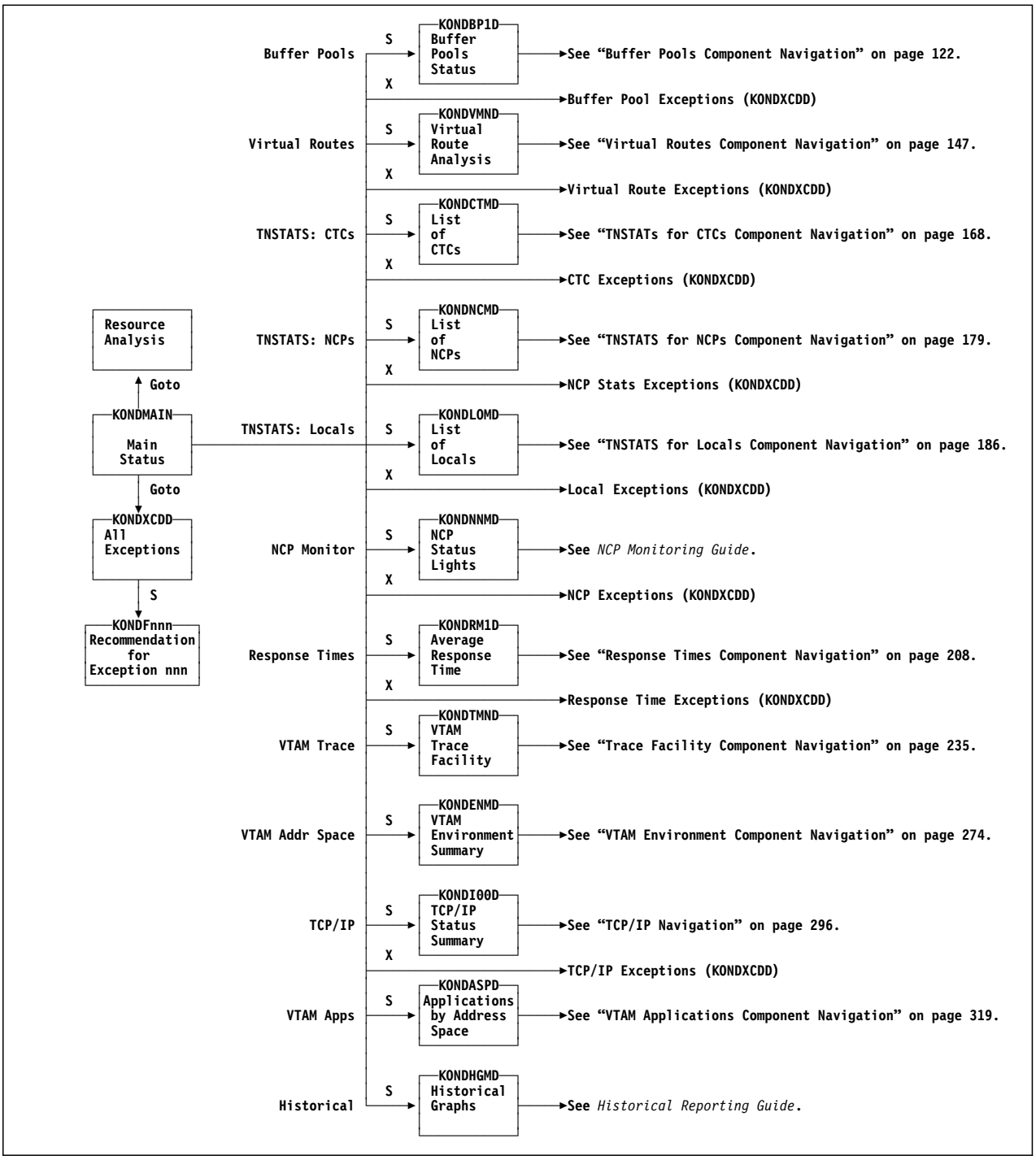
Navigation from Main Status Panel

The main status panel is the starting point for navigation to other panels. You can enter action code **S** (Show Details) next to a component to see performance details about that component. Then, you can navigate to further panels within the component by using action codes or the Goto pulldown. Refer to the navigation chart at the end of this chapter and at the end of each component chapter (such as buffer pools, virtual routes, or monitoring options).

Also, on the main status panel you can enter action code **X** (Exceptions) next to a component to see its current exceptions. Then you can enter action code **S** (Show Recommendations) next to a specific exception to see recommendations for handling the exception.

The following figure summarizes the navigation leading from the main status panel.

Main Status Navigation



Status Lights

Of the 13 status lights that comprise the central part of the Status Display, most are exception indicators. However, the VTAM Trace status light signals the status of any ongoing VTAM trace activity. Status lights are dynamic, informing you of the state of your network in real time.

Exceptions

Exception indicators inform you of the condition of certain network resources that are monitored in the background. The data for the exceptions is generated and refreshed according to the sampling interval (usually 20 or 30 seconds) specified in the Monitoring Options for each OMEGAMON II component (see "Monitoring Options" on page 323). Status lights based on exceptions are available for:

- buffer pools
- virtual routes
- response times
- NCP performance (NCPs, lines, PUs, and LUs)
- tuning statistics for channel-to-channel (CTC) connections
- tuning statistics for NCPs
- tuning statistics for locals
- TCP/IP address spaces

VTAM Trace

This status light keeps you apprised of the status of any ongoing VTAM trace activity. Whereas exception indicators provide information on network thresholds, the VTAM Trace status light indicates whether or not one or more trace events have occurred.

Status Light Color

Exception indicators are colored status lights that supply network information. Each indicator can be one of four colors:

Green	Normal condition.
Yellow	Warning condition.
Red	Critical condition.
Turquoise	Idle or disabled.

The VTAM trace indicator uses color differently:

Green	Trace(s) active.
Yellow	Trace(s) completed.
Turquoise	No traces currently running.
Red	Trace(s) abended or PIUs were lost.

A text label is printed inside the status light. If your terminal does not support extended attributes, you see text labels of the conditions and no status lights (as shown in Figure 18 on page 58). You can customize the default text inside the colored status light by selecting Status Bar Options from the Options pulldown, and changing the appropriate field (see "Status Bar Options" on page 49).

If a yellow status light is present, there is a potential problem in the network; if a red light is present, there is a definite problem in the network. To investigate a problem, you can follow one of the procedures in the following section.

Note: To display green, yellow, and red status lights on the main status panel for buffer pools, virtual routes, NCP performance, or CTC, NCP, or local tuning statistics, you must enable exception recording to the VSAM Log File. Otherwise, the component's status light displays as Idle (turquoise). To specify exception recording for each component, select Monitoring Options on the Options pulldown.

Main Status Beep

You can set any of the terminal beep options on the main status panel to alert you when there is a warning or critical condition for any specified component on the panel. The beep option is useful in autorefresh or normal operating mode. (See "Terminal Beep Option" on page 50.)

Although you can specify the beep option for the VTAM Environment component, use it with discretion. Depending on current system workloads, this component can frequently exceed exception thresholds.

You can activate both beep and autorefresh when you are running a VTAM trace. When the VTAM Trace status bar on the main status panel indicates that a trace has ended, the terminal will beep. Meanwhile you are free to do other work. The beep alerts you when the trace is ready to examine.

Exception Displays

To display exceptions for a network category for example, (buffer pools or virtual routes) tab to its entry field on the main status panel and enter **X**. You can display an exceptions list for any category except VTAM Trace and VTAM Environment.

Exception displays provide explanatory and quantitative information. Each exception shown is preceded by an identification number, the type of component (such as buffer pool, virtual route, or CTC), the time that the exception condition occurred, and an entry field.

You can also display a complete list of all the exceptions by selecting Exceptions from the Goto pulldown or by entering action code **X** on the command line. The following figure shows a sample panel for all exceptions being monitored in the network.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------------------------
KONDXCDD                        All Exceptions                    System: SYSG
                                                                     AUTO(60)
Select with a "/" or an action code.
   S=Show recommendations                                Lines 1 to 39 of 483
+-------------------------------------------------------------------------------+
|   Time     | Type | Description                                               |
+------------+------+-----------------------------------------------------------+
| _ 13:44:56 | BP   | EX103 Buffer pool LF00 has 8 active extents allocated     |
|            |      | (over by 3)                                               |
| _ 13:40:49 | BP   | EX103 Buffer pool LF00 has 8 active extents allocated     |
|            |      | (over by 3)                                               |
| _ 13:36:35 | BP   | EX101 Total buffers in CRPL is 860 (over by 360)          |
| _ 13:35:35 | BP   | EX103 Buffer pool LF00 has 8 active extents allocated     |
|            |      | (over by 3)                                               |
| _ 13:35:35 | BP   | EX101 Total buffers in CRPL is 860 (over by 360)          |
| _ 13:33:13 | CTC  | EX303 0C06 has 100.0 percent of its I/O due to            |
|            |      | priority PIUs (over by 90.0 %)                            |
| _ 13:33:13 | CTC  | EX303 0C15 has 81.0 percent of its I/O due to             |
|            |      | priority PIUs (over by 71.0 %)                            |
| _ 11:33:12 | BP   | EX107 TDCLS10  is using excessive buffers in the          |
|            |      | CRPL buffer pool. Number of buffers used is 80            |
|            |      | (9.7% percent of the pool)                                |
+-------------------------------------------------------------------------------+


Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 19. All Exceptions Panel

Exceptions are available for the current sampling interval as well as for previous sampling intervals. The period of time for which exceptions are retained for display is controlled with the Global Options selection of the Monitoring Options menu through the Options pulldown.

Exception Recommendations

To view an exception recommendation for a specific exception, enter action code **S** preceding the exception message. An exception recommendation includes:

- explanation, implications, and objectives
- recommendations for improving the condition
- background information
- how to modify thresholds

Exception Thresholds

Most exceptions are generated as the result of a value exceeding a threshold. Default values for exception thresholds are supplied with the product. Users with administrator authority may change threshold values. Any user may view them. (See "Monitoring Options" on page 323.)

Navigating by the Goto Pulldown

In some components, such as NCP performance, resource analysis and trends are available by using action codes.

In other places, certain panels are accessed by selecting the Goto pulldown and choosing one of the selections. You can access All Exceptions, VTAM Console, Resource Analysis, and trending panels via the Goto pulldown. The Goto menu selections vary depending on the current panel. As an example, the Goto pulldown menu for the main status panel is shown below.

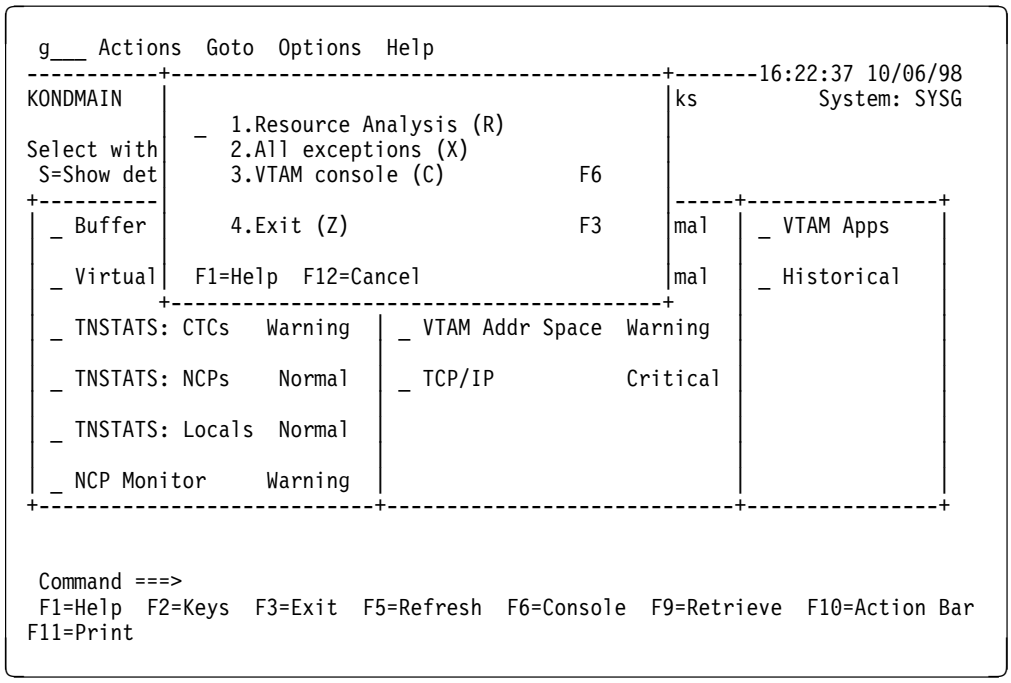


Figure 20. OMEGAMON II for Mainframe Networks Main Status Panel with Goto Pulldown

Resource Analysis Provides a quicker and more direct path to detailed information about a specific resource (see "Resource Analysis" on page 85).

VTAM console Takes you to the VTAM operator console, where you can enter VTAM commands (see "Using the VTAM Operator Console" on page 79).

Exceptions Displays a global exceptions panel (see "Exceptions" on page 61).

For help accessing a trending display via the Goto pulldown, refer to the trending navigation chart at the end of each relevant component chapter.

Response Times

To monitor response times, the End-to-End™ Response Time Feature must be installed and enabled. If an incompatible version of the End-to-End Response Time Feature has been installed (versions earlier than ETE Version 500) or if an internal error occurs in the ETE module, the Response Time status light is turquoise and contains the word **Error**. Check the job log for messages. If ETE is the wrong version, see the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide*, which also includes information on enabling and disabling ETE. If there seems to be an internal ETE module error, see the *End-to-End Response Time Feature Reference Manual*.

Response time monitoring requires the following:

1. End-to-End must be enabled and is the way OMEGAMON II is shipped.
2. Response time monitoring must be started. (See "How to Obtain Response Time Information" on page 196). The response time status light is set to turquoise and contains the word **Idle** until you start response time monitoring.

Using Trend Data

OMEGAMON II provides realtime network analysis data. While this information is useful, many network tuning decisions require data collection and analysis over longer periods of time. Trending displays, available for several OMEGAMON II selections, allow you to examine network data over the course of one or more days.

Trending information is available through the Goto pulldown for the following main status display selections:

- buffer pools
- virtual routes
- NCP performance
- tuning statistics for CTCs
- tuning statistics for NCPs
- tuning statistics for locals
- TCP/IP

The following figure shows a sample trend display for buffer pool usage. Each row lists pertinent data for the CRPL buffer pool and the recording interval in which data was collected. To set recording interval, sampling rate during those intervals, and hours of trending data to display, see "Monitoring Options" on page 323.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDBTRD              CRPL - Trend for Times Expanded             System: SYSA
                                                               Lines 1 to 9 of 14

The highest number of expansions for the collection period was 211.
+----------+----------+----------+---------+---------------------------------+
|   Date   |   Time   | Expans   | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
|----------+----------+----------+---------+---------------------------------|
| 08/31/93 | 10:49:08 |      211 | 100.0%  | ==============================> |
| 08/31/93 | 10:34:08 |      128 |  60.6%  | ==================>. . . . . |
| 08/31/93 | 10:19:08 |      164 |  77.7%  | ======================> . . . |
| 08/31/93 | 10:04:08 |      129 |  61.1%  | ==================>. . . . . |
| 08/31/93 | 09:49:08 |      162 |  76.7%  | ======================> . . . |
| 08/31/93 | 09:34:08 |      147 |  69.6%  | ====================>. . . . |
| 08/31/93 | 09:19:08 |      133 |  63.0%  | ==================>. . . . . |
| 08/31/93 | 09:04:08 |      129 |  61.1%  | ==================>. . . . . |
| 08/31/93 | 08:49:08 |        0 |   0.0%  | >. . . . . .                    |
| 08/31/93 | 08:34:08 |        0 |   0.0%  | >. . . . . .                    |
+----------+----------+----------+---------+---------------------------------+



Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 21. Trend Display for Number of CRPL Buffer Pool Expansions

In panels like this, the 100% point is set to the largest value found in an interval record (in this case 211). All other percentages are calculated against the 100% value.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

Chapter 3.
Saving and Retrieving Panels

Chapter Contents

Overview

This feature uses the facilities of the SNAP and VIEW commands. You use SNAP and VIEW to take a snapshot of an OMEGAMON II panel image and later retrieve it. You can use these commands to

- save and retrieve panel images across OMEGAMON II sessions
- prevent accidental snapshot replacement
- select snapshots form an individual user's directory
- print current or saved snapshots

You might save and retrieve or print snapshots of OMEGAMON II displays

- when there is an existing or potential network problem for problem reporting and determination
- to see network status occurring at various times of the day
- to compare trends of vital network statistics

Snapshot Storage

Snapshots are saved in a snapshot directory for each user under a unique description. The snapshot directory panel lists your snapshots. You can select from the directory panel to view, print, or delete snapshots.

Snapshots are stored in the Tables Database until user deletion. Although the Tables Database is a VSAM file which can extend, keep in mind that space is not unlimited. If the Tables Database runs out of space, error message KONCV116 will display.

Saving a Panel Image

To save a panel image for later retrieval, follow these steps.

1. On any OMEGAMON II panel that contains a command line at the bottom, enter SNAP on the command line followed by a description.

   ```
   SNAP description
   ```

   where description is 1 to 40 characters (including imbedded spaces).

   Result: The User Note pop-up appears. (See Figure 22 on page 74.)

2. Enter additional descriptive information or bypass entering a note by immediately pressing Enter or F12.

   Result: The result and next action differs depending on the description you entered with the SNAP command. See step 3.

3. Do one of the following:

   a. If you entered a unique description, no further action is required. The snapshot is saved in your own snapshot directory and a confirmation message appears above the command line.

      ```
      KONCV025 Request successful
      ```

   b. If you entered a description that already exists, a Duplicate Snapshot Description pop-up appears (see Figure 23 on page 74). Do one of the following:

      1) If you do not want to replace the existing snaphsot, enter another description that is unique.

         Result: Both the existing and new snapshots are saved and the KONCV025 confirmation message appears.

      2) If you want to replace the previously existing snapshot, press Enter.

         Result: The new snapshot is saved under the same name, replacing the existing snapshot, and the KONCV025 confirmation message appears.

Retrieving a Panel Image by Description

When you know the exact description of a previously save snapshot, on the command line of any OMEGAMON II panel that contains a command line, enter

```
VIEW description
```

where description is the exact description used when the snapshot was saved.

Result: The saved panel image appears with your description on the top line and the user note at the bottom right corner. The user note does not replace significant data. (See Figure 25 on page 76.)

Using the Snapshot Directory

When you do not know the snapshot description, enter **VIEW** without a description.

```
VIEW
```

Result: A directory of all of your snapshots appears, in alphabetical order by description. (See Figure 24 on page 75.)

Displaying a Snapshot

To display a snapshot, enter action code **S** (Show Snapshot) next to the description on the directory panel.

Result: The panel image appears with your description and annotation. (See Figure 25 on page 76.)

Finding a Snapshot

To locate your snapshot from a long directory listing:

1. Press F14 (Find).

   Result: The Find Description pop-up appears. (See Figure 26 on page 77.)

2. Enter a partial snapshot description in the pop-up.

   Result: The snapshot directory scrolls to the nearest matching description.

Printing a Snapshot

To print a snapshot, follow this procedure.

1. Enter action code **N** (Print Snapshot) next to the description on the directory panel.

   Result: The Screen Print Processing pop-up appears, giving you further instructions.

2. To proceed, press Enter.

   Result: The Screen Print Processing pop-up disappears.

3. To actually print the snapshot, select **Options** from the action bar and then select **Close Screen Print Log**.

   Result: A confirmation message appears.

   KONCV090 *n* screens routed for printing

Deleting a Snapshot

To delete a snapshot from the directory, enter action code **D** (Delete Snapshot) next to the description on the directory panel.

Result: The description disappears from the directory, and the snapshot is no longer available.

Snapshot Panels

The following panels and pop-ups are unique to saving and retrieving panel images using the SNAP and VIEW commands.

User Note Pop-up

When you request a snapshot, the User Note pop-up appears so you can annotate your snapshot.

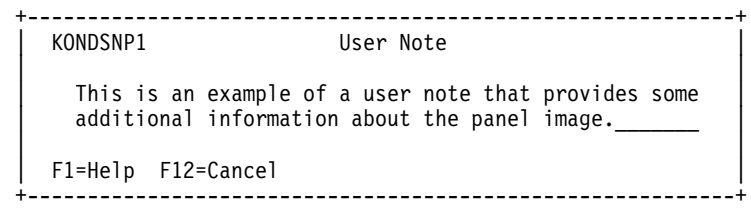


Figure 22. Enter a User Note

To bypass the note, press Enter or F12 immediately. Otherwise, enter your additional description information.

Duplicate Description Pop-up

When you enter a snapshot description that already exists, the Duplicate Snapshot Description pop-up appears.

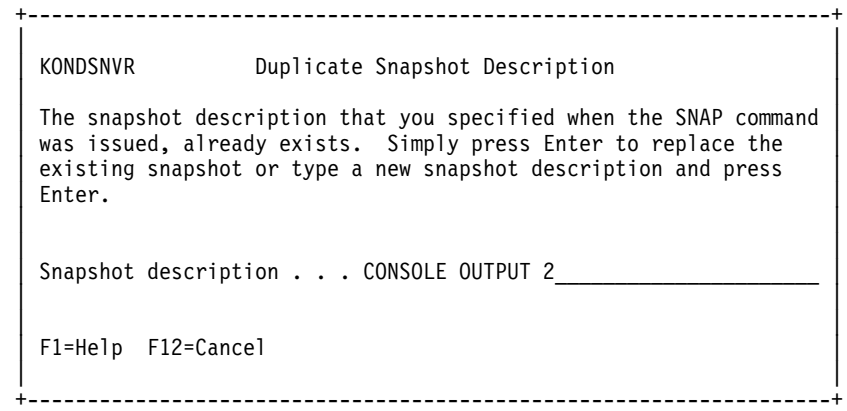


Figure 23. Duplicate Snapshot Description Pop-up

To replace the existing snapshot, press Enter. To keep the existing snapshot and also save the one requested, enter a new unique description.

Snapshot Directory

When you enter VIEW without a description, the Snapshot Directory appears.

```
____  Actions  Goto  Options  Help
--------------------------------------------------------------------------------
KONDSNVD                      Snapshot Directory                 System: SYSA

Select with a "/" or an action code.                          Lines 1 to 11 of 16
    S=Show snapshot  N=Print snapshot  D=Delete snapshot
+-----------------------------------------------+-------+----------+----------+
|                 Description                   | Notes |   Date   |   Time   |
+-----------------------------------------------+-------+----------+----------+
| _ BUFFER POOL IO00 EXTENTS                    |  YES  | 06/10/92 | 14:05:12 |
| _ BUFFER POOL START OPTIONS                   |  YES  | 01/19/92 | 10:32:05 |
| _ BUFFER POOL WP00 EXTENTS                    |  NO   | 06/12/92 | 11:09:14 |
| _ CONSOLE OUTPUT 2                            |  YES  | 10/14/92 | 18:20:02 |
| _ CTC TNSTATS                                 |  YES  | 10/04/92 | 15:22:08 |
| _ LOCAL TNSTATS                               |  NO   | 12/14/92 | 17:02:55 |
| _ NCP TNSTATS ANALYSIS                        |  NO   | 05/15/92 | 09:15:51 |
| _ RESPONSE TIME GROUPS                        |  NO   | 04/04/92 | 09:18:01 |
| _ RESPONSE TIME TERMINALS                     |  YES  | 04/08/92 | 10:17:45 |
| _ VIRTUAL ROUTEB BLOCKED                      |  YES  | 01/01/92 | 10:18:41 |
| _ VTAM CONSOLE D NET,APPLS COMMAND            |  NO   | 07/30/92 | 14:08:03 |
+-----------------------------------------------+-------+----------+----------+

Command ===> ____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 24. Snapshot Directory Panel

Notice that action codes S (Show snapshot), N (Print), and D (Delete) are available.

Snapshot Display

When you select a snapshot for viewing with the VIEW command or from the snapshot directory panel, your saved panel image appears as in the example below. Notice the description at the top of the panel and the user note at the bottom right. The user note appears in the command and function key lines so that you can view all the significant data in the snapshot.

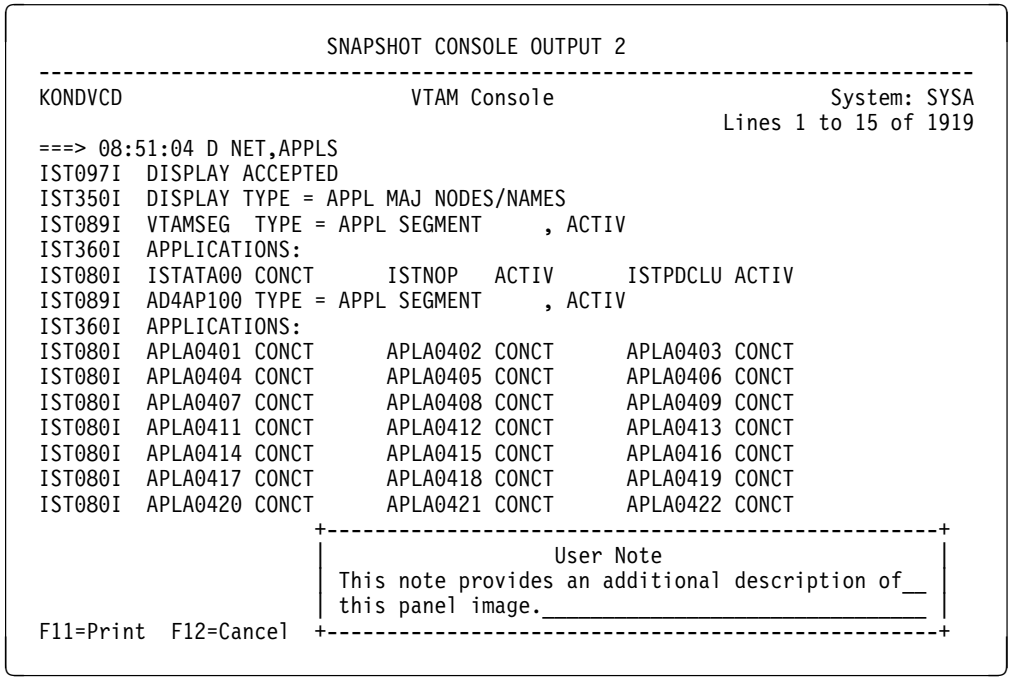


Figure 25. Snapshot Display Panel

Notice that the snapshot display has no action bar.

The only function keys available are

F11 (Print) Sends the panel image to the screen print log, which must be closed for actual printing (see the Options pulldown).

F12 (Cancel). Returns to the panel where you first entered the VIEW command.

Find Description Pop-up

When you press F14 (Find) while on the Snapshot Directory panel, the Find Description pop-up helps you locate your snapshot.

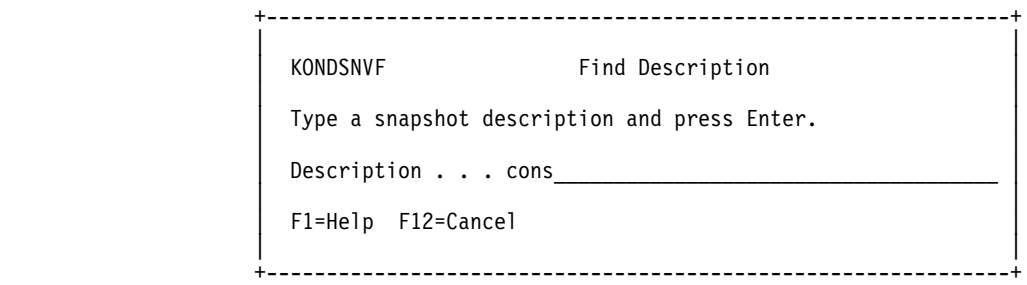


Figure 26. Find Description Pop-up

After you enter a partial description, the snapshot directory scrolls to the nearest matching description.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

Chapter 4. Using the VTAM Operator Console

Chapter Contents

Overview

You can issue VTAM operator commands directly from any OMEGAMON II panel, if you have been granted VTAM console access by your system administrator. OMEGAMON II also provides a console panel that logs and displays your VTAM commands and the resulting output; you can browse the console log as needed. Help windows provide templates of correct command syntax, and you can save and retrieve frequently issued commands. You can issue any VTAM command except HALT from OMEGAMON II.

Make sure that the OMEGAMON II console applid prefix specified in the Global Options selection of the Monitoring Options menu (accessed by the Options pulldown menu) agrees with the VTAMLST member used to define OMEGAMON II to VTAM. The applid prefix is the first six characters of the real applid name.

Issuing VTAM Commands

You can display the VTAM console from any panel by pressing F6. The VTAM Console panel appears.

For more information about the options on the Goto pulldown menu from the VTAM Console panel, see "Using the Goto Pulldown" on page 88.

```
____  Commands  Goto  Browse  Options  Help
--------------------------------------------------------------------------------
KONDVCD                        VTAM Console                     1 to 15 of 908

===> 16:57:23 D NET,APPLS,SCOPE=ACT
IST097I  DISPLAY  ACCEPTED
IST350I  DISPLAY TYPE = APPL MAJ NODES/NAMES
IST089I  VTAMSEG  TYPE = APPL SEGMENT     , ACTIV
IST360I  APPLICATIONS:
IST080I  CCCDRM01 ACTIV      ISTATA00 CONCT      ISTNOP   ACTIV
IST080I  ISTPDCLU ACTIV
IST089I  APLVTIIN TYPE = APPL SEGMENT     , ACTIV
IST360I  APPLICATIONS:
IST080I  VTIIN001 CONCT      VTIIN002 CONCT      VTIIN003 CONCT
IST080I  VTIIN004 CONCT      VTIIN005 CONCT      VTIIN006 CONCT
IST080I  VTIIN007 CONCT      VTIIN008 CONCT      VTIIN009 CONCT
IST080I  VTIIN010 CONCT      VTIINA01 CONCT      VTIINA02 CONCT
IST080I  VTIINA03 CONCT      VTIINA04 CONCT      VTIINA05 CONCT
IST080I  VTIINA06 CONCT      VTIINA07 CONCT      VTIINA08 CONCT


VTAM Command_____________________________________________________________________
F1=Help  F2=Keys F3=Exit  F4=Clear  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 27. VTAM Console Panel

You can issue VTAM operator commands at the VTAM Command line, or you can select commonly used commands through the Commands action bar choice.

To select and issue a command, follow these steps:

1. Select **Commands** from the action bar.

   The Commands pulldown menu shows four choices:

   User Stores your own selection of 1–50 commands in the User pop-up window for later retrieval.

   Once you have stored your personal VTAM commands, you can use fastpath selection characters to expedite the entry of these commands. For example, you can enter CU25 in the action bar entry field to retrieve the 25th command you specified in the User Commands pop-up.

   Enter commands in uppercase and command operands in lowercase. The cursor is positioned at the beginning of the lowercase operand, when the command is displayed, so that you can overtype it.

   Display Lists frequently used D NET,... commands.

   Modify Lists F NET,... commands.

   Vary Lists V NET,... commands.

2. Place the cursor to the left of the type of command you want to issue, and press Enter.

   A list of commands appears in a pop-up window.

3. Position the cursor to the left of the command you want to issue, or enter the selection number.

   The full command appears on the VTAM Command line at the bottom of the panel.

4. Edit the command if necessary. Pressing Enter issues the command.

   The resulting command output appears on your screen. If the console log is several panels long, use F8 and F7 to scroll through it; or select Browse from the action bar to navigate quickly to the specific information you want.

   You can use a string of selection letters in the action bar entry field to fastpath directly to a console log browse command. For example, if you enter BT, the console output display scrolls to the top. If you enter BB, the console output scrolls to the bottom.

5. To clear the console log, press F4. Until you either press F4 or exit OMEGAMON II, the console log is retained, and you can switch to other screens and then back to the console log display.

You can also issue VTAM commands directly from the **Command ===>** line of any panel by prefacing the command with VTAM (for example, **VTAM V NET,ACT,ID=TERM001**). This method of entering VTAM commands is useful when you are viewing an OMEGAMON II panel and want to enter several commands based on the display (for example, when you are viewing Applications by Address Space). The action bar VTAM command selections and the console help windows are available only on the VTAM Console panel.

Getting Help

For help on any command listed in a pulldown menu, position the cursor to the left of the command and press F1. A help window explains the command, shows the syntax, and provides a VTAM command line with the command already filled in. You can edit the command and issue it directly from the help window.

For example, suppose you want a list of all active application program major nodes and their associated minor nodes. From the VTAM Console screen action bar, select **Commands** and then select **Display**. The VTAM Display Commands pop-up appears.

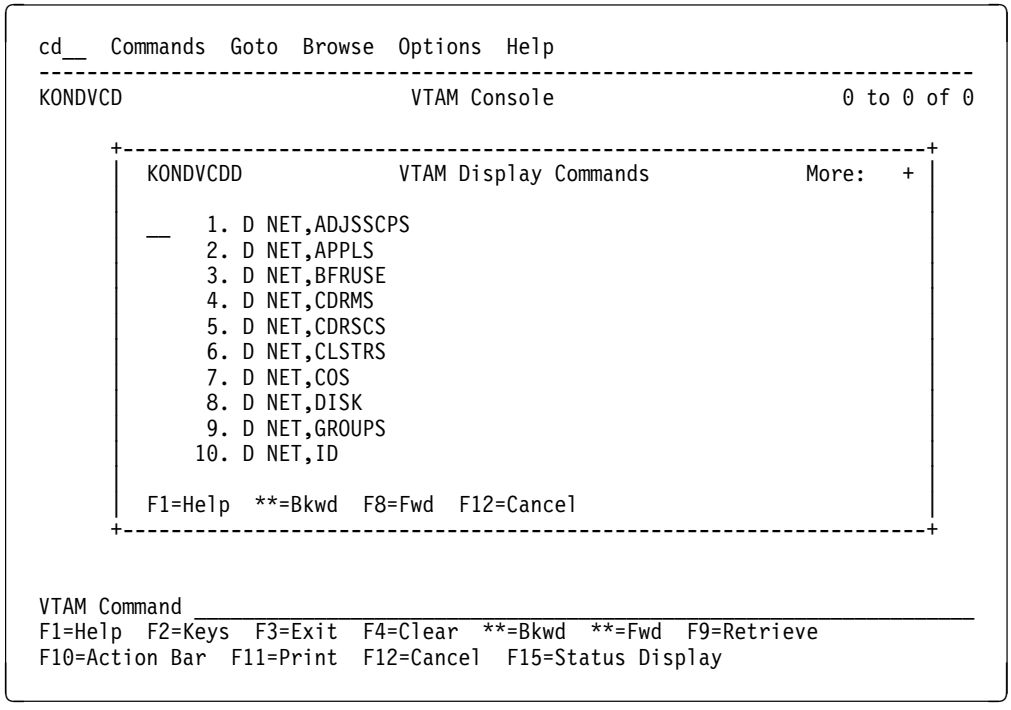


Figure 28. VTAM Display Commands Pop-up

The command you need (D NET, APPLS) is choice 2 on the list. However, if you issue the command as shown, the resulting display will show all applications, whether active or inactive.

If you cannot remember how to limit the console display to the active applications, position your cursor to the left of choice 2, D NET,APPLS and press F1 (see the previous). A help window appears as shown below.

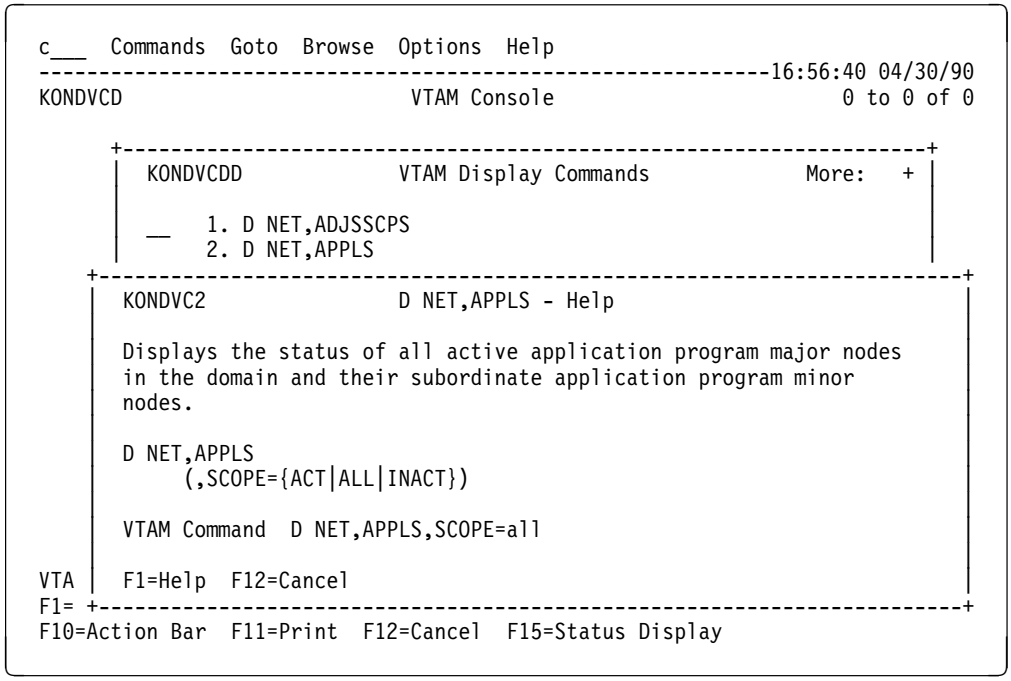


Figure 29. VTAM Command Help

The help window describes the command, shows the syntax, and gives you three choices for the SCOPE parameter: ACT, ALL, or INACT. At the bottom of the help window, the full command has already been entered for you. All you have to do is enter **ALL** instead of **ACT**.

Retrieving Commands

Until you clear the log (by pressing F4), log off OMEGAMON II, or restart VTAM, you can retrieve any command already issued. Press F9 once to retrieve the most recently issued command, twice to retrieve the previous command, and so on.

You can add the commands you most often use to the list on the VTAM User Commands panel. To access the User Commands pop-up, first select **Commands** from the action bar, then select **User** from the Commands pulldown. Enter your command to the right of one of the list numbers to store the command.

To retrieve a command stored in the User Commands list, position the cursor to the left of the command and press Enter. The command appears on the **VTAM Command** line at the bottom of the panel. Edit the command, if necessary, and issue it by pressing Enter.

Chapter 5. Resource Analysis

Chapter Contents

Overview

The resource analysis feature adds a powerful problem-solving tool to OMEGAMON II's set of resource analysis tools. This feature provides a direct path to detailed information about a specific resource.

Resource analysis enables you to view information about three types of resources: applications, terminals, and cross-domain resources (CDRSCs).

Both summary information and detailed session-level information are available. You can access information about control blocks and VTAM tables used for a particular resource or session.

Resource Types

The following are definitions of the resource types used with the resource analysis feature.

Applid Name of an application defined to VTAM in this domain.

CDRSC Name of a resource defined within another VTAM's domain.

Terminal Name of a resource defined to VTAM within this domain, using the LU, LOCAL, or TERMINAL definition statement.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

Analyzing VTAM Resources

Resource analysis allows you to choose among three points of entry:

- from the Goto pulldowns on the VTAM console and main status panels
- from the command line with the ANALYZE command (see "Issuing OMEGAMON II Commands" on page 55)
- from Virtual Route, Buffer Pools, Response Times, and NCP panels that include a Resource Analysis action code

Each of these methods allows you to select a resource to analyze (either by name or by its network address).

The data presented depends upon the type of resource selected: an applid, a terminal, or a CDRSC.

The following process explains how to analyze your selected resource.

1. When you select a resource, OMEGAMON II displays a panel that shows summary information.
2. From this panel, you can navigate to the panels displaying information about the active sessions for that resource.
3. You can then access information about control blocks and VTAM tables used for a particular session. Authorized users can also access VTAM console operator facilities.

Using the Goto Pulldown

Use the following procedure to invoke resource analysis from the Goto pulldown.

1. Select **Goto** from the action bar either on the main status or VTAM console panel.

   Result: The Goto pulldown appears.

2. Select Resource Analysis.

   Result: The Resource Analysis pop-up appears.

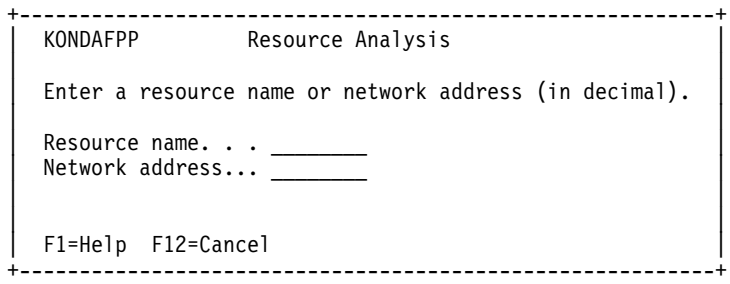


Figure 30. Resource Analysis Main Status Pop-up

3. Specify a resource name or network address. (The network address must be the base element address.)

   Result: The corresponding panel appears. See the following table.

IF...	THEN...
you specify an applid	the Resource Analysis for an Applid panel appears (Figure 31 on page 89)
you specify a terminal	the Resource Analysis for a Terminal panel appears (Figure 32 on page 90)
you specify a CDRSC	the Resource Analysis for a CDRSC panel appears (Figure 33 on page 91)

Resource Analysis for an Applid Panel

If you specify a resource that is an applid, the following panel appears.

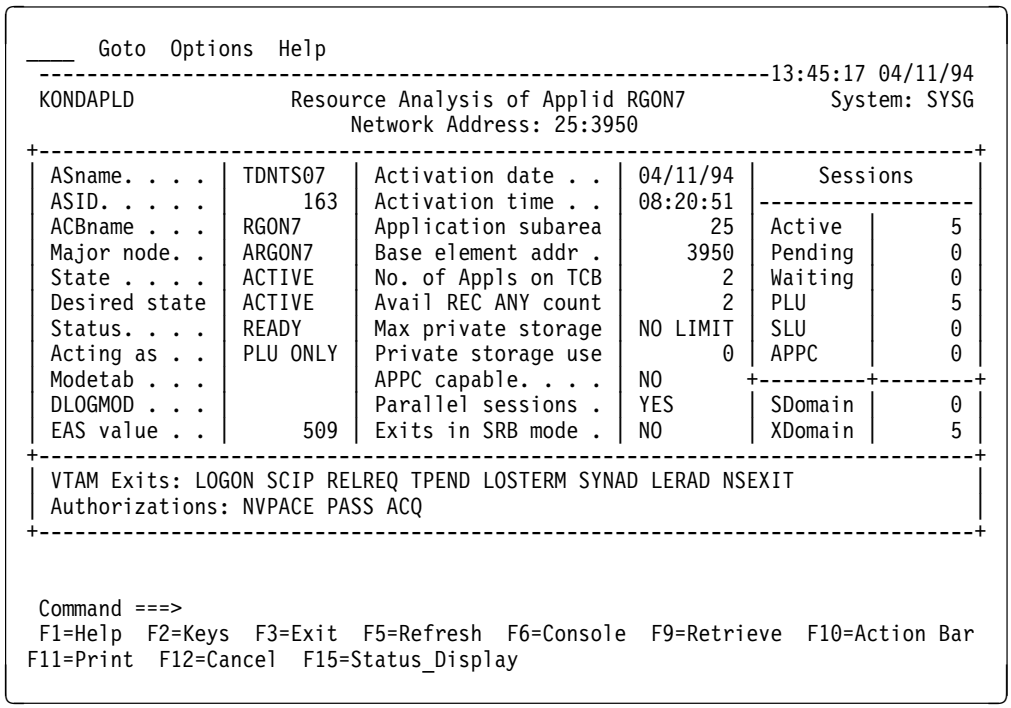


Figure 31. Resource Analysis for an Applid

To access more information, select the Goto pulldown menu from the action bar and select **Sessions** or **Control Blocks**.

IF...	AND IF...	THEN...
you select **Sessions**	only one session is available	the Session Analysis panel appears (Figure 35 on page 93)
you select **Sessions**	more than one session is available	the LUs in Session with a Resource panel appears (Figure 34 on page 92)
you select **Control Blocks**		the VTAM Control Blocks for Applid panel appears (“VTAM Control Blocks for Applid” on page 311)

Resource Analysis for a Terminal Panel

If you specify a resource that is a terminal, the following panel appears.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------12:24:18 08/31/94
 KONDARAD             Resource Analysis for Terminal L665          System: SYSG
                             Network Address 25:20

+---------------------------+----------+--------------------------+----------+
| LU activation date . . . . | 08/30/94 | Network ID . . . . . . . | CACOWLA1 |
| LU activation time . . . . | 07:52:45 | Owning NCP name. . . . . | NCP10Y   |
| State. . . . . . . . . . . | ACTIVE   | Owning line name . . . . | L900     |
| Desired state. . . . . . . | ACTIVE   | Owning PU name . . . . . | L900A    |
| LOGON mode table . . . . . | MODETAB1 | Subarea. . . . . . . . . |       25 |
| Default LOGMODE entry. . . | L32793B  | Element address. . . . . |       20 |
| Vary LOGON LOGMODE entry . |          | Unit address . . . . . . | 0665     |
| Active PLU sessions. . . . |        0 | USSTAB table name. . . . | USSTAB1  |
| Active SLU sessions. . . . |        1 | Major node name. . . . . | LOC660   |
| Pending sessions . . . . . |        0 | Major node type. . . . . | LCLNSNA  |
| Pacing n-count . . . . . . |        0 | VPacing n-count. . . . . |        0 |
| Pacing m-count . . . . . . |        0 | VPacing m-count. . . . . |        0 |
+---------------------------+----------+--------------------------+----------+

 Command ===> _____________________________________________________________
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 32. Resource Analysis for Terminals

To display session information, select **Sessions** from the Goto pulldown (or enter **GS** in the action bar entry field).

IF...	AND IF...	THEN...
you select **Sessions**	only one session is available	the Session Analysis panel appears (Figure 35 on page 93)
you select **Sessions**	more than one session is available	the LUs in Session with a Resource panel appears (Figure 34 on page 92)

Resource Analysis for a CDRSC Panel

If you specify a resource that is a cross-domain resource (CDRSC), the following panel appears.

```
____  Goto  Options  Help
 ------------------------------------------------------------10:49:04 05/10/95
 KONDACDD            Resource Analysis for CDRSC L0017121          System: SYSG
                            Network Address: 10:2740

+-------------------------------------------------------------------------------+
| State. . . . . . . . . . .| ACTIVE   | Major node name. . . . .| ISTCDRDY |
| Desired state. . . . . . .| ACTIVE   | Major node type. . . . .| CDRSC    |
| LOGON mode table . . . . .|          | Pacing n-count . . . . .|        0 |
| Default LOGMODE entry. . .|          | Pacing m-count . . . . .|        0 |
| Vary LOGON LOGMODE entry .|          | VPacing n-count. . . . .|        0 |
| Active PLU sessions. . . .|        0 | VPacing m-count. . . . .|        0 |
| Active SLU sessions. . . .|        1 | Network ID . . . . . .  | USCACO01 |
| Pending sessions . . . . .|        0 | Owning NCP name. . . . .| N/A      |
| Owning CDRM. . . . . . . .| CCCDRM01 | Owning line name . . . .| N/A      |
| Subarea. . . . . . . . . .|        1 | Owning PU name . . . . .| N/A      |
| Element address. . . . . .|     2740 |                         |          |
+-------------------------------------------------------------------------------+



 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 33. Resource Analysis for a CDRSC

To display session information, select **Sessions** from the Goto pulldown (or enter **GS** in the action bar entry field).

IF...	AND IF...	THEN...
you select **Sessions**	only one session is available	the Session Analysis panel appears (Figure 35 on page 93)
you select **Sessions**	more than one session is available	the LUs in Session with a Resource panel appears (Figure 34 on page 92)

LUs in Session with a Resource Panel

If more than one session exists for a given resource, this panel is displayed when you select **Sessions** on the Goto pulldown for any of the following panels:

- Resource Analysis for an Applid panel
- Resource Analysis for a Terminal panel
- Resource Analysis for a CDRSC panel

If only one session exists, the panel shown in Figure 35 on page 93 appears.

The panel displays one line for each LU that is in session with the selected resource.

```
      Actions  Goto  Options  Help
-------------------------------------------------------------13:46:24 04/11/94
KONDALUD            LUs in Session with APPLID RGON7             System: SYSG

Select with a "/" or an action code.                        Lines 1 to 5 of 5
   S=Session analysis
+-------------------------------------------------------------------------------+
|             |          | Resource | Acts |             |          | Network  |          |
|   LU Name   |  Status  |   Type   |  As  |  SA  VR  TP |          |    ID    |   CID    |
+-------------+----------+----------+------+-------------+----------+----------+
| _ ATERM454  | ACTIVE   | CDRSC    | SLU  |   1 | 0 | 1 | USCACO01 | 0E000134 |
| _ ATERM455  | ACTIVE   | CDRSC    | SLU  |   1 | 0 | 1 | USCACO01 | 6E00008A |
| _ ATERM465  | ACTIVE   | CDRSC    | SLU  |   1 | 0 | 1 | USCACO01 | 02000107 |
| _ ATERM483  | ACTIVE   | CDRSC    | SLU  |   1 | 0 | 1 | USCACO01 | 2000002D |
| _ L0048532  | ACTIVE   | CDRSC    | SLU  |  10 | 0 | 1 | USCACO01 | 10000097 |
+-------------------------------------------------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 34. LUs in Session with a Resource

To display more information about a session, enter action code **S** (Session Analysis) next to the LU name. The Session Analysis panel shown in Figure 35 on page 93 appears.

Session Analysis Panel

If only one session exists for a given resource, this panel is displayed when you select **Sessions** on the Goto pulldown for any of the following panels:

- Resource Analysis for an Applid panel
- Resource Analysis for a Terminal panel
- Resource Analysis for a CDRSC panel

This panel also displays if you select a session from the LUs in Session with a Resource panel (Figure 34 on page 92).

The panel displays session-related information for the selected resource in the upper box and partner-specific information in the lower boxes.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------13:52:38 04/11/94
 KONDAFPD              Session Analysis for RGON7                 System: SYSG
                              with ATERM454
+-------------------------------------------------------------------------------+
| Date session started. . . | 04/11/94 | Adaptive pacing. . . . . | YES          |
| Time session started. . . | 12:07:58 | APPC session . . . . . . | NO           |
| Status. . . . . . . . . . | ACTIVE   | Logmode entry name . . . | R3279X       |
| Send count. . . . . . . . |       15 | CID. . . . . . . . . . . | 0E000134     |
| Receive count . . . . . . |        9 | SIB address. . . . . . . | 08971680     |
| MAX RU in . . . . . . . . |      256 | FMCB address . . . . . . | 070D3C60     |
| MAX RU out. . . . . . . . |    1,024 | FMCB extension address . . | 07646268     |
+-------------------------------------------------------------------------------+
+---------------------------+  +-------------+  +-----------------------------+
| PLU name. . . . | RGON7   |<-|   Routing   |->| SLU name. . . . | ATERM454  |
| Resource type . | APPLID  |  |-------------|  | Resource type . | CDRSC     |
| Subarea . . . . |      25 |  | VR . |    0 |  | Subarea . . . . |         1 |
| Element address |    3949 |  | TP . |    1 |  | Element address |      1013 |
| RDT address . . | 8888C2B0|  | ER . |    4 |  | RDT address . . | 086E6170  |
| Network ID  . . | USCACO01|  | RER. |    3 |  | Network ID. . . | USCACO01  |
+---------------------------+  +-------------+  +-----------------------------+


 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 35. Session Analysis Panel

For additional session-level information on control blocks and VTAM tables, select the Goto pulldown. The pulldown shown in Figure 36 on page 94 appears.

Session Analysis Goto Pulldown

To list the session control blocks and VTAM tables for the selected session, select **Goto** from the action bar on the Session Analysis panel.

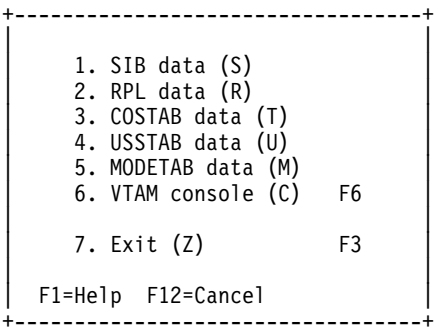


Figure 36. Session Analysis Goto Pulldown

Select the control block or VTAM table of interest. Panels showing control blocks or VTAM tables display in dump format.

Resource Analysis Feature Navigation

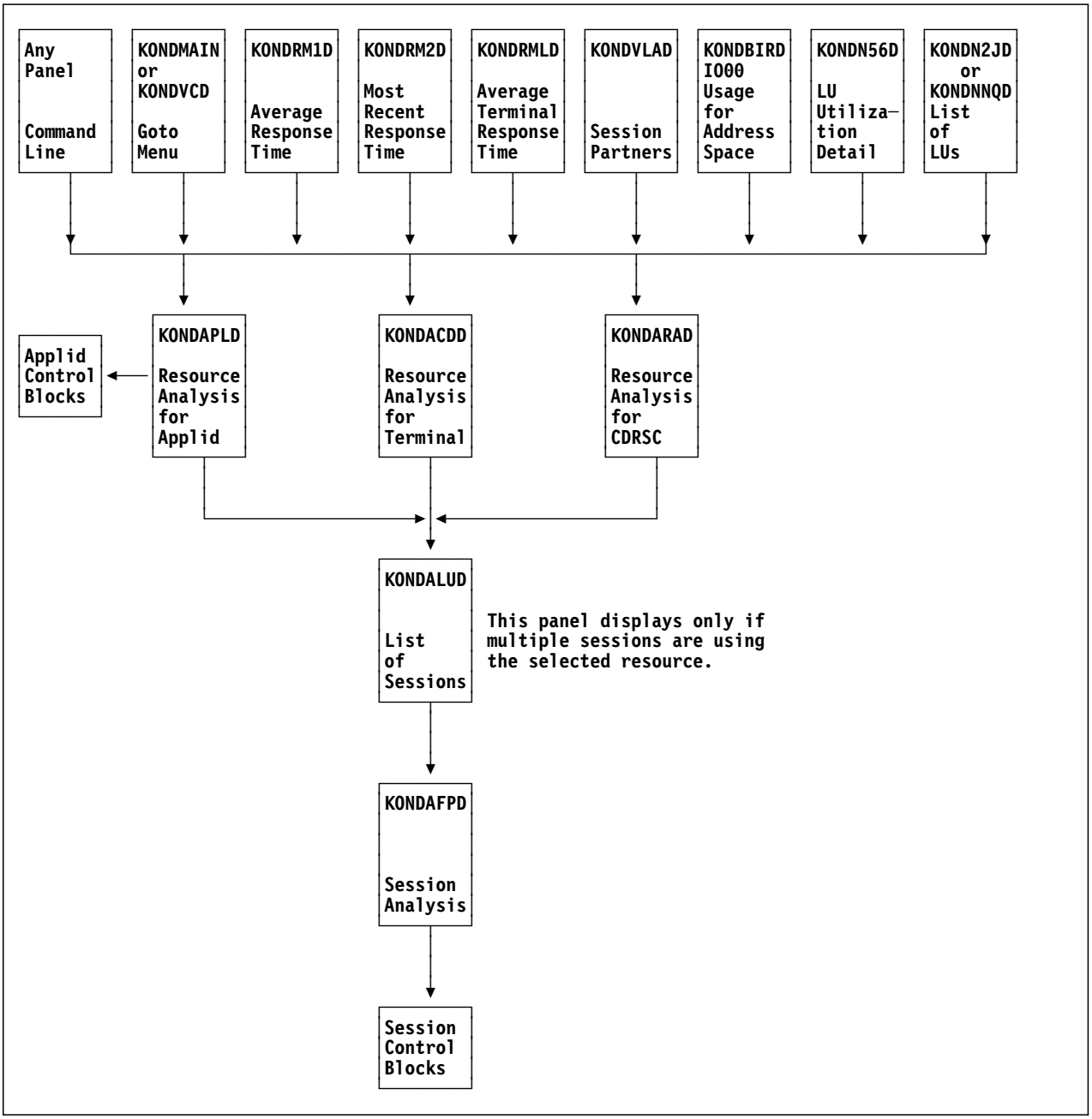


Figure 37. Resource Analysis Navigation

Part II: Network Tuning with OMEGAMON II

Chapter 6.
Buffer Pool Analysis

Chapter Contents

Overview

The Buffer Pool Analysis component displays realtime, trending, and historical information about VTAM buffer pool allocation. This chapter explains how VTAM uses these buffer pools and also guides you through the principal techniques for tuning buffer pools.

Types of Buffer Pool Allocation

VTAM uses buffer pools to allocate and deallocate space for VTAM control blocks, network traffic, and channel programs. You define these pools at VTAM startup, at which point several key decisions must be made.

One decision is whether to set the size of a buffer pool at startup, or let it increase or decrease depending upon demand. If you set the size at startup, you need to know the maximum potential demands for storage and set the buffer pool size slightly higher than the maximum. This is called *static* or *base* allocation.

If you allow the size of a buffer to increase or decrease depending upon demand, you have *dynamic* allocation. In this case, smaller base allocation values can be specified and peak demands on the pool will be met dynamically. Expansion occurs during temporary peak demands or unexpectedly high demands for buffers, and contraction occurs when these buffers are no longer needed.

Storage Usage

Dynamic allocation can increase the efficiency with which VTAM uses storage, particularly for I/O buffers. Figure 38 shows a comparison of static versus dynamic allocation, and illustrates the potential advantage of using dynamic allocation.

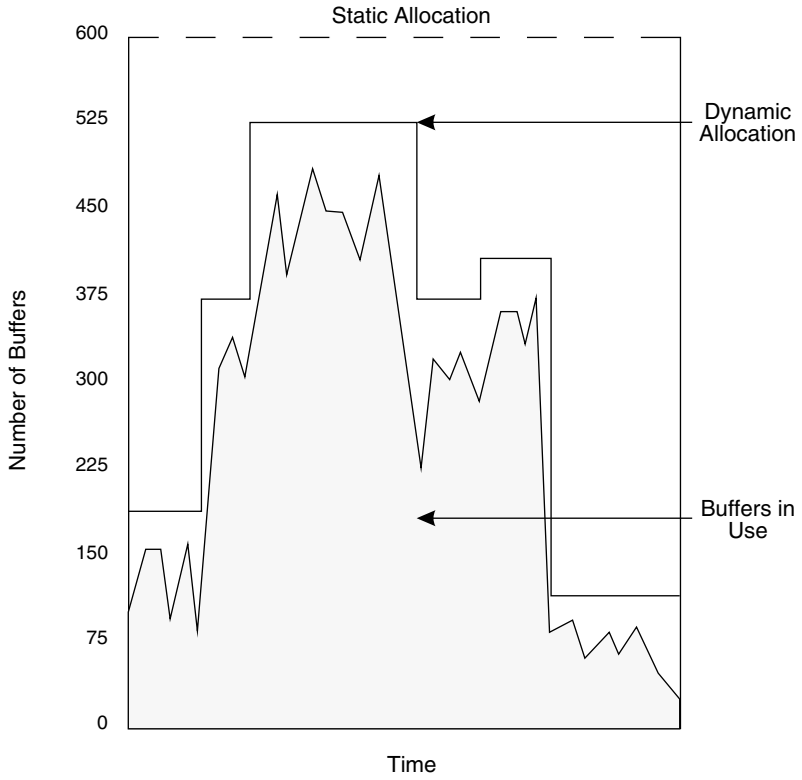


Figure 38. VTAM Storage Utilization with Static vs. Dynamic Allocation

When you tune a buffer pool, you optimize the tradeoff between CPU usage and the amount of storage allocated. If you specify a large base allocation, you may waste storage but conserve CPU usage. If you specify a small pool, you may conserve storage but use the CPU for frequent expansion and contraction. The goal of buffer pool tuning is to balance these resources in a way that best suits your network, ensuring that storage is available for users as needed.

VTAM Buffer Pools

Listed below are the VTAM buffer pools. Of these, the CRPL and IO00 (discussed in more detail below) are the most important. Two buffer pools (XD00 and BS00) apply to VTAM Version 3.4 and above.

IO00 Input-output (I/O) message storage pool.
LP00 Large pageable storage pool.
WP00 Message control pageable storage pool (VTAM V3.3 only).
CRPL Copied RPL storage pool.
SP00 Small pageable storage pool.
LF00 Large fixed storage pool.
SF00 Small fixed storage pool.
AP00 Buffer pool below the 16-Mb line.
XD00 Exchange Identifier (XID) pool (VTAM V3.4 and above).
BS00 Boundary node pool (VTAM V3.4 and above).

All of the buffer pools are allocated in extended CSA, except for AP00, which is located in CSA.

How To Define a VTAM Buffer Pool

The definition for a VTAM buffer pool is part of the START options member ATCSTRxx, in the VTAMLST dataset, as described below.

```
poolname=(BASENO,BUFSIZE,SLOWPT,F|P,XPANNO,XPANPT,XPANLIM)
```

BASENO Initial number of buffers in the pool, and can range from 1–32767 (base allocation).

BUFSIZE Size in bytes of each buffer in the pool. Only the size for the I/O buffer pool can be specified.

The BUFSIZE specified does not include headers. To estimate storage needs, you need to round the number to a multiple of eight, and then add 16 bytes to the result.

For IO00 *only*, add 55 bytes to the BUFSIZE number, round to a multiple of eight, and add 16 bytes to the result.

IBM recommends that the UNITSZ parameter on the HOST macro of the NCP be the same value as BUFSIZE.

SLOWPT Number of buffers available for priority requests. When the available buffers are equal to or less than SLOWPT, VTAM enters slow-down mode.

F|P Whether the storage is fixed (F) or pageable (P). VTAM specifies a default for each pool.

XPANNO Number of buffers allocated when VTAM expands the buffer pool. XPANNO can range from 0–32767, where 0 indicates that VTAM will not perform dynamic expansion or contraction for the specified pool. VTAM rounds up XPANNO to fit in full-page increments. Pages are contiguous when allocated.

XPANPT Point at which VTAM schedules expansion for the buffer pool. When available buffers are equal to or less than XPANPT, VTAM enters expansion mode.

XPANLIM Maximum allowable size of the buffer pool. If XPANLIM=BASENO, the XPANNO and XPANPT values are ignored. XPANLIM applies only to the I/O buffer pool.

After modifying any of the above parameters for a buffer pool, you must restart VTAM for them to take effect.

Rules for Expansion and Contraction

A VTAM buffer pool begins expansion when the number of free or available buffers in the pool decreases to the expansion point (XPANPT). The buffer pool expands by the value set by XPANNO.

A VTAM buffer pool attempts contraction when the number of free or available buffers is twice the expansion increment plus the expansion point:

```
CONTRACTION POINT = (2 * XPANNO) + XPANPT
```

Like expansion, contraction occurs in increments of the value set by XPANNO, rounded to page sizes. In addition, the entire page of buffers must be free. If some of the buffers from the page are in use, contraction cannot take place. Full pages of free buffers in the base allocation are ineligible for contraction.

Example of Buffer Definition Parameters

Suppose we assign the following buffer definition parameters to the I/O buffer pool, IO00.

```
IO00=(500,128,5,,20,25,2000)
```

This tells us the following:

1. The base allocation of buffers is 500, with the size of each buffer set to 128 bytes (excluding VTAM headers).
2. Using a null string for the fourth parameter specifies the default for IO00, which is F for fixed storage.
3. If there are 25 buffers or fewer available at any given time, VTAM will undergo dynamic expansion.
4. When IO00 undergoes dynamic expansion, VTAM will request 20 buffers at a time. Since only 20 buffers, each of 128 bytes, will fit on a page, VTAM gets one page at expansion. The maximum number of buffers that IO00 can expand to is 2000.
5. If there are 65 or more free buffers available at any given time (based on the formula in "Rules for Expansion and Contraction" on page 103: 2 x 20 + 25 = 65), VTAM will attempt to contract the pool in full-page increments.
6. At least five buffers are available for priority requests; if only those buffers are available, VTAM enters slowdown mode. At this time, priority requests are honored while nonpriority requests are queued.

I/O Buffer Pool

All of the network Path Information Units (PIUs) flow through the I/O buffer pool. Because of this, IO00 is sensitive to dynamic fluctuations in traffic rates. Consequently, it is a prime candidate for tuning.

The buffer size specified for IO00 is used to hold PIUs. VTAM appends a 16- and a 55-byte header to the front of each buffer, and uses that space to allocate a Transmission Subsystem Control Block (TSCB). The PIU is contained in the buffer after the TSCB.

Because a great deal of activity takes place in IO00, it is especially prone to *thrashing*, a condition of rapid and excessive buffer expansion and contraction. The detection and prevention of thrashing is the focus of later sections and of the case study at the end of this chapter.

CRPL Buffer Pool

Request Parameter List (RPL) control blocks for a VTAM application reside in the application's private storage area. Each RPL describes an API request to VTAM. These requests include starting and terminating sessions, as well as sending and receiving data.

Because these RPLs are located in private storage, they cannot be easily accessed by VTAM. VTAM addresses this problem by copying the RPL control blocks into extended CSA, and using the copies, called CRPLs (for Copied RPLs), to manage requests. The CRPLs may subsequently be modified by VTAM; for example, by the inclusion of error codes and sequence numbers. VTAM overlays the original RPL with the updated CRPL after the operation has been completed.

Tuning Buffer Pools with OMEGAMON II

OMEGAMON II monitors and displays the data you need to tune VTAM buffer pools. If the status light for buffer pools is green on the Main Status Display, all the buffer pools are functioning normally. If the status light for buffer pools is yellow or red, you can locate the source of the problem by entering X next to Buffer pools. This displays a list of the exceptions for buffer pools, which can help guide your use of the buffer pool options explained in the following sections. (See “Exceptions” on page 61 for details of exception monitoring.)

OMEGAMON II buffer pool analysis is dependent upon values contained in VTAM's buffer pool control blocks. Depending on the release of VTAM, some or all of these values are reset each time a VTAM SMS trace record is written. Consequently, you should disable VTAM SMS recording whenever conducting buffer pool analysis with OMEGAMON II.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

Selecting a Buffer Pool

The Buffer Pools Status Display, as shown below, lists the VTAM buffer pools, followed by a description and a condition indicator.

```
____  Actions  Goto  Options  Help
--------------------------------------------------------------------------------
KONDBP2D                 Buffer Pools Status Display            System: SYSA

Select with a "/" or an action code.
 X=Exceptions  S=Statistics  E=Extents  U=Usage  O=Start options  G=Categories
 +--------+---------+----------+-----------+------------+-----------+--------+
 |        |         | Storage  | Active    |            |           |        |
 |        |  Total  | Requests | Extents   |    Pool    |   Pool    |        |
 |  Pool  | Buffers | Queued   | Allocated |   Status   | Thrashing |  Cond  |
 +--------+---------+----------+-----------+------------+-----------+--------+
 | _ IO00 |     438 |        0 |         0 | Normal     |    No     | Normal |
 | _ LP00 |      12 |        0 |         0 | Contracted |    No     | Normal |
 | _ CRPL |     950 |        0 |        10 | Normal     |    No     | Critic |
 | _ SP00 |      21 |        0 |         0 | Normal     |    No     | Normal |
 | _ LF00 |     450 |        0 |        14 | Normal     |    No     | Warnin |
 | _ SF00 |     224 |        0 |         5 | Normal     |    No     | Normal |
 | _ AP00 |      56 |        0 |         0 | Normal     |    No     | Normal |
 | _ XD00 |      20 |        0 |         3 | Normal     |    No     | Normal |
 | _ BS00 |     210 |        0 |         0 | Normal     |    No     | Normal |
 | _ TI00 |     360 |        0 |         0 | Normal     |    No     | Normal |
 | _ CRA4 |      50 |        0 |         0 | Normal     |    No     | Normal |
 | _ CRA8 |      12 |        0 |         0 | Normal     |    No     | Normal |
 +--------+---------+----------+-----------+------------+-----------+--------+

 Command ===> ____________________________________________________________
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 39. Buffer Pools Status Display

This panel displays the buffer pools for VTAM release 3.4.0 and above. A similar panel (KONDBMMD) shows the buffer pools for prior VTAM releases with WP00 included and XD00 and BS00 excluded.

If a condition indicator is yellow (warning) or red (critical), it is telling you that a problem exists with the specific buffer pool. You can use this information to select the VTAM buffer pool for detailed realtime and trending analysis. Next to a buffer pool of interest, enter an action code to select the kind of data you want to examine. The action codes provide information on Exceptions (X), Statistics (S), Extents (E), Usage (U), Start Options (O), and User Categories (G).

Displaying the Start Options

If you select Start Options, you see a panel that supplies the buffer pool values from the last time VTAM was started (see the following figure). Most of the items are the parameters used to define the buffer pool. These values do not change dynamically. You must respecify them in VTAMLST and restart VTAM.

This panel also shows the number of buffers currently allocated in the named pool and provides information for both private and residual storage.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDBOPD            CRPL - Buffer Pool Start Options

+------------------------------------------------------------------------------+
| Number of buffers in base allocation. . | BASENO | 442   (102,544 bytes)      |
| Size of buffers in bytes. . . . . .     | BUFSZE | 160   (Actual 232)         |
| Slowpoint in available buffers. . . . . | SLOWPT | 3                          |
| Expansion number of buffers . . . . . . | XPANNO | 64    (Actual 68)          |
| Expansion point in available buffers. . | XPANPT | 4                          |
| Contraction point in available buffers. | CONTPT | 140                        |
| Buffer pool is fetched protected. . . . | FTCHPR | YES                        |
| Buffer pool attributes. . . . . .       | FIXPGE | FIXED                      |
| Buffer pool subpool . . . . . .         | SBPOOL | 231                        |
|------------------------------------------------------------------------------|
| Private:         Pct of total 100%    Residual:        Pct of total    0%   |
| Beginning address. . . . 07D6B000     Beginning address . . . . 00000000     |
| Ending address . . . . . 07D85000     Ending address. . . . . 00000000       |
| Number of buffers. . . .      442     Number of buffers . . . .        0     |
+------------------------------------------------------------------------------+


 Command ===>
 F1=Help  F2=Keys  F3=Exit  F6=Console  F9=Retrieve  F10=Action Bar
 F11=Print  F12=Cancel  F15=Status_Display
```

Figure 40. CRPL Buffer Pool Start Options

You want to tune VTAM so that the initial number of buffers (BASENO) in the pool is set to a level that manages storage efficiently. This means avoiding over- and under-allocation of BASENO.

You can use trending data from the Buffer Pool Statistics display to determine the average number of buffers used over time. See "Tuning a Buffer Pool with Trending Data" on page 110, later in this chapter.

The Buffer Pool Statistics display, as shown below, provides real-time data on the buffer pool. It includes statistics to help you calculate how efficiently the buffers are currently being used. Also, a graphic display of the buffer pool's condition indicates whether the buffer pool is in slowdown, expansion, normal, or contraction mode.

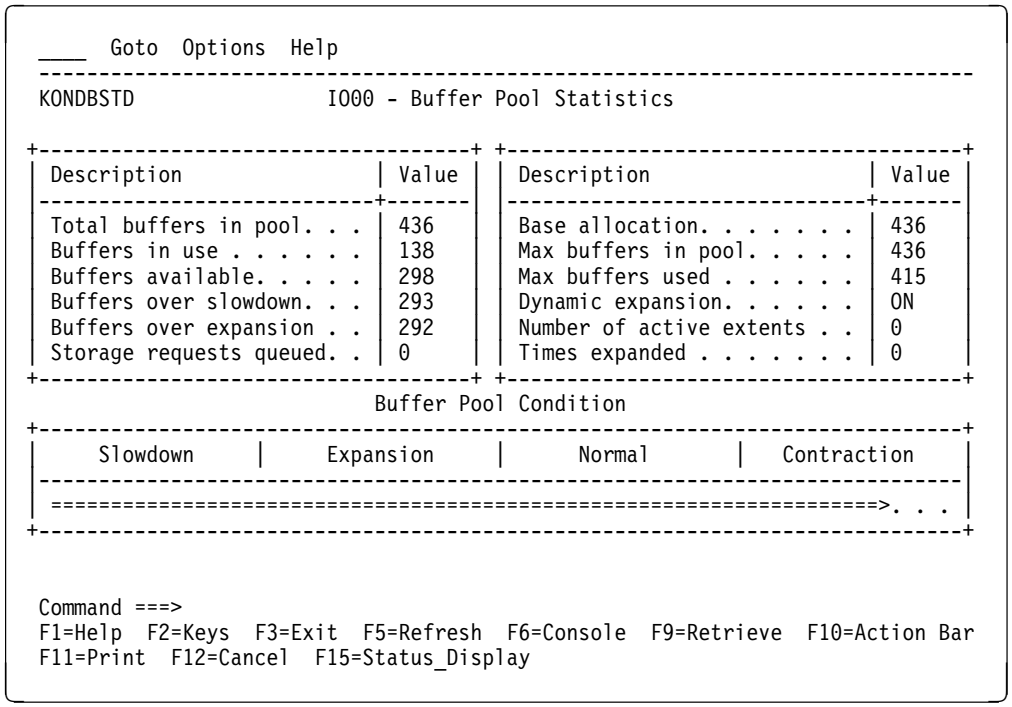


Figure 41. Buffer Pool Statistics Display

Begin by checking the Times Expanded value and the Dynamic Expansion flag. If Dynamic Expansion is set to ON, examine the Times Expanded field. If this field is 0, the pool has not expanded. This may mean that the base allocation is too large.

In this case, you can roughly calculate the amount of storage wasted (if any) as follows:

1. Subtract the number of buffers used, **Max buffers used**, from **Max buffers in pool**.
2. Multiply that result by the size of the buffer (examine the **Actual size** field from the Start Options display).

If **Max buffers used** is significantly less than **Max buffers in pool**, you may want to reduce the Base Allocation (BASENO) accordingly.

Thrashing

An important reason for tuning VTAM is to prevent a buffer pool from thrashing. Thrashing occurs when dynamic requests for buffers are excessive, causing an abnormally high rate of expansion and contraction in a buffer pool and a subsequent drain of CPU resources. Thrashing affects users local to VTAM, because requests for storage must be queued when VTAM expands a buffer pool.

You can detect thrashing by observing the **Times expanded** value on the Buffer Pool Statistics display as in the previous figure. If this value changes appreciably in a short span of time, then thrashing is occurring.

OMEGAMON II determines that thrashing is occurring for a given pool and generates an exception when the number of buffers obtained due to expansion greatly exceeds the total number of buffers in the pool. OMEGAMON II indicates thrashing if the following ratio is greater than five:

```
RATIO = (NUMEXP * XPANNO)/TOTBUF
```

NUMEXP	Current sample's number of expansions.
XPANNO	Number of buffers allocated when VTAM expands the pool.
(NUMEXP * XPANNO)	Number of buffers obtained due to expansion during the current sampling.
TOTBUF	Total number of buffers currently in the pool.

There are two ways to prevent thrashing:

1. Increase the initial allocation for the pool (BASENO). This method is recommended if you have ECSA available.
2. Increase the expansion increment (XPANNO) to a value large enough to give VTAM an additional page of buffers during expansion. This inhibits premature contraction of the buffer pool. Remember that the contraction formula is twice the expansion increment plus the expansion point. In addition, VTAM rounds your expansion increment up to full pages.

Also, you should make sure that the value XPANPT minus SLOWPT is greater than the largest single request for storage. Otherwise, a buffer pool can move from normal to slowdown mode with one request for storage. See the case study at the end of the chapter for a step-by-step analysis of using OMEGAMON II to detect and correct buffer pool thrashing.

Tuning a Buffer Pool with Trending Data

To tune a buffer pool properly, you need to examine buffer usage trends over a period of time. For example, you may want to check how many buffers, on average, are being used at regular intervals over the course of a day.

The Buffer Usage Trend display shows you such data. At the Statistics display, as in the previous figure, select **Trends** from the Goto pulldown. You receive a second pulldown asking for the type of trending data you want displayed:

1. Total buffers in pool
2. Buffers in use
3. Buffers available
4. Number of active extents
5. Times expanded
6. Storage requests queued

The Buffers in use and Times expanded options are the most useful for tuning a buffer pool. Both provide historical data on the usage of a pool and its expansion/contraction behavior over a period of time.

If you select Times expanded, you see a screen similar to the one shown in the following figure. The first two columns list the date and time, with each specifying a time interval. This is the start of the interval. The third column displays the number of expansions. The fourth and fifth columns show a percentage and graphic equivalent for the information, respectively.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDBTRD              CRPL - Trend for Times Expanded             System: SYSA
                                                              Lines 1 to 14 of 14

The highest number of expansions for the collection period was  10.
+----------+----------+----------+---------+---------------------------------+
|   Date   |   Time   | Expans   | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
+----------+----------+----------+---------+---------------------------------+
| 10/04/93 | 10:36:05 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 10:21:05 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 10:05:43 |        2 |  20.0%  | ======>. . . . . .              |
| 10/04/93 | 09:50:22 |       10 | 100.0%  | ==============================> |
| 10/04/93 | 09:35:03 |        3 |  30.0%  | =========> . . . . . .          |
| 10/04/93 | 09:19:48 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 09:04:34 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 08:49:23 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 08:34:08 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 08:19:05 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 08:03:50 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 07:48:34 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 07:33:28 |        0 |   0.0%  | >. . . . . .                    |
| 10/04/93 | 07:32:21 |        0 |   0.0%  | >. . . . . .                    |
+----------+----------+----------+---------+---------------------------------+



Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 42. Trend Display for Number of CRPL Buffer Pool Expansions

The graphic part of the display is a useful visual tool for detecting the presence of thrashing. You might suspect thrashing if high values are shown.

Historical Reports

If you have SAS/GRAPH installed and SMF recording enabled for buffer pool data (see “Buffer Pool Monitor Options” on page 329), you can use OMEGAMON II to display color historical graphs of the following types of buffer pool information:

- Analysis of buffer usage
- Total buffers vs. buffers obtained through expansion (thrashing indicator)
- IO00 buffer usage by category
- CRPL buffer usage by address space type
- CRPL buffer analysis

See the information about SAS reporting in the *OMEGAMON II for Mainframe Networks Historical Reporting Guide* for instructions on how to use this feature.

IO00 Buffer Pool Usage by Category

On the Buffer Pools Status display, you can enter action code **G** (Categories) next to IO00. The Use by User Category panel breaks down IO00 buffer pool usage by user category. You can view what percentages of a buffer pool are being allocated for read channel programs, SSCP traffic, application PLUs to various network resources, as shown in the following figure.

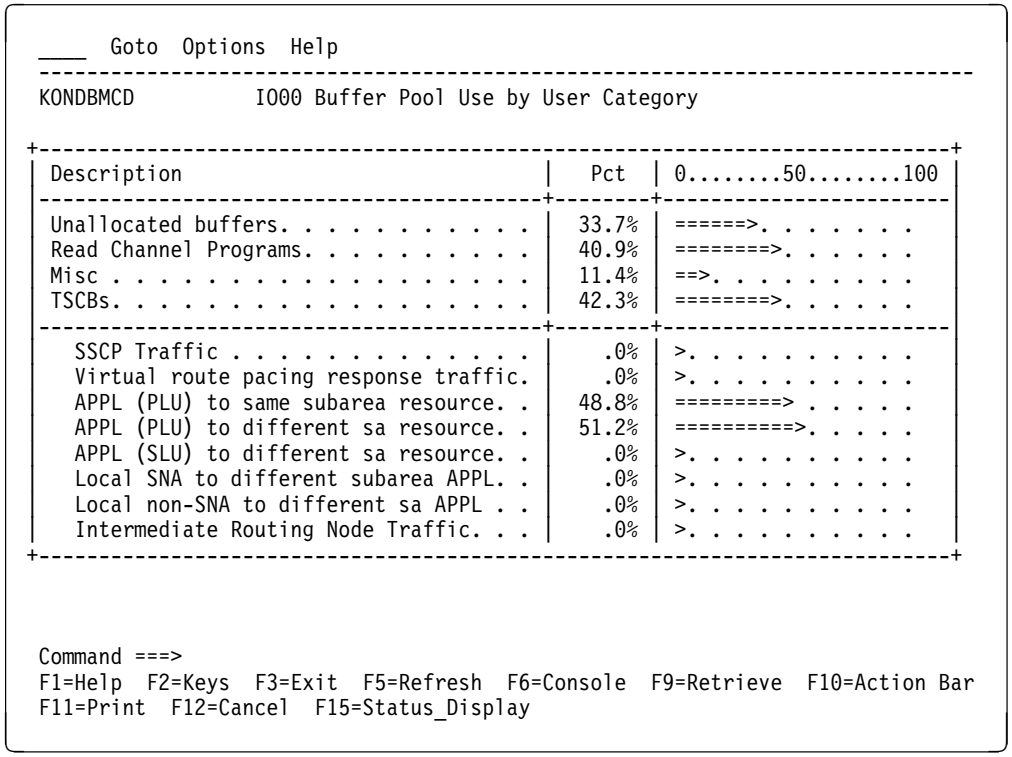


Figure 43. IO00 Usage by User Category

IO00 and CRPL Usage by Address Space

On the Buffer Pool Status display, you can enter action code **U** next to IO00 or CRPL. For the IO00 or CRPL buffer pool, usage information is provided for each address space as shown in the following figure. This information can help you ascertain the nature of the network traffic and users of VTAM resources, as well as detect unusually high demand for buffers or patterns indicative of network congestion.

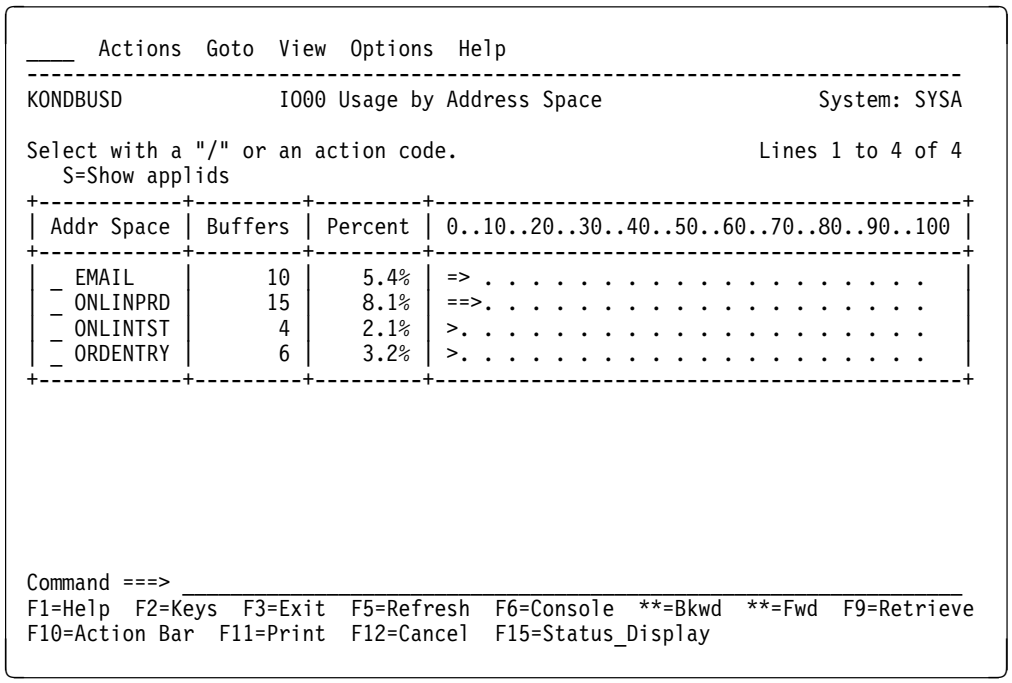


Figure 44. IO00 Usage by Address Space

For each address space, this panel lists the following:

Addr Space Name of address space that currently has buffers allocated in the pool. An address space can be a batch job, started task, or TSO user.

Buffers Number of buffers allocated by the address space. This value is displayed as an absolute number.

Percent Buffers for the address space as a percentage of the total number of buffers in the pool.

This panel can help you determine which address spaces are major consumers of IO00 or CRPL buffer resources. However, due to the highly transient nature of IO00 buffers, the IO00 display is most useful during periods of network congestion when TSCBs may be queued for long periods of time in the IO00 pool.

IO00 Usage by Application

On the IO00 Usage by Address Space display, you can select an address space with action code **S** (Show Applids). The IO00 Usage for Address Space appears.

```
____  Goto  View  Options  Help
-------------------------------------------------------------16:50:14 11/11/92
KONDBIRD         IO00 Usage for Address Space EMAIL              System: SYSA

Select with an "/" or an action code.                       Lines 1 to 3 of 3
   S=Resource analysis
+------------+---------+---------+-----------------------------------------+
|   Applid   | Buffers | Percent | 0..10..20..30..40..50..60..70..80..90..100 |
+------------+---------+---------+-----------------------------------------+
| _ MAILACE  |       1 |   10.0% | ===> . . . . . . . . . . . . . . . . .  |
| _ MAILEZ   |       1 |   10.0% | ===> . . . . . . . . . . . . . . . . .  |
| _ NMAIL10B |       8 |   80.0% | ================================> . . . .  |
+------------+---------+---------+-----------------------------------------+









Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 45. IO00 Usage by Application

For each applid, this panel lists the following:

Applid Application LU name that appears on either the origin or destination element within the buffers currently in use by the address space.

Buffers Number of buffers in which the application appears. This value is determined from the PIU within each IO00 buffer and is displayed as an absolute number.

Percent Percentage of buffers for the application out of the total number of buffers currently in use by the address space.

This panel can help you determine which of many application LUs are major consumers of IO00 buffer pool space.

Action code **S** (Resource Analysis) takes you to resource analysis for the selected applid.

Buffer Pool Extents

You can enter action code **E** (Extents) next to any pool on the Buffer Pools Status display. The Buffer Pool Extents, as in the following figure, shows you the status, address, and usage of each extent of buffers in the selected buffer pool.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDBEXD              CRPL - Buffer Pool Extents                 System: SYSA

 Each extent contains 3 pages.                                  Lines 1 to 7 of 7
 Each extent contains 90 buffers of 118 bytes each.
+-------------------------------------------------------------------------------+
| Ext |        | Start    | Ext Blk  | Free    |  Pct   |    Percent Used      |
|  #  | Status | Address  | Address  | Buffers |  Used  | 0......|......100    |
|-----+--------+----------+----------+---------+--------+----------------------|
| 1   | ACTIVE | 03288000 | 03716FE8 |       0 | 100.0% | ==============>     |
| 2   | ACTIVE | 032DB000 | 036BD048 |       0 | 100.0% | ==============>     |
| 3   | ACTIVE | 03200000 | 036BD030 |       1 |  98.9% | ==============>     |
| 4   | ACTIVE | 0318A000 | 036BB030 |       0 | 100.0% | ==============>     |
| 5   | ACTIVE | 0312A000 | 036BA040 |      60 |  33.3% | ====> . . . . .      |
| 6   | ACTIVE | 03120000 | 03643050 |      89 |   1.1% | > . . . . . .        |
| 7   | INACT  | 00000000 | 03643008 |       0 |    .0% | > . . . . . .        |
+-------------------------------------------------------------------------------+



Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Prubt  F12=Cancel  F15=Status_Display
```

Figure 46. Buffer Pool Extents for CRPL

The Extents panel is useful for investigating wasted storage, especially for fixed storage buffer pools like IO00. The reason is that active buffers may be randomly distributed throughout an extent, creating a situation where the unused portion is tied up. In an installation with a large amount of central storage, such fragmentation could affect system performance. The Extents panel helps you to determine if such a problem is occurring and, if so, in which extents the fragmentation exists.

Case Study: Recognizing and Correcting Thrashing

The following set of panels and data illustrates a typical buffer pool problem, and demonstrates how to solve it by correcting the VTAM startup parameter values.

Initial Approach

We begin by looking for exception messages; in particular, thrashing exceptions. Suppose we find one for the CRPL buffer pool. A useful approach is to first examine buffer pool usage trends for CRPL. This provides data on the number of buffer pool expansions and contractions, and available buffers over the course of a day.

Sequence of Actions

We begin by entering action code **S** (for Statistics) next to **CRPL** on the Buffer Pools Status Display. This navigates to the Buffer Pool Statistics panel. From that panel, we select **Trends** from the Goto pulldown, and then **Times Expanded** from the pop-up that follows.

The Trend for Times Expanded panel shows us the number of expansions of a buffer pool over a specified time interval. For example, the following figure indicates high values for the last two collection periods, suggesting that thrashing is occurring in this pool.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDBTRD              CRPL - Trend for Times Expanded             System: SYSA
                                                              Lines 1 to 30 of 36

The highest number of expansions for the collection period was 363.
+----------+----------+----------+---------+---------------------------------+
|   Date   |   Time   | Expans   | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
+----------+----------+----------+---------+---------------------------------+
| 10/10/93 | 11:42:32 |      363 | 100.0%  | ============================>   |
| 10/10/93 | 11:27:24 |      310 |  85.3%  | ========================> . .   |
| 10/10/93 | 11:11:54 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 10:56:38 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 10:41:20 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 10:26:04 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 10:10:57 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 09:55:55 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 09:40:56 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 09:25:40 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
| 10/10/93 | 09:10:24 |        0 |   0.0%  | >. . . . . . . . . . . . . . .   |
+----------+----------+----------+---------+---------------------------------+
Command ===> ____________________________________________________________

F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 47. Trend for Times Expanded for CRPL

Examining Usage by Address Space

The next step in this process might be to use the Usage action code for CRPL. This would provide information on whether any particular address space is holding many CRPL buffers.

We must navigate back to the Buffer Pools Status Display by repeatedly pressing F12. Then, we enter **U** (for Usage) next to CRPL. The CRPL Usage by Address Space panel appears.

```
____  Goto  View  Options  Help
--------------------------------------------------------------------------------
KONDBASD                CRPL - Usage by Address Space          1 to 11 of 139

+-------------------------------------------------------------------------------+
| Addr Space | Buffers |   Pct  | 0..10..20..30..40..50..60..70..80..90..100   |
|------------+---------+--------+----------------------------------------------|
| HOOG310A   |     240 |  47.5% | ================>. . . . . . . . . . .      |
| $DATABSA   |      60 |   9.3% | ===> . . . . . . . . . . . . . . . . .      |
| $DATABSB   |      51 |   7.9% | ===> . . . . . . . . . . . . . . . . .      |
| CLASS003   |      26 |   4.0% | => . . . . . . . . . . . . . . . . . .      |
| NETTER02   |      12 |   1.9% | >. . . . . . . . . . . . . . . . . .      |
| CHEMS07    |      12 |   1.9% | >. . . . . . . . . . . . . . . . . .      |
| CHEMS09    |       8 |   1.2% | >. . . . . . . . . . . . . . . . . .      |
| CICSTEST   |       8 |   1.2% | >. . . . . . . . . . . . . . . . . .      |
| CHEMS03    |       8 |   1.2% | >. . . . . . . . . . . . . . . . . .      |
| CLASS008   |       6 |    .9% | >. . . . . . . . . . . . . . . . . .      |
| IMSP022A   |       5 |    .8% | >. . . . . . . . . . . . . . . . . .      |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F6=Console  F5=Refresh  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 48. CRPL Usage by Address Space

We want to locate any address spaces that are holding an abnormally high number of buffers. Notice that in the first row, the address space held by user HOOG310A is using almost 50 percent of the buffers. That leads us to suspect that this user might be contributing to or aggravating the problem. Later, we confirm the hypothesis upon learning that HOOG310A has been using a file transfer program. If the buffer pool is not tuned properly, a file transfer program may cause it to expand and contract excessively, since the data is often transferred in bursts.

Optimizing the VTAM Startup Parameter Values

Effecting tuning decisions involve optimizing the VTAM startup parameter values. We need to examine the current ones and calculate a more efficient set.

From the Buffer Pools Status Display, enter action code **0** (for Start Options) next to CRPL. The Buffer Pool Start Options display for CRPL appears.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDBOPD             CRPL - Buffer Pool Start Options
+-------------------------------------------------------------------------------+
| Number of buffers in base allocation. . | BASENO | 192   (30,080 bytes)        |
| Size of buffers in bytes. . . . . .     | BUFSZE | 118   (Actual 136)          |
| Slowpoint in available buffers. . . . . | SLOWPT | 3                           |
| Expansion number of buffers . . . . . . | XPANNO | 64    (Actual 90)           |
| Expansion point in available buffers. . | XPANPT | 4                           |
| Contraction point in available buffers. | CONTPT | 184                         |
| Buffer pool is fetched protected. . . . | FTCHPR | YES                         |
| Buffer pool attributes. . . . . .       | FIXPGE | PAGEABLE                    |
| Buffer pool subpool . . . . . .         | SBPOOL | 231                         |
|-------------------------------------------------------------------------------|
| Private:         Pct of total  94%    Residual:        Pct of total    6%  |
| Beginning address. . . . 0331F000     Beginning address . . . . 03340A80     |
| Ending address . . . . . 03326000     Ending address. . . . . . 03341000     |
| Number of buffers. . . .      182     Number of buffers . . . .       10     |
+-------------------------------------------------------------------------------+


 Command ===>
 F1=Help  F2=Keys  F3=Exit  F6=Console  F9=Retrieve  F10=Action Bar
 F11=Print  F12=Cancel  F15=Status_Display
```

Figure 49. CRPL Buffer Pool Start Options

From this panel, we can extract the following values:

Base allocation (BASENO) 192
Slowpoint (SLOWPT) 3
Expansion number (XPANNO) 90
Expansion point (XPANPT) 4
Contraction Point (CONTPT) 184

We can interpret this data as follows: CRPL starts with a base allocation of 192 buffers. When all but 4 buffers from this base allocation are used, CRPL expands in an increment of 90 buffers over the base allocation, for a total of 282 buffers. This represents CRPL's first expansion. Subsequently, CRPL expands by the same amount each time all but 4 buffers remain unused.

The suggestions outlined below consider the startup parameter values for this example, as well as their relationships to each other.

SLOWPT: When examining the startup parameters, you should first check to see if SLOWPT is large enough to handle priority requests. Generally, for CRPL and IO00, a value of 5 to 8 buffers is sufficient. In Figure 49, SLOWPT is set at 3. It would be prudent to raise the value to around 6 to ensure that priority requests for buffers are not queued.

Correcting the Expansion Number (XPANNO): We ascertained from the Usage Trends display that expansion and contraction of CRPL are occurring at a high rate. Raising the value of XPANNO may help eliminate the problem, since fewer expansions of CRPL will be needed. Since the contraction point is correlated with XPANNO (contraction point = (2 * XPANNO) + XPANPT), increasing XPANNO also increases the contraction point, making CRPL less likely to contract. This should help reduce thrashing in CRPL.

To decide how much of an increase is optimal is something of a trial and error process. If OMEGAMON indicates that thrashing is severe, we may start by increasing XPANNO by a factor of at least two. In this example, we might begin by doubling the value of XPANNO to 180.

Checking the Base Allocation (BASENO): Another step in the buffer pool tuning process is setting the optimal base allocation (BASENO). To do this, we can use the Trend for Buffers in Use display to view the average number of buffers in use over the course of a day (see the following figure). Then, we want to select a value greater than the number used during some given percentage of the time; for example, 50 percent.

Viewing this figure, we estimate that the average number of CRPL buffers used over the course of a day is around 400. Based on that information, we will change our base allocation to 420, which should be slightly over the 50 percent usage value.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDBTRD              CRPL - Trend for Buffers in Use            System: SYSA
                                                          Lines 1 to 13 of 13

The highest number of buffers in use for the collection period was 533.
+----------+----------+----------+---------+---------------------------------+
|   Date   |   Time   | Buffers  | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
+----------+----------+----------+---------+---------------------------------+
| 10/14/93 | 10:21:05 |      533 | 100.0%  | ============================>   |
| 10/14/93 | 10:05:43 |      511 |  95.8%  | ============================>.  |
| 10/14/93 | 09:50:22 |      490 |  91.9%  | ===========================> .  |
| 10/14/93 | 09:35:03 |      461 |  86.4%  | =========================> . .  |
| 10/14/93 | 09:19:48 |      427 |  80.1%  | =======================>. . .  |
| 10/14/93 | 09:04:34 |      403 |  75.6%  | ======================>. . . .  |
| 10/14/93 | 08:49:23 |      389 |  72.9%  | ======================> . . . .  |
| 10/14/93 | 08:34:08 |      380 |  71.2%  | ======================> . . . .  |
| 10/14/93 | 08:19:05 |      365 |  68.4%  | ====================>. . . . .  |
| 10/14/93 | 08:03:50 |      344 |  64.5%  | ====================> . . . . .  |
| 10/14/93 | 07:48:34 |      330 |  61.9%  | ===================>. . . . . .  |
| 10/14/93 | 07:33:28 |      286 |  53.6%  | ================>. . . . . .    |
| 10/14/93 | 07:32:21 |      263 |  49.3%  | ==============>. . . . . .      |
+----------+----------+----------+---------+---------------------------------+

Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

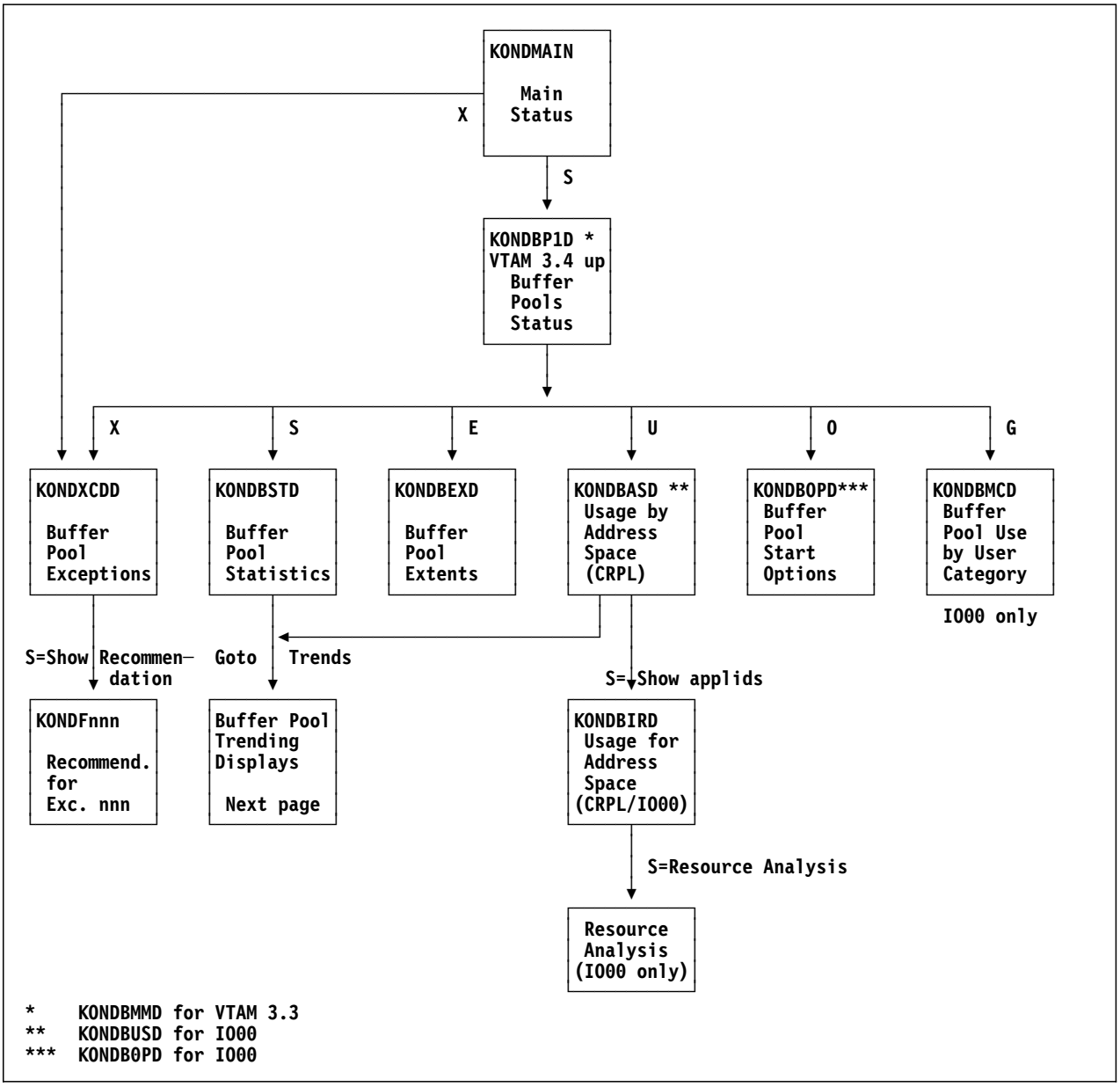
Figure 50. CRPL Usage Trending Display

Implementing the Changes

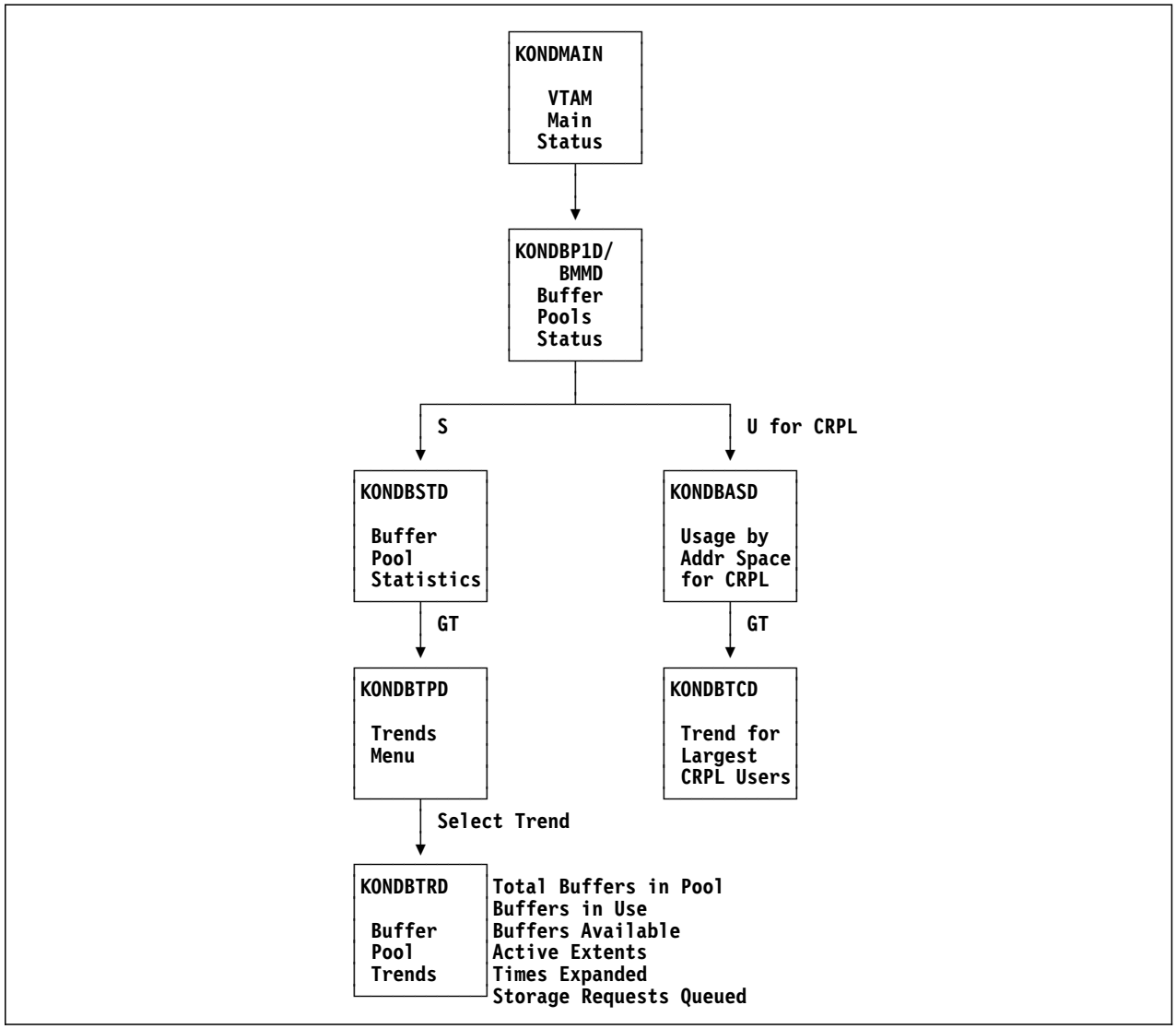
When our buffer pool tuning calculations are finished, we need to implement the changes in the VTAM start options parameters. To do this, we must exit from OMEGAMON II, change the VTAM start option parameter values for CRPL, and restart VTAM. Next, we would let the system and OMEGAMON II run for a while before using OMEGAMON II again to compare the new values of Trends and Usage by Address Space. In this fashion, we can determine whether:

- Thrashing in CRPL still exists, and XPANNO and BASENO require further adjustments.
- The CRPL buffer pool is expanding and contracting in a manner that indicates efficient use of storage.
- The adjustments to XPANNO and BASENO were too great (few or no expansions and contractions are occurring), indicating that smaller values should be used.

Buffer Pools Component Navigation



CRPL Buffer Pool Trending Navigation



Chapter 7. Virtual Routes

Chapter Contents

Overview

VTAM uses virtual routes to control data flow in the network. All session traffic flows over virtual routes, which are mapped to physical, or *explicit*, routes.

OMEGAMON II shows the mapping between virtual and explicit routes, monitors the flow of data on each route, and provides information to help you tune the network flow control mechanisms. To tune virtual routes, you can:

- change route definitions to produce a more efficient flow of data in the network
- distribute session traffic more evenly among the routes you have defined
- adjust virtual route pacing values to obtain maximum throughput

This chapter explains virtual routes and tells you how to use OMEGAMON II displays to tune them.

Virtual Routes and Explicit Routes

A *virtual route* is a logical connection between two subarea nodes in a network. A *subarea node* can be a VTAM or an NCP.

In the VTAMLST dataset, a path definition statement identifies each virtual route by:

- address of the subarea node at the end of the route (that is, the *destination subarea*)
- virtual route number from 0—7, which is the same in both directions
- explicit route number from 0—15

Traffic from an individual session is assigned to only one virtual route, but each virtual route can carry traffic from many sessions. At session activation, VTAM uses an entry in the *class-of-service table* to assign the session to a virtual route. If no class-of-service table entry exists for the session, VTAM uses a list of IBM-specified defaults.

If two virtual routes have the same virtual route number but different transmission priority numbers, VTAM considers them to be two separate virtual routes. Thus, there can be a maximum of 24 virtual routes between any two subarea nodes in the network:

```
8 virtual route numbers * 3 transmission priority numbers
```

Path definition statements in the VTAMLST dataset map virtual routes to explicit routes. You can change the routing of an application's data traffic either by modifying the path definition statement or by modifying the class-of-service table.

Virtual Route Pacing

Virtual route pacing is an SNA network's principal technique for controlling data flow globally. A *pacing window* is a group of Path Information Units (PIUs); that is, messages flowing through the network. *Pacing window size* is the number of PIUs in the group. Path definition statements can set minimum and maximum window sizes for each virtual route, or the minimum and maximum window sizes can default to values set by IBM. The actual, or *current*, window size fluctuates in the range set by the minimum and maximum values.

When a virtual route is initialized, the current window size is set at the minimum. The first PIU of each window contains a virtual route pacing request (VRPRQ). If there is no congestion in the network when the pacing request arrives, the receiving node returns a virtual route pacing response (VRPRS), a special PIU that contains no data and flows at network priority. Once the sending node receives the VRPRS, it can send another window of data.

If the VRPRS returns *before* the sender has transmitted an entire window of data, the window size remains the same; the VRPRS has not slowed network traffic, so there is no need to increase the window size. If, however, the VRPRS returns *after* the sender has transmitted an entire window, the window size increases by 1 (assuming the maximum window size has not been reached). These actions are performed independently and asynchronously for traffic originating at the two ends of the virtual route, and window sizes in the two directions may not be the same.

The following figure shows an example of flow control through virtual route pacing. In this example, assume that the minimum window size was set to 3, and the maximum was set to 9. Because the initial window size is 3, the sending node transmits 3 PIUs, the first of which contains a VRPRQ (a). When the VRPRQ arrives, the receiving node transmits an VRPRS. The VRPRS arrives before the sending node has transmitted the last PIU in the three-PIU window (b). Thus, the window size remains 3, and the sending node can transmit another window of 3 PIUs. This time, however, the sending node transmits all 3 PIUs before the VRPRS arrives (c). Therefore, the window size now increases to 4.

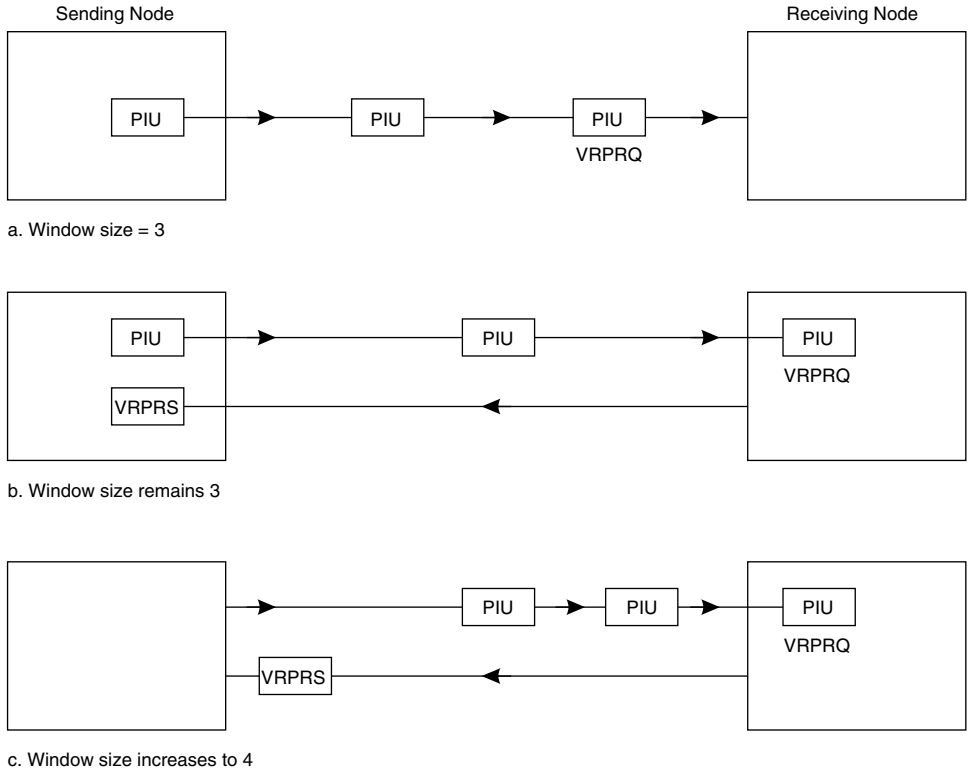


Figure 51. Virtual Route Flow Control

VTAM and NCP monitor their local resources (CPU, buffers, and so on) to check for *congestion*; that is, lessened availability of resources. When it detects congestion, VTAM reduces the window size to keep excessive data traffic from overloading the network's resources. If the congestion is moderate, the window size decreases by 1. If the congestion is severe, the window size is immediately reset to the minimum.

Virtual Route States

A virtual route that is carrying traffic or has sessions assigned to it is called an *active* virtual route. An active virtual route can be in any of three states:

Open When data traffic is flowing without delay.

Held When the sender has transmitted a window of data and is waiting for a pacing response before transmitting more data.

Blocked When the sender has transmitted a window of data, is waiting for a pacing response, *and* has a full window of PIUs queued for transmission.

The origin subarea node for traffic in each direction monitors the virtual route state. NCP does not have a blocked state and does not recognize VTAM's distinction between held and blocked states.

Virtual routes can enter the held state frequently in the normal course of operation, particularly if they are mapped to explicit routes that pass through more than one subarea node between origin and destination. In such a network, the slowest transmission group link becomes a bottleneck.

For example, the following figure shows a route in which the two transmission groups have different capacities. The link between Node B and Node C is the bottleneck link. We can expect the virtual route between A and B to enter the held state frequently while waiting for B to finish transmitting data to C.

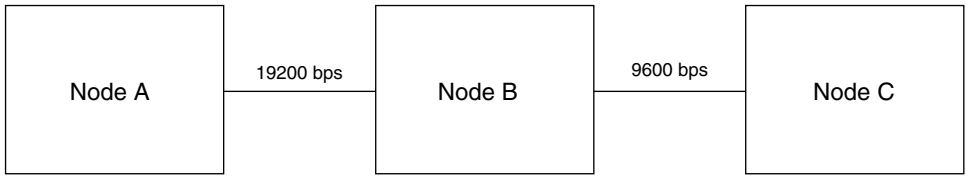


Figure 52. Transmission Group Links with Different Capacities

Because the slowest link governs the speed of data traffic on an entire explicit route, a frequent held state and even an occasional blocked state may be normal. In this situation, increasing the window size does no good and may overload the intermediate node's buffers.

When a virtual route is blocked, VTAM withholds all input to the route. If the blocked state lasts for a long time, throughput and response time in the entire network suffers.

Similarly, NCP withholds input to held virtual routes. Therefore, a persistent held state can cause network congestion, even if the held state results from normal operation.

How to Obtain Virtual Route Information

To obtain virtual route information, select **Virtual Routes** from the main status panel. The Virtual Route Analysis panel appears.

```
____  Actions  Goto  View  Options  Help
-------------------------------------------------------------------------------
KONDVMND                  Virtual Route Analysis               1 to  9 of 27
                 Subareas Defined from CCCDRM01 (Subarea 1)

Select with a "/" or an action code.
   X=Exceptions  S=VR status  M=ER mapping  R=PIU rates  D=LU distribution
+-----------------------------------------------------+
| Subarea |  Destination  |         Condition         |
|---------+---------------+---------------------------|
| _ 2     |  CCCDRM02     | Warning                   |
| _ 1     |  CCCDRM01     | Normal                    |
| _ 4     |  CCCDRM04     | Normal                    |
| _ 5     |  NCP05        | Normal                    |
| _ 6     |  NCP06        | Normal                    |
| _ 7     |  NCP07        | Normal                    |
| _ 8     |  NCP08        | Normal                    |
| _ 9     |  NCP09        | Normal                    |
| _ 10    |  NCP10        | Normal                    |
+-----------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 53. Virtual Route Analysis Panel

The Monitor List, under Virtual Route Monitoring Options on the Options pulldown, controls which subareas and virtual routes are monitored and displayed. From the Virtual Route Analysis panel, you can use these actions:

Exceptions Lists exceptions for virtual routes to the destination subarea.

VR status Tells whether each virtual route (VR) is active or inactive, and gives information about pacing window size and state (open, held, or blocked).

ER mapping Shows the explicit route (ER) for each virtual route, and identifies the adjacent subarea on the route.

PIU rates Gives the number and percentage of PIUs per second, outbound and inbound, on each virtual route.

LU distribution Graphs the number of logical-unit-to-logical-unit (LU-LU) sessions over virtual routes.

How to Interpret Virtual Route Information

If all the status lights are green (normal) on the Virtual Route Analysis panel, all the active routes in your network are open. If any light is yellow (warning) or red (critical), you can isolate the problem area by entering X (for Exceptions) to its left. A list of exceptions for virtual routes to the destination subarea appears. You can then use the Goto selection on the action bar to obtain more specific information.

"MAP 0100: Interpreting Virtual Route Information" on page 133 shows the sequence of steps to follow in interpreting virtual route information. You need to be able to answer three questions:

1. Is the virtual route open?
2. Is the window size at maximum?
3. Is the window size increasing?

For the answers to those questions, follow these steps to navigate to the Virtual Route Status panel:

1. On the main status panel, enter **S** (for Show next panel) to the left of **Virtual Routes**.

   The Virtual Route Analysis panel appears. This panel lists the destination subareas for all virtual routes that have been defined to the VTAM you are monitoring.

2. Enter **S** (for VR status) to the left of the subarea that is the destination of the virtual route you want to investigate.

Virtual Route Status

The Virtual Route Status panel, as shown below, lists information separately for each virtual route number and transmission priority number.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------------------------
KONDVVRD                    Virtual Route Status                    More:
                  for VRs from CCCDRM01 (1) to CCCDRM02 (2)

Select one or more with a "/" or an action code.
   S=Session partners
+-------------------------------------------------------------------------------+
| ------ VR ------ | ---- TP ---- | ------------ Pacing Window ------------- |
|   #    Status    | #   Status   | Curr    Min    Max   Status    Condition |
|------------------+--------------+-----------------------------------------|
| _ 0   | ACTIVE   | 0 | INACTIVE |    0 |    0 |    0 | Open   | Idle      |
|       |          | 1 | ACTIVE   |   12 |    1 |   50 | Open   | Normal    |
|       |          | 2 | ACTIVE   |   44 |    1 |   50 | Open   | Normal    |
+-------------------------------------------------------------------------------+




Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 54. Virtual Route Status Panel

If the virtual route that interests you is active, check the pacing window information in the right half of the display. The Status column under Pacing Window shows whether the virtual route is open, held, or blocked.

Now you need to find out whether the window size is at maximum. Compare the current pacing window size (Curr column) with the maximum window size (Max column).

To determine whether the window size is increasing, watch the Curr column for a few minutes. Press F5 frequently to refresh the panel. If the number in the Curr column increases, the window size is increasing.

You might also need long-term answers to the three questions. For example, if a virtual route is usually open but is consistently blocked at a certain time of day, examining the real-time Virtual Route Status panel does not give you all the information you need. To get an accurate picture of overall virtual route performance, you can examine the trending data and SAS-based historical graphs that OMEGAMON II provides. See “Virtual Route Trends” on page 140, “Historical Reports” on page 146, and “Case Study: Blocked Virtual Route” on page 145.

MAP 0100: Interpreting Virtual Route Information

001

Is the virtual route open?

Yes — **007**

The virtual route is fine.

No — **002**

Is the window size at maximum?

Yes — **006**

At least one of these is true:

- The maximum window size is too small.
- Too many sessions are using the same route.
- One or more sessions are sending large amounts of data.

Continue at "How to Tune Virtual Routes" on page 134.

No — **003**

Is the window size increasing?

Yes — **005**

Monitor the situation for change.

No — **004**

There is congestion in the network.

Continue at "How to Tune Virtual Routes" on page 134.

Resource Analysis

The resource analysis feature is available from Virtual Routes using the following steps:

1. Select **`Virtual Routes`** from the main status panel.
2. Enter action code **`S`** next to a subarea in the action code entry field.
3. Enter action code **`S`** (Session Partners) next to the VR number in the action code entry field.
4. Enter action code **`S`** (Resource Analysis) next to a resource.

Result: Depending on the type of resource selected, a resource analysis panel appears. See "Resource Analysis" on page 85.

How to Tune Virtual Routes

Depending on your answers to the questions in "MAP 0100: Interpreting Virtual Route Information" on page 133, you might need to take action to improve virtual route performance. The easiest and least drastic remedies to try are:

- changing the maximum window size
- mapping the virtual route to a different explicit route
- changing the class-of-service table to distribute sessions more evenly among the virtual routes

If these measures do not help, you may have a hardware problem. One or more transmission group links may be extremely slow, the order of the links in the transmission group may be wrong, or a network component may be defective.

Assuming that you do not have a hardware problem, you can tune the virtual routes in your network by modifying either the path definitions in the VTAMLST dataset or the class-of-service table in the VTAM load module library.

Specifying Path Definitions

A PATH statement:

- specifies the destination subarea
- assigns each virtual route to an explicit route

- optionally, gives a default minimum and maximum pacing window size for each virtual route

The IBM manual *VTAM Installation and Resource Definition* provides instructions for coding the PATH statement. Here is an example of a PATH statement:

```
PATH  DESTSA=2, ER6=2, VR3=6, VRPWS30=(15,255)
```

DESTSA=2 Indicates that the destination subarea is subarea 2.

ER6=2 Establishes subarea 2 as the adjacent subarea on explicit route 6.

VR3=6 Maps virtual route 3 to explicit route 6.

VRPWS30=(15,255) Sets 15 as the minimum window size and 255 as the maximum window size for virtual route 3 with transmission priority 0. (The first numeric character in VRPWSnn indicates the virtual route number, and the second numeric character indicates the transmission priority number.)

To change the maximum window size of a virtual route, you modify the PATH statement. Or if you discover that too many virtual routes are mapped to the same explicit route, you can change the mapping in the PATH statement. In addition, when you add or change hardware, you may need to change the explicit route definitions.

Recommended Window Sizes

By default, the *minimum* window size is the number of transmission groups in the explicit route to which the virtual route is mapped; the default *maximum* window size is three times that number. However, if the virtual route ends in an adjacent subarea, then the default maximum window size is the larger of:

```
15
```

or

```
255 - (16 * n)
```

where *n* is the number of explicit routes that pass through the adjacent subarea but do not end there. Thus, in a simple two subarea network, the default minimum window size is 1 and the default maximum window size is 255, since all explicit routes end at the adjacent subarea.

If your network has virtual route problems, you might want to increase the maximum window size. If the problems persist, increase the maximum again. A maximum window size that is set too low can cause significant virtual route problems, and the default value is too low for many networks.

You might also want to modify the minimum window size for VTAM channel-to-channel virtual routes. VTAM increases the window size only when the virtual route enters the held state; that is, when the sender is waiting for a virtual route pacing response before transmitting more data. Channel-to-channel routes are so fast that the virtual route may never enter the held state, and the window size may never increase from the minimum. When the window size is small, many virtual route pacing responses flow over the channel. The result can be an unnecessarily high amount of traffic and CPU usage.

Therefore, the IBM *VTAM Customization* manual recommends that you increase the minimum window size to 15 for single-link channel-to-channel routes. (The default minimum window size for such a route is 1.)

Creating and Modifying a Class-of-Service Table

You can use a class-of-service table to group together virtual routes with similar characteristics, such as security and transmission priority. For example, you can put the fast routes in a list intended for interactive sessions and the slow routes in another list intended for batch jobs.

A class-of-service table gives each list, or *entry*, a class-of-service name, which can then be associated with a session's logon mode. When VTAM establishes a session, it chooses the first available route from the list of routes for that session's class of service.

If no class-of-service table exists, VTAM uses a list of IBM-specified default routes. This default list may not suit your network. For example, the default list could result in an interactive session being assigned to a slow line, or in too many sessions being assigned to the same virtual route. The IBM *VTAM Customization* manual gives detailed instructions for creating a class-of-service table.

Once you have created a class-of-service table, you can use OMEGAMON II to see whether the flow of traffic on your network's virtual routes seems to be balanced. If not, you might want to change the list of routes in each class of service.

Virtual Route Response Times

Because virtual route problems often manifest themselves as response time problems, OMEGAMON II provides a summary of terminal response times by virtual route. To view the response time summary, follow these steps.

1. On the main status panel, enter **S** to the left of **Response Times**.

   The Terminal Response Time panel appears.

2. Select Goto from the action bar and then select Subarea Summary.

   The Response Time Summary by Subarea appears as shown below.

```
____  Actions  Goto  Options  Help
--------------------------------------------------------------------------------
KONDRSMD              Response Time Summary by Subarea             1 to 4 of 4

Select with a "/" or an action code.
   S=VR summary
+-------------------------------------------------------------------------------+
|   SA  | Name     |  LUs  |  PIUs  |   Host  | Network |  Total  |   Cond    |
|-------+----------+-------+--------+---------+---------+---------+-----------|
| s 2   | CCCDRM02 |    14 |     42 |    1.1s |    1.2s |    2.3s | Critical  |
| _ 7   |    -     |     5 |     12 |    0.5s |    0.7s |    1.2s | Critical  |
| _ 10  | NCP10    |     8 |      2 |    0.2s |    0.9s |    1.1s | Critical  |
| _ 9   |    -     |    13 |      0 |    0.0s |    0.0s |    0.0s | Normal    |
+-------------------------------------------------------------------------------+









Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 55. Response Time Summary by Subarea

3. Enter **S** to the left of the destination subarea that interests you. (In the example, we chose CCCDRM02, the subarea with the highest network response time.)

The Response Time Summary by VR appears as shown below. This panel displays average host, network, and total response times for each virtual route at each transmission priority.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------------------------
KONDRVMD                    Response Time Summary                 1 to 1 of 1
                               by VR for SA 2

Select with a "/" or an action code.
   S=Show terminals
+-------------------------------------------------------------------------------+
|  VR  | ER | RER | TP |  LUs |  PIUs  |  Host  | Netwrk |  Total | Condition |
|------+----+-----+----+------+--------+--------+--------+--------+-----------|
| _ 0  |  7 |  7  |  0 |    0 |      0 |   0.0s |   0.0s |   0.0s | Idle      |
|      |    |     |  1 |   14 |     44 |   1.1s |   1.2s |   2.3s | Critical  |
|      |    |     |  2 |    0 |      0 |   0.0s |   0.0s |   0.0s | Idle      |
|      |    |     |    |      |        |        |        |        |           |
+-------------------------------------------------------------------------------+




Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 56. Response Time Summary by Virtual Route

In this panel, all sessions that use Virtual Route 0 to Subarea 2 are assigned to Transmission Priority 1. Response time might improve if some sessions used Transmission Priority 0 or if some sessions used a different virtual route.

Number of Hops

When you select the Virtual Routes component on the main status panel, the Virtual Route Analysis panel appears. The panel shows the destination subareas known to this host subarea and uses a status light to indicate the condition of the virtual routes between the subareas.

Then, if you enter action code **M** (ER Mapping) next to a subarea of interest, the Explicit Route Mapping panel appears.

```
____ Actions  Goto  Options  Help
-------------------------------------------------------------------------------
KONDVERD                    Explicit Route Mapping                System: SYSA
                  for VRs from CCCDRM25 (25) to CCCDRM01 (1)

Select with a "/" or an action code.
   S=Session partners
+----------------+--------------------+------------------+------+-------------+
| ---- VR ------ | ------ ER -------- | Adjacent Subarea |  #   |             |
|   #    Status  |  #     Status      |   #    Name      | Hops | Condition   |
+------+---------+------+-------------+------+-----------+------+-------------+
| _ 0  | ACTIVE  |  4   | ACTIVE3     |   1  | CCCDRM01  |    2 | Normal      |
| _ 1  | INACT   |  1   | INACT       |  10  | NCP10     |      |             |
+------+---------+------+-------------+------+-----------+------+-------------+









Command ===> ____________________________________________________________
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 57. Explicit Route Mapping Panel

This panel shows the virtual route to explicit route assignments for all VRs defined between the two subareas specified in the panel title.

Notice the # Hops column to the right of the Adjacent Subarea column. The number of hops is the number of subareas in a virtual route through which data must travel until it reaches its destination. Only hops in this network are counted. An asterisk (*) in the # Hops field indicates that the virtual route is not in active status.

To improve application response times in a large complex network, you may decide to redirect sessions over different VRs via the class of service table (COSTABLE).

Virtual Route Trends

Many virtual route tuning and configuration decisions require not only real-time data, but also data collected over a longer period of time. To give you the long-term information you need, OMEGAMON II provides online trend displays. Virtual route trend information is available for:

- virtual route state (open, held, or blocked)
- pacing window size
- message traffic
- session distribution

Virtual Route State Trending

To view virtual route state trending information, follow these steps.

1. On the Virtual Route Analysis panel, enter **S** (for VR Status) to the left of the subarea that is the destination of the virtual route you want to examine.
2. On the Virtual Route Status panel, enter **gt** (for Goto Trending) in the action bar entry field.
3. On the VR Trending pop-up window, identify the virtual route that interests you by typing its VR number and TP number (see the figure below). Select **VR status** in the bottom section of the pop-up, and press Enter.

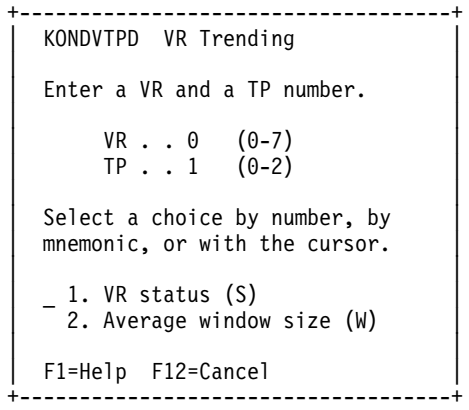


Figure 58. Virtual Route Trending Selection Window

The VR Status Trending panel appears as in the figure below. This display shows the percent of time during each trending interval that the virtual route was open, held, and blocked. The sum of these should equal 100%.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDVTRD                  VR Trending  -  VR Status              System: SYSA
                           for VR0 TP1 to Subarea 2
                                                          Lines 1 to 10 of 92


+----------+----------+----------+---------+---------------------------------+
|   Date   |   Time   | VRStatus | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
+----------+----------+----------+---------+---------------------------------+
| 10/06/93 | 17:06:27 | OPEN     |  100.0% | ============================>   |
|          |          | HELD     |    .0%  | >. . . . . . . . . . . . . . .   |
|          |          | BLOCKED  |    .0%  | >. . . . . . . . . . . . . . .   |
|          |          | INACTIVE |    .0%  | >. . . . . . . . . . . . . . .   |
| 10/06/93 | 16:51:11 | OPEN     |   85.0% | =========================> . .   |
|          |          | HELD     |   10.0% | ==>. . . . . . . . . . . . . .   |
|          |          | BLOCKED  |    5.0% | => . . . . . . . . . . . . . .   |
|          |          | INACTIVE |    .0%  | >. . . . . . . . . . . . . . .   |
| 10/06/93 | 16:36:03 | OPEN     |   89.0% | ==========================>. .   |
|          |          | HELD     |   11.0% | ==>. . . . . . . . . . . . . .   |
+----------+----------+----------+---------+---------------------------------+

Command ===> _____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 59. Virtual Route Status Trending

In this panel, the trending interval is 15 minutes.

Pacing Window Size Trending

To view pacing window size trending information, follow these steps.

1. On the Virtual Route Analysis panel, enter **S** (for VR status) to the left of the subarea that is the destination of the virtual route you want to examine.
2. On the Virtual Route Status panel, enter **gt** (for Goto Trending) in the action bar entry field.
3. On the VR Trending pop-up window, identify the virtual route that interests you by typing its VR number and TP number. Select **Average window size** in the bottom section of the pop-up, and press Enter. The VR Trending for Average Window Size panel appears.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDVTWD           VR Trending for Average Window Size            System: SYSA
                       for VR0 on TP1 from Subarea 2
                                                          Lines 1 to 10 of 22

The largest window size for the trending period was 50
+----------+----------+----------+---------+---------------------------------+
|   Date   |   Time   |  Window  | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
+----------+----------+----------+---------+---------------------------------+
| 04/06/93 | 17:06:27 |        8 |   16.0% | ====>. . . . . . . . . . . . .  |
| 04/06/93 | 16:51:11 |        7 |   14.0% | ====>. . . . . . . . . . . . .  |
| 04/06/93 | 16:36:03 |        6 |   12.0% | ===> . . . . . . . . . . . . .  |
| 04/06/93 | 16:20:41 |       10 |   20.0% | ======>. . . . . . . . . . . .  |
| 04/06/93 | 16:05:40 |       13 |   26.0% | =======> . . . . . . . . . . .  |
| 04/06/93 | 15:50:35 |       13 |   26.0% | =======> . . . . . . . . . . .  |
| 04/06/93 | 15:35:10 |       11 |   22.0% | ======>. . . . . . . . . . . .  |
| 04/06/93 | 15:19:57 |        9 |   18.0% | =====> . . . . . . . . . . . .  |
| 04/06/93 | 15:04:41 |        9 |   18.0% | =====> . . . . . . . . . . . .  |
| 04/06/93 | 14:49:24 |        8 |   16.0% | ====>. . . . . . . . . . . . .  |
+----------+----------+----------+---------+---------------------------------+

Command ===> ____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 60. Virtual Route Window Size Trending

This panel shows the average window size during each trending interval, and graphs the percentage of the maximum window size represented by each interval's average window size. If the maximum window size is very high and the average window size is low, the value does not register on the graph.

Message Traffic Trending

Note: For significant data to display, sampling interval should not exceed 30 seconds.

To view message traffic trending information, follow these steps.

1. On the Virtual Route Analysis panel, enter **R** (for PIU rates) to the left of the subarea that is the destination of the virtual route you want to examine.
2. On the PIUs/Sec over Virtual Routes panel, enter **gt** (for Goto Trending) to the left of the action bar.
3. On the VR Trending pop-up window, identify the virtual route that interests you by entering its VR number and TP number. The VR Trending for PIUs/Second panel appears.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDVTUD                VR Trending - PIUs/Second                System: SYSA
                      for VR0 on TP1 from Subarea 2
                                                          Lines 1 to 10 of 22

The highest number of PIUs per second for the trending period was 21.27
+----------+----------+---------+--------+--------+---------+-----------------+
|   Date   |   Time   |  Total  |  IPIU  |  OPIU  | Percent | 0....50....100  |
+----------+----------+---------+--------+--------+---------+-----------------+
| 04/06/93 | 17:06:00 |   16.49 |   8.92 |   7.57 |   77.5% | =========> . .  |
| 04/06/93 | 16:51:00 |   18.77 |  10.19 |   8.58 |   88.2% | ==========> .   |
| 04/06/93 | 16:36:00 |   19.33 |  10.42 |   8.91 |   90.8% | ==========> .   |
| 04/06/93 | 16:20:00 |   20.02 |  10.87 |   9.15 |   94.1% | ==========>.    |
| 04/06/93 | 16:05:00 |   20.24 |  10.84 |   9.40 |   95.1% | ==========>.    |
| 04/06/93 | 15:50:00 |   17.91 |   9.46 |   8.45 |   84.2% | ==========>. .  |
| 04/06/93 | 15:35:00 |   18.63 |  10.09 |   8.54 |   87.5% | ==========> .   |
| 04/06/93 | 15:19:00 |   17.53 |   9.21 |   8.32 |   82.4% | ==========>. .  |
| 04/06/93 | 15:04:00 |   21.27 |  11.16 |  10.11 |  100.0% | ==========>     |
| 04/06/93 | 14:49:00 |   17.35 |   9.19 |   8.16 |   81.5% | =========> . .  |
+----------+----------+---------+--------+--------+---------+-----------------+

Command ===> ____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 61. Virtual Route Message Traffic Trending

This panel shows the highest number of PIUs (inbound, outbound, and total) per second that traveled on the virtual route during each trending interval. The display also graphs the percentage of the highwater mark that each total represents. The highwater mark is the highest number of PIUs per second in any one trending interval.

Session Distribution Trending

To view session distribution trending information, follow these steps.

1. On the Virtual Route Analysis panel, enter **D** (for LU distribution) to the left of the subarea that is the destination of the virtual route you want to examine.
2. On the LU Session Distribution panel, enter **gt** (for Goto Trending) to the left of the action bar.
3. On the VR Trending pop-up window, identify the virtual route that interests you by entering its VR number and TP number. The VR Trending for LU Session Distribution panel appears.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDVTLD         VR Trending - LU Session Distribution          1 to 10 of 22
                      for VR0 on TP1 from Subarea 2

The highest number of sessions for the trending period was 280
+-------------------------------------------------------------------------------+
|   Date   |   Time   | Sessions | Percent | 0.10.20.30.40.50.60.70.80.90.100 |
|----------+----------+----------+---------+----------------------------------|
| 04/06/90 | 17:06:27 |      170 |   60.7% | ==================> . . . . . .  |
| 04/06/90 | 16:51:11 |      177 |   63.2% | ===================>. . . . . .  |
| 04/06/90 | 16:36:03 |      201 |   71.7% | ====================>. . . . .  |
| 04/06/90 | 16:20:41 |      213 |   76.0% | ======================>. . . .  |
| 04/06/90 | 16:05:40 |      222 |   79.2% | ======================> . . .  |
| 04/06/90 | 15:50:35 |      230 |   82.1% | =======================>. . .  |
| 04/06/90 | 15:35:10 |      237 |   84.6% | ========================> . .  |
| 04/06/90 | 15:19:57 |      246 |   87.8% | ========================>. .  |
| 04/06/90 | 15:04:41 |      252 |   90.0% | =========================>. .  |
| 04/06/90 | 14:49:24 |      263 |   93.9% | ==========================>.  |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 62. Virtual Route Session Distribution Trending

This panel shows the number of active LU-LU sessions on the virtual route during each trending interval. It also graphs the percentage of the highwater mark that each number represents. The highwater mark is the highest number of LU-LU sessions on the virtual route in any one trending interval.

Case Study: Blocked Virtual Route

This is a typical virtual route problem and its solution.

1. It is late afternoon. The main status panel shows a red light for Virtual routes.
2. You enter **X** next to **Virtual routes**. The Exceptions panel shows that Virtual Route 0 to Subarea 2 is blocked.
3. You navigate to the Virtual Route Status panel for virtual routes to Subarea 2. VR 0 is still blocked. When you press F5 to refresh the screen, the state of VR 0 changes to held. You press F5 several more times. VR 0 is held most of the time but is occasionally blocked. The current window size is 15, which is also the maximum window size.
4. You examine trending displays for virtual route state, window size, and message traffic. The displays show that VR 0 reached its maximum window size of 15 in peak traffic early in the day. Since that time, VR 0 has been open most of the time. Increased traffic in the late afternoon has resulted in held and blocked states.
5. You now examine SAS graphs that show patterns of virtual route activity and performance over the past several days. The graphs confirm the same trend you observed today: VR 0 is at maximum window size most of the day, and becomes held or blocked during late-afternoon heavy traffic. The SAS graphs also show that VR0 is carrying almost all message traffic to Subarea 2.
6. To solve the problem, you take two actions:
   a. Increase the maximum window size.
   b. Change the class-of-service table to distribute sessions more evenly among the virtual routes to Subarea 2.
7. Over the next several days, you continue to examine trending data and SAS graphs. If necessary, you make further adjustments to maximum window size and session routing.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for the panel.

Historical Reports

If you have SAS/GRAPH installed and SMF recording enabled for VR data (see "Virtual Route Monitor Options" on page 331), you can generate historical reports over a longer period than the trending displays accommodate. The historical graphs provide comparisons of virtual route performance over time. These analyses show you daily patterns, and help you test the effects of your changes to the path definition statements or to the class-of-service table.

OMEGAMON II provides the following historical reports for virtual routes:

- comparison of pacing window sizes over time among the three transmission priorities on a virtual route
- comparison of message traffic rates among the three transmission priorities on a virtual route
- comparison of message traffic rates among the virtual routes to the same destination subarea

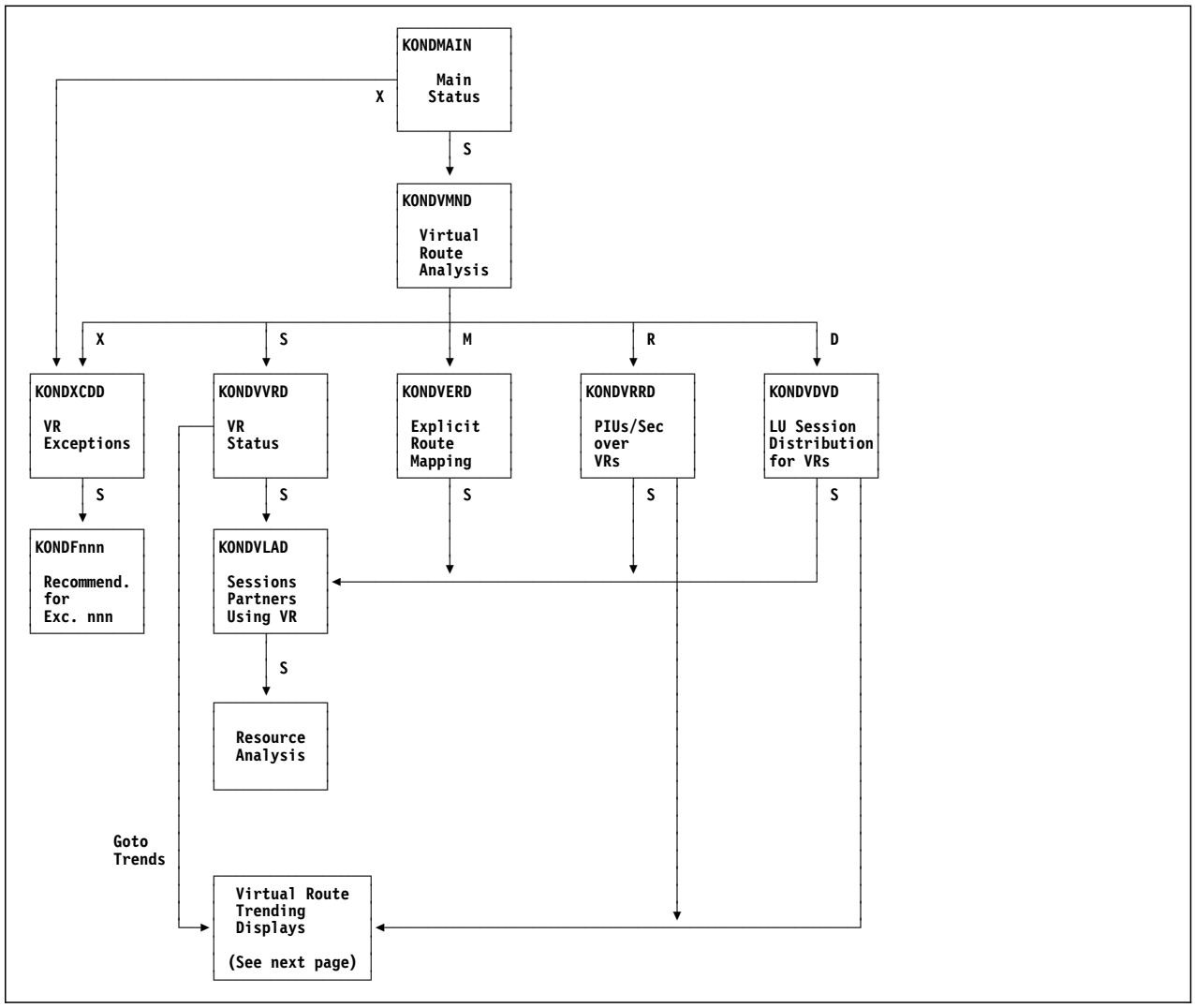
See the information about SAS reporting in the *OMEGAMON II for Mainframe Networks Historical Reporting Guide* for instructions on how to use this feature.

For Further VR Information

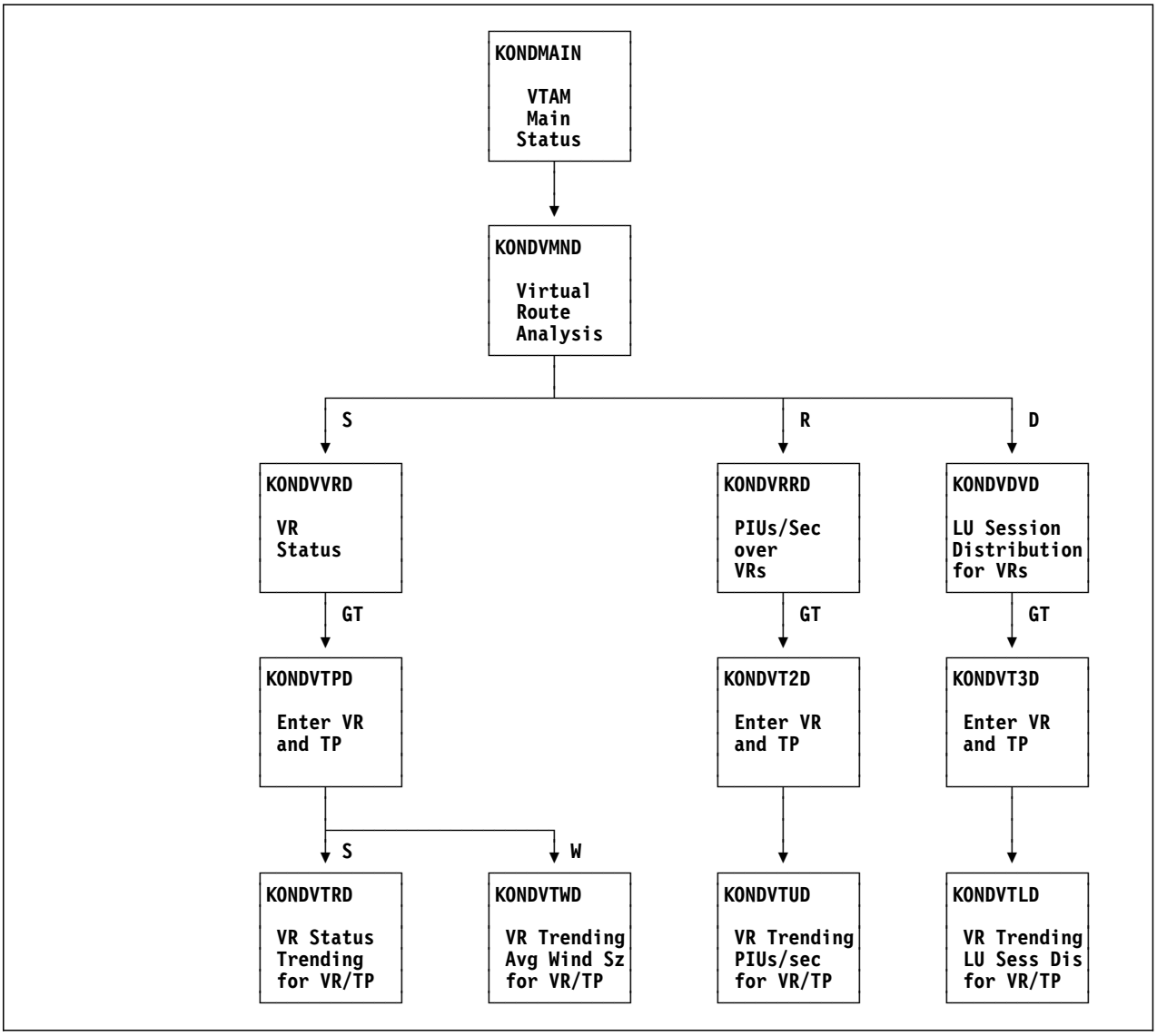
Virtual routes are a complex topic and this has only been a summary. For further information, see the following IBM publications:

- *ACF Network Flow Control* (technical bulletin)
- *"Held VR": Symptom, Problem, or Normal Operation?* (technical bulletin)
- *VR Performance and Window Size Tuning* (technical bulletin)
- *Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic*

Virtual Routes Component Navigation



Virtual Route Trending Navigation



Chapter 8. Tuning Statistics

Chapter Contents

Overview

This chapter introduces you to VTAM's tuning statistics (TNSTATs), which gather information about the transfer of data among network channels. By examining the TNSTATs information, you can determine the best way to tune VTAM, which is a process of balancing the network load to avoid congestion.

After a brief discussion of basic tuning objectives and the use of tuning statistics, the chapter focuses on OMEGAMON II's tuning statistics components: channel-to-channel (CTC) including multipath channels (MPC), Network Control Program (NCP), and locally attached controllers. Each of the three tuning statistics components displays and analyzes channel performance data from locally attached network devices.

Basic Tuning Objectives

VTAM, using MVS services, drives data across the following types of network channels:

CTCA CTC
Uses a single subchannel to connect a host processor to another host.

MPC CTC
Uses multiple, single-direction read and write subchannels to transmit data.

NCP Connects a host processor to a terminal controller that contains Network Control Program software.

Local Connects a host processor to local SNA terminal controllers.

The object in tuning VTAM is to move the data across the channels as quickly and efficiently as possible. By changing VTAM's tuning parameters, you can adjust the way the channel program reads data into VTAM or writes data out to an attached device.

Basic tuning objectives include:

- achieving the fastest terminal response time possible
- using the least amount of CPU cycles from the host processor
- using storage more efficiently in the host and network controller
- increasing *coattailing*, the process of sending or receiving more than one message over the channel every time the channel is scheduled (See "Tuning to Increase Coattailing" on page 152)

VTAM Tuning Statistics

You must specify **TNSTATS** in the start option list of VTAM or by VTAM operator command to enable the collection of tuning statistics.

TNSTATS Status Lights

OMEGAMON II's status lights represent the flow of data among network channels. If there appears to be a problem in the data flow (indicated by a yellow or red status bar), you can navigate through a series of panels that locate the source of congestion.

TNSTATS Data Panels

Each tuning statistics panel contains information about the flow of data between VTAM and SNA terminal controllers (NCP or local), or between two VTAMs housed in separate host processors (connected by CTC channels).

TNSTATS information helps you to adjust parameters in your VTAMLST dataset so that the load on the host is decreased and channel efficiency is increased.

The TNSTATS panels include such information as the number of:

- inbound messages
- outbound messages
- channel operations
- buffers used
- times the attached devices went into slowdown mode

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

What Happens in a NOTNSTAT Condition?

If you issue the following VTAM command

```
F procname,NOTNSTAT
```

VTAM stops recording tuning statistics.

When OMEGAMON II detects a NOTNSTAT condition, it does the following:

1. Stops generating trend records for CTC, NCP, and LOCAL devices.
2. Sets turquoise status lights for CTC, NCP, and LOCAL TNSTATS on the main status panel and sets the text within these lights to **NOTNSTAT**.
3. When the main status light indicates **NOTNSTAT**, the following are displayed on the corresponding List of CTCs, NCPs, or LOCALs panel:
   a. only configuration data for CTCs, NCPs, or LOCALs
   b. message KONCV145 stating **Tuning Statistics are not active**
   c. for each device, a turquoise condition field containing the text **IDLE**

Tuning to Increase Coattailing

Coattailing is a process in which

- more than one message is transferred to the host without generating an attention interrupt
- multiple messages are sent outbound
- a combination of multiple inbound and outbound messages occurs

Coattailing reduces the number of channel programs that must be executed. This decreases channel and host usage, but may slightly increase response time. Despite the tradeoff, coattailing is generally advantageous. By analyzing OMEGAMON II's tuning statistics data, you can decide which VTAM parameters to change to increase coattailing.

CTC Tuning Statistics

A VTAM attached to another VTAM through a channel-to-channel adapter is a channel-to-channel (CTC) VTAM connection. When initialized, the VTAMs first use an exchange ID (XID) procedure to exchange product, level, and definition information. Once the connection has been established, the VTAM that initiated XID writes first, then reads; the other VTAM reads first, then writes.

The following is a typical CTC tuning statistics panel.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------11:58:47 08/28/91
 KONDCTSD                        CTC TNSTATS                        System: SYSG
               Address: 0C01  Name: CTC12     CTC Line: CTC12L
+-------------------------------------------------------------------------------+
| Interval:   120 minutes                                                       |
|-------------------------------------------------------------------------------|
| Description       | Field |   Value | Description       | Field  |   Value    |
|-------------------+-------+---------+-------------------+--------+------------|
| Normal size write | CHNRM |   3,272 | Bytes transferred | RDBUF  |    239525  |
| Attentions        | ATTN  |   2,867 | Slowdowns         | SLODN  |          0 |
| Outbound PIUs     | OPIU  |   4,706 | Timer expired     | TIMERS |          5 |
| Inbound PIUs      | IPIU  |   4,724 | Buffer queue full | QDPTH  |         52 |
| High priority PIU | PRI   |   3,215 | Read buffers full | BUFCAP |          0 |
|-------------------------------------------------------------------------------|
| Direction     | Pct  | 0...10...20...30...40...50...60...70...80...90...100  |
|---------------+------+--------------------------------------------------------|
| PIUs Inbound  |  50% | ========================> . . . . . . . . . . . .     |
| PIUs Outbound |  50% | ========================> . . . . . . . . . . . .     |
+-------------------------------------------------------------------------------+
 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F8=Fwd  F9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 63. CTC Tuning Statistics Panel

CTC TNSTATs Displayed

CTC tuning statistics for the VTAM TNSTAT interval, which are shown in the previous figure, include the following:

CHNRM (t) Number of channel programs issued.

ATTN (t) Number of channel programs that were started because the host had data to send.

OPIU (t) Number of outbound Path Information Units. (PIUs)

IPIU (t) Number of inbound PIUs.

PRI Number of times VTAM initiated a channel program because a high-priority PIU needed to be sent.

RDBUF (t) Number of bytes transferred during the indicated interval.

SLODN (t) Number of times a channel program was completed but the data could not be sent because the other VTAM's buffers were full. You should have a SLODN value of zero. To avoid slowdowns, the IOBUF expansion point in the second VTAM should be greater than MAXBFRU (maximum) minus MAXBFRU (normal).

TIMERS Number of times a channel program was initiated because the interval specified for delaying channel-to-channel PIUs expired.

QDEPTH Number of times a channel program was started because the delay limit has been reached.

BUFCAP Number of times a channel program was started because one VTAM received a burst of data that filled the read buffers of another VTAM connected by a CTC channel.

Note: The **(t)** next to a TNSTAT listed above indicates that trending is available. Refer to "Trends for CTCs" on page 164 for how to access the trending displays.

CTC Channel Usage

CTC channel usage is characterized by:

- the number of times the channel is activated
- the number of bytes in each transfer

A channel program is activated for one of four reasons:

- The timer expires.

  The DELAY parameter (in the channel major node definition in the VTAMLST dataset) specifies the time for VTAM queuing. When the timer expires, VTAM initiates a channel operation. OMEGAMON II displays this value in the **TIMERS** field.

- The QDEPTH limit is reached.

  The QDEPTH parameter depends on the DELAY parameter. VTAM multiplies the number of PIUs that were sent in the previous delay interval by 0.75. When this number of PIUs are queued during the next interval, VTAM initiates a channel program. This is a way for VTAM to keep up with dynamic changes in the traffic pattern. OMEGAMON II displays this value in the **QDPTH** field.

- The buffers fill up.

  The MAXBFRU parameter specifies the block size (in pages) that VTAM uses for fixed-length channel program transfers. The MAXBFRU values are exchanged during XID. If a VTAM gets a burst of data in a short period of time that can fill the buffers of the other VTAM, it initiates a channel operation. OMEGAMON II displays this value in the **BUFCAP** field.

- Priority traffic must be sent.

  VTAM initiates a channel program for a virtual route pacing response or for Transmission Priority 2 (TP2) traffic. OMEGAMON II displays this value in the **PRI** field.

Improving CTC Performance

There are two goals to meet when tuning CTC connections:

- Minimize requests for I/O buffers.
- Reduce system I/O operations.

The following can be changed:

- MAXBFRU
- buffer pool parameters
- virtual route window sizes
- number of high-priority PIUs

Displaying CTC Data

When you select **TNSTATS for CTCs** from the main status panel, OMEGAMON II displays a list of CTC connections as shown in the following figure.

For each CTC, this panel shows

- CTC name
- MVS device address
- CTC line name
- CTC type
- name of the Cross Domain Resource Manager (CDRM) in the adjacent host
- adjacent subarea number
- condition of the CTC

You select a CTC by entering an action code next to the CTC name. Both channel-to-channel adapter (CTCA) and multipath channeling (MPC) groups and subchannels are displayed.

To monitor an MPC group, select a CTC with type **MPC GROUP**.

To monitor an MPC subchannel, select a CTC with type **MPC READ** or **MPC WRITE**.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------16:30:50 07/31/94
KONDCTMD                  CTC TNSTATS - List of CTCs            System: SYSG

Select with a "/" or an action code.                        Lines 1 to 18 of 18
    X=Exceptions  S=TNSTATS  R=Rate/sec  A=Analysis  N=Analysis/sec
+-------------------------------------------------------------------------------+
|   CTC       | Device    |            | CTC Line |     Adjacent      |           |
|   Name      | Address   |   Type     |   Name   | CDRM Name    SA   | Condition |
|-------------+-----------+------------+----------+-------------------+-----------|
| _ CTC01     |           | MPC GROUP  | CTC01L   | CCCDRM01     1    |  Normal   |
| _  CTC01    | 0C09      | MPC READ   | CTC01L   | CCCDRM01     1    |  Normal   |
| _  CTC01    | 0C2A      | MPC WRITE  | CTC01L   | CCCDRM01     1    |  Normal   |
| _ CTC12     | 0720      |   CTCA     | CTC12L   | CCCDRM12    12    |  Normal   |
| _ CTC13     | 0C37      |   CTCA     | CTC13L   |                   |  Normal   |
| _ CTC16     | 0C16      |   CTCA     | CTC16L   | CCCDRM16    16    |  Normal   |
| _ CTC21     | 0C15      |   CTCA     | CTC21L   |                   |  Normal   |
| _ CTC22     | 0C34      |   CTCA     | CTC22L   |                   |  Normal   |
| _ CTC24     | 0C35      |   CTCA     | CTC24L   |                   |  Normal   |
| _ CTC29     | 0C36      |   CTCA     | CTC29L   |                   |  Normal   |
| _ CTC30     | 0C17      |   CTCA     | CTC30L   |                   |  Normal   |
| _ CTC32     | 0750      |   CTCA     | CTC32L   | CCCDRM32    32    |  Normal   |
| _ CTC35     |           | MPC GROUP  | CTC35L   | CCCDRM35    35    |  Normal   |
| _  CTC35    | 0780      | MPC WRITE  | CTC35L   | CCCDRM35    35    |  Normal   |
| _  CTC35    | 0781      | MPC WRITE  | CTC35L   | CCCDRM35    35    |  Normal   |
| _  CTC35    | 0782      | MPC READ   | CTC35L   | CCCDRM35    35    |  Normal   |
| _ CTC36     | 07B0      |   CTCA     | CTC36L   | CCCDRM36    36    |  Normal   |
| _ CTC37     | 07E0      |   CTCA     | CTC37L   |                   |  Normal   |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 64. CTC TNSTATS – List of CTCs

You can choose a CTC from the list by entering one of the following action codes:

X List the exceptions.
S Display raw TNSTATS data.
R Display the rate of change to the raw TNSTATS data.
A Display analyzed TNSTATS data.
N Display the rate of change to the analyzed TNSTATS data.

When you select a CTC for analysis (by entering **A** next to **CTC30**, for example), OMEGAMON II displays the analysis panel.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDCTAD                  CTC TNSTATS Analysis
              Address: 0C06  Name: CTC30     CTC Line: CTC30L
+------------------------------------------------------------------------------+
| Interval:   120 minutes                                                      |
|------------------------------------------------------------------------------|
| Average bytes per CHPRG . . |     43.09 | TSCB pending queue. . |         0 |
| Average OPIUS per CHPRG . . |      1.20 | QDPTH SIO trigger . . |         1 |
| Bytes in for last CHPRG . . |         0 | OPIUs last timer. . . |         2 |
| Bytes out for last CHPRG. . |         0 | CTC pages per buff. . | Y=04 X=04 |
| Max write delay (ms). . . . |       100 | Read Attentions . . . |      6211 |
|------------------------------------------------------------------------------|
|         |           |         Percentage Breakdown of SIO Requests             |
| Field   |    Pct    | 0...10...20...30...40...50...60...70...80...90...100    |
|---------+-----------+----------------------------------------------------------|
| TIMERS  |    6.5%   | ===> . . . . . . . . . . . . . . . . . . . . . . .       |
| QDPTH   |   61.3%   | ==============================>. . . . . . . . . .       |
| BUFCAP  |     .0%   | >. . . . . . . . . . . . . . . . . . . . . . . . .       |
| PRI     |   32.0%   | ================>. . . . . . . . . . . . . . .       |
+------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
 F11=Print  F12=Cancel  F15=Status_Display
```

Figure 65. CTC TNSTATS Analysis Panel

This panel provides important information:

Coattailing indicator
Average number of outbound PIUs (OPIUs) per channel program (**Average OPIUs per CHPRG**). If this number is greater than one, coattailing took place during the interval. The larger the number, the greater the coattailing.

Transmission Subsystem Control Block (TSCB) pending queue
Number of I/O buffers queued with data to be sent.

Percentage of start I/O (SIO) requests caused by TIMERS, QDPTH, BUFCAP, and PRI
Graphically depicts why the channel is being scheduled. (See "CTC Channel Usage" on page 155.)

CTC pages per buff
Number of 4K pages used for buffering I/O by both the X-side and the Y-side of a CTC. The first expression (at the left) is the number of pages used for buffering by this host; the second expression (at the right) refers to the other host. The X indicates the host that started up

first and the Y indicates the host that started up second. The number of pages for I/O buffers are set with MAXBFRU in the PU statement of the CTC's VTAM definition in VTAMLST.

Multipath Channel Support

Before Version 4.1.0, VTAM included only channel-to-channel adapter (CTCA) CTCs, which use a single subchannel to read and write data. Multipath channeling (MPC) allows multiple read and write subchannels to be grouped together, thereby providing full-duplex, channel-to-channel communication between different VTAMs.

Traditionally, VTAM provides a single set of statistics for each CTCA CTC. However, for each MPC CTC, VTAM provides the following:

- a separate set of tuning statistics for each individual read or write subchannel
- a set of group tuning statistics that contain measurements for the entire MPC CTC (called an MPC group)

The following definitions are associated with multipath channel support:

CTCA CTCs Use a single subchannel to read and write data.

MPC CTCs Use multiple, single-direction read and write subchannels to transmit data.

subchannel tuning statistics Provide separate measurements for each MPC subchannel.

group tuning statistics Provide combined measurements for all subchannels assigned to an MPC group.

Multipath channel support provides the following information about MPC CTC groups and individual read and write subchannels:

- raw TNSTATs for MPC groups and subchannels
- analysis of those TNSTATs
- MPC exceptions and trends online
- SMF trend and exception data

The following panel is an example of MPC group tuning statistics. When you select **S** (TNSTATS) for an MPC group from the List of CTCs panel (Figure 64 on page 157), this panel displays.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------16:31:26 07/31/94
 KONDMGSD                    MPC CTC Group TNSTATS               System: SYSG
                           Name: CTC01 Line: CTC01L

+-------------------------------------------------------------------------------+
| Interval:   120 minutes                                                       |
|-------------------------------------------------------------------------------|
|                     Description                          |  Field |    Value    |
|----------------------------------------------------------+--------+-------------|
| Number of inbound PIUs received . . . . . . . . . . .    | IPIU   |         259 |
| Number of outbound PIUs sent  . . . . . . . . . . . .    | OPIU   |         229 |
| Number of timer sweeps due to excessive queue depth .    | QSWEEP |           0 |
| Number of timer sweeps due to timer pops  . . . . . .    | TSWEEP |           0 |
|-------------------------------------------------------------------------------|
| Direction     | Pct  | 0...10...20...30...40...50...60...70...80...90...100  |
|---------------+------+-------------------------------------------------------|
| PIUs Inbound  |  53% | ==========================>. . . . . . . . . . . .   |
| PIUs Outbound |  47% | ======================> . . . . . . . . . . . .     |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 66. MPC CTC Group TNSTATS Panel

When you select **R** (Rate/Second) for an MPC Group from the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows MPC group tuning statistics for the interval since your last refresh. (The Sample Interval field displays the length of the most recent interval.)

```
 ____  Goto  Options  Help
 ------------------------------------------------------------16:47:39 07/31/94
 KONDMGRD                                                      System: SYSG
                      MPC CTC Group TNSTATS Rate/Second
                          Name: CTC01 Line: CTC01L

+-------------------------------------------------------------------------------+
| Sample Interval:     59.13 seconds                                            |
|-------------------------------------------------------------------------------|
|                     Description                          |  Field |    Value    |
|----------------------------------------------------------+--------+-------------|
| Number of inbound PIUs received . . . . . . . . . . .    | IPIU   |        5.45 |
| Number of outbound PIUs sent  . . . . . . . . . . . .    | OPIU   |       12.30 |
| Number of timer sweeps due to excessive queue depth .    | QSWEEP |        0.00 |
| Number of timer sweeps due to timer pops  . . . . . .    | TSWEEP |        0.00 |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 67. MPC CTC Group TNSTATS Rate/Second

When you select **A** (Analysis) for an MPC group from the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows an analysis of the tuning statistics for an MPC group.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------16:49:38 07/31/94
 KONDMGAD                                                      System: SYSG
                        MPC CTC Group TNSTATS Analysis
                           Name: CTC01 Line: CTC01L

+-------------------------------------------------------------------------------+
| Interval:   120 minutes                                                       |
|-------------------------------------------------------------------------------|
|                           Description                          |    Value     |
|----------------------------------------------------------------+--------------|
| Average inbound PIU size . . . . . . . . . . . . . . . . . . . |       87.49  |
| Average number of inbound PIUs per SIO . . . . . . . . . . . . |        1.02  |
| Average outbound PIU size  . . . . . . . . . . . . . . . . . . |      378.00  |
| Average number of outbound PIUs per SIO  . . . . . . . . . . . |        1.04  |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 68. MPC CTC Group TNSTATS Analysis Panel

When you select **N** (Analysis/Second) for an MPC group from the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows an analysis of MPC group tuning statistics for the interval since your last refresh.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------16:55:25 07/31/94
 KONDMGND                                                      System: SYSG
                     MPC CTC Group TNSTATS Analysis/Second
                           Name: CTC01 Line: CTC01L

+-------------------------------------------------------------------------------+
| Sample Interval:      2.11 seconds                                            |
|-------------------------------------------------------------------------------|
|                           Description                          |    Value     |
|----------------------------------------------------------------+--------------|
| Average inbound PIU size . . . . . . . . . . . . . . . . . . . |      195.90  |
| Average number of inbound PIUs per SIO . . . . . . . . . . . . |        1.11  |
| Average outbound PIU size  . . . . . . . . . . . . . . . . . . |      271.84  |
| Average number of outbound PIUs per SIO  . . . . . . . . . . . |        1.04  |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 69. MPC CTC Group TNSTATS Analysis/Second

When you select **S** (TNSTATS) for an MPC read or write subchannel from the the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows tuning statistics for a read or write subchannel assigned to an MPC group.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------16:57:30 07/31/94
 KONDMSSD                                                      System: SYSG
                         MPC CTC Subchannel TNSTATS
            Name: CTC01   Line: CTC01L   Device: 0C09   Direction: READ

+-------------------------------------------------------------------------------+
| Interval:   120 minutes                                                       |
|-------------------------------------------------------------------------------|
|                    Description                    |    Field   |    Value    |
|---------------------------------------------------+------------+-------------|
| Maximum buffer size supported by this device  . . | BSIZE      |      16,367 |
| Accumulated number of bytes transferred . . . . . | BYTECNT    |   650.86 KB |
| Number of bytes used by largest channel program . | MAXBYTES   |       2,120 |
| Number of SIO operations counted for subchannel . | SIO        |       7,487 |
| Number of times slowdown mode has been entered  . | SLOWDOWN   |           0 |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 70. MPC CTC Subchannel TNSTATS

When you select **R** (Rate/Second) for an MPC read or write subchannel from the the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows MPC read or write subchannel tuning statistics for the interval since your last refresh.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------17:01:38 07/31/94
 KONDMSRD                                                      System: SYSG
                    MPC CTC Subchannel TNSTATS Rate/Second
            Name: CTC01   Line: CTC01L   Device: 0C09   Direction: READ

+-------------------------------------------------------------------------------+
| Sample Interval:      5.09 seconds                                            |
|-------------------------------------------------------------------------------|
|                    Description                    |    Field   |     Value   |
|---------------------------------------------------+------------+-------------|
| Accumulated number of bytes transferred . . . . . | BYTECNT    |     2.13 KB |
| Number of SIO operations counted for subchannel . | SIO        |        8.05 |
| Number of times slowdown mode was entered . . . . | SLOWDOWN   |         .00 |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 71. MPC CTC Subchannel TNSTATS Rate/Second

When you select **A** (Analysis) for an MPC read or write subchannel from the the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows an analysis of the tuning statistics for an individual read or write subchannel assigned to an MPC group.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------17:02:30 07/31/94
 KONDMSAD                                                      System: SYSG
                     MPC CTC Subchannel TNSTATS Analysis
            Name: CTC01   Line: CTC01L   Device: 0C09   Direction: READ

+-------------------------------------------------------------------------------+
| Interval:   120 minutes                                                       |
|-------------------------------------------------------------------------------|
|                           Description                         |     Value     |
|-------------------------------------------------------------------------------|
| Average number of bytes per SIO . . . . . . . . . . . . . . . |       89.88   |
| Buffer utilization percentage . . . . . . . . . . . . . . . . |       12.95%  |
|                                                               |               |
| Group SIO contribution (percent)  . . . . . . . . . . . . . . |      100.00%  |
| Group Byte Count Contribution (percent) . . . . . . . . . . . |      100.00%  |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 72. MPC CTC Subchannel TNSTATS Analysis

When you select **N** (Analysis/Second) for an MPC read or write subchannel from the the List of CTCs panel (Figure 64 on page 157), this panel displays. The panel shows an analysis of MPC read or write subchannel tuning statistics for the interval since your last refresh.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------17:04:56 07/31/94
 KONDMSND                                                      System: SYSG
                  MPC CTC Subchannel TNSTATS Analysis/Second
            Name: CTC01   Line: CTC01L   Device: 0C09   Direction: READ

+-------------------------------------------------------------------------------+
| Sample Interval:      3.32 seconds                                            |
|-------------------------------------------------------------------------------|
|                           Description                         |     Value     |
|-------------------------------------------------------------------------------|
| Average number of bytes per SIO . . . . . . . . . . . . . . . |       152.83  |
| Group SIO contribution (percent)  . . . . . . . . . . . . . . |      100.00%  |
| Group byte count contribution (percent) . . . . . . . . . . . |      100.00%  |
+-------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 73. MPC CTC Subchannel TNSTATS Analysis/Second

Trends for CTCs

OMEGAMON II supplies graphs of recent trends for selected data items. These trends provide a perspective of the system over time. Optionally, the trending data can be written to an SMF dataset and displayed or printed as SAS graphs (if you have SAS available).

To view trending for CTCs, perform the following steps:

1. On the CTC TNSTATS - List of CTCs panel (see Figure 64 on page 157), enter action code **S** (TNSTATS) or **A** (Analysis) next to a CTC of interest.
2. On the corresponding CTC TNSTATS or CTC TNSTATS Analysis panel, enter **GT** in the action bar entry field.
3. Select a TNSTAT for trending from the Trends menu.
   - From the TNSTATs panel, trending is available for:
     - channel programs
     - attentions
     - outbound PIUs
     - inbound PIUs
     - read buffers
     - slowdowns
   - From the Analysis panel, trending is available for:
     - SIO requests by TIMERS
     - SIO requests by QDPTH
     - SIO requests by BUFCAP
     - SIO requests by PRIORITY
     - SIO requests for all reasons
     - bytes per channel program

The following figure shows a trending panel for the SIO reason QDPTH.

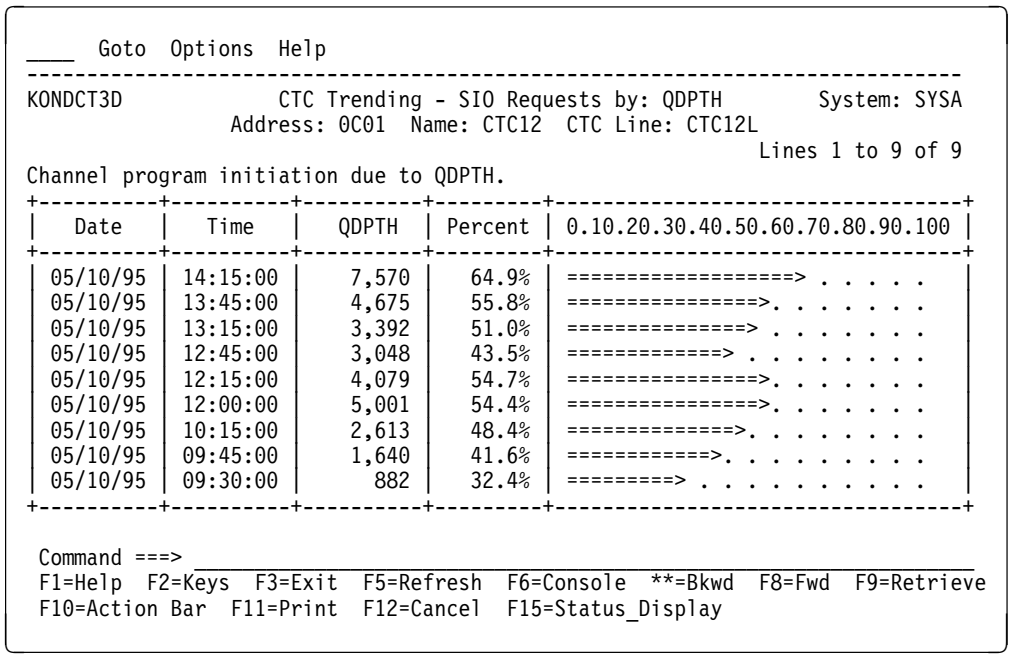


Figure 74. CTC Analysis Trending of Individual SIO Reasons Panel

The Percent field on this panel represents the percentage of SIO requests made for this reason, during the trend interval, relative to the total number of SIO requests.

Trends for MPCs

In addition to MPC TNSTATs, reports, and analysis, OMEGAMON II provides graphs of trends for selected MPC TNSTATs.

From the MPC Group TNSTATS panel, trending is available for

- inbound PIUs
- outbound PIUs
- queue sweeps
- timer sweeps

From the MPC Group TNSTATS Analysis panel, trending is available for

- average inbound PIU size
- average inbound PIUs per SIO
- average outbound PIU size
- average outbound PIUs per SIO

From the MPC Subchannel TNSTATS panel, trending is available for

- byte count
- MAXBYTES
- SIOs
- slowdowns

From the MPC Subchannel TNSTATS Analysis panel, trending is available for

- bytes per SIO
- buffer utilization percentage
- group SIO contribution
- group byte count contribution

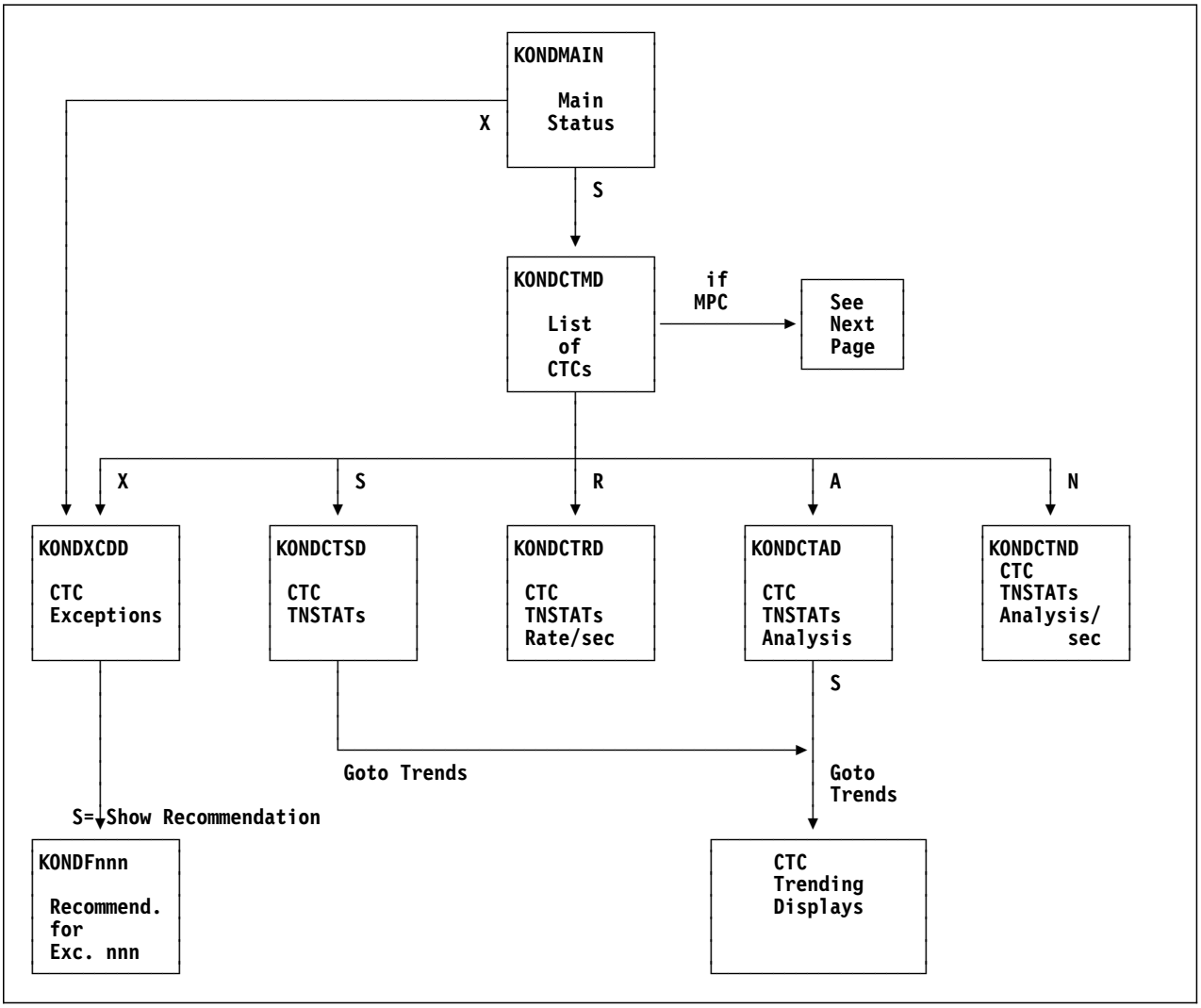
The following figure shows a trending panel for MPC CTC Subchannel TNSTATS.

```
____  Goto  Options  Help
-------------------------------------------------------------20:13:14 09/02/94
KONDMS1D                                                        System: SYSG
          MPC CTC Subchannel TNSTATS Statistics Trending - Byte Count
           Name: CTC01   Line: CTC01L   Device: 0C09   Direction: READ
                                                        Lines 1 to 28 of 36
The highest number of bytes transferred was 4.36 MB.
+-------------------------------------------------------------------------------+
|   Date   |   Time   |    BYTECNT    | Percent | 0...20...40...60...80...100 |
|----------+----------+---------------+---------+-----------------------------|
| 09/02/94 | 19:15:00 |       3.06 MB |   70.1% | =================>. . .    |
| 09/02/94 | 18:45:00 |       3.20 MB |   73.3% | ==================> . . .    |
| 09/02/94 | 18:15:00 |       2.71 MB |   62.1% | ===============>. . . .    |
| 09/02/94 | 17:45:00 |       2.80 MB |   64.2% | ================> . . . .    |
| 09/02/94 | 17:15:00 |       2.81 MB |   64.4% | ================> . . . .    |
| 09/02/94 | 16:45:00 |       2.85 MB |   65.3% | ================> . . . .    |
| 09/02/94 | 16:15:00 |       3.81 MB |   87.3% | ====================>. .    |
| 09/02/94 | 15:45:00 |       3.60 MB |   82.5% | ====================> . .    |
| 09/02/94 | 15:15:00 |       3.34 MB |   76.6% | ===================>. . .    |
| 09/02/94 | 14:45:00 |       3.67 MB |   84.1% | ====================>. .    |
| 09/02/94 | 14:15:00 |       3.71 MB |   85.0% | ====================>. .    |
| 09/02/94 | 13:45:00 |       3.68 MB |   84.4% | ====================>. .    |
| 09/02/94 | 13:15:00 |       4.36 MB |  100.0% | ========================>    |
| 09/02/94 | 12:45:00 |       3.55 MB |   81.4% | ====================> . .    |
| 09/02/94 | 12:15:00 |       3.22 MB |   73.8% | ===================> . . .    |
| 09/02/94 | 11:45:00 |       3.16 MB |   72.4% | ===================> . . .    |
| 09/02/94 | 11:15:00 |       4.01 MB |   91.9% | =====================> .    |
| 09/02/94 | 10:45:00 |       3.32 MB |   76.1% | ===================>. . .    |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

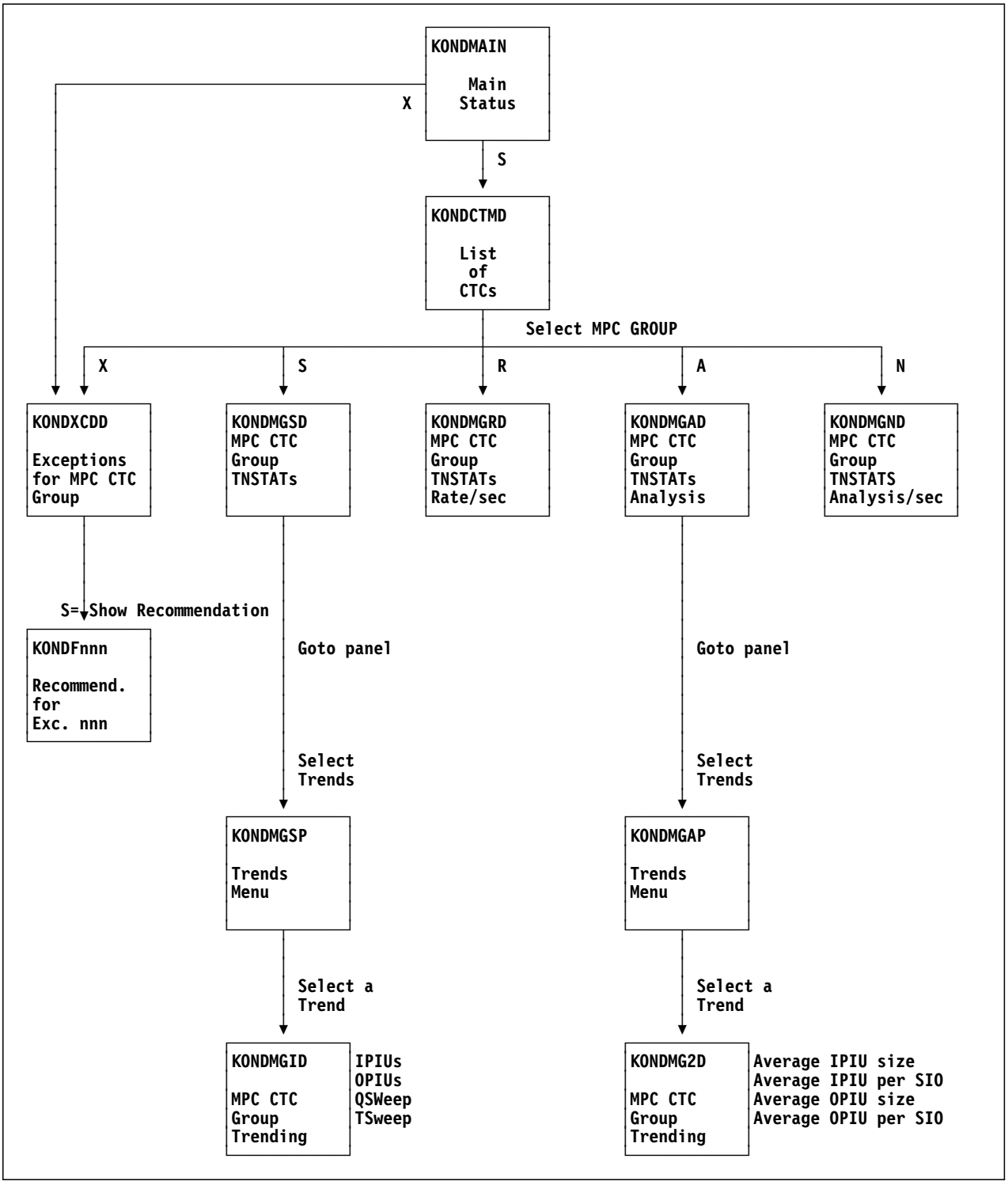
Figure 75. MPC CTC Subchannel TNSTATS Statistics Trending – Byte Count

The panel displays the total number of bytes sent or received for each trend recording interval. (Note that the highest value is displayed above the table headings.)

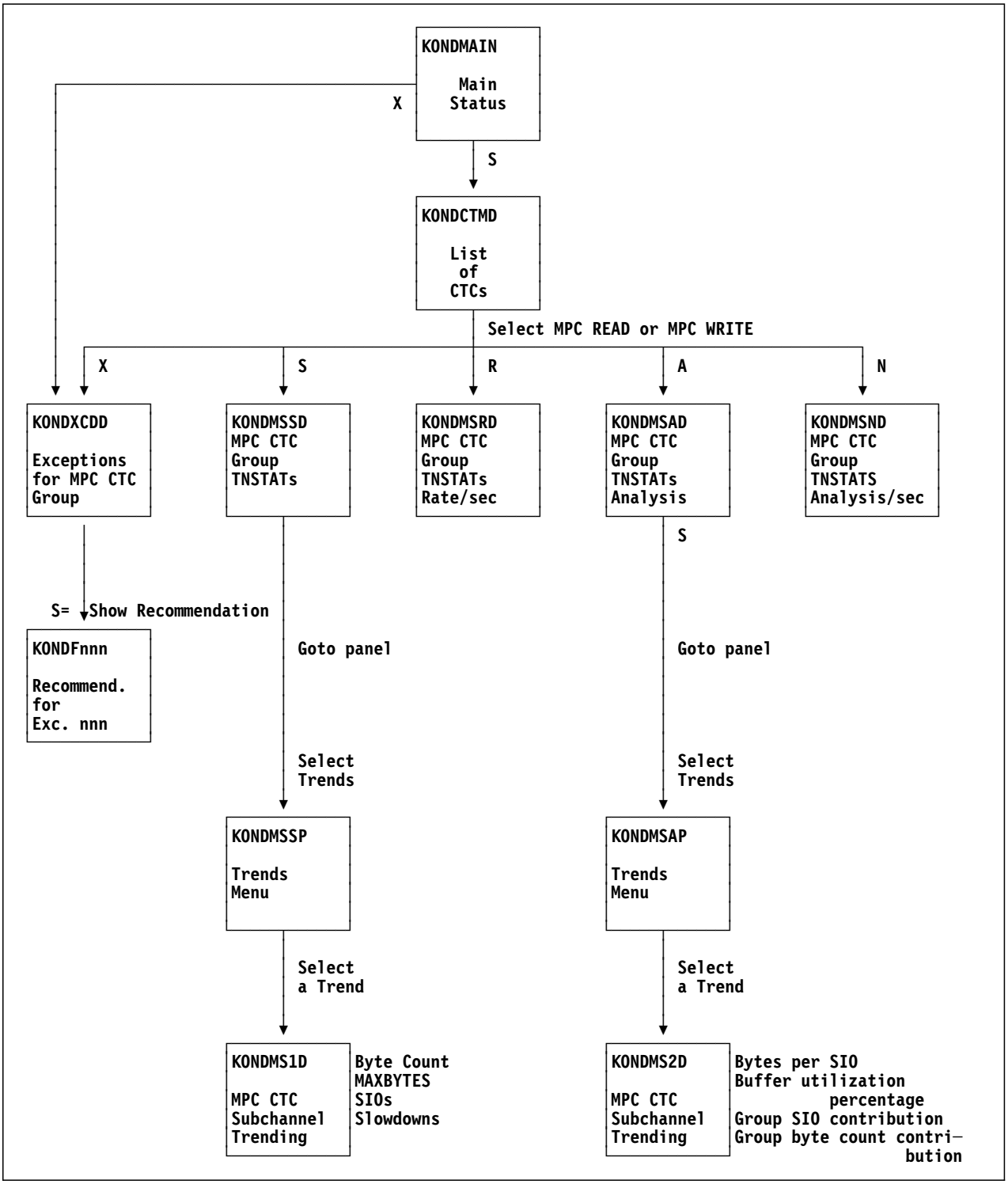
TNSTATs for CTCs Component Navigation



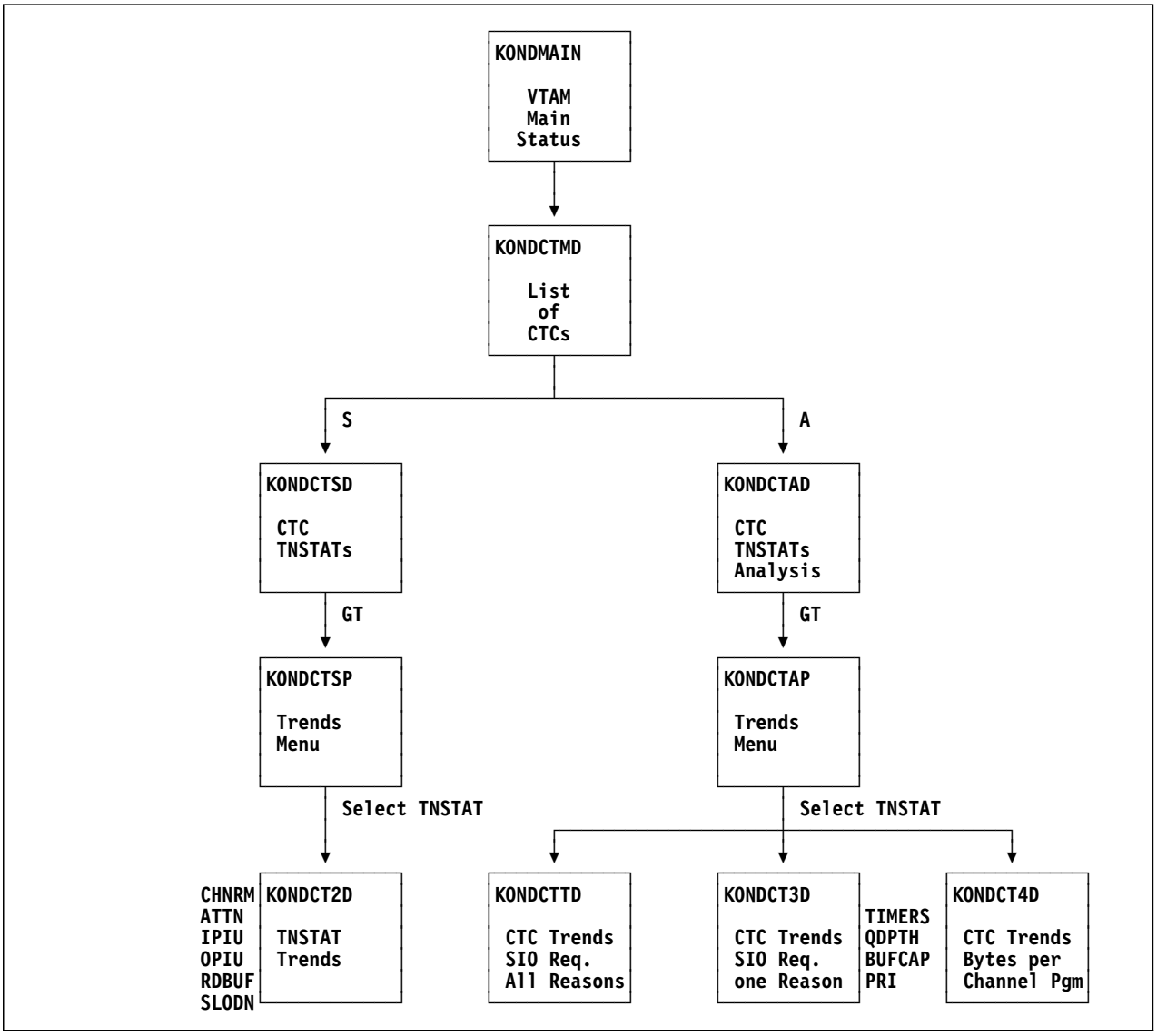
TNSTATs for Group MPC CTCs Navigation



TNSTATs for Subchannel MPC CTCs Navigation



CTC TNSTATs Trending Navigation



SNA Controllers (NCP and Local)

VTAM reads and writes data to SNA controllers (NCP and locally attached terminal controllers) via NCP and local channels:

NCP A communications controller housing the Network Control Program (NCP) is attached to the host through the NCP channel connection. Inside the controller, NCP handles the intake and transfer of data from remote controllers to the host processor. It functions as a network traffic cop, saving the host from having to deal with traffic control of data.

Local VTAM transfers data to and from a cluster controller attached to local terminals (usually in the same building as the host processor, or nearby)

How VTAM Reads Data from SNA Controllers

VTAM has two ways to read data from NCP and locally attached controllers:

1. As a standalone attention interrupt (ATTN)

   When an SNA controller has data to send to VTAM, the controller sends an attention interrupt to VTAM requesting a read operation.

2. As a read attention (RDATN)

   A read attention is an immediate sequel to a VTAM write function. If the controller gathered more data to send VTAM while VTAM was performing a write function, then VTAM immediately reads that data without a separate attention interrupt.

Read attentions are caused by the following situations:

- The communication controller receives more information during the read operation, causing it to request VTAM to perform another read.
- The channel command words (CCWS) in the read channel program are not long enough to contain all the data sent.

Read attentions coattail PIUs to the host processor. While such coattailing is preferable to standalone attention interrupts, a high RDATN value is not desirable because it creates poor terminal response time.

NCP Tuning Statistics

A single set of VTAM tuning statistics may be sufficient to indicate how the network is functioning. However, it's a good idea to compare sets of TNSTATS values over time to see differences and trends caused by changing parameters and buffer pool specifications.

The following is an example of an SNA (NCP) controller tuning statistics panel:

```
 ____  Goto  Options  Help
 ---------------------------------------------------------------10:31:36 08/23/91
 KONDNBSD                        NCP TNSTATS                        System: SYSG
                      Address: 060C  Name: NCP10  Line node: SYSG
+-------------------------------------------------------------------------------+
| Interval: 120 minutes                                                         |
|-------------------------------------------------------------------------------|
| Total count of write channel programs . . . . . | CHWR     | 40,485          |
| Total count of read channel programs. . . . . | CHRD     | 21,643          |
| Total attention indications received. . . . . | ATTN     | 13,279          |
| Number of attentions at end of read program . . . | RDATN    |     20          |
| Number of inbound PIUs to VTAM. . . . . | IPIU     | 52,426          |
| Number of outbound PIUs from VTAM . . . . . | OPIU     | 49,078          |
| Total count of VTAM read buffers used . . . . . | RDBUF    | 53,625          |
| Times NCP entered Slowdown condition. . . . . | SLODN    |      0          |
|-------------------------------------------------------------------------------|
| PIUs Inbound    |    51% | ======================> . . . . . .          |
| PIUs Outbound   |    49% | ======================> . . . . . .          |
+-------------------------------------------------------------------------------+
```

Figure 76. NCP Tuning Statistics Panel

This panel displays the following tuning statistics:

CHWR Number of write channel programs initiated during the indicated interval.

CHRD Number of read channel programs initiated to read data.

ATTN Number of attention interrupts received from the communications controller, including the number of read attentions.

RDATN Number of times VTAM, after reading data, was immediately requested to read more data.

IPIU Number of PIUs sent to the host by the controller.

OPIU Number of PIU's sent to the controller.

RDBUF Number of VTAM buffers used for read functions.

SLODN Number of times the controller went into slowdown mode.

When you are on this panel, you can select trending displays from the Goto pulldown for any of the TNSTATs displayed. See "Trends for NCPs" on page 177 for how to access trending displays.

NCP Channel Usage

NCP channel usage is determined by both of the following:

- the size of the channel programs
- the number of buffers transferred

A channel program is activated for one of four reasons:

1. The timer expires.

   The DELAY parameter (in the NCP BUILD definition statement) specifies the elapsed time between the receipt of the first inbound message and the presentation of an attention message to VTAM.

2. The QDEPTH limit is reached.

   The QDEPTH parameter depends on the DELAY parameter. VTAM multiplies the number of PIUs that were sent in the previous delay interval by 0.75. When this many PIUs are queued during the next interval, VTAM initiates a channel program. This is a way for VTAM to keep up with dynamic changes in the traffic pattern.

3. The buffer fills up.

   The MAXBFRU parameter (specified in the NCP HOST definition) specifies the number of I/O buffers allocated by VTAM for one inbound data transfer.

4. Priority traffic must be sent.

   VTAM initiates a channel program for a virtual route pacing response or for Transmission Priority 2 (TP2) traffic.

Improving NCP Performance

When you tune NCP connections, you have three goals:

1. Limit the size of channel programs.
2. Minimize requests for I/O buffers.
3. Reduce system I/O operations.

You can change the following VTAM tuning parameters:

- I/O buffer size
- MAXBFRU
- buffer pool parameters
- virtual route window sizes
- number of high-priority PIUs

Increasing the I/O buffer size can reduce the size of the channel program.

Displaying NCP Data

The following panel displays a list of NCP connections. There are three ways to reach this panel:

1. Select **TNSTATS for NCPs** from the main status panel.
2. Press F22 (TNSTATs) from the NCP Status Summary panel in the NCP performance component.
3. Press F22 (TNSTATs) from the NCP Statistics Summary panel in the NCP performance component.

```
____  Actions  Goto  View  Options  Help
-------------------------------------------------------------12:45:11 11/15/94
KONDNCMD                  NCP TNSTATs - List of NCPs             System: SYSA

Select with a "/" or an action code.
    X=Exceptions  S=TNSTATS  R=Rate/sec  A=Analysis  N=Analysis/sec
+-------------------------------------------------------------------------------+
|   NCP      | Device  | NCP      | NCP     | Line     |                       |
|   Name     | Address | Line     | Subarea | Node     |     Condition         |
|------------+---------+----------+---------+----------+-----------------------|
| _ NCP10    | 060C    | 60C-L    |      10 | ISTPUS   | Warning               |
| _ NCP11    | 070F    | 77C-R    |      11 | ISTPUS   | Warning               |
+-------------------------------------------------------------------------------+









Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
F22=NCP_Performance
```

Figure 77. NCP Tuning Statistics Panel

For each NCP, this panel indicates

- NCP name
- MVS device address
- NCP line name

- NCP subarea number
- name of the NCP line node
- condition of the NCP

You can choose an NCP connection from the list by entering one of the following action codes:

X List the TNSTATS exceptions.
S Display raw TNSTATS data.
R Display the rate of change to the raw TNSTATS data.
A Display analyzed TNSTATS data.
N Display the rate of change to the analyzed TNSTATS data.

If you press F22 (NCP Performance), you navigate to the NCP performance component in one of the two following ways:

- If you came from the NCP performance component, you return to the panel from which you came.
- If you haven't come from the NCP performance component, you navigate to the NCP Status Summary panel.

Analyzing NCP Performance

When you select an NCP for analysis, OMEGAMON II displays the NCP TNSTAT Analysis panel.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDNCAD                   NCP TNSTATS Analysis                     More: +
              Address: 060C  Name: NCP10  Line node: ISTPUS
+------------------------------------------------------------------------------+
| Interval: 120 minutes                                                        |
|------------------------------------------------------------------------------|
| Description                                                    |    Value    |
|----------------------------------------------------------------+-------------|
| Average number of IPIUs per NCP channel read . . . . . .       |     1.77    |
| Average number of OPIUs per NCP channel write. . . . . .       |     1.15    |
| Average number of buffers per inbound PIU. . . . . .           |     1.05    |
| Average number of buffers per channel read . . . . . .         |     1.87    |
| Percent of channel reads caused by an NCP ATTN . . . . . .     |    72.60%   |
| Percent of channel reads after channel writes. . . . . .       |    27.40%   |
| Percent of channel standalone reads. . . . . .                 |    72.58%   |
| Percent of multiple channel reads. . . . . .                   |      .02%   |
| Percent of read buffers used . . . . . .                       |     5.86%   |
| Percent of unused (zero length) CCWs . . . . . .               |    94.13%   |
+------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F8=Fwd  F9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 78. NCP TNSTATS Analysis Panel

This panel displays the coattailing indicator, which is the average number of inbound PIUs (IPIUs) per NCP channel read. If this number is greater than one, coattailing took place during the interval. The larger the number, the greater the coattailing.

Trends for NCPs

OMEGAMON II supplies graphs of statistical trends for selected data items. These trends indicate the average activity of the system over a period of time. Optionally, the trending records can be written to an SMF dataset and displayed or printed as SAS graphs (if you have SAS available).

To view trending for NCPs, perform the following steps:

1. On the NCP TNSTATS - List of NCPs panel (Figure 77 on page 175), enter action code **S** (TNSTATS) or **A** (Analysis) next to an NCP of interest.
2. On the corresponding NCP TNSTATS or NCP TNSTATS Analysis panel, enter **GT** in the action bar entry field.
3. Select an NCP TNSTAT for trending from the Trends menu.
   - When you are on the TNSTATs panel, trending is available for any of the TNSTATs displayed:
     - channel writes
     - channel reads
     - attentions
     - read attentions
     - inbound PIUs
     - outbound PIUs
     - read buffers
     - slowdowns
   - When you are on the Analysis panel, you can select trending for inbound PIUs per read and outbound PIUs per write.

The following figure is an example of the NCP Trending panel for Channel Writes.

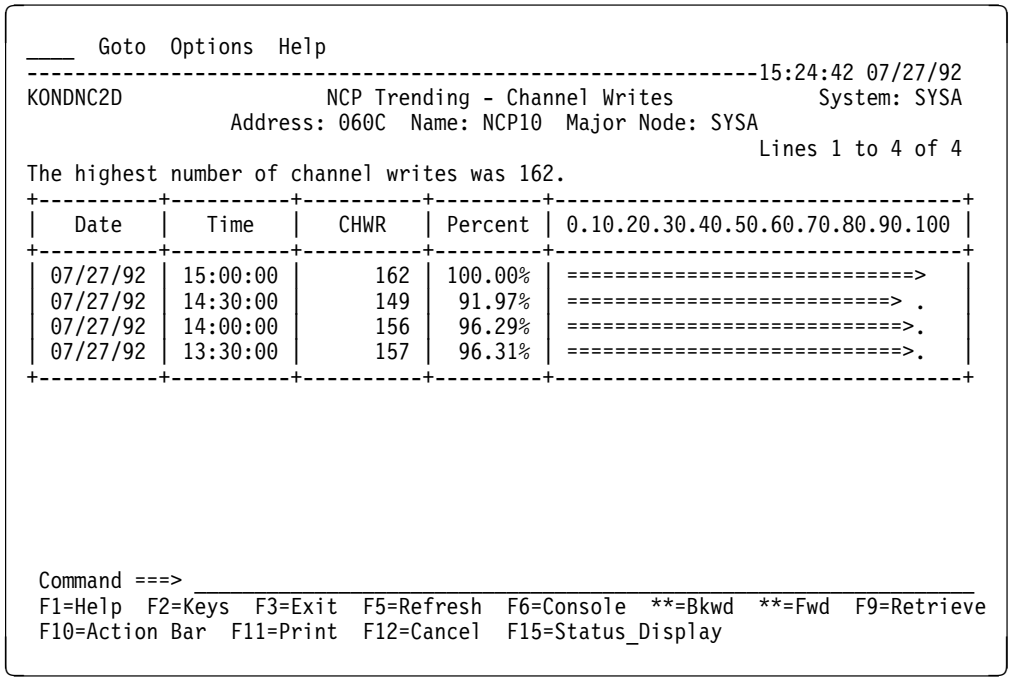


Figure 79. NCP Trending Panel

An NCP Trending panel charts the trend for the selected TNSTAT over the course of a day, based on a specified time interval. The most recent time interval is displayed first. The data displayed represents the totals for the TNSTAT during the trend period. The trend record with the largest value is the relative 100% mark. All other trend records are measured against the high point. Each trend record potentially resets the high point.

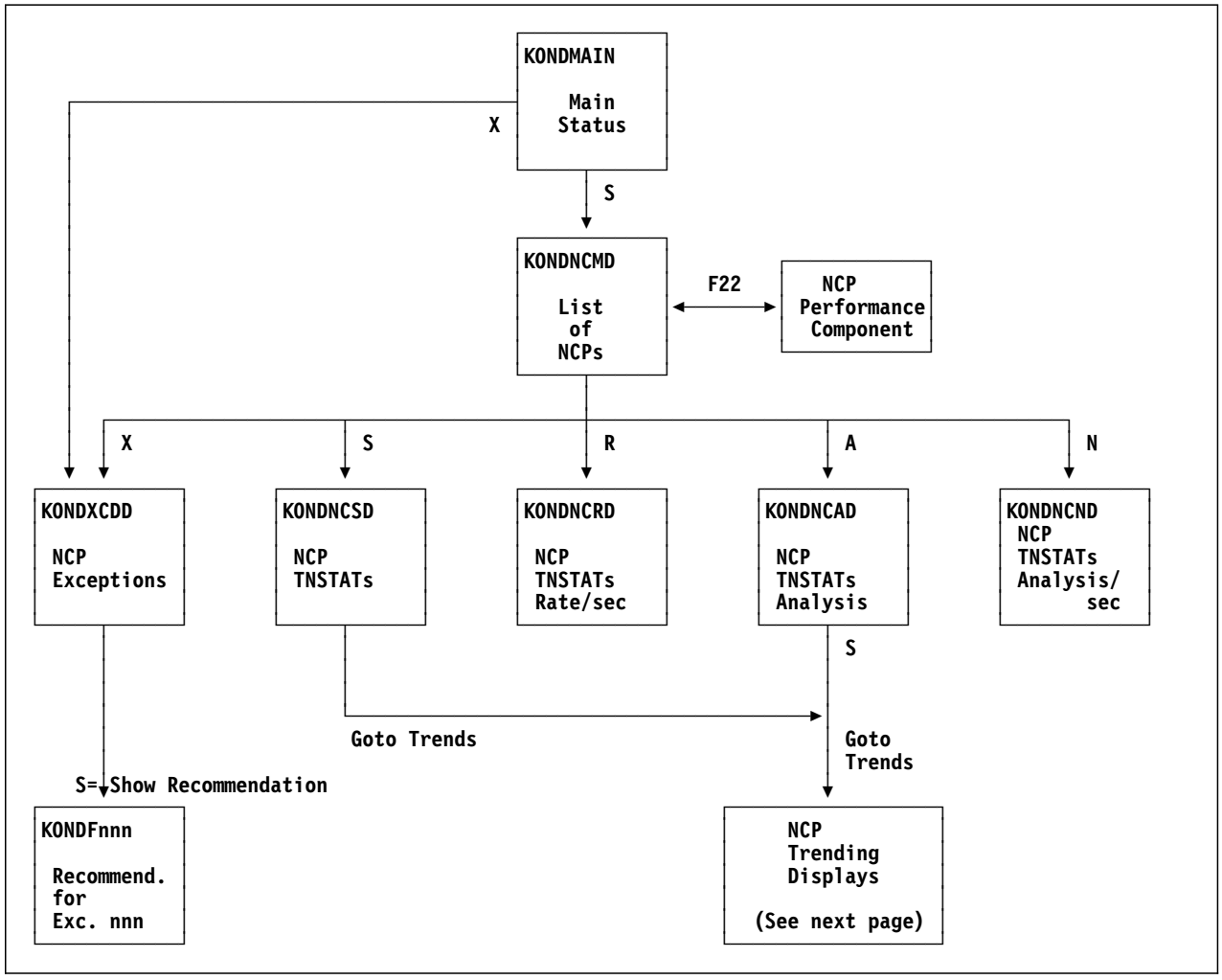
The fields listed on an NCP Trending panel are described below:

Date Date the trend record was created.

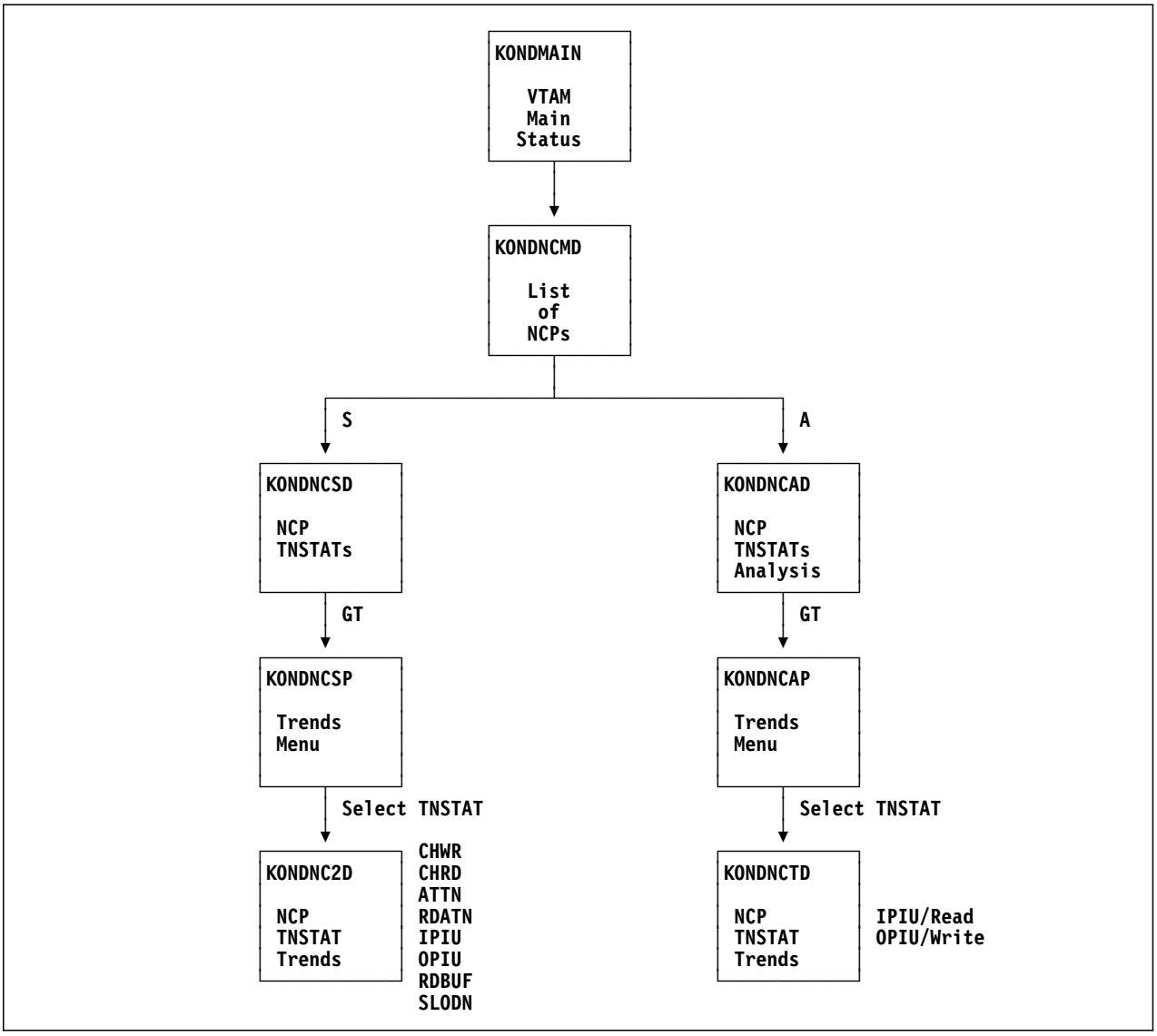
Time Time the trend record was created.

Percent Percentage of this TNSTAT value as compared to the highest value for the TNSTAT.

TNSTATS for NCPs Component Navigation



NCP TNSTATs Trending Navigation



Historical Reports

If you have SAS/GRAPH installed, and SMF recording enabled for CTC and/or NCP tuning statistics (see "Tuning Statistics Monitoring Control Options" on page 340, and "Tuning Statistics Options for NCPs" on page 341), you can display color historical graphs of these kinds of data.

For CTC connections, you can display a comparison of the reasons for an SIO request (described in "CTC Channel Usage" on page 155):

- priority PIUs received
- buffers filled
- queue depth reached
- time expired

For NCP connections, you can display:

- The VTAM buffer allocation (IPIU/RDBUF) over time.

  IPIU Number of inbound PIUs.

  RDBUF Total number of buffers used by VTAM for reading data from the NCP.

- The coattailing indicator (ATTN/CHRD) over time.

  ATTN Number of attention signals received from the NCP.

  CHRD Total number of read channel programs issued to read data.

For instructions on using this feature, see the information about SAS reporting in the *OMEGAMON II for Mainframe Networks Historical Reporting Guide*.

Local Tuning Statistics

VTAM maintains TNSTATS for locally attached 3x74 SNA control units.

Local Channel Usage

Local channel usage is determined by:

- the size of the data buffer
- the number of buffers transferred
- the number of attention interrupts

Improving Local Performance

Changing the number of buffers and the buffer size in the host can help you to use storage more efficiently. Changing controller parameters to reduce the number of attention interrupts and adjusting buffer pool parameters to minimize expansion and contraction can help you to save host cycles.

Displaying Local Data

When you select **TNSTATS for LOCALs** from the main status panel, you see the LOCAL TNSTATS panel which is a list of local connections.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------------------------
KONDLOMD               LOCAL TNSTATS - List of LOCALs           1 to 9 of 11

Select one or more with a "/" or an action code.
    X=Exceptions  S=TNSTATS  R=Rate/sec  A=Analysis  N=Analysis/sec
+-------------------------------------------------------------------------------+
|   LOCAL    | Device  | Device   |          | Major    |                      |
|   Name     | Address | Node     | Subarea  | Node     |     Condition        |
|------------+---------+----------+----------+----------+----------------------|
| _ L610     | 0610    | L610     |        2 | LOC610   | Critical             |
| _ L618     | 0618    | L618     |        2 | LOC618   | Normal               |
| _ L617     | 0617    | L617     |        2 | LOC617   | Normal               |
| _ L616     | 0616    | L616     |        2 | LOC616   | Normal               |
| _ L615     | 0615    | L615     |        2 | LOC615   | Normal               |
| _ L614     | 0614    | L614     |        2 | LOC614   | Normal               |
| _ L613     | 0613    | L613     |        2 | LOC613   | Normal               |
| _ L612     | 0612    | L612     |        2 | LOC612   | Normal               |
| _ L611     | 0611    | L611     |        2 | LOC611   | Normal               |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 80. Local TNSTATS Panel

For each local channel, this panel indicates:

- local device name
- MVS device address
- name of the device node
- local channel subarea number
- name of the local channel major node
- condition of the local device

You can choose a local connection from the list by entering one of the following action codes:

X List the TNSTATS exceptions.
S Display raw TNSTATS data.
R Display the rate of change to the raw TNSTATS data.
A Display analyzed TNSTATS data.
N Display the rate of change to the analyzed TNSTATS data.

When you select a local device for analysis (by entering action code **A** next to **L610**, for example), OMEGAMON II displays the LOCAL TNSTATS Analysis panel. This panel can help you to assess local performance.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDLOAD                 LOCAL TNSTATS Analysis                     More: +
              Address: 0610  Name: L610  Major node: LOC610
+------------------------------------------------------------------------------+
| Interval: 120 minutes                                                        |
|------------------------------------------------------------------------------|
| Description                                                    |    Value    |
|----------------------------------------------------------------+-------------|
| Average number of IPIUs per LOCAL channel read . . . . . .     |     1.03    |
| Average number of OPIUs per LOCAL channel write. . . . . .     |     1.02    |
| Average number of buffers per inbound PIU. . . . . .           |     1.00    |
| Average number of buffers per channel read . . . . . .         |     1.03    |
| Percent of channel reads caused by an LOCAL ATTN . . . . . .   |    99.65%   |
| Percent of channel reads after channel writes. . . . . .       |      .35%   |
| Percent of channel standalone reads. . . . . .                 |    99.30%   |
| Percent of multiple channel reads. . . . . .                   |   100.00%   |
| Percent of read buffers used . . . . . .                       |     3.24%   |
| Percent of unused (zero length) CCWs . . . . . .               |    96.75%   |
+------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F8=Fwd  F9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 81. Local TNSTATS Analysis Panel

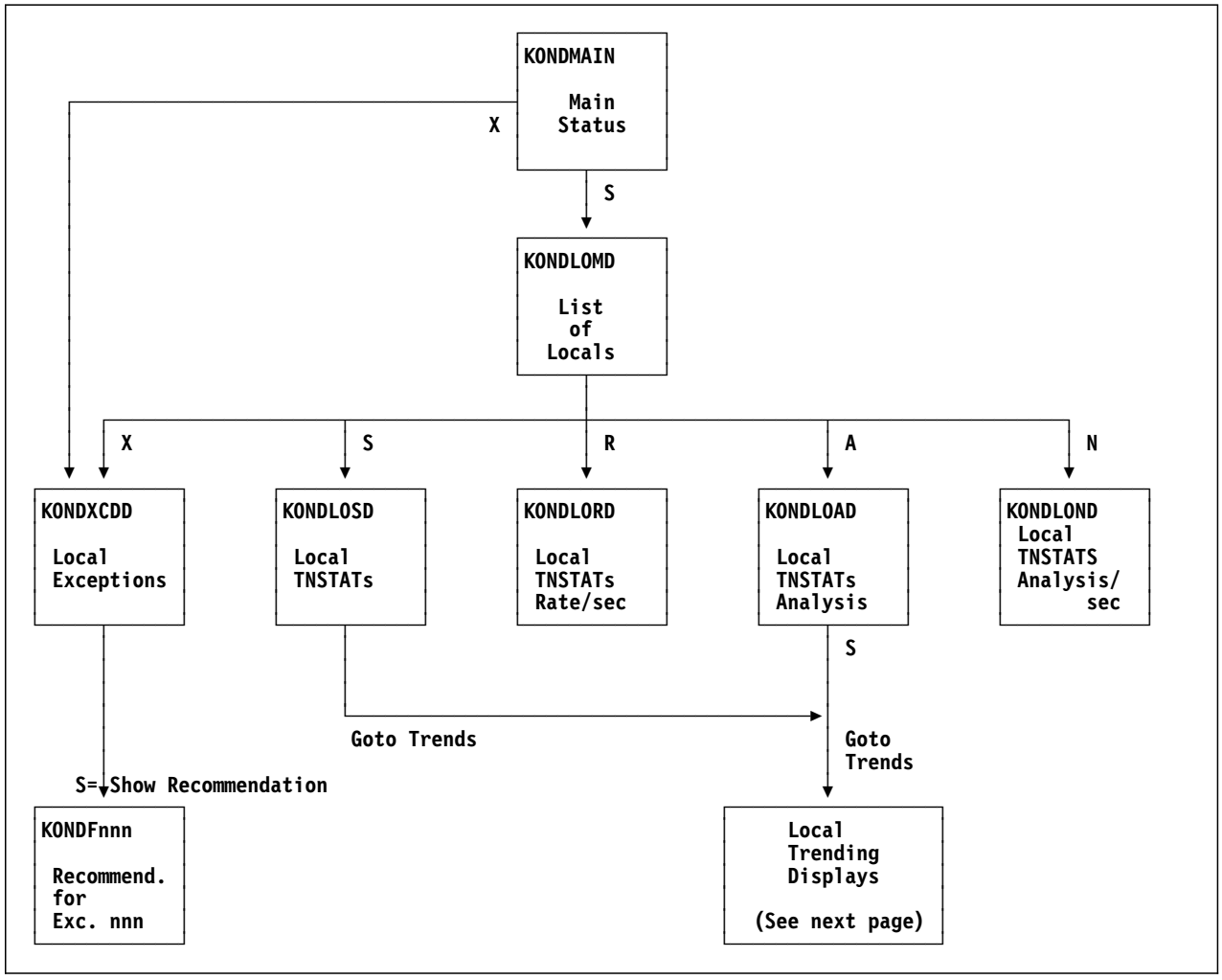
Trends for Locals

OMEGAMON II supplies graphs of statistical trends for many of the TNSTATs displayed on the LOCAL TNSTATS and LOCAL TNSTATS Analysis panels. These trends indicate the average activity of the system over a period of time. Optionally, the trending records can be written to an SMF dataset and displayed or printed as SAS graphs (if you have SAS available).

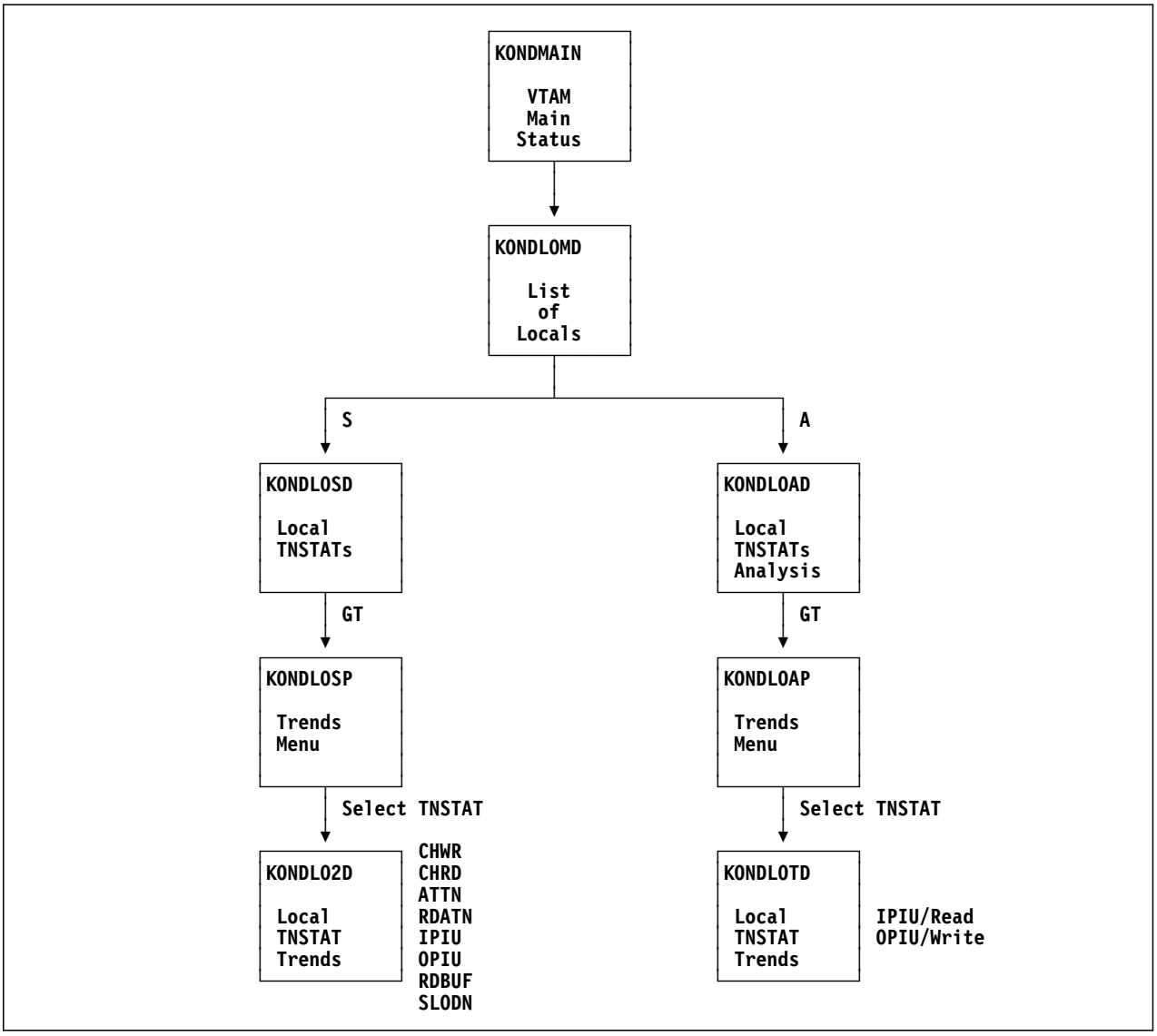
To view trending for LOCALs, perform the following steps:

1. On the LOCAL TNSTATS - List of LOCALs panel (see Figure 80 on page 183), enter action code **S** (TNSTATS) or **A** (Analysis) next to a local unit of interest.
2. On the corresponding LOCAL TNSTATS or LOCAL TNSTATS Analysis panel, enter **GT** in the action bar entry field.
3. On the Trends menu, select a local TNSTAT for trending:
   - From the TNSTATS panel, trending is available for any of the TNSTATs displayed:
     - channel writes
     - channel reads
     - attentions
     - read attentions
     - inbound PIUs
     - outbound PIUs
     - read buffers
     - slowdowns
   - From the Analysis panel, you can select trending for inbound PIUs per read or outbound PIUs per write.

TNSTATS for Locals Component Navigation



Local TNSTATs Trending Navigation



Fastpathing to Trending Displays

When you are on any TNSTAT or TNSTAT Analysis panel, you can access the Trends menu by entering fastpath **GT** in the action bar entry field.

To navigate directly to the TNSTAT trending display, enter fastpath **GTc** in the action bar entry field, where **c** is the mnemonic for the TNSTAT that is listed on the corresponding Trends menu. Some examples of fastpaths to trending displays follow:

GTA Navigates to Trending for Attentions.

GTW Navigates to Trending for Channel Writes.

GTR Navigates to Trending for Channel Reads.

Chapter 9. Response Time

Chapter Contents

Overview

If you have installed and enabled the End-to-End Response Time Feature (ETE), OMEGAMON II can report several types of response time for SNA terminals connected to applications on the host. You can use this response time information to establish appropriate service-levels and to verify and trace reported response time problems.

This chapter explains each type of response time, tells how OMEGAMON II collects response time data, and gives suggestions for using the response time information. See these manuals for:

Installing ETE OMEGAMON II installation instructions shipped with the product

Enabling and disabling ETE
OMEGAMON II for Mainframe Networks Configuration and Customization Guide

Further information
End-to-End Response Time Feature (ETE) Reference Manual

Types of Response Time

OMEGAMON II reports several types of response time for SNA terminals connected to applications on the host:

- *End-to-end response time* is the time experienced by a user who has pressed a key and is waiting for a response at the terminal.
- *Host response time* is the time the user's request and the application's response spend in VTAM and in the application.
- *Network response time* is the time the request and its response spend traveling through the network outside the host. This interval includes all time spent in front-end processors, modems, and telephone lines.

Host response time and network response time are the two components of end-to-end response time. In cross-domain environments, where terminals owned by another host are in session with applications on the host of the VTAM being monitored, network time includes the time in the other host. The time in the other host is generally a small component of network time.

Types of Sessions That Can Be Monitored

Using ETE, OMEGAMON II can monitor host, network, and total transit times for normal SNA LU type 2 devices in direct session with applications on OMEGAMON II's VTAM domain. A parameter can be passed to ETE to:

- provide special handling to LU types 1 and 3
- treat these LU types no differently from LU type 2
- avoid forcing definite response on LU types 1 and 3
- avoid monitoring LU types 1 and 3 in any way

See the *End-to-End Response Time Feature (ETE) Reference Manual* for detailed information on specifying this parameter.

In addition to these direct (or native) sessions, OMEGAMON II can monitor sessions routed through a properly configured multisession manager (MSM) such as CL/SUPERSESSION. When monitoring by application or application group (as opposed to terminal group), the response time reported will include the transactions that take place while the end user is actually interacting with the desired application. The response time reported is still *end-to-end*, i.e. the transit time out to the real terminal is included in the network transit time. Please see the *End-to-End Response Time Feature (ETE) Reference Manual* for detailed information regarding MSMs and ETE's MSM support.

In order for OMEGAMON II to monitor a session for response time, the session's PLU (application) must reside on the same VTAM domain as OMEGAMON II (and ETE). One exception to this rule exists: when the session is using a properly configured MSM, the PLU of the virtual session may reside on the same domain, cross-domain or cross-net. When monitoring a session that is using this rule, the time that it takes for the transaction to be sent from the MSM host to the application host will be reflected in the host transit time of the response time calculations.

How OMEGAMON II Collects Response Time Data

End-to-End response time is the amount of time between the user's pressing a key (Enter, F1 through F24, PA1, PA2, PA3, or Clear) and receiving a response at the terminal. If you started a stopwatch when the user pressed Enter, and you stopped it when the terminal received the application's first response to the user's request, the stopwatch time would be the end-to-end response time of that request.

When calculating average response time for a group, OMEGAMON II uses the total accumulated transit time for all subordinate devices divided by the total PIU count for the group.

To measure end-to-end response time, OMEGAMON II places its response time monitor inside one of the VTAM SNA layers. In this location the monitor can time all SNA traffic that flows through VTAM. OMEGAMON II captures end-to-end response time for applications that use either the definite response protocol or the exception response protocol.

Definite Response Protocal

Under the *definite response* protocol, the application asks the terminal controller to respond to transmitted data by indicating whether or not the transmission was successful. The application must then wait for the controller's response before continuing. Because the controller responds to all transmissions, end-to-end response time is relatively easy to monitor under the definite response protocol.

Exception Response Protocal

Under the *exception response protocol*, the application asks the controller to respond only if an error occurs during transmission of data to the terminal. Because end-to-end response time can be measured only for transactions that require a response from the controller, the response time monitor must turn on definite response for applications that use the exception response protocol. Once it has measured the response time, the monitor discards the definite response before it flows to the application. Thus, the application never sees the definite response and is not even aware that a definite response has been elicited.

How OMEGAMON II Calculates Response Times

From its position inside VTAM, the response time monitor can measure the time between SNA events. The stopwatch starts when the request flows through VTAM toward the application. The watch stops when VTAM receives the definite response from the terminal controller. Only one portion of end-to-end response time cannot be captured directly and must be estimated: it is the time before the user's request reaches VTAM, t1 minus t0. See the following figure.

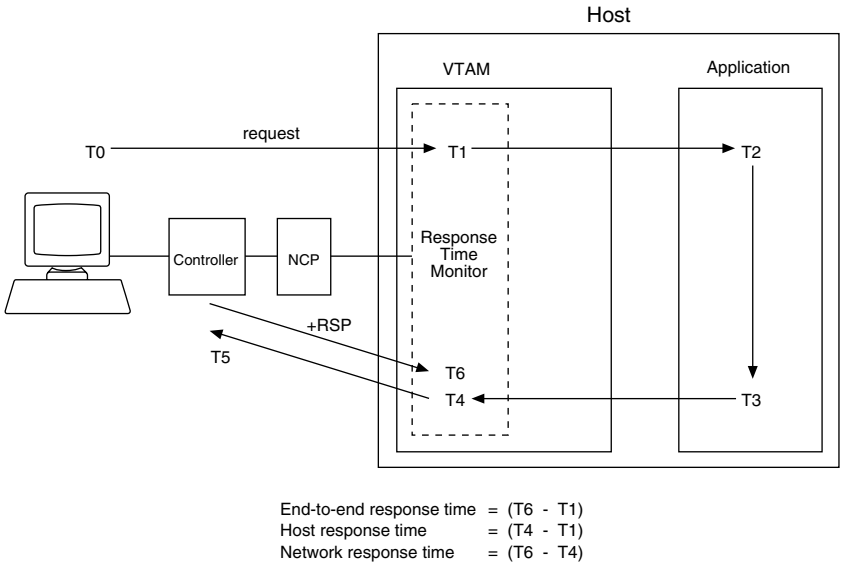


Figure 82. Calculating Response Time

In most cases, the amount of time a request takes to flow from the terminal to VTAM (t1 minus t0) approximately equals the amount of time the definite response takes to flow from the controller to VTAM (t6 minus t5). This is true because all definite responses and most requests contain little data. Therefore, OMEGAMON II calculates end-to-end response time as (t6 minus t1).

How OMEGAMON II Counts PIUs

When the information transmitted is longer than the receiving device type can accept, VTAM chains together several PIUs in order to accomplish the following:

- keep the information together
- accommodate the device

For inbound or average inbound PIUs, each PIU is counted separately, whether or not there is chaining.

For outbound or average outbound PIUs, several PIUs chained together are counted as only one PIU.

Support for Multisession Managers

OMEGAMON II, in conjunction with the End-to-End Response Time Feature (Version 500 or later), provides complete response time data for sessions established through multisession managers such as CL/SUPERSESSION. When monitoring an application or application group, OMEGAMON II displays the names of the real network terminals that accessed the application. Thus, instead of showing the session manager accessing the application, OMEGAMON II shows the actual terminals accessing the application. Refer to the Multi-Session Manager Interface chapter in the *End-to-End Response Time Feature (ETE) Reference Manual* for more information.

OMEGAVIEW Considerations

If you use OMEGAVIEW, you want the response time profile used in OMEGAVIEW to be the same as the response time profile used in a zoomed to OMEGAMON II session. You zoom to an OMEGAMON II session to investigate response time problems that were flagged in OMEGAVIEW.

If your product administrator defined a response time profile for the OMEGAVIEW collector session user ID, any user who zooms into OMEGAMON II automatically operates under the same profile as the collection session.

For more administrator information, see “OMEGAVIEW Considerations” on page 355.

Response Time Status Light

The text within the Response Time status light on the main status panel shows you the status of the OMEGAMON II Response Time facility and the End-to-End Response Time Feature as follows:

Critical Red. Monitored terminal or application groups have exceeded their specified critical response time threshold.

Warning Yellow. Monitored terminal or application groups have exceeded their specified warning response time threshold.

Normal Green. Monitored terminal and application groups are responding below their warning thresholds.

Idle Turquoise. Monitoring of terminal or application group response time is inactive.

N/A Turquoise. End-to-End Response Time Feature not installed, terminated, or abended. To restart ETE and OMEGAMON II, see the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide*.

Disabled Turquoise. ETE must be enabled by a NAM command. See the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide*.

Error Turquoise. Internal error. Call Customer Support for assistance.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

How to Obtain Response Time Information

The first time you looked at the main status panel after the response time feature was installed and enabled, you probably saw that the Response Times status light was turquoise and contained **Idle**. In contrast with the other monitoring facilities in the product, the response time monitor is idle by default. To monitor response times, you must first designate a resource or application group to monitor, and then activate monitoring.

Adding a Resource or Application to Monitor

To begin monitoring response times, follow these steps.

1. On the main status panel, enter **S** next to **Response Times**. The Average Response Time panel appears with asterisks in all of its columns, indicating that no resources or applications have yet been designated for monitoring.
2. In the entry field next to the row of asterisks, enter **A** (Add). The Add a Resource or Application Group pop-up appears as shown in the following figure.

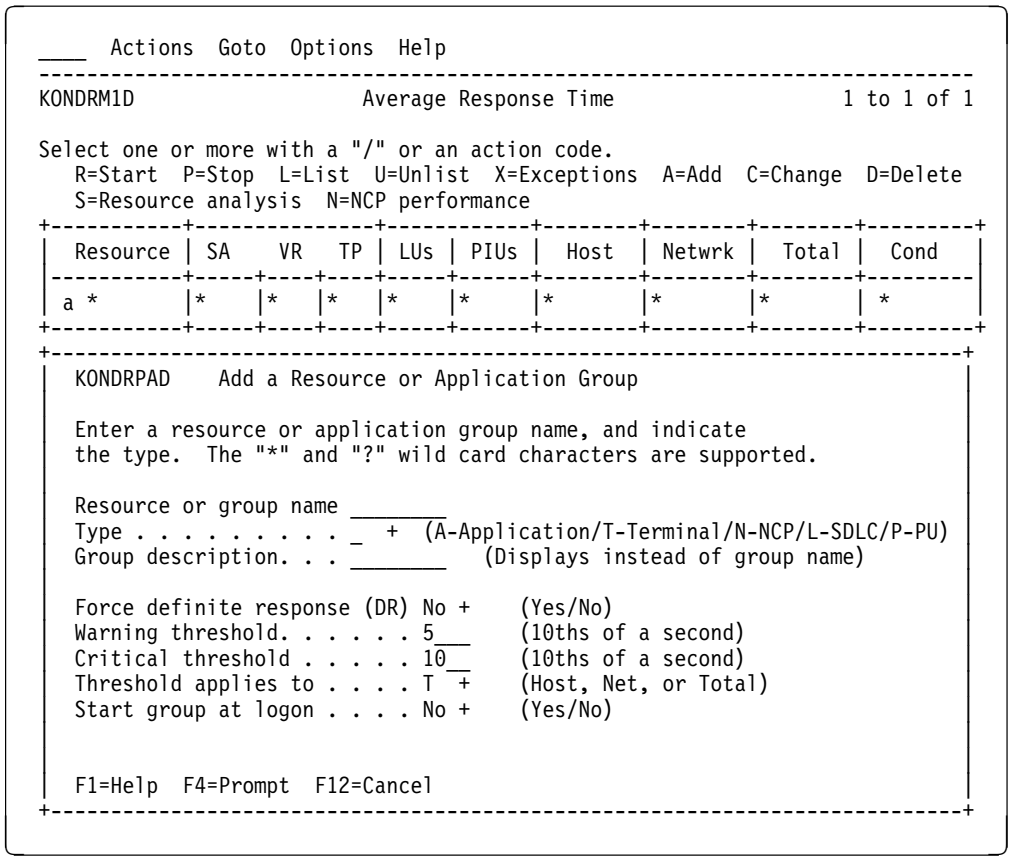


Figure 83. Adding a Resource or Application to Monitor

3. Complete the Add a Resource or Application Group pop-up as follows:

   Resource or group name
   Identify the resource, group of LUs, or application group you want to monitor. For example, if you want to monitor the LUs attached to an SDLC line, enter the line name. You can use wildcard characters ***** and **?** to group similarly named (generic) terminals or applids only. For example, if your data center's naming convention provides for a group of terminals named LTERM001 through LTERM010, and you want to monitor those 10 terminals, specify **LTERM***. If you want to monitor two applications, CICSA1 and CICSB1, specify CICS?1. If you want to monitor only one terminal, specify the whole name of that terminal; for example, **LTERM007**.

   Type Identify the group as one of the following:

   A Application group
   T Terminal group
   N NCP group
   L SDLC line group
   P SDLC PU group

Group description

This optional description appears on response time panels instead of group name. It may be a department name or location which is more meaningful than the generic group specification. For example, all the terminals in the Payroll department belong to generic terminal group L616*. Enter **Payroll** in this field to display Payroll as the resource instead of L616* on response time panels.

Force definite response

To force definite response for applications that do not normally run in definite response mode, enter **Y**. If an application does not normally run in definite response mode and you do not force definite response, OMEGAMON II cannot monitor response times for terminals connected to that application. If the application is already running in definite response mode, specifying **Y** here does not cause any problem.

Warning threshold

OMEGAMON II displays a yellow status light when total response time is equal to or greater than the threshold you specify here, and less than the critical threshold set in the next field. Specify the threshold in tenths of a second; for example, 20 for two seconds. The default is 5 (that is, 0.5 second).

Critical threshold

OMEGAMON II displays a red status light when total response time is equal to or greater than the threshold you specify here. Specify the threshold in tenths of a second; for example, 50 for five seconds. The critical threshold must be greater than the warning threshold. The default is 10 (that is, 1 second).

Threshold applies to

The response time thresholds established for a group may be applied to the host (H), network (N), or total (T) response time components. The default is T, for total response time.

Start group at logon

To start monitoring automatically as soon as you log onto OMEGAMON II, enter **YES** here. Otherwise, you will have to start monitoring by entering **R** (Start) on the Average Response Time panel each time you logon.

4. When you have completed the Add a Resource or Application Group pop-up, the Average Response Time panel, as in the following figure, displays the resource or application group you just added.

Activating Monitoring

Monitoring starts when you enter action code **R** (for Start) next to the resource or group name on this panel, as shown below.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------01:21:45 05/24/94
KONDRM1D                     Average Response Time              System: SYSA
                                                                  More:   +>
Select with a / or an action code                          Lines 1 to 16 of 16
   R=Start  P=Stop  L=List  U=Unlist  X=Exceptions  A=Add  C=Change  D=Delete
   S=Resource analysis  N=NCP performance
+-----------------+-----------+----+-----+-------+--------+--------+---------+
| Resource    Type| SA  VR  TP| LUs| PIUs|  Host | Netwrk |  Total |  Cond   |
+-----------------+---+---+---+----+-----+-------+--------+--------+---------+
| _ NCP10Y    NCP |   |   |   |  10|  546|   2.3s|    2.7s|    5.0s| Critical|
+-----------------+---+---+---+----+-----+-------+--------+--------+---------+









Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F4=Sessions  F5=Refresh  F6=Console **=Bkwd **=Fwd
F9=Retrieve  F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
F17=Clear counts
```

Figure 84. Average Response Time Panel Showing NCP Resource Group Added

When you first activate monitoring for a group of terminals, OMEGAMON II displays average response times across the group, rather than response times for the individual terminals. The number in the column headed **LUs** (10 in the example) is the total number of terminals in the group (for an application group, the number of LUs in session with the application or application group is displayed). The number in the column headed **PIUs** (546 in the example) is the total number of PIUs in the transactions monitored.

Listing LU Response Times

To view individual response times for all the LUs (terminals) in the group, enter **L** (for List) next to group name. The display expands to show individual response times and to identify the destination subarea, virtual route number, and transmission priority of each terminal's session.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------01:21:45 11/15/94
KONDRM1D                      Average Response Time              System: SYSA
                                                                   More:   +>
Select with a / or an action code                          Lines 1 to 16 of 16
   R=Start  P=Stop  L=List  U=Unlist  X=Exceptions  A=Add  C=Change  D=Delete
   S=Resource analysis  N=NCP performance
+-----------------+----------+----+-----+-------+--------+--------+---------+
| Resource    Type| SA  VR  TP| LUs| PIUs|  Host | Netwrk |  Total |  Cond   |
+-----------------+---+---+---+----+-----+-------+--------+--------+---------+
| _ NCP10Y    NCP |   |   |   |  10|  546|   2.3s|    2.7s|    5.0s| Critical|
| _  L1650100 LU  | 25|  1|  0|   1|   24|   2.3s|    2.7s|    5.0s| Critical|
| _  L1652290 LU  | 25|  1|  0|   1|   75|   0.1s|    0.2s|    0.3s| Warning |
| _  L1651000 LU  | 25|  1|  0|   1|   18|   0.2s|    0.1s|    0.3s| Warning |
| _  L1651001 LU  | 25|  1|  0|   1|    3|   0.1s|    0.1s|    0.2s| Normal  |
| _  L1651002 LU  | 25|  1|  0|   1|   34|   0.1s|    0.3s|    0.4s| Normal  |
| _  L1651003 LU  | 25|  1|  0|   1|   42|   0.2s|    0.2s|    0.4s| Warning |
| _  L1651004 LU  | 25|  1|  0|   1|   16|   0.1s|    0.2s|    0.3s| Normal  |
| _  L1651005 LU  | 25|  1|  0|   1|    6|   0.1s|    0.1s|    0.2s| Normal  |
| _  L1651006 LU  | 25|  1|  0|   1|    0|   0.0s|    0.0s|    0.0s| Normal  |
| _  L1651007 LU  | 25|  1|  0|   1|    0|   0.0s|    0.0s|    0.0s| Normal  |
| _ R617      SDLC|   |   |   |   2|   23|   0.1s|    2.9s|    3.0s| Warning |
| _  R617A20  LU  | 10|  0|  1|   1|   24|   0.1s|    5.0s|    5.1s| Critical|
| _  L620A00  LU  | 10|  0|  1|   1|   75|   0.1s|    0.8s|    0.9s| Warning |
| _ TSO*      APPL|  1|  0|  1|   1|    5|   0.1s|    0.3s|    0.3s| Normal  |
| _  ATERM010 LU  |  1|  0|  1|   1|    5|   0.1s|    0.3s|    0.3s| Normal  |
+-----------------+---+---+---+----+-----+-------+--------+--------+---------+

Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F4=Sessions  F5=Refresh  F6=Console **=Bkwd **=Fwd
F9=Retrieve  F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
F17=Clear counts
```

Figure 85. Average Response Time Panel Showing Individual LUs in Groups

Displaying Exceptions

You can also choose to display only the LUs (terminals) that show response time problems. To do so, enter **X** (for Exceptions) to the left of the group name. For example, if you enter **X** next to **NCP10Y** in the figure above, the resulting display shows average response times for the NCP group, and individual response times for LUs L1650100 and L1652290 (the two LUs with red status lights). If L1650100's response time improved, it would disappear from the display; if its response time lessened, its status light would turn yellow.

Collapsing the List

To collapse a list of LUs back into a one-line group report, enter **U** (for Unlist) next to the group name.

Deactivating Monitoring

To stop monitoring a group, enter **P** next to the group name. The group name still appears on the panel, but the status light displays **Idle**.

Starting at Logon

Your group definitions are retained when you log off. The next time you log on, the group will be started automatically if you have specified **YES** for **Start group at logon** when the group was created. Otherwise, you activate monitoring by entering **R** next to each resource or group you want to monitor.

Deleting a Definition

You can delete a group definition by entering **D** next to it.

Changing a Definition

If you want to change a group or resource's specifications, enter **C** next to it. Enter your changes on the pop-up that appears.

For an alternate view of the response time data, press F4 for Sessions. The following panel appears.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------17:51:11 03/24/94
KONDRM2D              Most Recent Response Time                  System: SYSA
                                                                   More: < +
Select one or more with a "/" or an action code.             Lines 1 to 16 of 16
   R=Start  P=Stop  L=List  U=Unlist  X=Exception  A=Add  C=Change  D=Delete
   S=Resource analysis  N=NCP performance
+------------+----------+--------+--------+--------+--------+--------+---------+
|  Resource  | GT/SESSP | AvIPIU | AvOPIU | Last H | Last N | Last T |  Cond   |
+------------+----------+--------+--------+--------+--------+--------+---------+
| _ NCP10Y   | NCP      |   10.6 |   12.8 |    2.3s|    2.7s|    5.0s| Critical|
| _  L1650100| TERMINAL |   10.6 |   12.8 |    2.3s|    2.7s|    5.0s| Critical|
| _  L1652290| TERMINAL |   10.6 |   12.8 |    0.1s|    0.8s|    0.9s| Warning |
| _  L1651000| TERMINAL |   10.6 |   12.8 |    0.2s|    0.8s|    1.0s| Warning |
| _  L1651001| TERMINAL |   10.6 |   12.8 |    0.1s|    0.1s|    0.2s| Normal  |
| _  L1651002| TERMINAL |   10.6 |   12.8 |    0.5s|    0.3s|    0.8s| Normal  |
| _  L1651003| TERMINAL |   10.6 |   12.8 |    1.2s|    0.8s|    2.0s| Warning |
| _  L1651004| TERMINAL |   10.6 |   12.8 |    0.1s|    0.2s|    0.3s| Normal  |
| _  L1651005| TERMINAL |   10.6 |   12.8 |    0.1s|    0.1s|    0.2s| Normal  |
| _  L1651006| TERMINAL |   10.6 |   12.8 |    0.0s|    0.0s|    0.0s| Normal  |
| _  L1651007| TERMINAL |   10.6 |   12.8 |    0.0s|    0.0s|    0.0s| Normal  |
| _ R617     | SDLC     |   10.6 |   12.8 |    0.1s|    2.9s|    3.0s| Warning |
| _  R617A20 | TERMINAL |   10.6 |   12.8 |    0.1s|    5.0s|    5.1s| Critical|
| _  L620A00 | TERMINAL |   10.6 |   12.8 |    0.1s|    0.8s|    0.9s| Warning |
| _ TSO*     | APPL     |   10.6 |   12.8 |    0.1s|    0.3s|    0.3s| Normal  |
| _  ATERM010| TERMINAL |   10.6 |   12.8 |    0.1s|    0.3s|    0.3s| Normal  |
+------------+----------+--------+--------+--------+--------+--------+---------+


Command ===> _____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F4=Routing  F5=Refresh  F6=Console  **=Bkwd  **=Fwd
F9=Retrieve  F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
F17=Clear counts
```

Figure 86. Most Recent Response Time Panel Showing Sessions View

The Most Recent Response Time panel displays session partners as well as information on message sizes and response time data for the last transaction that took place, including:

- Group type (GT) for a specific group. The group types can be TERMINAL, APPL, NCP, SDLC, or PU.
- Session partner (SESSP) for a specific terminal.
- Average inbound (AvIPIU) and outbound (AvOPIU) PIU size in bytes.
- Last host, last network, and last total response time.

You can use this display for problems requiring the response time of the last transaction, rather than the average response time.

Obtaining Resource Analaysis

You can use action code **S** to obtain resource analysis for a selected LU.

Navigating to the NCP Component

If a session on the Average Response Time or Most Recent Response Time panel belongs to an NCP group (NPC, line, or PU), you can use action code **N** (NCP performance) to navigate directly to a corresponding panel in the NCP performance component as follows:

- For an NCP-attached terminal, you go to the LU Resource Summary.
- For an NCP, you go to the NCP Statistics Summary.
- For a line, you go to the LU Status for Line panel.
- For a PU, you go to the LU Status for PU panel.

For more information about the NCP component, see the *OMEGAMON II for Mainframe Networks NCP Monitoring Guide*.

Highlighting Groups

On the Average Response Time and Most Recent Response Time panels, you can use the RT command to highlight the appearance of each group by changing the color of indented session rows from white to blue. Do the following:

1. Press F9 to put the cursor on the command line.
2. Enter **RT**.
3. Press F5 to refresh the panel.

Refreshing Response Time Displays

Either of two methods refresh the response time panels and display response time data from the latest transmissions:

1. Press F5 to refresh the panel.
2. To automatically refresh response time panels:
   a. Enter **OR** (for Options and Autorefresh) in the action bar entry field.
   b. Enter **YES** in the Autorefresh Active field.
   c. Specify an interval between 10 and 3600 seconds in the Autorefresh Seconds field.

Clearing Counts

You can reset the response time numbers, PIU sizes, and PIU counts displayed by the response time panels by pressing F17 (Clear Counts). These values become zeros and then begin accumulating again.

How Sessions Are Routed

To solve response time problems, you often need to know not only which terminals are having poor response time, but also how those terminals' sessions are being routed and which applications are their session partners. If most or all terminals with response time problems are in sessions that share the same virtual route, for example, you might improve response time by changing some of the terminals' class of service.

Summarizing Subareas

You can view a response time summary, broken down by destination subarea, by selecting **Subarea Summary** from the Goto pulldown. The summary covers only the terminals you are currently monitoring, as shown in the following figure.

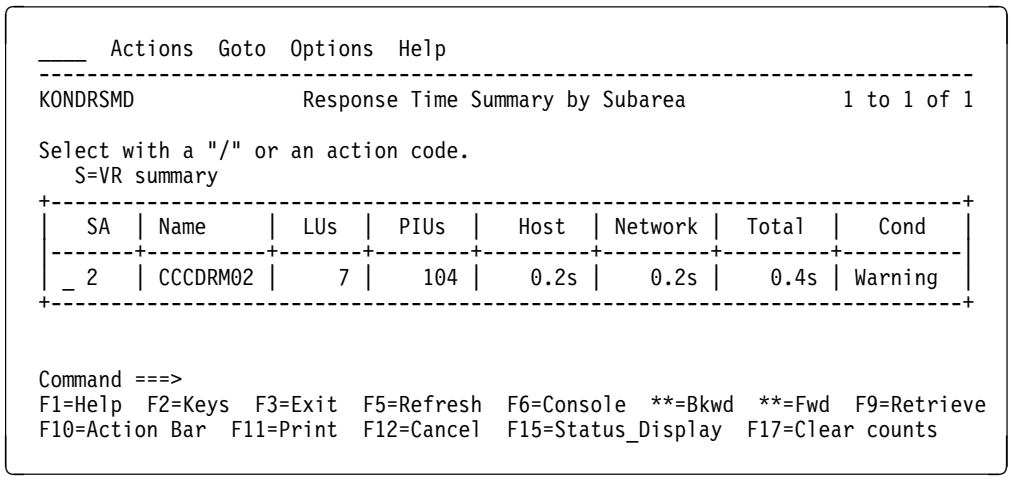


Figure 87. Response Time Summary by Subarea

Summarizing Virtual Routes for a Subarea

To see a response time summary by virtual route, enter **S** to the left of the destination subarea that interests you. The following panel appears.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDRVMD                    Response Time Summary                 1 to 1 of 1
                               by VR for SA 2

Select with a "/" or an action code.
   S=Show terminals
+-------------------------------------------------------------------------------+
|  VR  | ER | RER | TP |  LUs |  PIUs  |  Host  | Netwrk |  Total | Condition |
|------+----+-----+----+------+--------+--------+--------+--------+-----------|
| _ 0  |  7 |  7  |  0 |    0 |      0 |   0.0s |   0.0s |   0.0s | Idle      |
|      |    |     |  1 |    7 |    108 |   0.2s |   0.2s |   0.4s | Warning   |
|      |    |     |  2 |    0 |      0 |   0.0s |   0.0s |   0.0s | Idle      |
|      |    |     |    |      |        |        |        |        |           |
+-------------------------------------------------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display  F17=Clear counts
```

Figure 88. Response Time Summary by Virtual Route

In this panel, all terminals with response time problems are in sessions that use Virtual Route 0 (VR0) and Transmission Priority 1 (TP1). Response time might improve if some sessions used TP0 or if some sessions used a different virtual route.

Summarizing LUs for a Virtual Route

You can break down the summary even further by entering **S** to the left of the virtual route that interests you. The following panel appears.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDRLMD           Average Terminal Response Time                 1 to 7 of 7
                             for SA 2 VR 0
Select with a "/" or an action code.
   S=Resource analysis
  +-------------------------------------------------------------------------+
  | Terminal |  Session | TP | PIUs |  Host  | Netwrk |  Total | Condition  |
  |----------+----------+----+------+--------+--------+--------+------------|
  | LTERM001 | TSOA     |  1 |    0 |    0.0s|    0.0s|    0.0s| Normal     |
  | LTERM002 | TSOB     |  1 |   32 |    0.0s|    0.1s|    0.1s| Normal     |
  | LTERM004 | TSOC     |  1 |    4 |    0.0s|    0.3s|    0.3s| Normal     |
  | LTERM006 | IMSA     |  1 |   31 |    0.1s|    0.2s|    0.3s| Normal     |
  | LTERM007 | IMSB     |  1 |   10 |    0.3s|    0.2s|    0.5s| Warning    |
  | LTERM009 | CICSA    |  1 |    0 |    0.0s|    0.0s|    0.0s| Normal     |
  | LTERM010 | CICSB    |  1 |   32 |    0.4s|    0.2s|    0.6s| Warning    |
  +-------------------------------------------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display  F17=Clear counts
```

Figure 89. Terminal Response Time by Virtual Route and Transmission Priority

This panel lists:

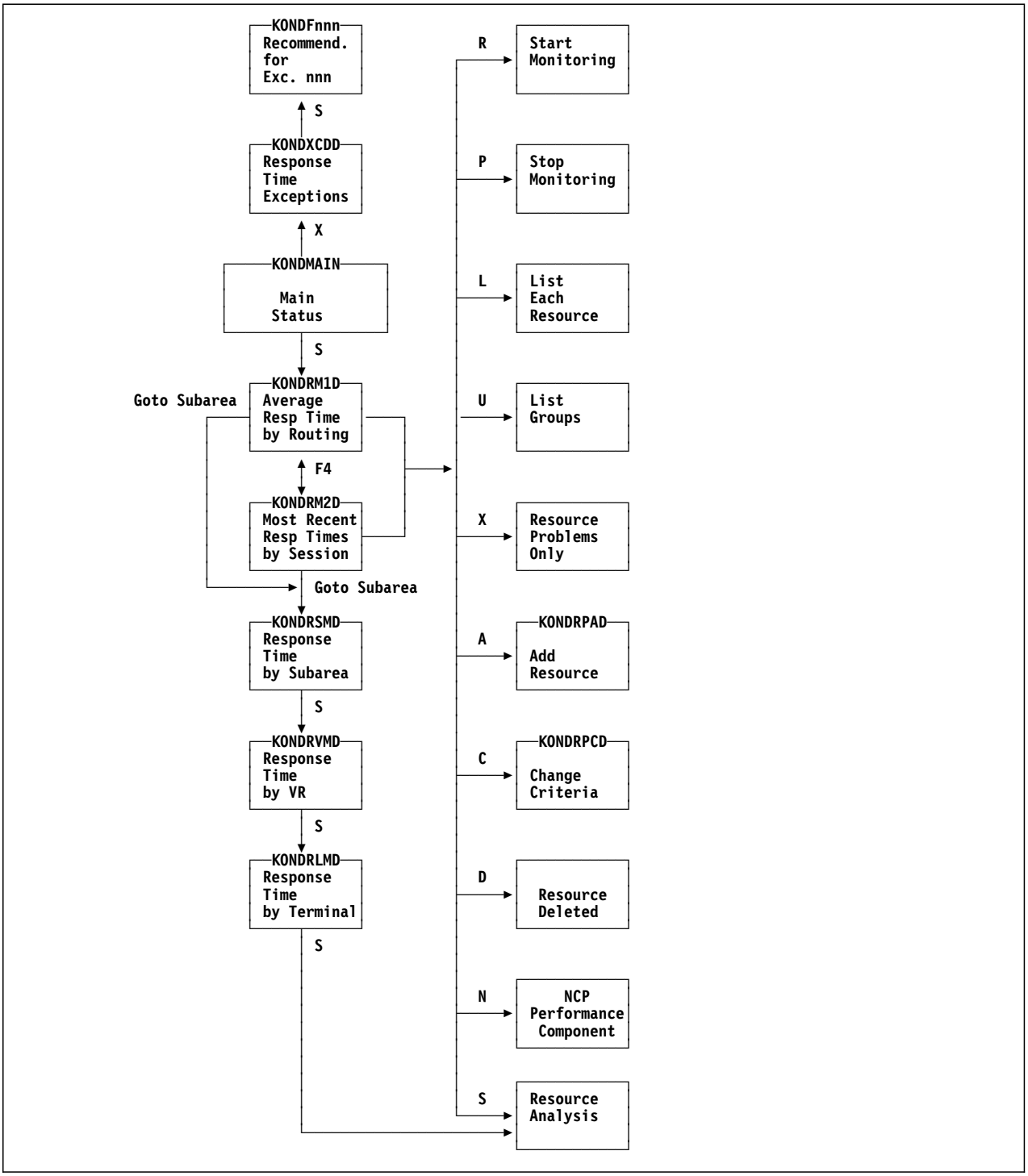
- terminals using the virtual route
- each terminal's session partner
- transmission priority of each session
- number of PIUs in the latest monitored transmission of each session
- response time data for each session

Historical Reports

If you have SAS installed at your data center, you can produce service-level reports of response time data for offline analysis. See the information about SAS reporting in the *OMEGAMON II for Mainframe Networks Historical Reporting Guide* and the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide* for details.

If you have SAS/GRAPH installed, you can display color historical graphs of your response time data. The color graphs display the application and network response times across each day for each response time group defined to OMEGAMON II. See the *OMEGAMON II for Mainframe Networks Historical Reporting Guide* for information on how to use the color graphs facility.

Response Times Component Navigation



Chapter 10. VTAM Trace

Chapter Contents

Overview

This chapter shows you how to use the OMEGAMON II VTAM Trace Facility which traces, searches for, analyzes, and displays VTAM Path Information Units (PIUs). The first section explains the concepts behind the trace facility. The remaining sections describe the actions you can take, how to navigate within the facility, and each of the panels you use.

VTAM Trace Facility

VTAM Trace is a diagnostic tool for solving network problems such as terminals disappearing from a network or locking up, lost messages or data, inconsistent results from programs, invalid data on displays, or logon failures. You can use the trace facility to search for and examine the VTAM PIUs being transferred.

The OMEGAMON II Trace Facility inspects the PIUs being passed through VTAM to the various components that make up a network. You can capture all PIUs for a session or for a pair of session partners. This facility formats and interprets the contents of the PIUs for direct online inspection, provides field-level help, and can search for a specified string or command.

There are two types of trace that you can request:

1. **`Non-search Trace`** captures a specified number of PIUs.
2. **`Search Trace`** searches for a specified character or hexadecimal string, or SNA command within a PIU.

You may display details of the PIUs in realtime, save the trace data in a file for future use, or print all or part of the trace results.

For details on network concepts and definitions, refer to IBM's VTAM or Communications Server publications.

Note: Since the trace facility depends on the End-to-End Response Time Feature to provide the PIUs, the End-to-End Response Time Feature must be installed and enabled. If the Response Time status light on the main status panel contains N/A (Not Available), ERROR, or DISABLED, you cannot use the trace facility to start new traces. See “Response Time Status Light” on page 195 for more information. It is not necessary to be measuring end-to-end response time, to use the trace facility. It's OK if the Response Time status light displays Idle.

VTAM Trace Status Light

The **VTAM Trace** selection is available on the main status panel.

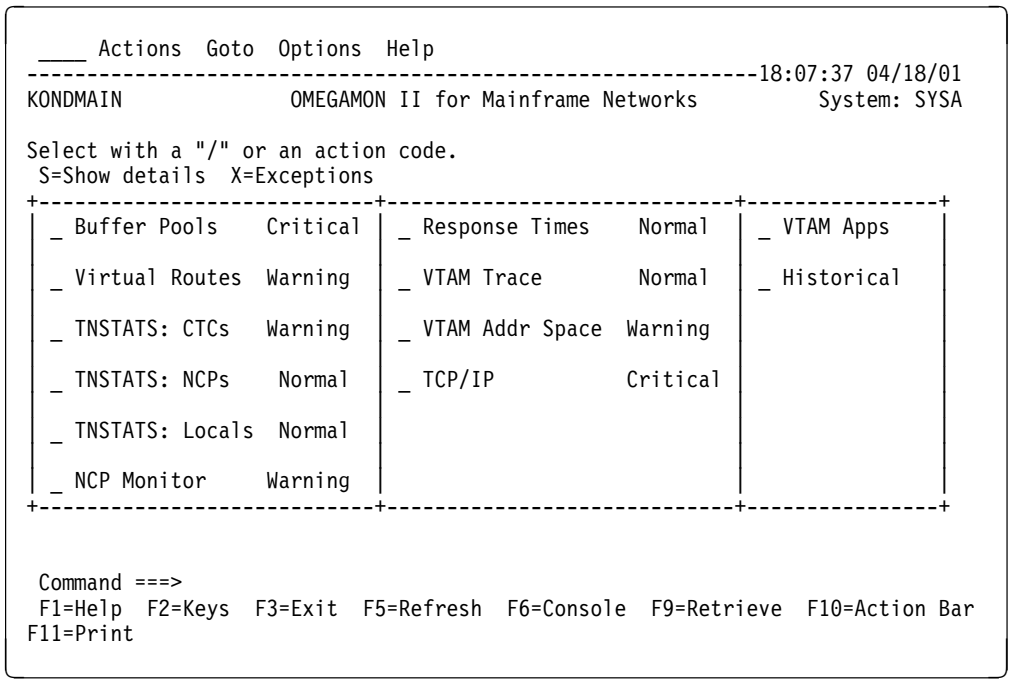


Figure 90. OMEGAMON II for Mainframe Networks Main Status Panel with VTAM Trace Status Light

On this panel the VTAM Trace status light has the following values:

Turquoise Idle. No traces are currently running.

Green Normal. One or more traces are running.

Yellow Warning. One or more traces have completed.

Red Critical. One or more traces have terminated.

- because of insufficient storage or
- with missing PIUs caused by a surge in PIU flow

If more than one of the above conditions is true, the more critical status displays (turquoise is least critical and red is most critical).

F1

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

Listing the Traces

Select **VTAM Trace** from the main status panel and press Enter. The VTAM Trace Facility panel displays a list of available traces.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------11:12:59 08/12/91
KONDTMND                    VTAM Trace Facility                  1 to 1 of 1

+-------------------------------------------------------------------------------+
| Trace status: ACTIVE                | Number of traces active: 2              |
+-------------------------------------------------------------------------------+

Select with a "/" or an action code.
  S=Show Details  A=Add  D=Delete  R=Start  P=Stop  V=Review  H=Save  N=Print
+-------------------------------------------------------------------------------+
|  Trace ID  | Status | PIUs | Max  |  Seen  |          Description            |
|------------+--------+------+------+--------+---------------------------------|
| _ AMTRACE  | ACTIVE | 10   | 10   | 53     | Search for LOGON                |
| _ PMTRACE  | ACTIVE | 20   | 20   | 35     | Search for User001              |
| _ ABTRACE  | STOPPED| 18   | 20   | 18     | Trace 20 PIUs                   |
+-------------------------------------------------------------------------------+









Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 91. VTAM Trace Facility Panel

This panel displays current trace status and lists the traces available for viewing.

The upper section of the panel describes the Trace Facility as a whole. The **Trace status** field is **ACTIVE** if a trace is in progress; or **INACTIVE** if no traces are running. The **Number of traces active** field shows the total number of active traces.

The remainder of the panel lists the available traces. Asterisks (*) indicate no traces or no data. The fields describing a trace are as follows:

Trace ID Unique name specified when the trace definition was added.

Status Current status of the trace as follows:

ACTIVE Running and not wrapping.

ACT/WR Running and wrapping.

INACT Not started.

STOPPED Was stopped before completion.

SAVED Was saved for access in subsequent OMEGAMON sessions.

ENDED Terminated normally.

STORAGE Terminated abnormally because of a storage shortage.

MISSING Ended with PIUs missing because of a PIU flow surge.

PIUs Number of PIUs that were retained by the trace facility for viewing or printing. For non-search traces, the value of **PIUs** always equals the value of PIUs **Seen** and is limited by the value of **Max**.

For search traces, this number equals the number of PIUs **Seen** until the trace begins to wrap. A search trace wraps when the number of PIUs retained reaches the maximum value specified by **Max**. When the search trace wraps, each new entry in the trace table replaces the oldest entry. **PIUs** are limited by the value of **Max**, while the number of PIUs **Seen** increment until the search argument specified in the trace definition is matched.

For search traces, **PIUs** may actually exceed **Max** by up to five PIUs. To provide trace continuity, the trace facility records five PIUs beyond the matching PIU regardless of the **Max** setting.

Max Maximum number of PIUs retained by the trace facility for viewing or printing. The actual number of PIUs retained may exceed **Max** by up to five PIUs for search traces only. You specify **Max** when you **Add** a trace definition with the **A** action code. The **Max** you specify may not exceed the maximum set by an Administrator in the Global Options selection on the Monitoring Options menu under the Options pulldown.

Seen Number of PIUs observed by the trace. For non-search traces which never wrap, this number always equals the number of **PIUs** retained and is limited by the value of **Max**. For wrapped search traces, this value exceeds the number of **PIUs** retained.

Description
Comment that identifies the trace.

Controlling the VTAM Trace Facility

In a typical operation of trace, you first **Add** or define the trace. Then you **Start** collecting PIUs. You may **Review** the trace definition at any time. A trace ends normally if it either collects the maximum number of PIUs or it satisfies a search for a specified character or hexadecimal string, or SNA command. Also, you may **Stop** a trace before it completes. You inspect the trace results with the **Show** action.

Note: Traces are normally deleted when a session is ended.

You may preserve **Ended** or **Stopped** traces, between sessions, with the **Save** action. You specify the portions of the trace you want printed with the **Print** action. Finally, you may **Delete** a trace when it is no longer needed.

On the VTAM Trace Facility panel (see Figure 91 on page 212), you execute all actions either from the action bar or on the display panel. To use the action codes displayed above the list of traces, place the cursor in the entry field of the selected Trace ID and enter any one of the following actions:

S Show details of the selected trace. Lists the PIU headers which you can then examine in more detail.

A Add a new trace definition. Required before a trace is initiated.

D Delete the trace definition. Removes the trace from this list.

R Start running a trace that was previously defined by an add, or restart a trace that has completed.

P Stop the trace immediately, before it completes.

V Review the trace definition.

H Save the trace in a file for access in subsequent OMEGAMON II sessions.

P Print all or selected portions of an ended trace.

The following sections each describe an available action.

Adding a Trace

Use action code **A** to add a new trace definition. The Add a Session To Be Traced pop-up appears.

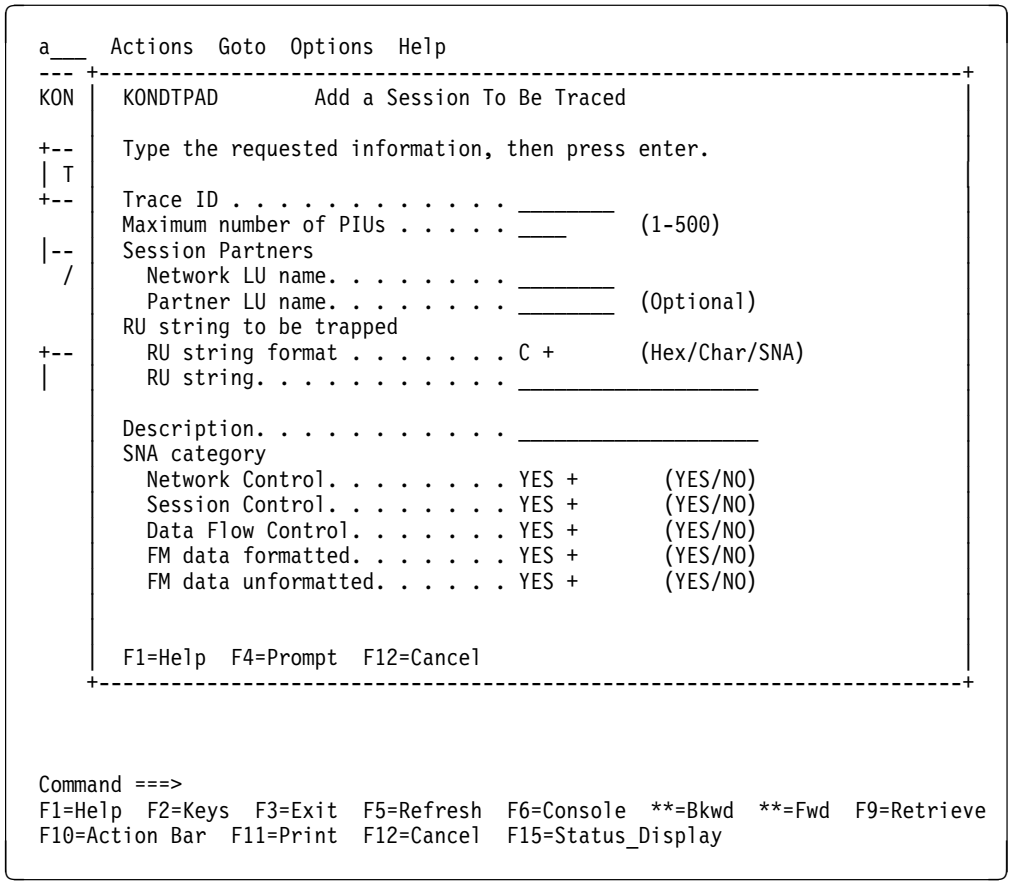


Figure 92. Add a Trace Pop-up

Complete the Add a Trace pop-up as follows:

Trace ID Unique 1- to 8-character identifier for the trace.

Maximum number of PIUs
Maximum number of PIUs to be retained by the Trace Facility for viewing or printing. Allowable values display in parenthesis. The maximum number is set by your system administrator through the Options pulldown.

Session Partners

Session to be monitored by the trace:

- Network LU name. This LU name is required and will have its data flow traced.
- Partner LU name (Optional). Limits the trace to the traffic between the session partners specified so that the scope of the trace narrows.

RU string to be trapped (optional)

String to search for in the PIU. There are two parameters for this search:

- RU string format. Format of the string to be searched for: hexadecimal (H), character (C), or SNA command (S). The default is character format (C).
- RU string. Actual string to be trapped. The string must be entered in the format specified in RU string format.

Note: The trace can find a search string only if it is completely contained within a PIU. Also, be aware that the character search is case-sensitive. Wherever you specify uppercase characters, the search looks only for uppercase characters and wherever you specify lowercase, the search looks only for lower case.

Description

Identify or explain the trace.

SNA category

Enter **YES** or **NO** to specify whether or not to retain the following types of network data:

Network Control

Requests and responses that affect network components.

Session Control

Commands and responses that affect sessions.

Data Flow Control

Requests and responses that control session flow.

FM data formatted

Function management data to be transferred to the LUs that contains FM headers.

FM data unformatted

Function management data to be transferred to the LUs without FM headers. This is the default assumed if you specify NO for all data types.

Starting the Trace

When you use the **A** action code, the trace definition is created but the trace is not yet activated. Use action code **R** to start the trace running. The **R** (Start) action starts collecting PIUs. Once started the trace runs until one of the following happens:

- The trace collects the maximum allowed PIUs.
- The trace traps a specified RU string and collects 5 more PIUs.
- The trace is explicitly stopped.

Restarting the Trace

You can restart a trace that has completed. Enter action code **R** to restart a trace that is no longer active. The restart pop-up appears.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------18:04:39 08/31/93
KONDTMND                    VTAM Trace Facility               System: SYSG
                                                            Lines 1 to 6 of 6

Select with a "/" or an action code.
   S=Show details  A=Add  D=Delete  R=Start  P=Stop V=Review  H=Save  N=Print
+-- +-------------------------------------------------------------------+ ----+
| T |  KONDTRRP             Restart a Trace                             |     |
+-- |                                                                   | ----+
|   |  Type the requested information, then press Enter.                |     |
+-- |                                                                   | ----+
| _ |  Trace ID . . . . . . . . . . . . TRACER                          |     |
| _ |  Maximum number of PIUs . . . . . 11_         (1-150)             |     |
| _ |  Session Partners                                                 |     |
| r |    Network LU name  . . . . . . . CCCDRM01                        |     |
| _ |    Partner LU name. . . . . . . . __________  (Optional)          |     |
| _ |  RU string to be trapped                                          |     |
+-- |    RU string format . . . . . . . C    +     (Hex/Char/SNA)      | ----+
    |    RU string  . . . . . . . . . . ________________________________ |
    |                                                                   |
    |    Description  . . . . . . . . . ________________________________ |
    |    SNA category                                                   |
    |      Network control  . . . . . . . Yes  +     (Yes/No)           |
    |      Session control  . . . . . . . Yes  +     (Yes/No)           |
    |      Data flow control  . . . . . . Yes  +     (Yes/No)           |
    |      FM data formatted  . . . . . . Yes  +     (Yes/No)           |
    |      FM data unformatted  . . . . . Yes  +     (Yes/No)           |
    |                                                                   |
Com |                                                                   |
F1= |  F1=Help  F4=Prompt  F12=Cancel                                   | rieve
F10 +-------------------------------------------------------------------+
```

Figure 93. Restart a Trace Pop-up

On the restart pop-up you can do any of the following:

1. Press Enter to rerun the trace with the same parameters. The new trace output will replace the existing trace output.
2. Modify any of the parameters shown and rerun the trace using these parameters. The new trace output will replace the existing trace output.
3. Rerun the trace with the same or different parameters, but save the output under a new trace ID so that the original trace output is preserved.

Restarting a trace resets the status. A restarted trace will be deleted at session termination, whether or not the original trace was saved. You must explicitly save the new trace if you want to preserve it across OMEGAMON II sessions.

Stopping the Trace

Use action code **P** to stop the trace. A stopped trace appears as **Stopped** in the status field of the Trace Facility panel. A stopped trace may not be restarted.

Saving the Trace

Use action code **H** to save the trace data in the Tables Database and change the trace status to **Saved**. To view a trace in subsequent OMEGAMON II sessions, you must save the trace.

Reviewing a Trace Definition

Use action code **V** to review a trace definition. You can inspect a trace definition through a view-only pop-up.

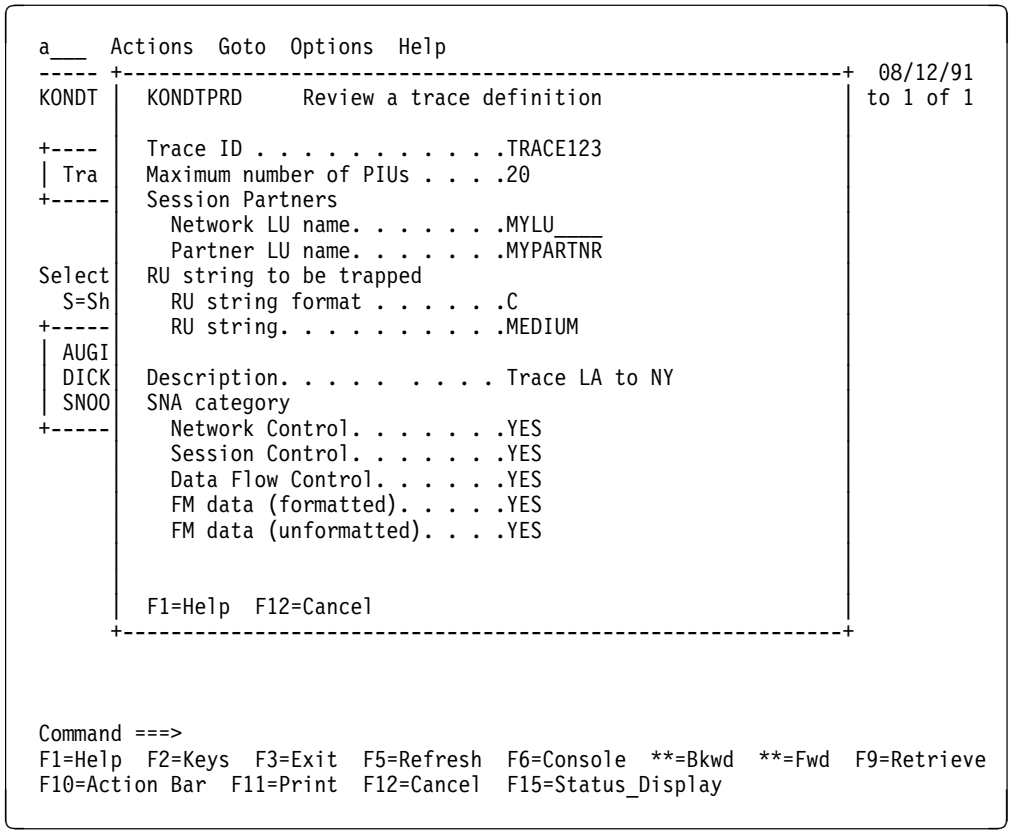


Figure 94. Review a Trace Definition Pop-up

Showing the PIUs

Enter action code **S** (Show Details) next to a selected trace on the Trace Facility panel to show a summary of the trace's PIU headers. The Trace ID and Description fields identify the trace. PIU headers are listed in the order in which they were captured, so that the most recent PIU is at the bottom of the trace.

```
____  Actions  Goto  Browse  Options  Help
-------------------------------------------------------------18:30:28 08/31/93
KONDTCDD                    Display PIU Entries                  System: SYSG
                           for Trace ID: TRACE123
                                                          Lines 1 to 13 of 25
Select with a "/" or an action code.
    T=TH analysis  R=RH analysis  U=RU analysis  D=Data stream analysis
+-----------------------------------+---------------------------------------+
| Starting time. . : 10:09:47.443459  | Ending time. . . . : 10:09:47.576242  |
+-------+-----------------+----------++---------+--------+--------------------+
|  Seq  |    PIU Type     |  Origin  |   Dest   |   RH   |         RU         |
+-------+-----------------+----------+----------+--------+--------------------+
| _    1| DATA            | M2VTGV18 | OMVTAMG  | 030000 | 7D404011C15040E2E8 |
| _    2| DATA            | OMVTAMG  | M2VTGV18 | 038000 | F1C31140401D406D6D |
| _    3| +RSP            | M2VTGV18 | OMVTAMG  | 838000 |                    |
| _    4| DATA            | M2VTGV18 | OMVTAMG  | 030000 | 7D404011C15040D9E3 |
| _    5| DATA            | OMVTAMG  | M2VTGV18 | 038000 | F1C31140401D406D6D |
| _    6| +RSP            | M2VTGV18 | OMVTAMG  | 838000 |                    |
| _    7| DATA            | M2VTGV18 | OMVTAMG  | 030000 | 7D404011C15040E7C1 |
| _    8| DATA            | OMVTAMG  | M2VTGV18 | 038000 | F1C31140401D406D6D |
| _    9| +RSP            | M2VTGV18 | OMVTAMG  | 838000 |                    |
| _   10| DATA            | M2VTGV18 | OMVTAMG  | 030000 | 7D404011C150404B4B |
| _   11| DATA            | OMVTAMG  | M2VTGV18 | 038000 | F1C31140401D406D6D |
| _   12| +RSP            | M2VTGV18 | OMVTAMG  | 838000 |                    |
| _   13| DATA            | M2VTGV18 | OMVTAMG  | 030000 | 7D404011C15040E7C1 |
+-------+-----------------+----------+----------+--------+--------------------+



Command ===> _____________________________________________________________
F1=Help  F2=Keys  F3=Exit  F4=Expand  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd
F9=Retrieve  F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 95. Condensed PIU Entries Panel

Each PIU row consists of

Starting Time Local date and time the first PIU was traced.

Ending Time Local date and time the last PIU was traced.

Seq Logical sequence number of the PIU in collection order.

PIU Type Type of PIU being sent.

Origin Originating node of the PIU.

Destination Destination node of the PIU.

RH Request/response header data.

RU First 18 bytes of the request/response unit data.

A trace usually contains multiple PIUs. Press F8 to scroll forward through the listed PIU headers, or press F7 to scroll backward.

Press F4 (Expand) for an expanded display that shows for each PIU

- the complete TH
- the complete RH
- the first 40 bytes of the RU

Expanded PIU Display

You can use F4 to toggle between the expanded and condensed display of trace entries. An example of an expanded display is shown in the following figure.

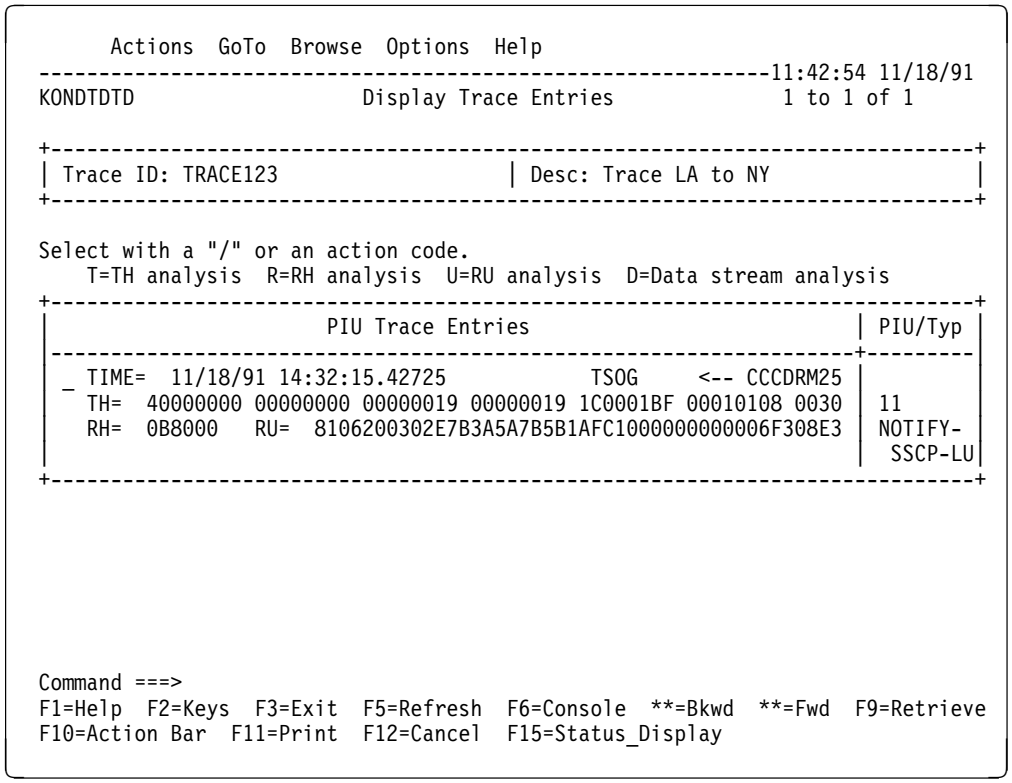


Figure 96. Display Trace Entries Panel

Browsing the PIUs

To help you browse through a trace's PIU headers, use the **Browse** choice on the action bar. The Browse pulldown displays a menu of browse options to scroll to a specified position within the listed PIUs. The fastest way to access a browse option is to enter the fastpath in the action bar entry field. You can enter any of the following browse option fastpaths:

BT Scrolls to the PIU at the top of the list.

BB Scrolls to the PIU at the bottom of the list.

BS Scrolls to the PIU containing the search string in a search trace.

BC Scrolls to the PIU containing a character string that you specify.

BH Scrolls to the PIU containing a hexadecimal string that you specify.

BP Scrolls to the PIU containing the previous occurrence of the last search string specified.

BN Scrolls to the PIU containing the next occurrence of the last search string specified.

BM Scrolls to the PIU number that you specify.

BF Scrolls to the PIU of the specified PIU type, which may be an SNA command

You can choose Browse from the action bar on three trace panels:

- Display Trace Entries (see the previous figure)
- RU Trace Analysis (see Figure 99 on page 229)
- Data Stream Analysis (see Figure 100 on page 231)

Analyzing the PIUs

If you are viewing a successful search trace, the RU portion of the PIU that is displayed in yellow contains the search string.

After deciding which PIU interests you, you can examine the trace data in more detail. On the Display Trace Entries panel (see previous figure), next to the PIU header, enter any one of the following action codes:

T Displays the TH data.

R Displays the RH data.

U Displays the RU data. For search traces, the search string is highlighted in yellow within the RU display.

D Displays the RU data in 3270 data stream format.

On formatted analysis displays, you can get help for elements or commands within the PIU. Position the cursor to the formatted field and press F1 for Help.

The following sections discuss each of the above actions.

Displaying the TH Data

Select action code **T** to display the transmission header (TH) data, as shown in the following figure.

```
____  Goto  Options  Help
-------------------------------------------------------------11:45:53 08/12/91
KONDTTHD                     TH Trace Analysis                     System: SYSG
                                                                 1 to 23 of 32
                                                                   PIU 1 of 14
+-----------------------------------------------------------------------------+
|                              PIU Header                          | PIU/Type |
 -----------------------------------------------------------------------------
 TIME=  11/18/91 14:31:50.864903            TSOG    <-- CCCDRM25  | 1
 TH=  40000000 00000000 00000019 00000019 1C0001BF 00010105 00EE  | CINIT
 RH=  0B8000   RU=  810601000A000000000000026010303B1903080000087 |
 -----------------------------------------------------------------------------
     Offsets       |                                  |
 Bytes     Bits    |           Description            |          Value
 ----------------- | -------------------------------- | ----------------------
  000  | 0100 .... | Format Identifier                | Type 4
       | .... 0... | TG Sweep                         | Not Restricted
       | .... .0.. | ER and VR Support                | Yes
       | .... ..0. | VR Pacing Count Indicator        | Count is Not Zero
       | .... ...0 | Network Priority                 | Lower Priority
  001  | 00.. .... | TG Segmenting                    | Not Segmented
       | ..00 0000 | Reserved Area 1                  |
  002  | 0000 .... | Initial Explicit Route Number    | 0 X'0'
       | .... 0000 | Explicit Route Number            | 0 X'0'
  003  | 0000 .... | Virtual Route Number             | 0 X'0'
       | .... 00.. | Reserved Area 2                  |
       | .... ..00 | Transmission Priority            | Low Priority
  004  | 0... .... | VR Change Window Indicator       | Increment
       | .0.. .... | TG Non-FIFO Indicator            | FIFO Required
       | ..00 .... | VR Sequence and Type             | Non-Supervisory
       |           | Transmission Group Sequence      | 0 X'000'
  006  | 0... .... | VR Pacing Request                | VRPRS Not Requested
       | .0.. .... | VR Pacing Response               | No Response Sent
       | ..0. .... | VR Change Window Reply           | Increment
       | ...0 .... | VR Reset Window                  | No Reset
       |           | VR Send Sequence                 | 0 X'000'
  008  |           | Destination Subarea Field        | X'00000019'
  00C  |           | Origin Subarea Field             | X'00000019'
+-----------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F6=Console  F5=Refresh  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12-Cancel  F15=Status_Display  **=Prev  F22=Next
```

Figure 97. TH Trace Analysis Panel

This panel is a detailed analysis of the transmission header (TH) data contained in the PIU header. The top portion of the panel displays the PIU header and the bottom portion of the panel formats the elements within the TH. The PIU header is that same as that displayed on the Display Trace Entries panel.

There are thirty-two fields which correspond to individual TH elements. There is field-level help for each TH element. Place the cursor on a TH element and press F1 for Help. When field help is selected, the corresponding byte offset of the field in the PIU header is highlighted in yellow so you can relate the TH data displayed with its physical location in the TH.

You can navigate to the other analysis displays through the Goto pulldown or by returning to the PIU Trace Entries display and entering an action code (**R** for RH analysis, **U** for RU analysis, or **D** for Data stream analysis).

This panel provides double scrolling. To select another PIU header for display, you can scroll backward through the PIUs for the current trace with F21 (Prev) and forward with F22 (Next). To view more elements, you can scroll backward through the current PIU with F7 (Bkwd) and forward with F8 (Fwd).

Displaying the RH Data

Select action code **R** to display the request/response header (RH) data.

```
 ____  Goto  Options  Help
 -------------------------------------------------------------11:49:20 08/12/91
 KONDTRHD                    RH Trace Analysis                      System: SYSG
                                                            Lines 1 to 23 of 23
                                                                    PIU 1 of 14
 +-----------------------------------------------------------------------------+
 |                               PIU Header                         | PIU/Type |
 |-----------------------------------------------------------------------------|
 | TIME=  11/18/91 14:31:50.864903            TSOG    <-- CCCDRM25  | 1        |
 | TH=  40000000 00000000 00000019 00000019 1C0001BF 00010105 00EE  | CINIT    |
 | RH=  0B8000   RU=  810601000A0000000000026010303B1903080000087   |          |
 |-----------------------------------------------------------------------------|
 |     Offsets      |                                  |                       |
 | Bytes    Bits    |             Description          |         Value         |
 |------------------|----------------------------------|-----------------------|
 |  000   | 0... .... | Type Indicator                  | Request               |
 |        | .00. .... | RU Category                     | FM Data               |
 |        | ...0 .... | Reserved Area 1                 |                       |
 |        | .... 1... | Format Indicator                | Format 1              |
 |        | .... .0.. | Sense Data Indicator            | Not Included          |
 |        | .... ..1. | Begin Chain Indicator           | First RU in Chain     |
 |        | .... ...1 | End Chain Indicator             | Last RU in Chain      |
 |  001   | 1... .... | Definite Response 1             | Required              |
 |        | .0.. .... | Reserved Area 2                 |                       |
 |        | ..0. .... | Definite Response 2             | Not Required          |
 |        | ...0 .... | Exception Response Indicator    | Definite or None      |
 |        | .... 0... | Reserved Area 3                 |                       |
 |        | .... .0.. | Request Larger Window Size      | No                    |
 |        | .... ..0. | Queued Response                 | Bypass TC Queues      |
 |        | .... ...0 | Pacing Indicator                | Response Not Required |
 |  002   | 0... .... | Begin Bracket                   | Not Begin Bracket     |
 |        | .0.. .... | End Bracket                     | Not End Brackete      |
 |        | ..0. .... | Change Direction                | No                    |
 |        | ...0 .... | Reserved Area 8                 |                       |
 |        | .... 0... | Code Selection                  | Code 0                |
 |        | .... .0.. | Enciphered Data                 | RU is Not Enciphered  |
 |        | .... ..0. | Padded Data                     | RU is Not Padded      |
 |        | .... ...0 | Conditional End Bracket         | No                    |
 +-----------------------------------------------------------------------------+

 Command ===>
  F1=Help  F2=Keys  F3=Exit  F6=Console  F5=Refresh  F9=Retrieve  F10=Action Bar
 F12=Cancel  F15=Status_Display  **=Prev  F22=Next
```

Figure 98. RH Trace Analysis Panel

This panel is a detailed analysis of the request/response header (RH) data contained in the PIU header. The top portion of the panel displays the PIU header and the bottom portion of the panel formats the elements within the RH. The PIU header is the same as that displayed on the Display Trace Entries panel.

There are 24 fields which correspond to individual RH elements. There is field-level help for each RH element. Place the cursor on an RH element and press F1 for Help. When field help is selected, the corresponding byte offset of the field in the PIU header is highlighted in yellow so you can relate the RH data displayed with its physical location in the RH.

You can navigate to the other analysis displays through the Goto pulldown or by returning with F3 to the PIU Trace Entries display and selecting by action code (**T** for TH analysis, **U** for RU analysis, or **D** for Data stream analysis).

This panel also provides double scrolling. You scroll backward and forward through the PIUs for the current trace with F21 (Prev) and F22 (Next). You scroll backward and forward throuch the RH elements in the current PIU with F7 and F8.

Displaying the RU Data

Select action code **U** to display an analysis of the request/response unit (RU) data.

```
____  Goto  Browse  Options  Help
-------------------------------------------------------------11:51:13 08/12/91
KONDTRUD                    RU Trace Analysis                   System: SYSG
                                                             1 to 12 of 12
                                                               PIU 1 of 14
+-------------------------------------------------------------------------------+
|                                PIU Header                           | PIU/Type  |
|-------------------------------------------------------------------------------|
| TIME=  11/18/91 14:31:50.864903            TSOG    <-- CCCDRM25   | 1         |
| TH=  40000000 00000000 00000019 00000019 1C0001BF 00010105 00EE   | CINIT     |
| RH=  0B8000   RU=  810601000A000000000000026010303B1903080000087 |           |
|-------------------------------------------------------------------------------|
|  Off  |                RU Data Hex                 |   RU Data Character    |
|-------+--------------------------------------------+------------------------|
| 0000  | 81060100 0A000000 00000026 010303B1 90300800 | a...................   |
| 0014  | 0087C780 00020000 00000018 502B507F 000004E3 | .gG.........&.&"...T   |
| 0028  | E2D6C700 05000006 040AF308 C2C4C3C5 D4F1F1F7 | SOG.......3.BDCEM237   |
| 003C  | 00000000 0E01C06D 00000080 00001850 2B507F00 | ........(_.....&.&".   |
| 0050  | 0D24C4F4 C1F3F2F7 F8F44040 40404040 40401300 | ..D4A32784..........   |
| 0064  | 01080001 01010201 03010401 05010601 07011514 | ...................    |
| 0078  | 00000019 01BE0000 00010227 E4E2C3C1 C3D6F0F1 | ...........USCAC001    |
| 008C  | 0E0EF3E4 E2C3C1C3 D6F0F14B E3E2D6C7 0E12F3E4 | ..3USCAC001.TSOG..3U   |
| 00A0  | E2C3C1C3 D6F0F14B C2C4C3C5 D4F2F1F7 2C0A0108 | SCAC001.BDCEM237....   |
| 00B4  | 40404040 40404040 2D0908C4 F4C1F3F2 F7F8F460 | ...........D4A32784-   |
| 00C8  | 1AE7B3A7 ABB5A686 9811E4E2 C5E2E2F0 F0F14BF1 | .X.x..wfq.USESS001.1   |
| 00DC  | C3C3C4D9 D4F0F12F 03038000 3F0180            | CCDRM01.......         |
+-------------------------------------------------------------------------------+



Command ===>
F1=Help  F2=Keys  F3=Exit  F6=Console  F5=Refresh  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display  **=Prev  F22=Next
```

Figure 99. RU Trace Analysis Panel

The upper portion of this panel displays the PIU header. The PIU header is the same as that shown on the Display Trace Entries panel.

The bottom portion of the panel displays:

Off Hexadecimal offset into the RU.
RU Data Hex RU data in hexadecimal format.
RU Data Character RU data in character format.

When a search trace successfully completes, the search string is highlighted in yellow within the RU that contains the string. If you specified a character-format search string, the string is highlighted within the RU Data Character area. Hexadecimal-format search strings are highlighted within the RU Data Hex area.

To quickly locate a search argument within the matching RU, first scroll through the PIU headers on the Display Trace Entries panel to locate the PIU containing the search string. The RU containing the search string is displayed in yellow on the Display Trace Entries panel. Next, enter the **U** (RU) action code to display the complete RU.

The RU Trace Analysis panel provides double scrolling. You can scroll through the PIUs with F21 (Prev) and F22 (Next), and you can scroll through the RU data for the current PIU with F7 (Bkwd) and F8 (Fwd).

You can navigate to the other analysis displays by using the Goto pulldown or returning to the Display Trace Entries panel with F3 and entering action codes.

Displaying the Data Stream

Select action code **D** to display the RU data in 3270 data stream format.

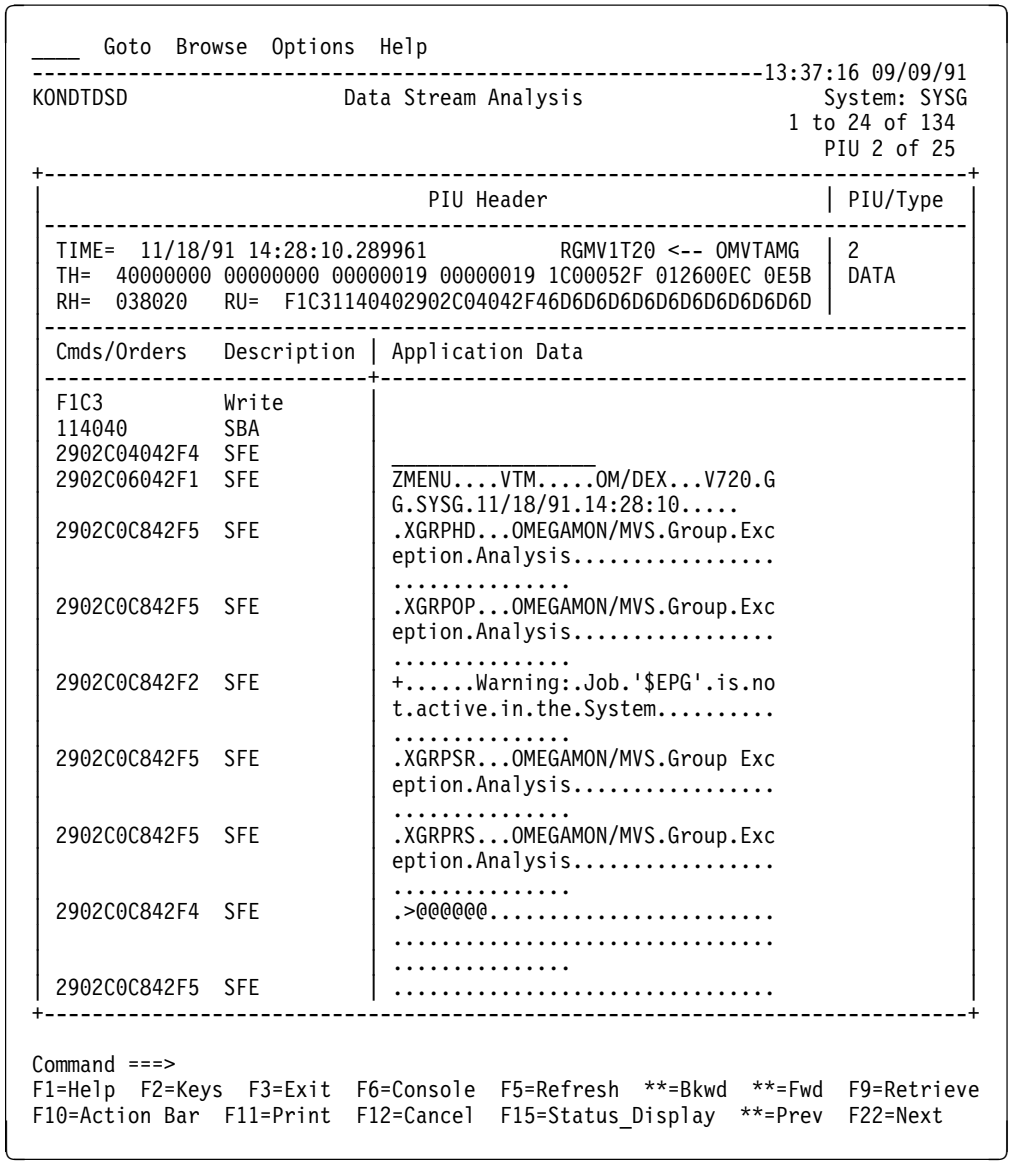


Figure 100. Data Stream Analysis Panel

This panel is a detailed analysis of the RU data in 3270 datastream format. There is field-level help for the 3270 data elements. The top portion of the panel is the PIU header which is the same as that displayed on the Display Trace Entries panel.

The bottom portion of the panel presents the RU data which may consist of Function Management data, SNA commands, or orders. The column headings for the RU display depend on the type of PIU as follows:

- When PIU type is an actual SNA command, the column headings are:

  cccccccc RU Where cccccccc is one of the following, depending on the setting in the RH:

  - Function Management Data
  - Session Control
  - Data Flow Control
  - Network Control

  Offset Offset into the displayable hexadecimal data.

  Hex Data RU data in hexadecimal format.

- When PIU type is DATA the column headings are:

  Cmds/Orders Hexadecimal commands and orders which structure and define the data.

  Description Description of the commands and orders in the data.

  Application Data 3270 or APPC application data.

There is field-level help for each of the command elements displayed except for write-structured commands. Position the cursor on a command and press F1 for Help.

This panel also provides double scrolling. You can scroll through the PIUs for the current trace with F21 (Prev) and F22 (Next) and through the data stream for the current PIU with F7 (Bkwd) and F8 (Fwd).

You navigate to the other trace analysis panels by using the Goto pulldown or by returning to the Display Trace Entries panel with F3 and then entering an action code.

Printing a Trace

Use action code **N** to print a trace report. The Print VTAM Trace Report pop-up appears.

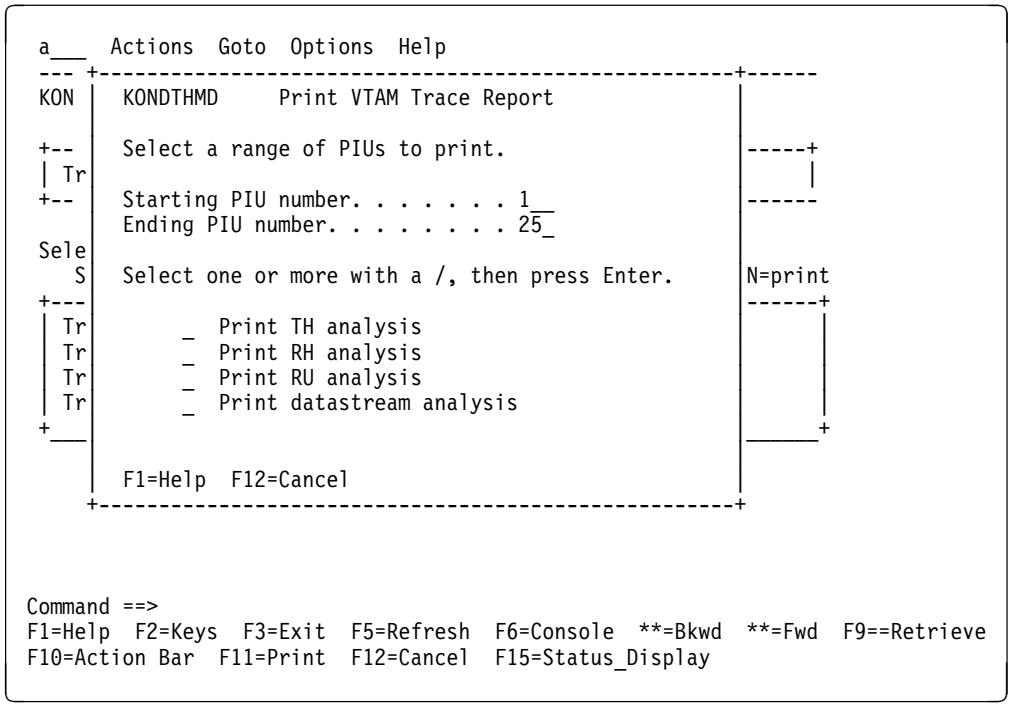


Figure 101. Print Trace Report Pop-up Panel

Use this pop-up to print hardcopy of a trace that has been stopped, ended, or saved. Once you have entered which PIUs and which analyses to print, a SYSOUT dataset is allocated. The trace report appears on SYSOUT under the started task or jobname of the OMEGAMON II address space. The resulting trace report is fully formatted.

Complete the Print VTAM Trace Report pop-up as follows:

- Range of PIU sequence numbers to print. You are prompted with the full range of PIUs in the trace. You can modify these sequence numbers to limit the report to the PIUs of interest.
- Types of analyses to print (TH, RH, RU, and/or Data Stream). You can select any or all of the analyses to print.

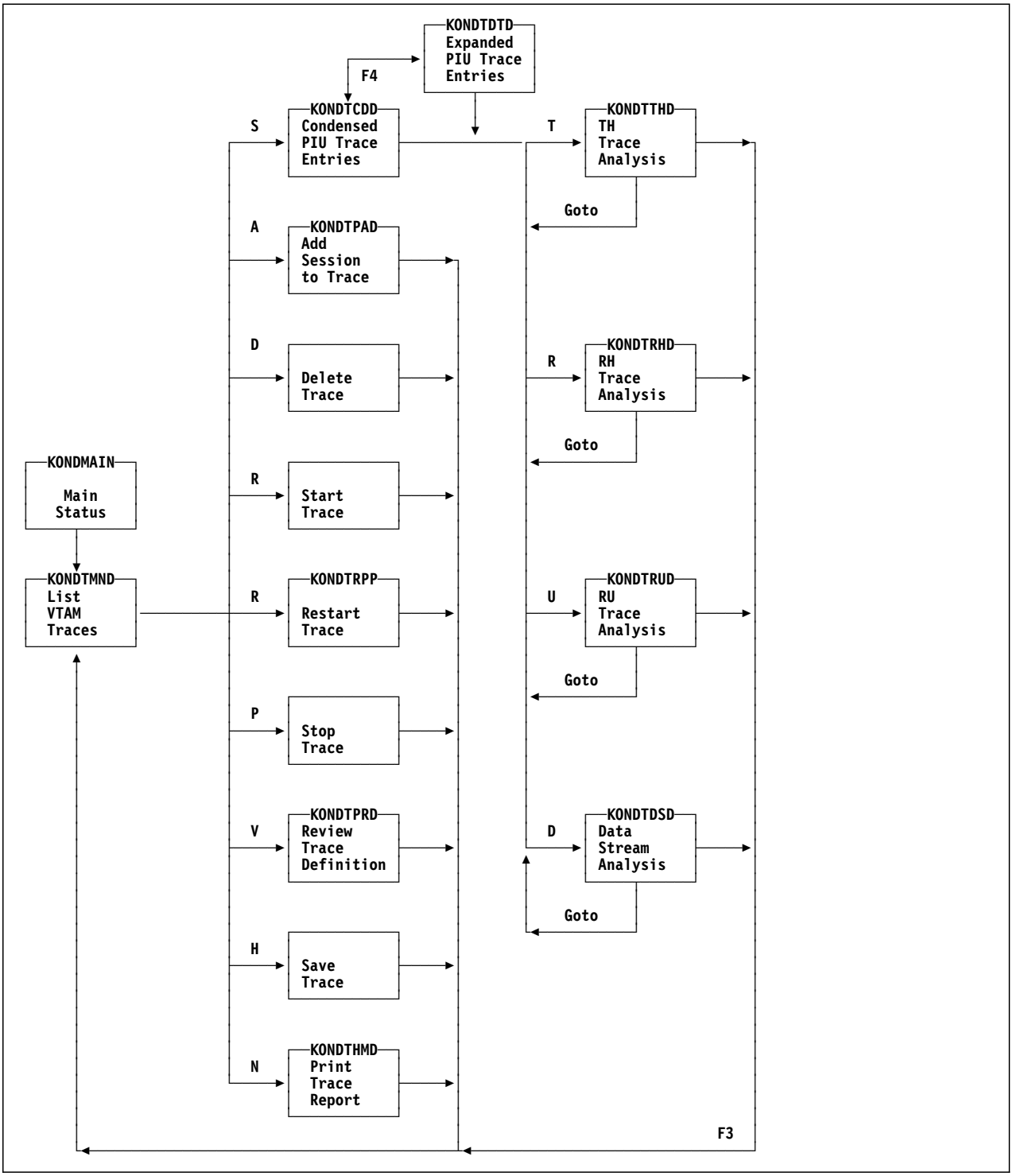
If you do not select one of the analyses, only the PIU headers are printed.

To specify trace print options such as SYSOUT, number of copies, and destination, select the Options pulldown and then select Printer Options.

Deleting a Trace

Use action code **D** to delete a trace. Trace results are immediately removed from the listing of traces and are no longer available for viewing. Once deleted, the trace results may not be recalled.

Trace Facility Component Navigation



Chapter 11. VTAM Environment

Chapter Contents

Overview

Although VTAM is a key component of the MVS operating system, it starts as a subsystem of MVS. Consequently, MVS treats VTAM as a program running in an address space, and subjects it to the same restrictions as other address spaces. In order to properly tune VTAM, it is important that you understand these restrictions.

This chapter provides procedures for using OMEGAMON II to examine VTAM and its environment. It explains the use of thresholds to control the status light displays and briefly describes each of the MVS resources monitored.

Tuning VTAM with OMEGAMON II

OMEGAMON II monitors and displays the data needed to tune VTAM. If the status light for VTAM Environment is green on the main status panel, VTAM is performing as expected with respect to the selected major MVS resources (CPU usage, PAGING rate, SIO rate, CSA allocation, and C24 allocation).

If the status light for VTAM Environment is yellow or red, a specified threshold has been exceeded. You can locate the source of the problem by entering **S** next to **VTAM Environment**. This will display a summary of VTAM performance data. From here you can also go to information about locks being held by VTAM processes.

The VTAM Environment analysis depends on thresholds set by your system administrator through the Monitoring Options selection on the Options pulldown. Refer to "VTAM Environment Options" on page 335 for information on setting and adjusting the environment thresholds.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

VTAM Environmental Summary

The VTAM Environmental Summary panel displays VTAM performance data with respect to the MVS operating system. To view this panel select **VTAM Environment** from the main status panel.

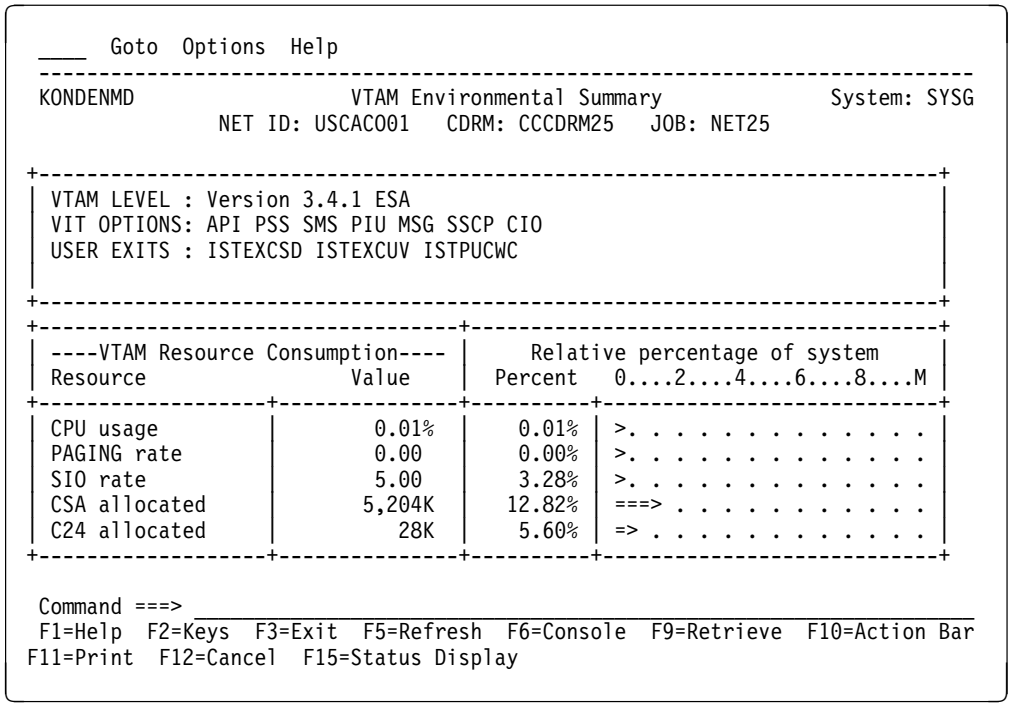


Figure 102. VTAM Environmental Summary Display

This panel summarizes the network environment, trace options, user exits, and resource consumption.

You can access the panels shown in the rest of this chapter through selections on the Goto pulldown.

- Network environment is summarized in the following fields at the top:

  NET ID Network identification number.
  CDRM Cross Domain Resource Manager (CDRM) name.
  JOB VTAM job name.

  For more information, select **Environment** from the Goto pulldown. The panel shown in Figure 103 on page 241 displays.

- Current VTAM Internal Trace (VIT) options are summarized in the **VIT OPTIONS** field. For more information, select **Trace statistics** or **VIT trace data** from the Goto pulldown. The panel shown in Figure 109 on page 250 or Figure 110 on page 252 displays.

- Currently installed global VTAM exits are summarized in the **USER EXITS** field. For more information, select **User exits** from the Goto pulldown. The panel shown in Figure 111 on page 253 displays.
- VTAM's performance for some of the major MVS resources.

  CPU usage Sum of VTAM Task Control Block (TCB) and Service Request Block (SRB) time. For more information, select **CPU Utilization** from the Goto pulldown. The panel shown in Figure 108 on page 249 displays.

  PAGING rate The sum of all VTAM private area, common area, and link pack area pageins. For more information, select **Paging Rates** from the Goto pulldown. The panel shown in Figure 105 on page 245 displays.

  SIO rate The sum of I/Os per second to:

  – Network Control Program (NCP) controllers
  – Channel-to-channel (CTC) adapters
  – Local SNA controllers
  – Local non-SNA controllers
  – DASD devices
  – Other devices

  For more information, select **IO Distribution** and **IO Rates** from the Goto pulldown. The panels shown in Figure 106 on page 247 and Figure 107 on page 248 display.

  CSA allocated The number of bytes of Common System Area (CSA) storage, above and below the 16-megabyte line, that are used by VTAM. For more information, select **CSA Utilization** from the Goto pulldown. The panel shown in Figure 104 on page 243 displays.

  C24 allocated The number of bytes of CSA storage below the 16-megabyte line that are used by VTAM. For more information, select **CSA Utilization** from the Goto pulldown. The panel shown in Figure 104 on page 243 displays.

  If you have administrator authority, you can set exception thresholds for the above resources. To view the current thresholds, select the Options pulldown from any OMEGAMON II panel and select **Monitoring Options**. Then, select **VTAM Environment**. For more information on setting exception thresholds, see “Monitoring Options” on page 323.
- Analysis of VTAM's Symbol Resolution Table (SRT), and percent of the SRT being used for each chain length. For more information, select **SRT**

Analysis or **SRT Distribution** from the Goto pulldown. The panels shown in Figure 112 on page 256 or Figure 114 on page 258 display.

Environmental Data

When you select **Environment** from the Goto pulldown, the VTAM Environmental Data displays host-specific information about VTAM as shown below.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDENED                    VTAM Environmental Data

 +-----------------------------------+---------------------------------------+
 |  CDRM Manager. . . . : CCCDRM35   | Address space name. . : NET35         |
 |  Network name. . . . : USCACO01   | Address space number. : 73(49)        |
 |  VTAM release le . . : VE42       | ASCB address. . . . . : 00FB8D00      |
 |  MVS release level . : SP5.1.0    |                                       |
 +-----------------------------------+---------------------------------------+
 |  VTAM start options. : ATCSTR35   | Node type . . . . . . : SUBAREA       |
 |  VTAM config list. . : ATCCON35   | SSCP subarea number . : 35            |
 |                                   | SSCP element address. : 1             |
 +-----------------------------------+---------------------------------------+









Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 103. VTAM Environmental Data

This panel includes:

- Names and release levels that identify this VTAM to other VTAMs in the network:

  CDRM Manager — Cross Domain Resource Manager name specified in VTAMLST(ATCSTR*cc*). The parameter is SSCPNAME.

  Network name — Specified in VTAMLST (ATCSTR*cc*). The parameter is NETID.

  VTAM release level — For example, VE42 specifies VTAM Version 4 Release 2.

MVS release level	For example, SP5.1.0 specifies MVS/ESA Release 5.1.
VTAM start options	Name of the VTAM startup parameter list used to initialize VTAM (ATCSTR*cc*).
VTAM config list	Name of the VTAM configuration parameter list used to initialize VTAM (ATCCON*cc*).

- Debugging aids that show where VTAM resides within MVS:
  - Name of the VTAM address space.
  - Address space number (ASID) of the VTAM address space.
  - Address Space Control Block (ASCB) address.
- Debugging aids that show how VTAM is identified within the network. You can determine the network address of VTAM by looking at:
  - VTAM (SSCP) subarea number.
  - VTAM (SSCP) element or network address.
  - Node type which may be:
    - Network
    - End
    - Interchange
    - Migration
    - Subarea

    If it is a network or end node, subarea number and element address are *****NA***** because they do not apply.

CSA Performance

VTAM uses the Common Storage Area (CSA) for many of its control blocks and all of its buffer pools. Most of the storage is above the 16-megabyte line. When you select **CSA Utilization** from the Goto pulldown, you see a summary of CSA performance information.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDENCD                     VTAM CSA Performance

+--------------------------------------------------------------------------+
| CSA Performance Summary            |    Relative percentage of maximum   |
|------------------------------------|  Percent   0....2....4....6....8....M |
| CSA Limit. . . . . :    NO LIMIT   |-------------------------------------|
| MAX CSA used . . . :   2,940,628   |    8.05% | ==>. . . . . .           |
| CSA allocated. . . :   2,964,256   |    8.12% | ==>. . . . . .           |
| CSA highwater. . . :   3,019,185   |    8.27% | ==>. . . . . .           |
+--------------------------------------------------------------------------+
+--------------------------------------------------------------------------+
| C24 Performance Summary            |    Relative percentage of maximum   |
|------------------------------------|  Percent   0....2....4....6....8....M |
| C24 Limit. . . . . :     512,000   |-------------------------------------|
| MAX C24 used . . . :      38,802   |    7.57% | => . . . . . .           |
| C24 allocated. . . :      29,582   |    5.77% | => . . . . . .           |
| C24 highwater. . . :      34,858   |    6.80% | => . . . . . .           |
+--------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 104. VTAM CSA Performance

The CSA Performance panel summarizes two important features:

1. The top box summarizes the total Common Storage Area (CSA) usage.
2. The bottom box illustrates the C24 (below the line) performance.

The CSA Performance panel, as in the previous figure, includes:

CSA and C24 limits

Parameters CSALIMIT and CSA24 are specified in VTAMLST (ATCSTR*cc*). To compute the CSA upper boundary, VTAM uses the lesser of CSALIMIT or the available system CSA. If either CSALIMIT or CSA24 is set to zero, a **NO LIMIT** condition exists for that storage area and VTAM uses as much storage as necessary. The bar graphs represent the percentage of storage used with respect to what VTAM can allocate. The maximum storage is calculated only when you issue a D NET,BFRUSE VTAM command (releases prior to 4.3), or since the last recording

interval (VTAM 4.3). You can issue the BFRUSE command in several ways:

- Press F6 (Console) to go to the VTAM console and enter the command.
- Enter the command from an MVS master console.
- Use an automated operator tool to automatically issue the command at timed intervals.

Maximum CSA and C24 Used prior to the last D NET,BFRUSE (releases prior to VTAM 4.3) or since the last recording interval (VTAM 4.3). **MAX CSA used** and **MAX C24 used** both reflect the maximum storage VTAM had at any one time *before* the last D NET,BFRUSE command was issued or since the last recording interval. Prior to the first execution of the BFRUSE command, the field is zero.

CSA and C24 allocated Amounts currently in use.

Highwater CSA and C24 Maximum used since the last D NET,BFRUSE was issued (releases prior to VTAM 4.3) or since the last recording interval (VTAM 4.3).

CSA highwater and **C24 highwater** both reflect the maximum storage VTAM had at any one time *since* the last D NET,BFRUSE command was issued or since the last recording interval.

VTAM compares maximum and highwater, and if the highwater value is higher, replaces the maximum value with the highwater value. Then, VTAM replaces the highwater value with the allocated value.

Paging Performance

When you select **Paging Rates** from the Goto pulldown, you see paging-related information for the VTAM address space.

```
____  Goto  Options  Help
--------------------------------------------------------------------------
KONDENPD                   VTAM Paging Performance

        +-------------------------------------------------------------+
        |  Sample Interval:             0.08 seconds                  |
        +-------------------------------------------------------------+
        +-------------------------------------------------------------+
        |  Target working set size. . . . . . . . . . |       2,400K  |
        |  Current working set size . . . . . . . . . |       2,968K  |
        |  Current central frames in use. . . . . . . |         738   |
        |  Current expanded frames in use . . . . . . |           4   |
        |  Private area page-ins. . . . . . . . . . . |           0   |
        |  Common area page-ins (CSA) . . . . . . . . |           0   |
        |  Link pack area page-ins (LPA). . . . . . . |           0   |
        |  Total VTAM page-ins. . . . . . . . . . . . |           0   |
        +-------------------------------------------------------------+
        +-------------------------------------------------------------+
        |  Current VTAM paging rate (pages/second):            0.00   |
        +-------------------------------------------------------------+



Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 105. VTAM Paging Performance

This panel includes:

- Working set sizes:

  Target Number of bytes that the System Resources Manager (SRM) attempts to keep in real storage for VTAM. This number is specified in the PARMLIB dataset, in member IEAIPS*xx*. The parameter name is PWSS. (PWSS values are expressed as minimum and maximum page frames, not bytes.) The target working set size ensures that VTAM has enough real storage to perform well. If this value is too small, VTAM may page excessively. If it is too big, real storage may be wasted.

  Current Actual amount of real storage used by VTAM. It may be above or below the target working set size.

Note: Working set size refers to VTAM's private area storage only. It does not have CSA storage figured in. To get a better value of VTAM's total working set size, use buffer pool analysis and add together the:

- working set sizes
- fixed buffer pool sizes
- fixed buffer pool extent sizes

Do not add in the pageable pools. The result will be approximately equal to the total working set size.

- Frames in use:

  Current 4K blocks of real storage currently in use by VTAM.

  Current extended
  4K blocks of real storage currently in use by VTAM that have an address greater than 16 Mb. 31-bit addressing must be used to access these frames.

- Area page-ins. The number of page-in operations that occurred during the sample time at the top of the panel. This is broken down by major sections of VTAM's storage map.

Private	Private area of MVS.
Common	Common area of MVS.
Link pack area (LPA)	MVS area where common modules are stored.
Total VTAM	Total of common and private page-ins.

I/O Distribution

When you select **IO Distribution** from the Goto pulldown, you see information on I/O for the VTAM address space.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDENDD                    VTAM I/O Distribution

  +-------------------------------------------------------------------------+
  | Sample Interval:              1.02 seconds                              |
  +-------------------------------------------------------------------------+
  +-------------------------------------------------------------------------+
  |--------- Start IO Rate --------|    Relative frequency distribution     |
  | Device               SIOs/Sec  |  Percent   0....2....4....6....8....M  |
  |--------------------------------+----------------------------------------|
  | DASD . . . . . :         0.00  |    0.00% | >. . . . . . . . . . . . . |
  | NCP. . . . . . :         4.90  |   16.66% | ====>. . . . . . . . . . . |
  | CTC. . . . . . :        22.54  |   76.66% | ==================> . . . |
  | Local SNA. . . :         0.00  |    0.00% | >. . . . . . . . . . . . . |
  | Local Non-SNA. :         1.96  |    6.66% | => . . . . . . . . . . . . |
  | Other. . . . . :         0.00  |    0.00% | >. . . . . . . . . . . . . |
  |--------------------------------+----------+----------------------------|
  | Total. . . . . :        29.41  |  100.00% |
  +----------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 106. VTAM I/O Distribution

For each device class, this panel includes:

- number of start I/Os per second
- relative percentage of activity for that class
- where data is flowing from VTAM

This panel shows which components currently comprise VTAM's workload. From this breakdown, you can determine where tuning efforts might best be focused.

I/O Rates

When you select **IO Rates** from the Goto pulldown, you see I/O rates for the VTAM address space.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDENRD                        VTAM I/O Rates

 +-------------------------------------------------------------------------------+
 |  Sample Interval:              1.05 seconds                                   |
 +-------------------------------------------------------------------------------+
 +-------------------------------------------------------------------------------+
 |-------- Device Types -------|   Total SIO   |  Delta SIO    |   SIO Rate    |
 |  Device              Count  |     Count     |    Count      |  per second   |
 |-----------------------------+---------------+---------------+---------------|
 |  DASD . . . . . :        0  |          973  |            0  |        0.00   |
 |  NCP. . . . . . :        1  |       39,920  |            3  |        2.85   |
 |  CTC. . . . . . :       11  |      244,564  |          160  |      152.38   |
 |  Local SNA. . . :        0  |            0  |            0  |        0.00   |
 |  Local Non-SNA. :       27  |       32,301  |            0  |        0.00   |
 |  Other. . . . . :        0  |            0  |            0  |        0.00   |
 |-----------------------------+---------------+---------------+---------------|
 |  Total. . . . . :       39  |      317,758  |          163  |      155.23   |
 +-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 107. VTAM I/O Rates

For each device class, this panel includes:

Device List of the device types.

Count How many of each device type. This reflects the number of allocated NCBs and is always zero for DASD.

Total SIO Count Number of start I/O instructions per device type.

Delta SIO Count Number of start I/O instructions performed since the last Enter (the sampling interval displayed at the top of the panel).

SIO Rate per second Delta SIO count divided by the number of seconds.

CPU Utilization

When you select **CPU Utilization** from the Goto pulldown, you see VTAM's use of the CPU.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDENHD                    VTAM CPU Utilization

  +-----------------------------------------------------------------------+
  | Sample Interval:              0.02 seconds                            |
  +-----------------------------------------------------------------------+
  +-----------------------------------------------------------------------+
  |---- TCB and SRB Utilization ---|         Relative Distribution        |
  | Mode                     Time  |  Percent   0....2....4....6....8....M |
  |--------------------------------+--------------------------------------|
  | TCB mode . . . . :   0.000374  |   27.93% | =======> . . . . . . . . . |
  | SRB mode . . . . :   0.000965  |   72.07% | ==================>. . . . |
  | Total task . . . :   0.001339  |  100.00% |                            |
  +-----------------------------------------------------------------------+
  +-----------------------------------------------------------------------+
  | Current VTAM CPU usage . . . . |    2.43% | >. . . . . . . . . . . . . |
  | Current CPU busy . . . . . . . |  100.00% | ========================> |
  +-----------------------------------------------------------------------+



Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 108. VTAM CPU Utilization

This panel includes:

- percentage of time that VTAM was in Task Control Block (TCB) mode
- percentage of time that VTAM was in Service Request Block (SRB) mode
- current VTAM CPU usage
- current CPU busy

You can use this panel to determine if CPU cycles are available to VTAM and to assess VTAM's relative consumption of the CPU resource.

Internal Trace Statistics

VTAM internal trace is a VTAM provided debugging facility that traces the flow of data into and out of VTAM. It can be started by VTAM initialization parameters or from a VTAM console. VTAM internal trace statistics describe VTAM internal traces, but not the traces started through the OMEGAMON II trace facility.

When you select **Trace Statistics** from the Goto pulldown, you see information on VTAM's internal trace statistics.

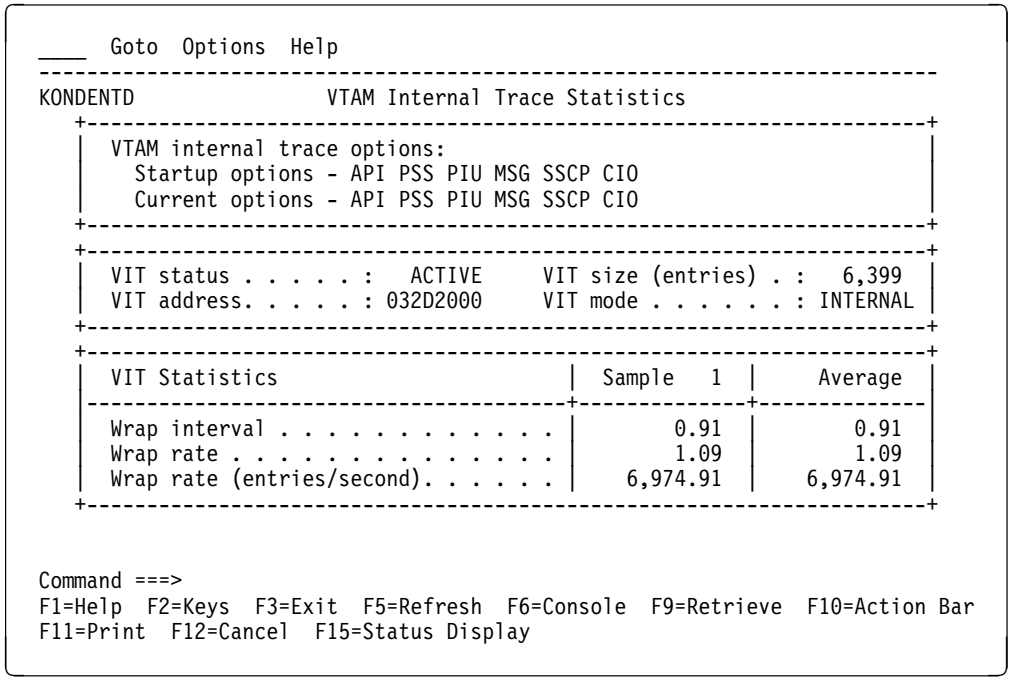


Figure 109. VTAM Internal Trace Statistics

If tracing is active, the trace options currently in use are displayed. If the trace is inactive and you want to start it, press F6 to go to the VTAM console.

Note: When using OMEGAMON II's response time feature, the VTAM internal trace must be active and PIU must be one of the trace options.

The trace information in the previous figure includes:

- Lists of the internal trace options that are enabled:
  - Startup
  - Current
- A list of VIT characteristics:
  - Status
  - Address
  - Size (entries)
  - Mode
    - if INTERNAL, data is accumulated to a trace table
    - if EXTERNAL, data is written to GTF
    - otherwise, INACTIVE
- VIT statistics:

Wrap interval	Elapsed time between the two most recent VIT table wraps.
Wrap rate	How fast the table wraps around, that is, the proportion of the VIT table filled per second.
Wrap rate in entries per second	Current rate at which VIT trace entries are added to the VIT table, normalized per second.

Internal Trace Data

When you select **VIT Trace Data** from the Goto pulldown, you see VTAM internal trace data.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDENVD               VTAM Internal Trace Data                1 to 13 of 20

+-------------------------------------------------------------------------------+
|  Address | Type ----- VIT trace entry in hexadecimal (bytes 2 thru 31) -----  |
|----------+--------------------------------------------------------------------|
| 032EB080 | QUE  C5002A084800031F95200332FE3880DB467002CC9D58E3E2D6D903344560 |
| 032EB0A0 | DISP E2D72A000800031F95200332FE3802CC9D5802CC9D58E3E2D6D903344560 |
| 032EB0C0 | QUE  C5992A00400002E88EF802E38578821D841003354A38E3E2E2D903344560 |
| 032EB0E0 | EXIT C9E32A000028031F95200332FE38821C7B1E80000000E3E2D6D903344560 |
| 032EB100 | RE   22222A000000039ABC08005E9F02037F51C80000003020001DD00000000 |
| 032EB120 | DISP E2D76799000002E88EF802E3857803354A3803354A38E3E2E2D903344560 |
| 032EB140 | PIU  E44067994000033 54A3840000000000000000000001000000011C000D43 |
| 032EB160 | PIU2 E4F205C300CC00060390207C40C10000000000000000000000000000000000 |
| 032EB180 | QUE  C5996700480002E296380333F560821CA2CE03354A38E3E2C9D903344560 |
| 032EB1A0 | EXIT C9E36700002802E88EF802E38578821CA33080000000E3E2E2D903344560 |
| 032EB1C0 | DISP E2D76799000002E296380333F56003354A3803354A38E3E2C9D903344560 |
| 032EB1E0 | EXIT C9E36700001002E296380333F560821C6C2C80000000E3E2C9D903344560 |
| 032EB200 | RE   2302670000000 38423C00002109203945FD80000003020001DC00000000 |
 -------------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 110. VTAM Internal Trace Data

For the 20 most recent trace entries, this panel includes:

- address of the trace data
- type of trace entry
- bytes 2 through 31 of the trace entry

If the trace is inactive and you want it started, select **VTAM console** from the Goto pulldown and start it.

Note: This display shows updated information on a refresh when information in the VTAM internal trace header control block changes. On a lightly loaded system, or one with a large trace table, the trace table may not have wrapped since Enter or F5 was pressed. In those cases, the information displayed is not updated.

User Exits

When you select **User Exits** from the Goto pulldown, you see VTAM user exit information. These exits are global in nature (one per VTAM). However ISTEXCPM, the Performance Monitor Interface (PMI), is a new exit in VTAM 4.3 that can have more than one instance.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------19:53:45 03/03/93
 KONDENUD                       VTAM User Exits                   System: SYSG

+-------------------------------------------------------------------------------+
| SME user data area (ISTUDATA) address: 00000000                               |
+-------------------------------------------------------------------------------+
| SME Functions: No Session Management functions are currently enabled          |
+-------------------------------------------------------------------------------+
                                                                 Lines 1 to 9 of 9
+----------+----------+----------+--------------+----------+---------+--------+
|   Name   |  Module  |  Level   | Description  | Address  |  Type   | Status |
+----------+----------+----------+--------------+----------+---------+--------+
| ISTAUCAG |          | ***NA*** | Session Acct | 00000000 | STATIC  | INACT  |
| ISTAUCAT |          | ***NA*** | Session Auth | 00000000 | STATIC  | INACT  |
| ISTCMMND |          | ***NA*** | Cmd Verify   | 00000000 | DYNAMIC | INACT  |
| ISTEXCAA |          | ***NA*** | Session Mgmt | 00000000 | DYNAMIC | INACT  |
| ISTEXCCS |          | ***NA*** | Config Serv  | 00000000 | DYNAMIC | INACT  |
| ISTEXCDM |          | ***NA*** | Dir Srv Mgmt | 00000000 | DYNAMIC | INACT  |
| ISTEXCPM |          | ***NA*** | PMI          | 00000000 | DYNAMIC | INACT  |
| ISTEXCPM | KONAMV00 | 00000500 | PMI          | 80B303D0 | DYNAMIC | ACTIVE |
| ISTEXCSD | ISTEXCSD | ***NA*** | SDDLU        | 8583A0A0 | DYNAMIC | ACTIVE |
| ISTEXCUV | ISTEXCUV | ***NA*** | USERVAR      | 86265808 | DYNAMIC | ACTIVE |
| ISTEXCVR |          | ***NA*** | VR Selection | 00000000 | DYNAMIC | INACT  |
| ISTPUCWC |          | ***NA*** | VR Window Sz | 85D462D8 | STATIC  | ACTIVE |
+----------+----------+----------+--------------+----------+---------+--------+

 Command ===> ____________________________________________________________
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 111. VTAM User Exits (VTAM 4.3)

The number of exits displayed varies depending on the version of VTAM you are monitoring. For each exit, this panel includes the following fields:

Name Eight-character name.

Module Module name or exit instance. Beginning with VTAM 4.3, multiple instances of some exits can be active at the same time.

Level Internal exit version or level identifier. *****NA***** means exit level is not coded in the exit.

Description Brief description of the exit.

Address Starting address. (All zeros indicates that no exit has been defined.)

Type Possible values are

- **STATIC** Exit cannot be modified while VTAM is active.
- **DYNAMIC** Exit can be modified by issuing a MODIFY EXIT command from a VTAM operator console.

Status Possible values are

- **ACTIVE** Currently in effect.
- **PEND01** Pending (VTAM 3.4.0 only).
- **PEND02** Pending an inactive state (VTAM 3.4.1 and above).
- **PEND03** Pending an inactive replace state (VTAM 3.4.1 and above).
- **PEND04** Pending an active replace state (VTAM 3.4.1 and above).
- **PEND05** Pending an active state (VTAM 3.4.1 and above).
- **INACT** Inactive.

If the exit is not active, no exit name appears on the VTAM Environmental Summary display. This display also indicates the functions that are enabled for the session management exit.

The ISTPUCWC load module is distributed by IBM in VTAMLIB. Therefore, you always see this module displayed whenever you install a new version of VTAM.

For help on a particular exit, position the cursor on the row describing the exit and press F1 (Help).

SRT Information and Modeling Facility

OMEGAMON II can display information about VTAM's Symbol Resolution Table (SRT). VTAM uses the SRT to translate symbolic node names into addresses. VTAM creates the table during initialization and updates it as new resources are added to the network.

OMEGAMON II monitors the SRT directory, which contains pointers to chains of network resource addresses. Each chain anchor occupies a slot in the SRT. SRT chain sizes range from zero, if a table slot contains no chain, to any positive integer, where the integer represents the number of network addresses on the chain.

In terms of network performance, short chain lengths are desirable. Shorter chain lengths generally result from a wider distribution of SRT slots in the SRT table.

The SRT size is set by a hashing algorithm that uses the value of the RACHSRT parameter at VTAM startup. The default value is 1499. However, you may be able to fine tune network performance by changing the value of RACHSRT. If your network SRT chain lengths are long, you can model proposed SRT values and verify the impact on the existing network load.

In developing a new RACHSRT parameter, be aware that the SRT distribution may change, particularly if large network components (such as NCPs) are activated and deactivated over the course of a day. This is because the SRT distribution is sensitive to the network naming conventions used. Thus, new proposed RACHSRT values should be modeled under all major network configurations in order to assure the anticipated result.

In tuning the SRT, the primary criteria is generally a reduction in the average chain length across all major network configurations. Although the chaining efficiency algorithm takes into consideration any wasted storage that may accrue from a large RACHSRT value, this waste is usually of lesser concern since the storage is allocated *over the line* in VTAM's private region.

In VTAM V4.1 and above, the RACHSRT parameter can be overridden with a startup option (ACTSTRcc) or with a MODIFY VTAMOPTS command while VTAM is running. See “Resetting VTAM Constants Specifications” on page 271.

To access the SRT modeling facility, select **SRT Analysis** from the Goto pulldown on the VTAM Environmental Summary display.

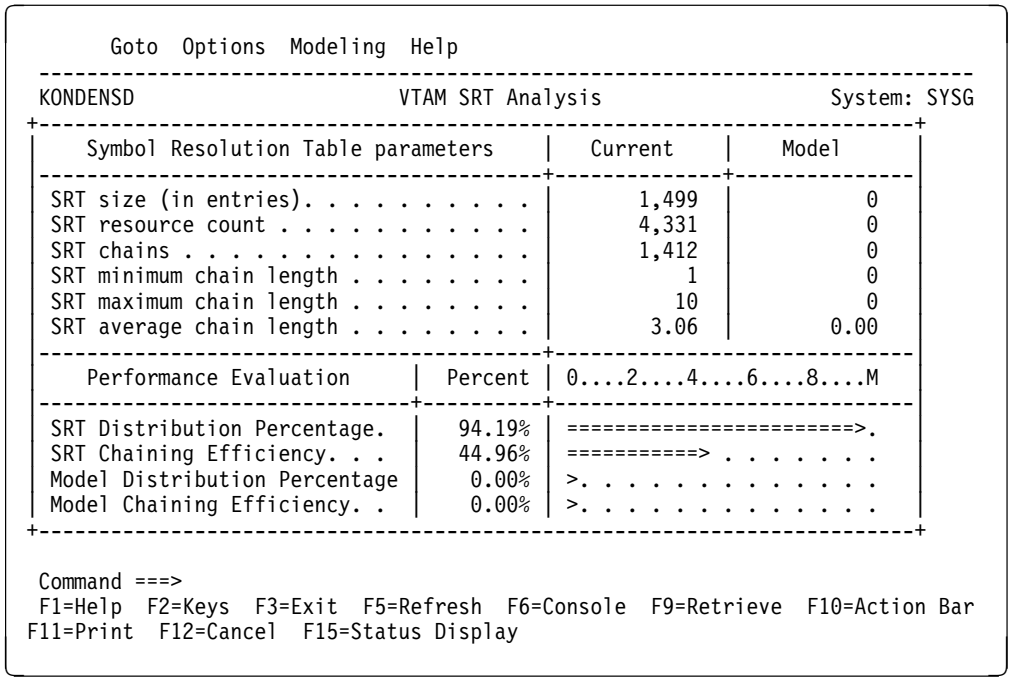


Figure 112. Symbol Resolution Table (SRT) Analysis Panel

This panel displays the current SRT parameters and the model parameters. However, until you enter a value for RACHSRT, the model fields contain zeros.

To change the value of RACHSRT, select the Modeling pulldown.

```
+-----------------------------------------+
|  KONDENM                                |
|            SRT Modeling                 |
|                                         |
|  Enter the proposed value for the RACHSRT
|  parameter.  Generally a prime number is
|  recommended in order to improve the SRT
|  frequency distribution and reduce average
|  SRT chain lengths.                     |
|                                         |
|  Current RACHSRT parameter is 1499      |
|                                         |
|  Next lower  prime number is  1493      |
|  Next higher prime number is  1511      |
|                                         |
|  New RACHSRT parameter . . .  0___      |
|                                         |
|  F1=Help  F2=Primes  F12=Cancel         |
+-----------------------------------------+
```

Enter a new value for RACHSRT, which should be a prime number (press F2 to view the preceding and subsequent prime numbers).

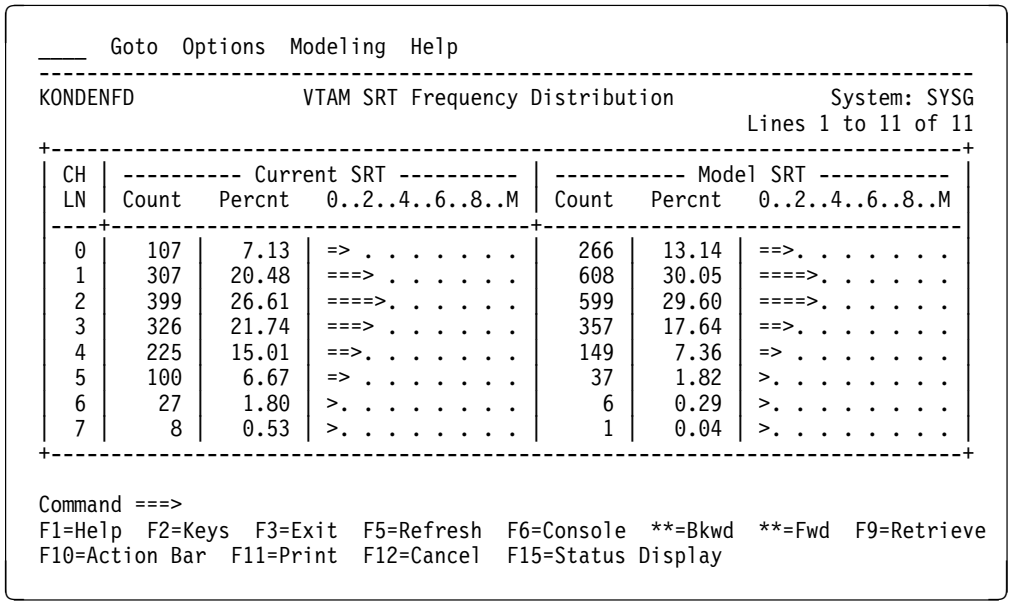
When you press Enter, you can compare the effects of the model SRT values with the current SRT values as shown below. The modeling facility in no way affects the existing SRT table.

```
      Goto  Options  Modeling  Help
 ------------------------------------------------------------------------------
 KONDENSD                      VTAM SRT Analysis
+-----------------------------------------------------------------------------+
|    Symbol Resolution Table parameters    |   Current    |    Model      |
|------------------------------------------+--------------+---------------|
| SRT size (in entries). . . . . . . . . . |       1,499  |       2,023   |
| SRT resource count . . . . . . . . . . . |       3,704  |       3,704   |
| SRT chains . . . . . . . . . . . . . . . |       1,392  |       1,757   |
| SRT minimum chain length . . . . . . . . |          1   |          1    |
| SRT maximum chain length . . . . . . . . |          7   |          7    |
| SRT average chain length . . . . . . . . |       2.66   |       2.10    |
|------------------------------------------+------------------------------|
|    Performance Evaluation     |  Percent | 0....2....4....6....8....M   |
|-------------------------------+----------+------------------------------|
| SRT Distribution Percentage.  |   92.86% | ========================>.   |
| SRT Chaining Efficiency. . .  |   48.64% | ============>. . . . . . .   |
| Model Distribution Percentage |   86.85% | ======================>. .   |
| Model Chaining Efficiency. .  |   55.45% | ==============>. . . . . .   |
+-----------------------------------------------------------------------------+

 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status Display
```

Figure 113. VTAM SRT Analysis Panel with Model Values

SRT Frequency Distribution

You can obtain current and model frequency distribution data on SRT chain lengths (ranging from 0–25 or greater) as shown below. Select **SRT Distribution** from the Goto pulldown.



```
____  Goto  Options  Modeling  Help
--------------------------------------------------------------------------------
KONDENFD              VTAM SRT Frequency Distribution             System: SYSG
                                                                Lines 1 to 11 of 11
+-------------------------------------------------------------------------------+
| CH | ---------- Current SRT ---------- | ----------- Model SRT ----------- |
| LN | Count   Percnt   0..2..4..6..8..M | Count   Percnt   0..2..4..6..8..M |
|----+-----------------------------------+-----------------------------------|
|  0 |   107 |   7.13 | => . . . . . . . |   266 |  13.14 | ==>. . . . . . . |
|  1 |   307 |  20.48 | ===> . . . . . . |   608 |  30.05 | ====>. . . . . . |
|  2 |   399 |  26.61 | ====>. . . . . . |   599 |  29.60 | ====>. . . . . . |
|  3 |   326 |  21.74 | ===> . . . . . . |   357 |  17.64 | ==>. . . . . . . |
|  4 |   225 |  15.01 | ==>. . . . . . . |   149 |   7.36 | => . . . . . . . |
|  5 |   100 |   6.67 | => . . . . . . . |    37 |   1.82 | >. . . . . . . . |
|  6 |    27 |   1.80 | >. . . . . . . . |     6 |   0.29 | >. . . . . . . . |
|  7 |     8 |   0.53 | >. . . . . . . . |     1 |   0.04 | >. . . . . . . . |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 114. SRT Frequency Distribution Panel

Lock Analysis

The VTAM lock analysis feature provides important information about locks currently held by various VTAM processes. It also identifies owners of the locks and the processes waiting for the locks.

When a problem in the VTAM network occurs, the lock analysis feature will help by identifying VTAM processes holding a lock and any processes waiting for locks.

For each acquired lock, you can display

- the lock name, level, and type (exclusive or shared)
- the control block containing the lockword itself
- the control block containing the Process Anchor Block (PAB) that holds a lock
- the name of the address space associated with the PAB
- all processes waiting for a particular lock

For each process waiting for a lock, you can display

- the summary of a lock being waited for
- the control block containing the lockword itself
- the control block containing the PAB waiting for a lock
- the name of the address space associated with the PAB
- storage at the resume address in the waiting VTAM module

To access the lock analysis feature, select **`Lock Analysis`** from the Goto pulldown on the VTAM Environmental Summary display.

Note: The lock analysis panels are display only. No data will be modified as a result of using this feature.

Currently Acquired VTAM Locks Panel

When you select **Lock Analysis** from the Goto pulldown on the VTAM Environmental Summary panel, a panel displays information about the VTAM locks that are currently held.

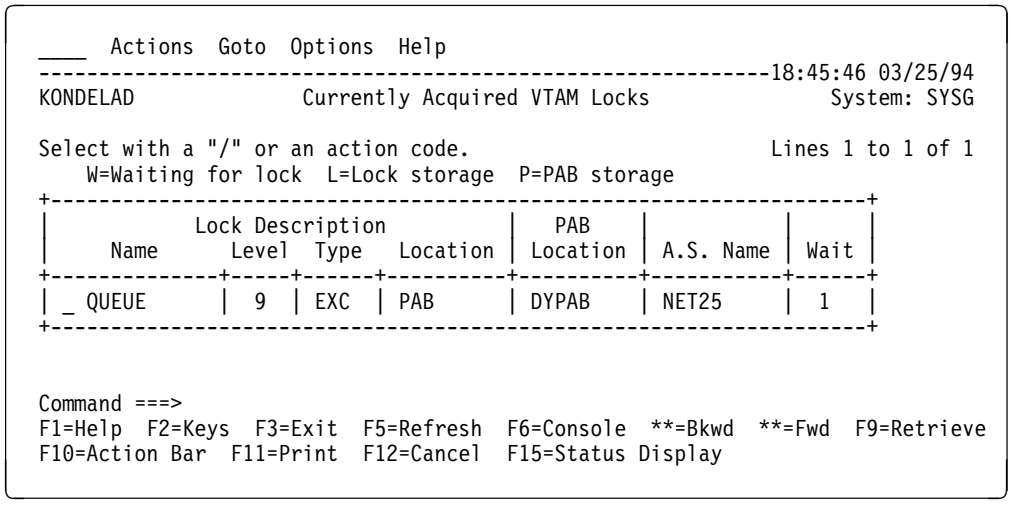


Figure 115. Currently Acquired VTAM Locks

For each acquired lock, this panel includes:

Lock Name The lock name as defined in the IBM *VTAM Diagnosis* manual. If the lock name is not identifiable, this field contains **UNKNOWN**.

Lock Level Each lock in VTAM has a level associated with it. This means that a process already holding a lock can only request a higher- level lock.

The level hierarchy prevents a deadlock when two processes hold a lock, and each process requests a lock held by the other process. Possible values are 1 to 9.

Lock Type The type of lock. Each lock can be acquired either as shared (SHR) or exclusive (EXC). Any number of processes can hold a shared lock on a resource at the same time. If a lock is obtained as exclusive, no other process can obtain the lock on the resource until the exclusive lock holder releases it.

Lock Location The name of the VTAM control block containing the lockword. Each VTAM lock is always located inside a VTAM control block.

If the control block is not identifiable, this field contains the address of the lockword.

PAB Location The name of the VTAM control block containing the PAB. The PAB is always located inside another VTAM control block. Each lock is associated with a PAB. If the control block is not identifiable, this field contains the address of the PAB.

Address Space Name The name of an address space associated with the process that acquired the lock.

Wait The number of VTAM processes waiting for this particular lock.

To display more lock analysis data, use one of the following action codes.

W Displays the list of VTAM processes waiting for locks, described on page 262.

L Displays a dump of the control block containing the lockword, described on page 266.

P Displays the control block containing the PAB, described on page 264.

Waiting for Lock Panel

To display the list of VTAM processes waiting for locks, use action code **W** (Waiting for lock) on the Currently Acquired VTAM Locks panel (Figure 115 on page 260).

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------18:27:18 03/25/94
KONDELWD                 Waiting for QUEUE Lock                 System: SYSH

+-------------------------------------------------------------------------------+
|                              Lock Summary                                     |
|           QUEUE lock is held as an exclusive lock by 1 VTAM process.          |
|           Lockword address is 00AEB258.  The level of the lock is 9.          |
+-------------------------------------------------------------------------------+

Select with a "/" or an action code.                          Lines 1 to 1 of 1
    P=PAB Storage   R=Resume Address  L=Lock Storage
+-----------------------------------------------+
|     PAB Location      |            | Resume   |
|   Address      Name   | A.S. Name  | Address  |
+-----------------------+------------+----------+
|   00BAE230 | ATCVT    | CICSA      | 00D47A3E |
+-----------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 116. Waiting for a Lock

This panel includes the following information about the lock you selected on the Currently Acquired VTAM Locks panel (Figure 115 on page 260). (The data displayed in this panel is not refreshable.)

Lock Summary The lock summary displays the number of processes holding a lock, the lock name, type, address, and level that represent the lock being waited for.

PAB Address The address of the PAB.

PAB Name The name of the VTAM control block containing the PAB. The PAB is always located inside another VTAM control block. Each lock is associated with a PAB.

If the control block is not identifiable, this field contains **UNKNOWN**.

Address Space Name The name of an address space associated with the process that is waiting for the lock.

Resume Address The location that a VTAM routine resumes executing after the lock is acquired.

To display more lock analysis data, use one of the following action codes.

P Displays the control block containing the PAB, described on page 264.

R Results in a dump display of storage at the resume address, described on page 268.

L Displays a dump of the control block containing the lockword, described on page 266.

Dump Display of the PAB-containing Control Block

To display the control block containing the PAB, use the **P** (PAB storage) action code on the Currently Acquired VTAM Locks panel (Figure 115 on page 260) or the Waiting for a Lock panel (Figure 116 on page 262).

```
____  Goto  Options  Help
-------------------------------------------------------------18:46:30 03/25/94
KONDEL5D               Control Block DYPAB (Current)             System: SYSG
                       PAB is Located at Offset 0010

                                                                Lines 1 to 3 of 3
+-------------------------------------------------------------------------------+
|  Address | Offset |              Hex Data                |  Character Data  |
+----------+--------+--------------------------------------+------------------+
| 00AEB230 |  0000  | 11400000 00000000 07E3E030 00000000 | . .......T\..... |
| 00AEB240 |  0010  | 07E98C68 00000000 083E18C8 00000000 | .Z.........H.... |
| 00AEB250 |  0020  | 10321000 00000010                   | ........         |
+----------+--------+--------------------------------------+------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F4=PAB Snap  F5=Refresh  F6=Console  **=Bkwd  **=Fwd
F9=Retrieve  F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 117. Dump Display of the PAB-containing Control Block

The storage display is in dump format, which includes both hexadecimal and character representations of the data. Note the actual address and the offset from zero that correspond to each line of data. This panel includes:

Address The actual starting address of this control block in memory.

Offset The relative offset into the control block in hexadecimal format, starting from zero.

Hex Data Displays the contents of the control block in hexadecimal format.

Character Data Displays the contents of the control block in character format.

If the control block containing the PAB is not identifiable, then the panel displays the unknown control block from its beginning to the end of the PAB. In this case, the panel title displays **UNKNOWN** as name of the control block.

F4 serves as a toggle between a snapshot of the PAB contents at a lock analysis time (see Figure 118 on page 265) and the current contents of the control block containing the PAB.

Dump Display of PAB (Snapshot)

To display a snapshot of the PAB that existed at a lock analysis time, press F4 on the PAB-containing control block panel (Figure 117 on page 264).

```
____  Goto  Options  Help
-------------------------------------------------------------18:46:39 03/25/94
KONDEL6D                Control Block PAB (Snapshot)             System: SYSG


                                                                 Lines 1 to 2 of 2
+-------------------------------------------------------------------------------+
|  Address | Offset |              Hex Data                |  Character Data  |
+----------+--------+--------------------------------------+------------------+
| 00AEB240 |  0000  | 87E98C68 80000000 083E18C8 07E6B810 | gZ.........H.W.. |
| 00AEB250 |  0010  | 10321000 00000010                   | ........         |
+----------+--------+--------------------------------------+------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F4=Current  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 118. Dump Display of PAB at a Lock Analysis Time

The storage display is in dump format, which includes both hexadecimal and character representations of the data. Note the actual address and the offset from zero that correspond to each line of data.

The data displayed in this panel is not refreshable, and shows the data previously acquired for the panel described on page 260.

Dump Display of the Control Block Containing the Lockword

To display the control block containing the lockword, use the **L** (Lock storage) action code from the Currently Acquired VTAM Locks panel (Figure 115 on page 260) or the Waiting for a Lock panel (Figure 116 on page 262).

```
____  Goto  Options  Help
-------------------------------------------------------------18:46:09 03/25/94
KONDEL7D                Control Block PAB (Current)              System: SYSG
                     Lockword is Located at Offset 0018

                                                              Lines 1 to 3 of 3
+----------+--------+-------------------------------------+------------------+
|  Address | Offset |              Hex Data               |  Character Data  |
+----------+--------+-------------------------------------+------------------+
| 00AEB240 |  0000  | 07E98C68 00000000 083E18C8 00000000 | .Z.........H.... |
| 00AEB250 |  0010  | 10321000 00000010 00000000 00000000 | ................ |
| 00AEB260 |  0020  | 00000000 00000000 00000000 00000000 | ................ |
+----------+--------+-------------------------------------+------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F4=Lock Snap  F5=Refresh  F6=Console  **=Bkwd
**=Fwd  F9=Retrieve  F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 119. Dump Display of the Control Block Containing the Lockword

The storage display is in dump format, which includes both hexadecimal and character representations of the data. Note the actual address and the offset from zero that correspond to each line of data.

If the control block containing the lockword is not identifiable, then the panel title displays **UNKNOWN** as the control block name. In this case, the panel displays 512 bytes of storage starting 256 bytes before the lockword address.

F4 serves as a toggle between a snapshot of the lockword content at a lock analysis time (see Figure 120 on page 267) and the current contents of the control block.

Dump Display of Lockword (Snapshot)

To display a snapshot of the lockword that existed at a lock analysis time, press F4 on the control block containing the lockword panel (Figure 119 on page 266).

```
____  Goto  Options  Help
-------------------------------------------------------------18:46:16 03/25/94
KONDEL8D                Lockword Content (Snapshot)              System: SYSG


                                                                Lines 1 to 1 of 1
+------------------+--------------------------------------+------------------+
|  Address | Offset |              Hex Data                |  Character Data  |
+----------+--------+--------------------------------------+------------------+
| 00AEB258 |  0000  | 07E61810 00018000 00000000 00000000 | ................ |
+----------+--------+--------------------------------------+------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F4=Current  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 120. Dump Display of the Lockword at a Lock Analysis Time

The storage display is in dump format, which includes both hexadecimal and character representations of the data. Note the actual address and the offset from zero that correspond to each line of data.

The data displayed in this panel is not refreshable, and shows the data previously acquired for the panel described on page 260.

Dump Display of Storage at Resume Address

To display the storage at the resume address in a VTAM module where processing is to resume after the lock is acquired, use action code **R** (Resume address) on the Waiting for a Lock panel (Figure 116 on page 262). (The resume address displays on the last line of the Address column.)

```
____  Goto  Options  Help
-------------------------------------------------------------18:28:58 03/25/94
KONDEL9D                  Storage at Resume Address              System: SYSH
                          Resume Address is 00D47A3E


+----------+-------------------------------------+------------------+
|  Address |              Hex Data               |  Character Data  |
+----------+-------------------------------------+------------------+
| 00D47870 | B9315820 54185620 B8DD58F0 52FC4140 | ...........0...  |
| 00D47880 | 001505EF 982D1028 41300218 1E314150 | ....q.........&  |
| 00D47890 | 00015E50 30345050 30344130 010D1953 | ..;&..&&........ |
| 00D478A0 | 4720B8AF 41300008 19F34780 B7934130 | .........3...l.. |
| 00D478B0 | 000819F3 47B0B8C1 96801248 47F0B8C5 | ...3...Ao....0.E |
| 00D478C0 | 947F1248 58E01244 07FE0001 FFFFFFF0 | m"...\.........0 |
| 00D478D0 | FFFFFFF4 FFFFFFF8 7FFFFFFF 80000000 | ...4...8"....... |
| 00D478E0 | 00FFFFFF FFFC0000 80FFFFFF FF000000 | ................ |
| 00D478F0 | FF800000 0000FFFF 80000000 00D4B3CC | ............M.. |
| 00D47900 | 00D46000 00000000 10000000 00000000 | .M-............. |
| 00D47910 | 40000000 40000000 40000000 40000000 |  ... ... ... ... |
| 00D47920 | 00000000 00000000 18000000 38000000 | ................ |
| 00D47930 | 18000000 C9E2E3C1 C9C3C9D9 D9D7D3F3 | ....ISTAICIRRPL3 |
| 00D47940 | 00000000 00000000 00000000 00000000 | ................ |
| 00D47950 | 00000000 00000000 00000000 00000000 | ................ |
| 00D47960 | 00000000 00000000 00000000 00000000 | ................ |
| 00D47970 | 01000000 00000000 00000200 00000000 | ................ |
| 00D47980 | 00000000 00000000 00000000 00000000 | ................ |
| 00D47990 | 00000000 00000000 00000000 00000000 | ................ |
| 00D479A0 | 03000000 00000000 0000000C 002C0070 | ................ |
| 00D479B0 | 007800A8 0001000D 08000010 0D00100E | ...y............ |
| 00D479C0 | 00100D00 14100000 70000000 78000000 | ................ |
| 00D479D0 | 7C000000 78000000 2C000F00 07000000 | @............... |
| 00D479E0 | 00000000 00000000 47F0F014 0FC9E2E3 | .........00..IST |
| 00D479F0 | C1D7C3D2 E440F9F4 4BF0F1F8 90ECD00C | APCKU 94.018..}. |
| 00D47A00 | 18CFB20B 0000B20A 000018FB 180C181D | ................ |
| 00D47A10 | 58E002FC 58DE0248 05ED18BF 18FD18C0 | .\.............{ |
| 00D47A20 | 18D1B20A 2000B20B 0000B20A 000018FB | .J.............. |
| 00D47A30 | 180C181D 58E002FC 98BDE21C 05ED18BF | .....\..q.S..... |
+-------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F7=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status Display
```

Figure 121. Dump Display of Storage at Resume Address

The storage display is in dump format, which includes both hexadecimal and character representations of the data. Note the actual address that corresponds to each line of data.

You can scroll backward in order to find the module ID. The module ID (including the module name, the Julian date, and the PTF eyecatcher, if any) is displayed in the Character Data field. VTAM module names normally begin with the prefix IST.

VTAM Constants

VTAM module ISTRACON is the *VTAM constants module*. It contains miscellaneous constants for functions that normally do not require operator modification. However, in some cases, changing one or more constants may result in improved network performance.

The remaining sections

- show how to display the VTAM constants for VTAM releases prior to 4.2
- recommend alternate values for some constants
- explain how to reset the VTAM constants

The VTAM Constants Display shows you the values that are specified in the ISTRACON module for VTAM releases prior to 4.2. Be aware that these values may have been modified via VTAMLST(ATCSTRcc) or a VTAM MODIFY command. See “Resetting VTAM Constants Specifications” on page 271.

For more detailed information about VTAM constants, see IBM's *VTAM Customization* manual.

Obtaining Current VTAM Constants Specifications

To see the current settings for the VTAM constants, select **`VTAM Constants`** on the Goto pulldown. The VTAM Constants Display appears as shown in the following figure.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDCOD                      VTAM Constants Display              More:   +


  Offset  Bytes  Name      Value    Description           ISTRACON - 03D86F88
  ------- -----  --------  -------  ----------------------------------------
  02(02)  2      RACBSNAP  1000     Buffer requests between snapshot dumps
  04(04)  2      RACMCPBF  4096     Max RU size for all SSCP sessions
  06(06)  2      RACMLUBF  6144     Max RU size for LU-LU sessions
  08(08)  4      RACINOPT  X'011E'  Timeout value for BSC 3270's
  12(0C)  10     Reserved           Reserved area
  22(16)  2      RACABCNT  4        Max times a task can abend in an interval
  24(18)  4      RACABINT  6866     Interval within which abends can occur
  28(1C)  1      RACSSMSG  X'01'    Adjacent SSCP message control
  29(1D)  1      RACALIAS  X'FF'    Alias name translation control flag
  30(1E)  2      RACSSDTO  30       (VM VSE) Switched SA disconnect timeout
  32(20)  4      RACINNBL  0        Max VS size to store IRN transmissions
  36(24)  1      RACPDBFS  2        Max buffers for an NLDM request
  37(25)  1      RACVCNT   10       Max SSCP rerouting count
  38(26)  2      RACHSRT   1499     Number of entries in SRT directory

Command ===>
F1=Help  F2=Keys  F3=Exit  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 122. VTAM Constants Display (VTAM releases prior to 4.2)

You can scroll down to see more VTAM constants by pressing F8, or you can get more information about a VTAM constant by positioning your cursor anywhere in the line for that constant and pressing F1.

Notes:

1. In VTAM 4.1, the operating values of constants modified by start options or the MODIFY VTAMOPTS command are not stored in the ISTRACON module. Therefore, the contents of this panel may not reflect the actual values in effect. OMEGAMON II displays a warning message.
2. In VTAM 4.2 and 4.3, constants previously defined in ISTRACON are specified exclusively through VTAM start options. Although ISTRACON is distributed, the module is not used and the constant values within it have no effect. OMEGAMON II displays a message and does not display this panel.

Resetting VTAM Constants Specifications

You probably want to leave most VTAM constants at their default settings. However, under specific circumstances you may be able to improve network performance by changing one or more of them. This section highlights some VTAM constants that you might want to change.

There are several ways to change a VTAM constant:

- You can change most of the values by zapping the ISTRACON module within the VTAMLIB library with the AMASPZAP service aid. You must then restart VTAM so that the new values take effect. For VTAM releases prior to V4.1, this is the only valid method.
- You can set all replaceable constants in the ISTRACON module with start options (in VTAMLST(ATCSTRcc)). The value in ISTRACON is the default; a value you code on a start option overrides the value in ISTRACON.
- You can reset some of the values with the MODIFY VTAMOPTS command while VTAM is running. A value you specify on the VTAMOPTS command overrides a value specified on a start option or in ISTRACON. You can use the DISPLAY VTAMOPTS command to display the current values of one or more start options.

Symbol Resolution Table Directory Sizes

The value for RACHSRT specifies the number of queue pointers in the Symbol Resolution Table (SRT) for the host network. RACONSRT specifies the number of queue pointers in each SRT directory for other networks known to the host VTAM.

If your network is large, the default value of 1499 for RACHSRT may affect multiple VTAM processes, resulting in long queues and excessive processing time. To shorten queue length and decrease search time, specify a larger directory size. Similarly, you might want to increase the default value of 43 for RACONSRT.

IBM recommends that you use prime numbers for RACHSRT and RACONSRT, to ensure an even distribution of SRT entries to the queues. These values can range from 0–X'7FFF'. If you specify zero, VTAM uses the default value.

Host Node Table and Index Table Sizes

RACHNTSZ determines the size of the host node table used to find element addresses. RACCITSZ determines the size of the index tables used to find function management control blocks and conversation control blocks. The default table size is 4080.

You can reduce table search time by increasing the table size, because larger tables result in less chaining to additional blocks of entries. However, larger tables also use more storage, so your decision is a trade-off between cycles and storage.

Default EAS Value

The EAS value for VTAM determines the maximum number of SNA network addressable units and non-SNA terminals that can be active at the same time. If the total number of units and devices in the network is larger than the default of 3000, you can shorten VTAM search times by increasing the RACEAS value. RACEAS can range from 0–32767.

Because many applications do not require the 4K FMCB directory table allocated when the EAS value is 3000, you can save storage by specifying smaller EAS values in some of your APPL definitions. However, if the EAS value you specify is too small, the resulting increase in FMCB chain length will require more scan time.

To modify the EAS value for a particular VTAM application, specify the desired value in the APPL definition, not in ISTRACON. For more information on EAS values, see IBM's *VTAM Customization* manual.

Maximum Subarea Number

The value for RACSASUP determines the maximum subarea number supported in the network. The default of 255 is the largest allowable value. If the network contains few subareas, you can improve performance by specifying a smaller number.

Timeout Value for BSC 3270

VTAM constant RACINOPT specifies a time interval. If two general poll failures occur for a BSC 3270 during the specified interval, VTAM assumes that an unrecoverable failure has occurred, and deactivates the terminal.

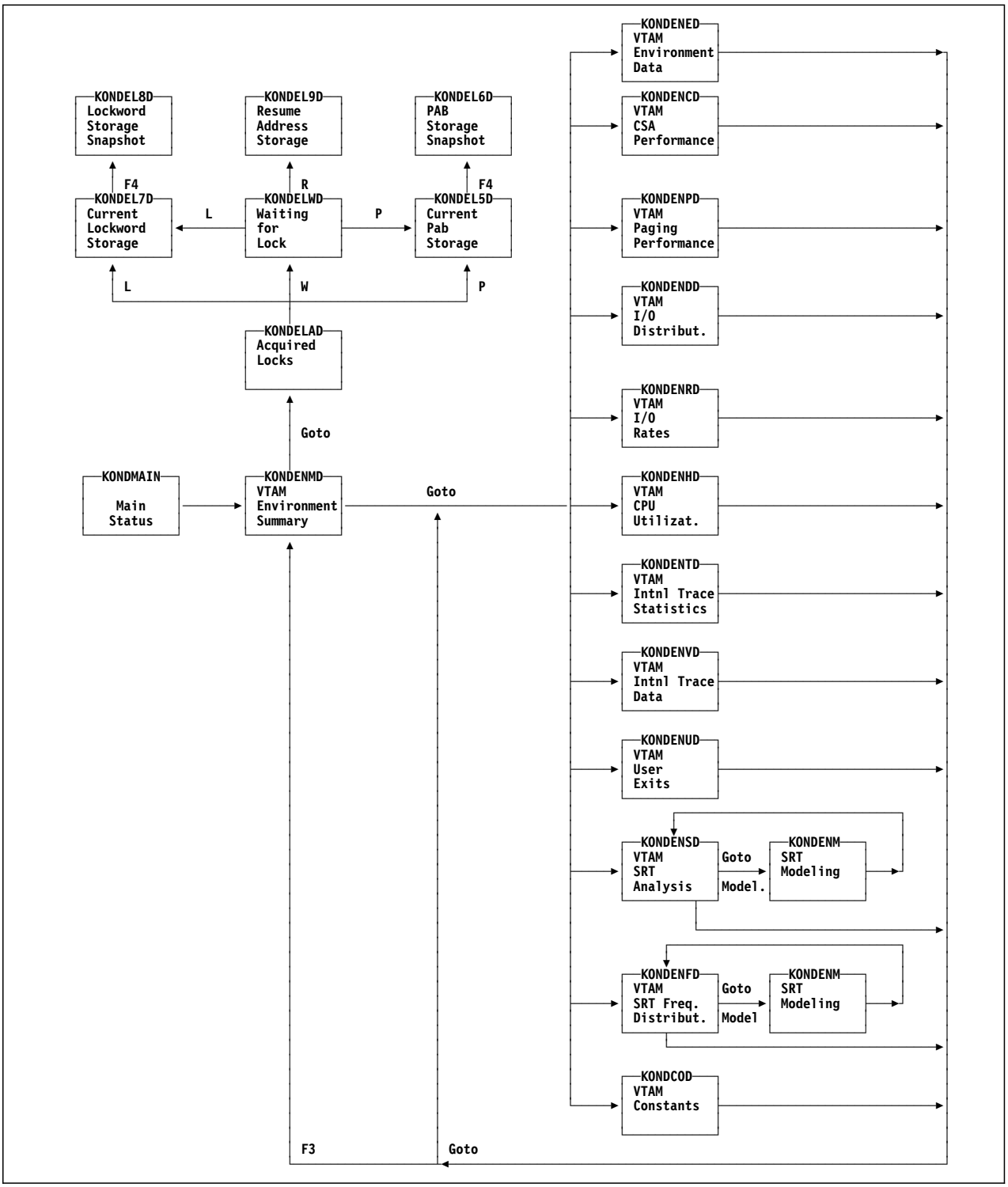
If any of your users' terminals are being deactivated unnecessarily, you might want to decrease the time interval. On the other hand, if general poll failures are occurring frequently but the terminals are not deactivating, you might want to increase the time interval, so that the failures can be detected and corrected more quickly.

The value for RACINOPT is specified in units of 1.048576 seconds. The default is X'11E' (approximately 5 minutes). The value can range from 0–X'84E1FFFF'. If the value is 0, VTAM never deactivates a device as a result of a general poll failure.

Maximum Number of Input/Output Messages

RACNTWRE specifies the maximum number of IST530I/IST5321 message pairs per subarea. If the number of pending I/O operations is greater than the RACNTWRE value, VTAM writes one message pair for each type of pending I/O operation, rather than one message pair for each individual operation. To ensure that the messages report each individual operation, IBM set the default at X'7FFFFFFF'. If your network is large, specify a smaller value for RACNTWRE, to avoid flooding the network with messages.

VTAM Environment Component Navigation



Chapter 12. TCP/IP

Chapter Contents

Overview

The TCP/IP component enables you to monitor and collect the performance of your mainframe TCP/IP address spaces and the network resources and applications controlled by these address spaces. Measurements include throughput, utilization, and network response time.

Requirements

Obtaining TCP/IP performance measurements requires the following environment:

- OS/390 version 2.5 or above
- TCP/IP version 3.2 or above
- C Language Environment 1.8 or above.
- Defining an OMVS segment in RACF for the OMEGAMON II started task procedure.
- SUPERUSER (UID(0)) authority for the OMVS segment to issue privileged TCP/IP commands such as DROP and TRACERTE.
- An active SNMP agent.
- An active SNMP subagent.
- Enabling CSA Tracking to display TCP/IP CSA usage.
- During CICAT configuration:
  - Specifying that you want to configure the TCP/IP component.
  - Providing the requested parameters.

Background

Non-hierarchical non-SNA connectionless networks have profilerated. This is because of advances in communications technology and acceptance of protocol standards that have reduced implementation costs and increased telecommunications reliability and flexibility. Network interfaces have been developed to bridge the gap between non-SNA and SNA networks. By permitting distribution of network traffic over multiple and dissimilar networks, these interfaces have profoundly affected users' ability to access data regardless of computing platform or network implementation. As you migrate your networks or portions of your networks to TCP/IP, you face a new set of challenges requiring new tools. The TCP/IP component can help you meet your monitoring requirements.

Benefits

To ensure appropriate service levels and provide cost-effective solutions, it is increasingly essential that you can monitor both TCP/IP and SNA traffic from a mainframe perspective. All network traffic passing through VTAM's domain impacts VTAM utilization whether the traffic originates in the VTAM domain or in a non-SNA network domain such as TCP/IP. Conversely, traffic originating in the VTAM domain but destined for a non-SNA network impacts non-SNA (TCP/IP) network utilization.

Network planners and support staff require the ability to assess the impact of traffic from non-SNA networks on VTAM and also the impact of VTAM on non-SNA network resoures. This component provides part of the solution by monitoring TCP/IP address spaces, applications, and connections from a mainframe point of view.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

TCP/IP Address Spaces

When you select **TCP/IP** from the Main Status panel, the TCP/IP Status Summary panel displays.

```
 ____ Actions  Goto  View  Options  Help
-------------------------------------------------------------15:57:28 06/08/01
KONDI00D               TCP/IP Status Summary                    System: SYSA
                                                                  More:
Select with a "/" or an action code.                        Lines 1 to 2 of 3
 X=Exceptions S=Show Details T=Trends A=Add C=Change D=Delete R=Start P=Stop
 CO=Connections AP=Appls DE=Devices GA=Gateways BP=Buffer Pools CF=Config
+------------+--------------------------------+--------------------------------+
|   Address  |                                |                                |
|    Space   | Type    Value  Pct  Condition  | Type        Value    Condition |
+------------+--------------------------------+--------------------------------+
| __ TCPIPA  | CPU       --  27.2% Critical   | Connections     295   Normal   |
|            | Paging   3.00  0.2%  Normal    | Sockets          10   Normal   |
|            | CSA     1025K 12.0%  Warning   | Devices           4   Warning  |
|            | C24       66K  2.0%  Warning   | Gateways          5   Warning  |
|            | IP        --    --   Critical  | Buffer Pools  49.0%   Normal   |
|            | SNMP      --    --   Normal    | TELNET Pool   10.0%   Normal   |
|            |                                | Bytes/min      989K   Normal   |
|            |                                |                                |
| __ TCPIPB  | CPU       --  27.2% Critical   | Connections     250   Normal   |
|            | Paging   3.00  0.2%  Normal    | Sockets          10   Normal   |
|            | CSA     1025K 12.0%  Warning   | Devices           4   Warning  |
|            | C24       66K  2.0%  Warning   | Gateways          5   Warning  |
|            | IP        --    --   Critical  | Buffer Pools  44.0%   Normal   |
|            | SNMP      --    --   Normal    | TELNET Pool   12.0%   Normal   |
|            |                                | Bytes/min      898K   Normal   |
+------------+--------------------------------+--------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 123. TCP/IP Status Summary

For each monitored address space, this panel displays identifying information, performance measurements, and a summary of conditions being monitored.

Statistics and exceptions are based on the current or last sample interval, or on running totals since initialization of TCP/IP or OMEGAMON II.

To control monitoring or access more detailed information, you can use the following actions on the TCP/IP Status Summary:

- To define which address spaces to monitor, use action codes A (Add) and D (Delete). To add an address space, you are requested to enter the TCP/IP started task name, the profile dataset name, and the community name. You can add any address space on the current LPAR.
- To control address space monitoring, you can use action codes R (Start) and P (Stop).
- To override the default thresholds for the address space, a user with administrator authority can use action code C (Change).
- To view exceptions raised when thresholds are exceeded, use action code X (Exceptions).
- To view recent performance trends, use action code T (Trends).

From the TCP/IP Status Summary panel you can also reach performance and environmental information for the network resources controlled by each TCP/IP address space. To reach network resource panels, use these action codes:

- Action code S (Show Details) displays measurements for the TCP/IP started task.
- Action code CO (Connections) displays status of all connected applications or those of a selected connection type.
- Action code AP (Appls) displays application status.
- Action code DE (Devices) displays network devices status.
- Action code GA (Gateways) displays gateway status.
- Action code BP (Buffer Pools) displays version 3.2 buffer pool utilization and status.
- Action code CF (Config) displays the address space configuration parameters from the TCP/IP Profile Dataset.

Derivations and Recommendations

In any TCP/IP display panel: For specific information about how a field is derived and recommendations for using the measurement to tune TCP/IP, place your cursor on the field and press F1 (Help).

Started Task Resource Summary

When you use action code S (Show Details) next to an address space on the TCP/IP Status Summary, the following panel displays.

```
 ____ Actions  Goto  Options  Help
-------------------------------------------------------------14:41:44 06/08/01
KONDI02D  Resource Summary for TCP/IP Started Task: TCPIP22       System: SP22
                                                                    More:  +
 Select with a "/" or an action code.  X=Exceptions C=Change T=Trends.
+-------------------------------------------------------------------------------+
| Total CSA. .:   96M    IP input segs. . .: 8052K   IP Fragmentation.: 1024     |
| CSA usage. .: 2441K    IP output segs . .: 7496K   IP Frag failures.:  500     |
| Total C24. .: 4620K    IP Input discards.: 1024                                |
| C24 usage. .:  136     IP output discards: 1024                                |
| TELNET pool.:   30     IP reassemblies. .:   10K                               |
| TELNET usage:    2     IP reassm failures: 1024                                |
+-------------------------------------------------------------------------------+
|  _ CPU. . .: Norm  2.49%    _ IP in discards  Norm   .05% _ SNMP agent Norm    |
|  _ Paging .: Norm     0%    _ IP out discards Norm   .03% _ Subagent   Norm    |
|  _ CSA. . .: Warn  2.47%    _ IP reassemblies Norm   .12% _ More       Norm    |
|  _ C24. . .: Norm     0%    _ IP reassm fails Crit    10%                     |
|  _ Telnet .: Norm  6.66%    _ IP fragmentatn  Norm   .01%                     |
|  _ Bytes/mn: Norm  1670K    _ IP frag fails   Crit 32.81%                     |
+-------------------------------------------------------------------------------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=R
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 124. Resource Summary for TCP/IP Started Task

In addition to the information carried forward from the TCP/IP Status Summary panel, this panel displays information for the selected started task:

IP segments
IP discards
IP reassemblies
IP fragmentation
TCP retransmits
UDP datagrams

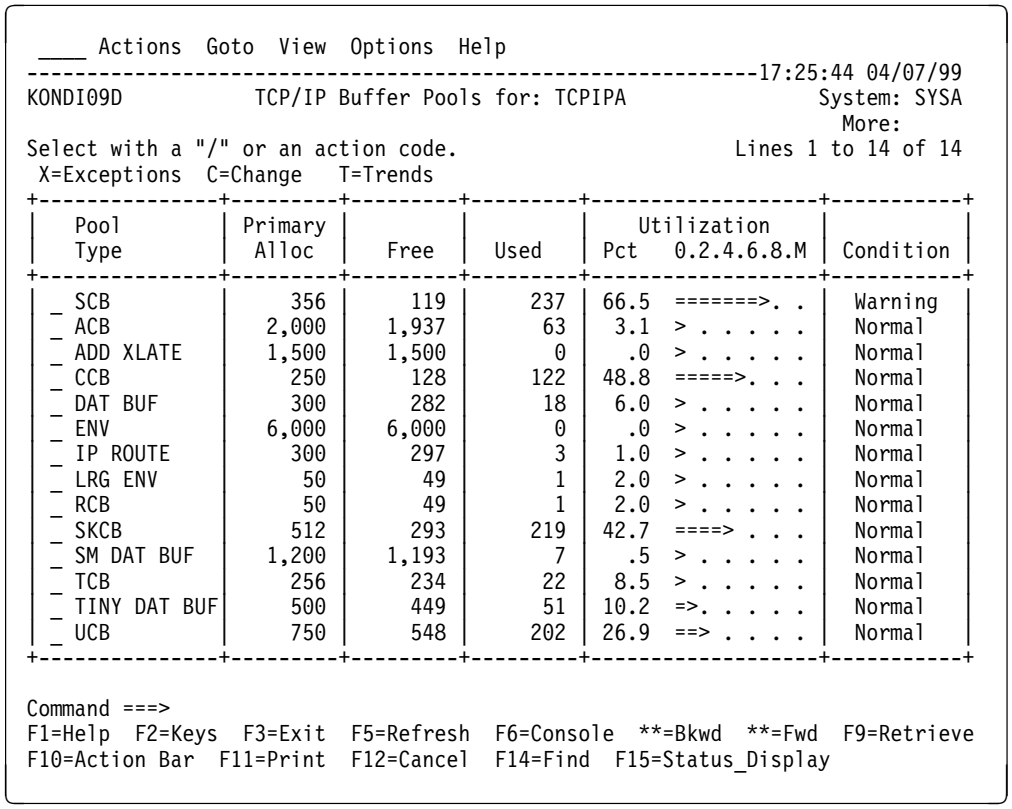
The More status light, displayed below the SNMP Agent and Subagent status lights, summarizes the status lights found on a second panel which you can reach with F8 (Fwd).

Action codes are available for key performance measurements:

- X displays the exceptions raised when threshholds are exceeded for the measurement.
- C enables an administrator to override default thresholds.
- T displays historical trends for the measurement.

TCP/IP Buffer Pools

When you use action code **BP** (Buffer Pools) next to an address space on the TCP/IP Status Summary panel, the following panel displays if you are running TCP/IP version 3.2. Later versions of TCP/IP do not supply buffer pool utilization statistics.



```
 ____ Actions  Goto  View  Options  Help
-------------------------------------------------------------17:25:44 04/07/99
KONDI09D           TCP/IP Buffer Pools for: TCPIPA                System: SYSA
                                                                    More:
Select with a "/" or an action code.                          Lines 1 to 14 of 14
 X=Exceptions  C=Change   T=Trends
+---------------+---------+---------+---------+-------------------+-----------+
|   Pool        | Primary |         |         |    Utilization    |           |
|   Type        |  Alloc  |   Free  |  Used   | Pct   0.2.4.6.8.M | Condition |
+---------------+---------+---------+---------+-------------------+-----------+
| _ SCB         |     356 |     119 |     237 | 66.5  =======>. . |  Warning  |
| _ ACB         |   2,000 |   1,937 |      63 |  3.1  > . . . . . |  Normal   |
| _ ADD XLATE   |   1,500 |   1,500 |       0 |   .0  > . . . . . |  Normal   |
| _ CCB         |     250 |     128 |     122 | 48.8  =====>. . . |  Normal   |
| _ DAT BUF     |     300 |     282 |      18 |  6.0  > . . . . . |  Normal   |
| _ ENV         |   6,000 |   6,000 |       0 |   .0  > . . . . . |  Normal   |
| _ IP ROUTE    |     300 |     297 |       3 |  1.0  > . . . . . |  Normal   |
| _ LRG ENV     |      50 |      49 |       1 |  2.0  > . . . . . |  Normal   |
| _ RCB         |      50 |      49 |       1 |  2.0  > . . . . . |  Normal   |
| _ SKCB        |     512 |     293 |     219 | 42.7  ====> . . . |  Normal   |
| _ SM DAT BUF  |   1,200 |   1,193 |       7 |   .5  > . . . . . |  Normal   |
| _ TCB         |     256 |     234 |      22 |  8.5  > . . . . . |  Normal   |
| _ TINY DAT BUF|     500 |     449 |      51 | 10.2  =>. . . . . |  Normal   |
| _ UCB         |     750 |     548 |     202 | 26.9  ==> . . . . |  Normal   |
+---------------+---------+---------+---------+-------------------+-----------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 125. TCP/IP Buffer Pools Panel

For each type of TCP/IP version 3.2 buffer pool, this panel displays utilization information and a status light. The color of the status light indicates the condition of pool utilization based on exception settings specified under the Options pulldown.

These action codes are available for a selected buffer pool:

- X displays the exceptions raised when thresholds are exceeded.
- C enables an administrator to override the default thresholds for the buffer pool.
- T displays trends for key buffer pool performance measurements.

Connection Selection

When you use action code **CO** (Connections) next to an address space on the TCP/IP Status Summary panel, the following panel displays so that you can select

all connections
only high priority connections
the connections for a specific application

```
KONDI25D  Connection Menu

  __  Select a connection type.

Sel  User ID   Count  Condition

1   ALL CONS     35   Critical
2   High Pri     10   Warning
3   $FTP          4   Warning
4   TELNET       10    Normal
5   $SMTP        10    Normal
6   OMVS          1     Idle

F1=Help  F2=Ex_Help  F12=Cancel
```

Figure 126. TCP/IP Connection Selection

The sets of connections listed on this menu are sorted by condition: critical, then warning, and then normal.

If you selected **All** from the Connections Selection menu, all connections to the selected address space are displayed, including clients and servers.

```
 ____ Actions  Goto  View  Options  Help
-------------------------------------------------------------16:07:41 04/07/99
KONDI01D              TCP/IP Connections: ALL CONS              System: SYSA
                                                                 More:    >
Select with a "/" or an action code.                      Lines 1 to 15 of 207
 X=Exceptions S=Show details C=Change
 HI=High_Priority PI=Ping NS=Nslookup TR=Tracerte DR=Drop
+-------------+-------+-------+-------------------------+-------------+-------+
|             |       | Local |                         | Connection  | Cond- |
| Application | Conn  | Port  |    Foreign Socket       | Status      | ition |
+-------------+-------+-------+-------------------------+-------------+-------+
| __ $PORT22  | UDP   | 21    | 0.0.0.0..0              | Listen      | Idle  |
| __ AFOG031L | 1012  | 111   | *..*                    | UDP         | Idle  |
| __ INTCLIEN | 1010  | 111   | 0.0.0.0..0              | Listen      | Idle  |
| __ INTCLIEN | 1013  | 1028  | *..*                    | UDP         | Idle  |
| __ INTCLIEN | 1016  | 17666 | 0.0.0.0..0              | Listen      | Idle  |
| __ INTCLIEN | 1019  | 10007 | 0.0.0.0..0              | Listen      | Idle  |
| __ INTCLIEN | 1025  | 1181  | 0.0.0.0..0              | Listen      | Idle  |
| __ INTCLIEN | 1031  | 4718  | 0.0.0.0..0              | Listen      | Idle  |
| __ QMQACHIN | 1009  | 1587  | *..*                    | UDP         | Idle  |
| __ QMQBCHIN | 1014  | 1182  | 198.210.51.158..1920    | Established | Idle  |
| __ QMQHCHIN | 1011  | 4718  | *..*                    | UDP         | Idle  |
| __ S3DSH03L | UDP   | 1588  | *..*                    | UDP         | Idle  |
| __ S3DSH03L | UDP   | 1617  | *..*                    | UDP         | Idle  |
| __ S3DSH03L | UDP   | 5042  | 0.0.0.0..0              | Listen      | Idle  |
| __ S3DSH03L | UDP   | 5041  | 0.0.0.0..0              | Listen      | Idle  |
+-------------+-------+-------+-------------------------+-------------+-------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display  **=Left
F20=Right
```

Figure 127. All Connections for an Address Space

This is the first of four panels that display performance and identifying information for the set of connections you selected.

On the Connections panels, the connections are sorted by condition (critical, warning, normal) and then user ID.

On the Connections panels, these action codes are available for a selected application:

- X (Exceptions) displays the exceptions raised when thresholds are exceeded.
- S (Show details) summarizes details about the connection.
- C (Change) enables a user with administrator authority to override the default thresholds for the connection.
- HI (High_Priority) adds the connection to the High Priority display.
- PI (Ping) builds a PING command to poll the address.
- NS (Nslookup) builds an NSLOOKUP command to return the network name associated with the address.
- TR (Tracerte) builds a TRACERTE command to trace the route taken through the network by the application.
- DR (Drop) builds a DROP command to drop the connection.

Use F20 (Right) to display throughput, F20 again to display round trip time and retransmit statistics, and F20 once more to display UDP datagram statistics. Use F19 to scroll left.

If the connections list is long:

- You can use F14 (Find) to go to a specific application name.
- You can use ISPF-like cursor (CSR) scrolling along with the F7 and F8 keys to position yourself in the list. You can also enter `M` in the command line to go to the top or bottom of the list.

Applications

When you use action code **AP** (Appls) next to a selected address space on the TCP/IP Status Summary, the applications connected to the selected address space are displayed. An application is associated with a socket which consists of a port plus a protocol. It is any TCP/IP application.

```
 ____ Actions  Goto  View  Options  Help
-------------------------------------------------------------16:13:44 04/07/99
KONDI06D        TCP/IP Application Status Summary for: TCPIPA     System: SYSA
                                                                    More:
Select with a "/" or an action code.                          Lines 1 to 15 of 22
 X=Exceptions C=Change T=Trends CO=Connections
+-------------+------+-------+--------------------+--------------------+------+
|             | Conn | Bytes |   Current Bytes    |     Total Bytes    |      |
|  Appl Name  | Cnt  | /Min  |  In   Out  Total   |  In   Out   Total  | Cond |
+-------------+------+-------+------+------+------+------+------+------+------+
| __ S3DSH03L |   28 |   584 |  204 | 1548 | 1752 | 575K | 666K | 1241K| Crit |
| __ S9DS2CM  |   14 |     0 |    0 |    0 |    0 |  11K |  16K |   28K| Crit |
| __ VFCTH@@L |   26 |   11K |  19K |  16K |  35K | 421K | 1567K| 1988K| Crit |
| __ VGCTH@@L |   28 |   37K |  75K |  36K | 112K | 7641K|  14M |  21M | Crit |
| __ VGMVH@@L |   21 |   19K | 6968 |  52K |  59K | 2617K| 8297K|  10M | Crit |
| __ VHCTH@@L |   10 |  7596 | 6140 |  16K |  22K | 9789K|  62M |  72M | Crit |
| __ VHDFH@@L |   10 |     0 |    0 |    0 |    0 |  52M | 8698K|  60M | Crit |
| __ VHMVH@@L |   13 |  3638 | 7654 | 3260 |  10K | 2744K| 4010K| 6755K| Crit |
| __ VPCTH@@L |   21 |   21K |  37K |  27K |  64K | 6848K| 5629K|  12M | Crit |
| __ VPMVH@@L |   11 |   13K |  14K |  26K |  41K | 2217K| 3961K| 6179K| Crit |
| __ OMVS     |    7 |     0 |    0 |    0 |    0 |    0 |    0 |    0 | Warn |
| __ S3DSH11L |    6 |     0 |    0 |    0 |    0 |  77K |  325K|  402K| Warn |
| __ TELNET   |    7 |  1065 |    3 | 3192 | 3195 |  53K | 3764K| 3817K| Warn |
| __ VBCTH@@L |    8 |     0 |    0 |    0 |    0 | 917K |  945K| 1862K| Warn |
| __ $FTP22   |    1 |     0 |    0 |    0 |    0 |    0 |    0 |    0 | Norm |
+-------------+------+-------+------+------+------+------+------+------+------+

Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Fine  F15=Status_Display  **=Left
F20=Right
```

Figure 128. Application Status Panel

This is the first of two panels that display performance measurement statistics by application name. All statistics are derived by summing the statistics for connections that were active at the end of the current sample interval.

You can change the sample interval in the TCP/IP Global Options panel under the Options pulldown.

On the Application Status Summary, these action codes are available:

- X displays the exceptions raised when thresholds are exceeded.
- C enables an administrator to override the default thresholds.
- T displays trends for key socket performance measurements.
- CO displays the connections established for the application.

Use F20 (Right) to display retransmits and datagram statistics.

If the applications list is long:

- You can use F14 (Find) to go to a specific application name.
- You can use ISPF-like cursor (CSR) scrolling along with the F7 and F8 keys to position yourself in the list. You can also enter `M` in the command line to go to the top or bottom of the list.

Devices

When you use action code **DE** (Devices) next to an address space, the devices connected to the selected address space are displayed. Devices are channel connections.

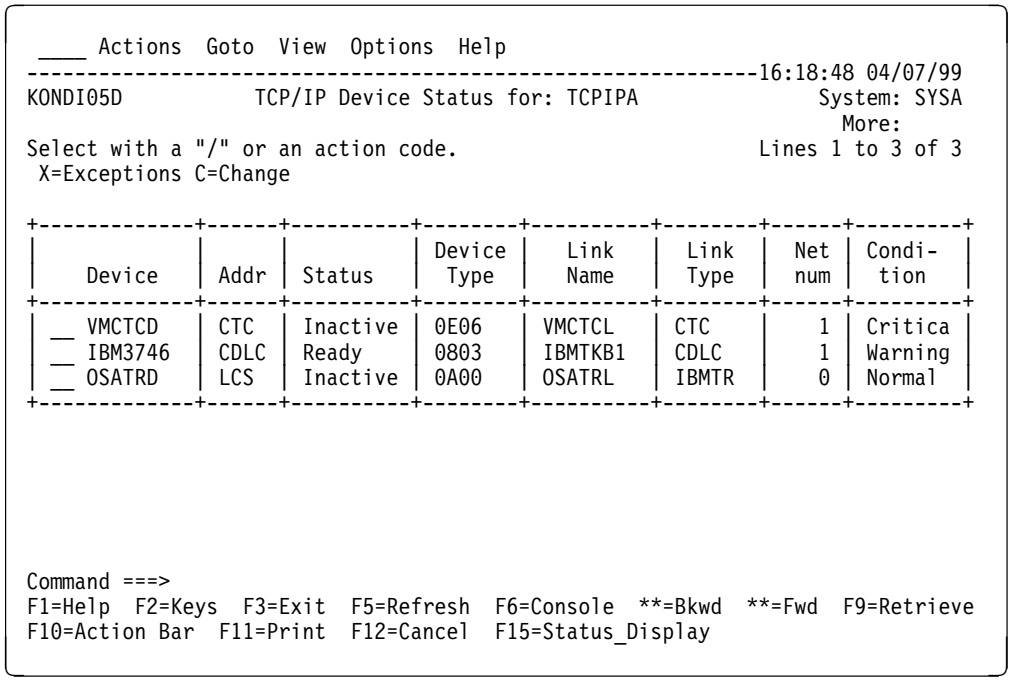


Figure 129. Device Status Panel

This panel displays identifying and status information for the devices defined to the selected TCP/IP address space.

These action codes are available for a selected network device:

- X displays the exceptions raised when thresholds are exceeded.
- C enables an administrator to override the default thresholds for the device.

Gateways

When you use action code **GA** (Gateways) next to an address space, the gateways connected to the selected address space are displayed. Gateways are network routers.

```
 ____ Actions  Goto  View  Options  Help
-------------------------------------------------------------16:45:29 04/07/99
KONDI07D          TCP/IP Gateway Status for: TCPIPA               System: SYSA
                                                                    More:
Select with a "/" or an action code.                          Lines 1 to 2 of 2
 C=Change PI=Ping N=Nslookup TR=Tracerte

+------------------+--------------+--------+----------+----------+-----------+
|   Gateway        |              |  Link  | Subnet   | Subnet   |           |
|   Address        | First Hop    |  Name  |  Mask    | Value    | Condition |
+------------------+--------------+--------+-----+----+----------+-----------+
| __ 198.210.51.0  |<direct>      |IBMTKB1 | 0.0.0.252| 0.0.0.156|   Idle    |
| __ Default       |198.210.51.157|IBMTKB1 | <none>   |          |   Idle    |
+------------------+--------------+--------+----------+----------+-----------+









Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Display
```

Figure 130. Gateway Status Panel

For the gateways defined to the selected address space, this panel displays:

- IP address
- first hop, which is the first router in the path to the remote host
- link name associated with the gateway
- subnetwork mask and value for subnetted networks.
- status light whose color indicates the gateway condition based on the exception setting specified under the Options pulldown

These action codes are available for a selected gateway:

- C enables an administrator to override default exception settings.
- PI builds a PING command for you to execute.
- NS builds an NSLOOKUP command to execute.
- TR builds a TRACERTE command to execute.

Configuration

When you use action code **CF** (Configuration) next to an address space, the statements and parameters from the Profile Dataset for the selected address space are displayed.

```
 ____ Actions  Goto  View  Options  Help
-------------------------------------------------------------16:24:00 04/08/99
KONDI08D        Configuration Information for: TCPIPA             System: SYSA
                                                                    More:   +
                                                               Lines 1 to 20 of 399
+-------------------------------------------------------------------------------+
| ;                                                                             |
| ;-----------------------------------------------------------------            |
| ;    tcpip v3r2                                                               |
| ;-----------------------------------------------------------------            |
| ;                                                                             |
| ;                                                                             |
| ; chg: 12/29/98 AE  increase      UCBPOOLSIZE  400--> 750                     |
| ; chg: 12/29/98 AE  increase      ACBPOOLSIZE 1200--> 2000                    |
| ; chg: 12/29/98 AE  increase ENVELOPEPOOLSIZE 4000--> 5000                    |
| ; chg: 09/08/98 AE  increase ENVELOPEPOOLSIZE 3200--> 4000                    |
| ; chg: 08/31/98 AE  Added OMVS ports 5021 and 5022for DB2                     |
| ; chg: 04/06/98 AE  Added OMVS ports                                          |
| ; chg: 03/05/98 AE  increase      ACBPOOLSIZE 1000--> 1200                    |
| ; chg: 03/05/98 AE  increase      CCBPOOLSIZE  150--> 250                     |
| ; chg: 03/05/98 AE  increase ENVELOPEPOOLSIZE 1600--> 3200                    |
| ; chg: 02/27/98 AE  TCPIP V3R1 --> V3R2                                       |
| ;-----------------------------------------------------------------            |
| ; chg: 11/21/97 AE  increase ENVELOPEPOOLSIZE 1100--> 1600                    |
| ; chg: 07/25/97 AE  increase SKCBPOOLSIZE     256 --> 512                     |
| ; chg: 07/25/97 AE  increase UCBPOOLSIZE      250 --> 400                     |
+-------------------------------------------------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve  F10=Action
Bar F11=Print  F12=Cancel
```

Figure 131. Configuration Information Panel

This panel displays the contents of the Profile Dataset that defines the selected TCP/IP address space.

Use F8 (Fwd) to scroll to additional Profile Dataset parameters and then use F7 (Bkwd) to return.

TCP/IP Console

You can reach the TCP/IP console panel from any panel in the TCP/IP component. It is an extended MVS console where you can enter TCP/IP or any other MVS commands you are authorized to use. The console panel includes a Commands pulldown. Use the command and MIB browser prompts to select the TCP/IP command or MIB variable of interest.

Commands Pulldown

Use the Commands menu to select a category of TCP/IP commands or the MIB browser. Commands in the same category are displayed in a menu. You can select a command to invoke or press F1 to view the command syntax.

The MIB browser displays MIB variables by prefix. A BULKWALK command using the variable you selected is constructed for you.

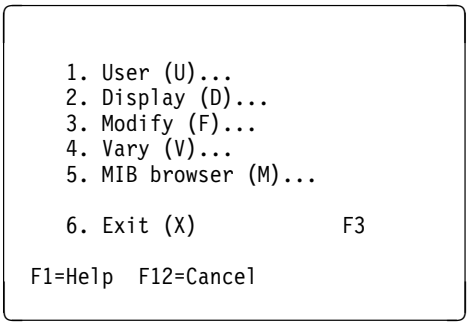


Figure 132. Commands Pulldown Menu

Browse Pulldown

Use the Browse pulldown to find information in the command output. You can:

- Scroll to the top or bottom.
- Scroll up or down 5 lines.
- Find a character string and its next or previous occurrences.
- Reinvoke the last command issued.

TCP/IP Command Prompts

Here are examples of the display, modify and vary command prompts that you can reach from the Commands pulldown. When you select a TCP/IP command, it is placed on the Command line at the bottom of the panel where you can edit it or press Enter to invoke it.

Display Commands Prompt

```
KONDICDD  Display Commands  More:   +

Press F1 for help with command formats.

     1. D TCPIP,,HELP
     2. D TCPIP,,NETSTAT
     3. D TCPIP,,OMROUTE
     4. D TCPIP,,TELNET,APPL
     5. D TCPIP,,TELNET,DEFAULTS
     6. D TCPIP,,TELNET,DEVICETYPE
     7. D TCPIP,,TELNET,HNGROUP
     8. D TCPIP,,TELNET,IPGROUP

F1=Help  **=Bkwd  F8=Fwd  F12=Cancel
```

Figure 133. Display Commands Prompt

Modify Commands Prompt

```
KONDICFD   Modify Commands   More:   +

Press F1 for help with command format.

     1. F FTPname
     2. F SNALINK LU0
     3. F SNALINK LU62
     4. F X25
     5. F REXEC
     6. F OROUTED
     7. F OMPROUTE
     8. F NCPROUTE

F1=Help  **=Bkwd  F8=Fwd  F12=Cancel
```

Figure 134. Modify Commands Prompt

Vary Commands Prompt

```
KONDICVD    Vary Commands    More:

Press F1 for help with command format.

     1. V TCPIP,,PKTTRACE
     2. V TCPIP,,CMD=Obeyfile
     3. V TCPIP,,CMD=DRop
     4. V TCPIP,,START
     5. V TCPIP,,STOP
     6. V TCPIP,,START,device
     7. V TCPIP,,STOP,device
     8. V TCPIP,,TELNET

F1=Help  **=Bkwd  **=Fwd  F12=Cancel
```

Figure 135. Vary Commands Prompt

Command Syntax

To view the complete syntax of a command, move the cursor to the command as it is displayed on the prompt and press F1 (Help).

MIB Browser Prompts

When you select MIB browser from the Commands pulldown, you see a menu of MIB variable prefixes. Since there are nearly 1000 MIB variables, they are divided into prefix groups for ease of access.

MIB Prefixes

When you select a prefix, you see all the variables with that prefix.

```
KONDICMD    MIB Prefixes    More:   +

     1. system ...
     2. interfaces ...
     3. at ...
     4. ip ...
     5. icmp ...
     6. tcp ...
     7. udp ...
     8. egp ...
     9. ipoa ...
    10. snmp ...

F1=Help  **=Bkwd  F8=Fwd  F12=Cancel
```

Figure 136. MIB Prefixes Prompt

When you select a MIB variable, a BULKWALK command using the variable is placed on the Command line at the bottom of the panel. You can Press Enter to invoke the command.

Here are examples of the system, IP, TCP and SNMP variables that you can reach from the MIB Prefixes menu.

System Variables Prompt

```
KONDICBD          TCP/IP MIB Variables             More:   +

    1     system                                    TABLE
    2     sysDescr                                  DISPLAY
    3     sysObjectID                               OBJECT
    4     sysUpTime                                 TICKS
    5     sysContact                                DISPLAY
    6     sysName                                   DISPLAY
    7     sysLocation                               DISPLAY
    8     sysServices                               NUMBER
    9     sysORLastChange                           TICKS
    10    sysORTable                                TABLE

F1=Help  **=Bkwd  F8=Fwd  F12=Cancel
```

Figure 137. System Variables Prompt

IP Variables Prompt

```
KONDICBD          TCP/IP MIB Variables          More:  -+

    47    ip                                      TABLE
    48    ip_group                                TABLE
    49    ipForwarding                            NUMBER
    50    ipDefaultTTL                            NUMBER
    51    ipInReceives                            COUNTER
    52    ipInHdrErrors                           COUNTER
    53    ipInAddrErrors                          COUNTER
    54    ipForwDatagrams                         COUNTER
    55    ipInUnknownProtos                       COUNTER
    56    ipInDiscards                            COUNTER

F1=Help  F7=Bkwd  F8=Fwd  F12=Cancel
```

Figure 138. IP Variables Prompt

TCP Variables Prompt

```
KONDICBD          TCP/IP MIB Variables          More:  -+

    140   tcp                                     TABLE
    141   tcp_group                               TABLE
    142   tcpRtoAlgorithm                         NUMBER
    143   tcpRtoMin                               NUMBER
    144   tcpRtoMax                               NUMBER
    145   tcpMaxConn                              NUMBER
    146   tcpActiveOpens                          COUNTER
    147   tcpPassiveOpens                         COUNTER
    148   tcpAttemptFails                         COUNTER
    149   tcpEstabResets                          COUNTER

F1=Help  F7=Bkwd  F8=Fwd  F12=Cancel
```

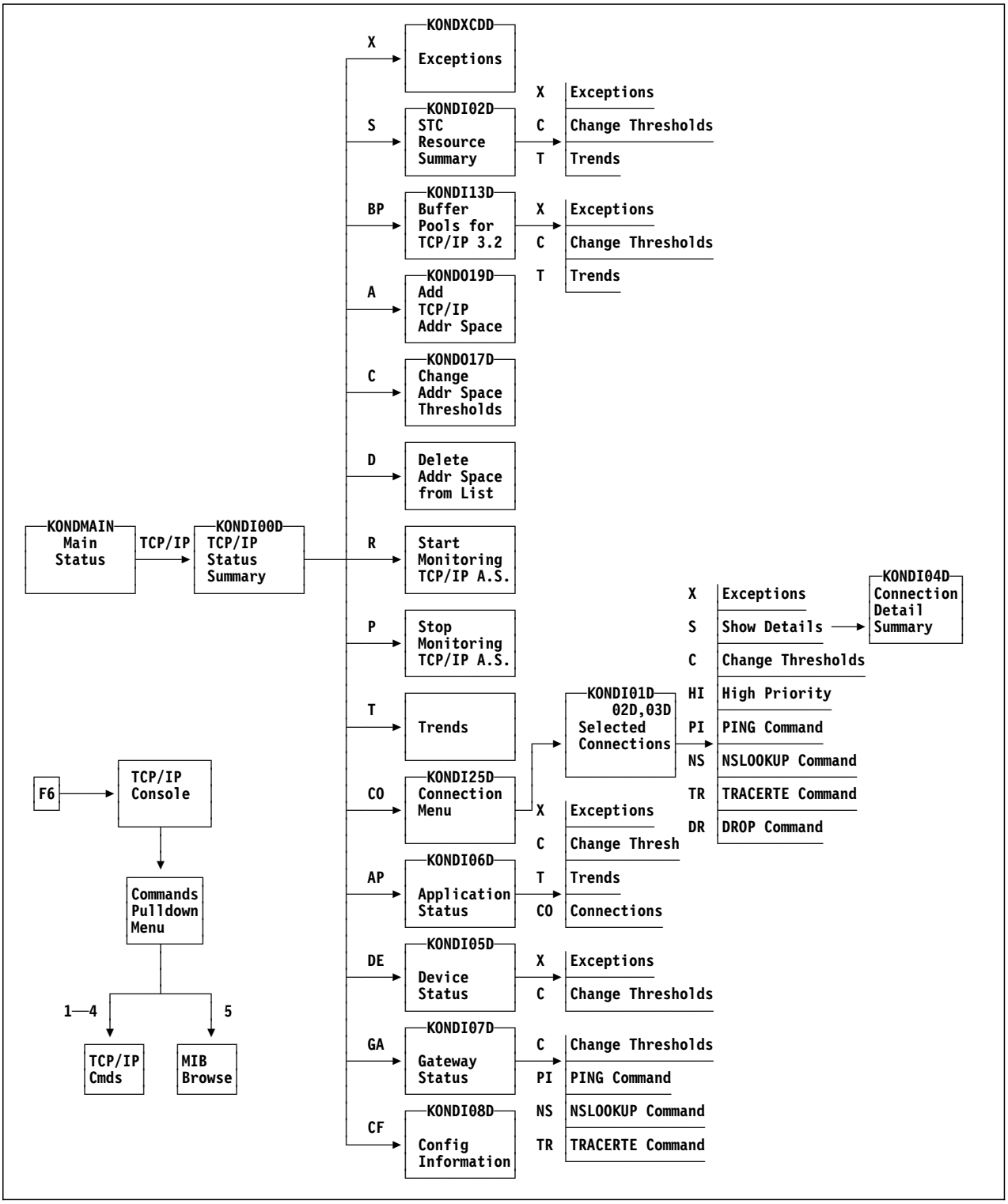
Figure 139. TCP Variables Prompt

SNMP Variables Prompt

```
KONDICBD          TCP/IP MIB Variables          More:  -+

    239   snmp                                    TABLE
    240   snmp_group                              TABLE
    241   snmpInPkts                              COUNTER
    242   snmpOutPkts                             COUNTER
    243   snmpInBadVersions                       COUNTER
    244   snmpInBadCommunityNames                 COUNTER
    245   snmpInBadCommunityUses                  COUNTER
    246   snmpInASNParseErrs                      COUNTER
    247   snmpInBadTypes                          COUNTER
    248   snmpInNoSuchNames                       COUNTER

F1=Help  F7=Bkwd  F8=Fwd  F12=Cancel
```

Figure 140. SNMP Variables Prompt

TCP/IP Navigation



Chapter 13. Applications Analysis

Chapter Contents

Overview

A program that uses VTAM to send data to and receive data from other network resources is a *VTAM application*. For example, a CICS region that uses VTAM to communicate with 3270 terminals is a VTAM application. Every VTAM application identifies itself to VTAM internally through an Access Method Control Block (ACB), and accesses the network through a unique applid (a symbolic name for the application) defined to VTAM in the VTAMLST dataset.

Obtaining Application Information

VTAM assists in establishing sessions between Logical Units (LUs). Within a single LU-to-LU session, one LU is considered to be the primary (PLU) and the other secondary (SLU). PLUs are always application programs, whereas SLUs can be terminals, printers, or other applications. Each application runs within an MVS address space and can have one or more applids open. Each applid can in turn be in session with one or more LUs as shown in the following figure.

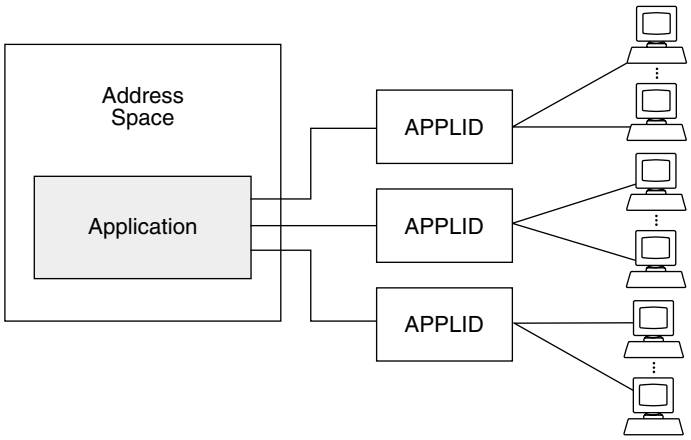


Figure 141. Address Space, Applids, and Terminals

Obtaining performance information on a VTAM application can be difficult and time-consuming. The Applications Analysis feature does that work for you, and displays the data in several ways. For example:

1. You can list all opened applids in the system. See "Applications by Applid" on page 303.
2. You can list all or a subgroup of the address spaces acting as VTAM applications, and then examine them.
3. You can list all or a subgroup of applids within a job.
4. Once you find the applid, you can:
   - Display analysis information, including ACB name, application subarea, REC ANY count, PLU, SLU, and APPC sessions.
   - List all the sessions and zoom in on the one you want.
   - Get control block information for the applid.
   - Display information about VTAM exits.
   - Display VTAM definition data.
   - Display control blocks and VTAM tables for a session

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

Applications by Address Space

On the main status panel, select **VTAM Applications**.

```
____  Actions  Goto  View  Options  Help
------------------------------------------------------------------------------
KONDASPD              Applications by Address Space            1 to  9 of 143

Select with a "/" or an action code.
   S=Applids  A=Analysis
+------------------------------------------------------------------------+
|             |        |             |          | ------Sessions------   |
|   A.S.Name  |  Type  |     ASID    |  Applids |   Active    Pending    |
|-------------+--------+-------------+----------+------------------------|
| _ CONFGRE   |  STC   |    39 (027) |       3  |        1  |        0   |
| _ CONFNFT   |  STC   |    40 (028) |       4  |        0  |        0   |
| _ MAPSNUA   |  STC   |    31 (01F) |       6  |        0  |        0   |
| _ NETTS03   |  STC   |    43 (02B) |      24  |       40  |        0   |
| _ NLNTS05   |  STC   |   197 (0C5) |       5  |        2  |        0   |
| _ LANTS07   |  STC   |   106 (06A) |       6  |        0  |        0   |
| _ DB2TEST   |  STC   |    61 (03D) |       1  |        0  |        0   |
| _ TSOS15    |  TSO   |    86 (056) |       1  |        1  |        0   |
| _ TSOS25A   |  TSO   |    85 (055) |       1  |        1  |        0   |
+------------------------------------------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 142. Applications by Address Space

The Applications by Address Space panel is a useful starting point for gathering data on applications where the applids may not be known, such as CICS. It lists the following:

A.S. Name
Address space name, which is the unique name by which the address space is known.

Type
Whether the job is batch (BAT), a started task (STC), or a TSO user.

ASID
Unique identifier for the address space assigned by MVS.

Applids
Number of applids that have been opened in the address space.

Active Sessions
Number of active sessions for all of the applids in the address space.

Pending Sessions
Number of sessions that are queued and in the process of being activated.

The display gives an overall picture of application usage. You can get an indication of an application's activity by the number of applids and active sessions.

From this display, you can obtain:

- Detailed analysis of selected address spaces. Type **A** (for Analysis) next to each address space and then press Enter.
- Applids for one or more selected address spaces. Type **S** (for Applids) next to each address space and then press Enter.

Analysis of Address Space

If you choose to analyze a selected address space, a panel like the one in the following figure appears.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDAJAD            Analysis of Address Space NETTS07

+--------------------------------------------------------------------------------+
| Address Space Name . . | NETTS07   | Start date. . . . . . . | 03/14/90   |
| Step Name. . . . . . . | NETTS11   | Start time. . . . . . . | 14:56:47   |
| Job type . . . . . . . | STC       |                         |            |
+--------------------------------------------------------------------------------+
+--------------------------------------------------------------------------------+
| Address of ASCB. . . . | 00F35600  | Tasks using VTAM services |        4   |
| Address of MPST. . . . | 009B0130  | Number of APPLs . . . . . |        7   |
| Active sessions. . . . |         3 | Private storage usage . . |        0   |
| Pending sessions . . . |         0 | Address space ID. . . . . |   106(6A)  |
+--------------------------------------------------------------------------------+









Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 143. Address Space Analysis for VTAM Application Panel

The top portion of this panel shows:

- when the address space was started
- address space name
- step name, which specifies the step active in the address space
- job type: batch (BAT), started task (STC), or TSO user

The bottom portion of the panel includes control block, session, and storage information, and the number of tasks and APPLs running within the address space.

Private Storage Usage

The private storage usage field is particularly useful. It displays the number of bytes of data that VTAM allocated in the private area of the address space. VTAM uses this area to store messages that arrived for the application, but for which no RECEIVE was issued. If this number is too large, it means that data is arriving faster than the application can accept it.

Applid Displays

There are two applid panels in Applications Analysis. Both provide basic information on an applid, including:

State Active, inactive, pending active, pending inactive, connectable, reactivating.

Status Ready, holding, no logon, no SSCP, quiescing, closing, abending, init.

ACB name Which may be different from the applid.

Address space Address space name associated with the applid.

Sessions Number of active and pending sessions.

Depending on the type of information on hand, you want to choose from one of the two applid panels described below. One is a global list of applids; the other is a list of applids within a particular address space. From both you can navigate to displays (described in following sections) that provide detailed information on:

- analysis of a specified applid
- sessions
- control blocks
- VTAM tables
- exits
- VTAM definition data

Applications by Applid

Use this first display, a list of applications by applid, when you know the applid but not the address space name. Select the Goto pulldown and then select **Applications by APPLID** from the Applications by Address Space display. The following panel appears.

```
____  Actions  Goto  View  Options  Help
--------------------------------------------------------------------------------
KONDATDD                  Applications by APPLID            1 to 28 of 523

Select with a "/" or an action code.
   S=Sessions  A=Analysis  C=Control blocks  E=Exits  V=VTAM definition
+-------------------------------------------------------------------------------+
|             |              |                |           | ------Sessions------|
|   Applid    |  State       | Status         | A.S. Name |   Active    Pending |
|-------------+--------------+----------------+-----------+---------------------+
| _ AABNL05   |  ACTIVE      | INIT           | $MULTIAA  |         1 |         0 |
| _ AABNL07   |  ACTIVE      | INIT           | $MULTIAA  |         0 |         1 |
| _ ADDKK01   |  ACTIVE      | INIT           | $MULTIAC  |         2 |         0 |
| _ ADDKK03   |  ACTIVE      | INIT           | TDXCONF1  |         1 |         0 |
| _ CONYX01   |  ACTIVE      | READY          | TDXCONF1  |         1 |         0 |
| _ CONYX02   |  ACTIVE      | READY          | TDXCONF1  |         1 |         0 |
| _ CONYX04   |  ACTIVE      | READY          | TDXCONF1  |         0 |         0 |
| _ CONYX06   |  ACTIVE      | NO LOGON       | TDXCONF1  |         0 |         0 |
| _ CTLEG01   |  ACTIVE      | READY          | TDSJAAB6  |         2 |         0 |
| _ MKBNL05   |  ACTIVE      | INIT           | $MULTIAA  |         1 |         0 |
| _ MKBNL07   |  ACTIVE      | INIT           | $MULTIAB  |         0 |         1 |
+-------------------------------------------------------------------------------+


Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 144. Applications by APPLID

The applids are listed in alphabetical order. Locate the applid you want by paging through the panels. (You can also use the View pulldown to select a subset of applids. See “Using the View Facility” on page 53.) Enter one of the following action codes next to the applid name:

S Sessions
A Analysis of applid
C Control blocks
E Exits
V VTAM definition data
+ All of the above

Applids in Address Space

If you know the address space name, but not the applid name, you may first want to view a list of applids in an address space. To do so, enter **S** (Applids) next to an address space name on the Applications by Address Space display (Figure 142 on page 300). The APPLIDs in Address Space display appears.

```
____  Actions  Goto  View  Options  Help
--------------------------------------------------------------------------------
KONDAIDD            APPLIDs in Address Space CLNTS07             1 to 7 of 7

Select with a "/"  or an action code.
   S=Sessions  A=Analysis  C=Control blocks  E=Exits  V=VTAM definition
+-------------------------------------------------------------------------------+
|             |              |              |          | ------Sessions-----  |
|   Applid    | State        | Status       | ACBNAME  |   Active    Pending  |
|-------------+--------------+--------------+----------+----------------------|
| _ NERT0010  | ACTIVE       | READY        | CL7T0010 |        1 |         0 |
| _ CONCAS03  | ACTIVE       | READY        | CL706    |        0 |         0 |
| _ SESS7E1   | ACTIVE       | READY        | CL705    |        1 |         0 |
| _ GRE7AEW3  | ACTIVE       | READY        | CL703    |        0 |         0 |
| _ GRE6AEW2  | ACTIVE       | READY        | CL701    |        0 |         0 |
| _ HEWPREL1  | ACTIVE       | READY        | CL700    |        1 |         0 |
| _ VPIR01    | ACTIVE       | NO LOGON     | CL704    |        0 |         0 |
+-------------------------------------------------------------------------------+



Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd
F9=Retrieve F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 145. APPLIDs in Address Space Panel

Use this panel the same way as discussed previously for the Applications by APPLID panel. That is, obtain further information by scrolling to the applid you want and entering one of the indicated action codes next to its name.

Analysis of Applid

Action code **A** (Analysis) displays more detailed data on the applid and its sessions, including the number and percentage of sessions from the same versus other domains as shown in the following figure.

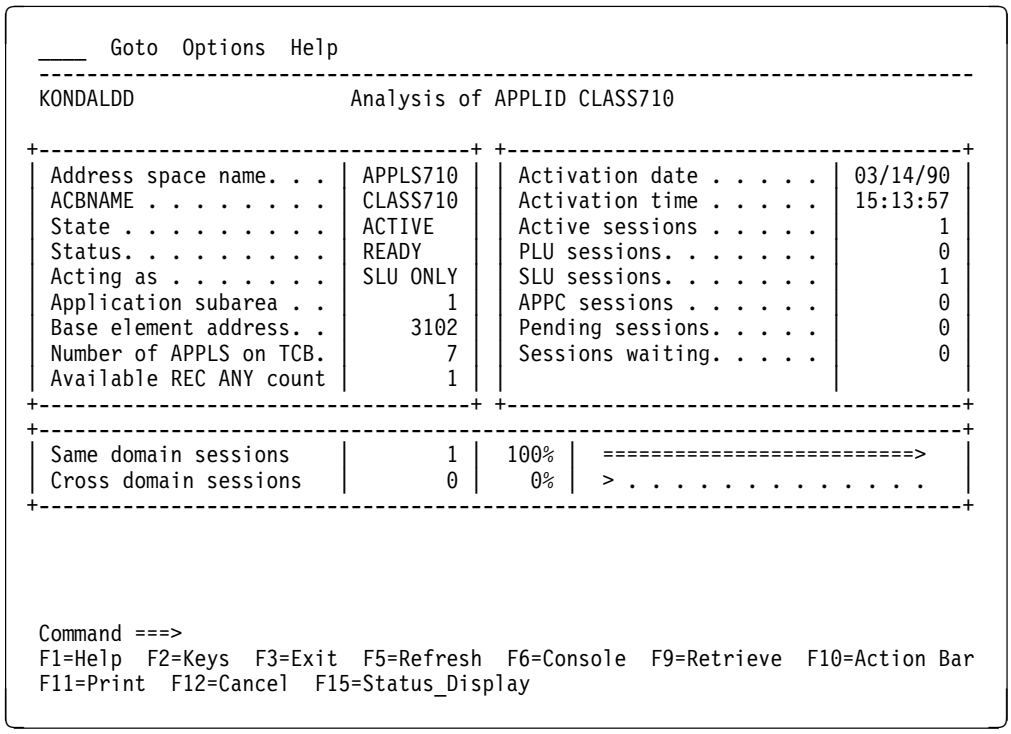


Figure 146. Analysis of APPLID Display

Of the data shown, the **Available REC ANY count** is particularly useful in diagnosing response time problems. When an application (such as CICS) issues a receive any (REC ANY) macro, it informs VTAM that it is ready to receive data traffic for any session. VTAM queues multiple REC ANY requests. When the application issues a REC ANY, the **Available REC ANY count** is increased by 1. When one of the receives is satisfied by incoming data, that count is decremented by 1. When the number of REC ANYs reaches zero, incoming data on sessions must wait. If the value is zero, then the application program may need to be modified so that enough REC ANYs are issued and no session waits.

LUs in Session with Applid

Enter action code **S** (Sessions) for a selected applid to get a session-level topology of the network by viewing which terminals or applications are in session with the application. This information, as shown in the following figure, can be used by network analysts and operators when debugging problems.

```
____  Actions  Goto  Options  Help
--------------------------------------------------------------------------------
KONDAPTD             LUs in Session with Applid V146GTW1          System: SYSA

Select with a "/" or an action code.                        Lines 1 to 18 of 18
   S=Session info  I=SIB  L=RPL  C=COSTAB  U=USSTAB  M=MODETAB
+------------+----------+------+-----+----+----+------------------+
|   LU Name  | Status   | Type |  SA | VR | TP |       PCID       |
+------------+----------+------+-----+----+----+------------------+
| _ ATERM017 | ACTIVE   | SLU  |   1 |  0 |  1 | E7B3A7ABDD2BA34F |
| _ ATERM175 | ACTIVE   | SLU  |   1 |  0 |  1 | E7B3A7ABDD2C4344 |
| _ ATERM277 | ACTIVE   | SLU  |   1 |  0 |  1 | E7B3A7ABDD2D59E7 |
| _ L20A12   | ACTIVE   | SLU  |   8 |  0 |  1 | E7B3A7ABDD2C1108 |
| _ L20A14   | ACTIVE   | SLU  |   8 |  0 |  1 | E7B3A7ABDD2C1111 |
| _ L3052400 | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2D3B66 |
| _ R120A02  | ACTIVE   | SLU  |  10 |  0 |  1 | E7B3A7ABDD2D5D4E |
| _ R120A03  | ACTIVE   | SLU  |  10 |  0 |  1 | E7B3A7ABDD2A0BDD |
| _ R120A08  | ACTIVE   | SLU  |  10 |  0 |  1 | E7B3A7ABDD279E07 |
| _ R121A08  | ACTIVE   | SLU  |  10 |  0 |  1 | E7B3A7ABDD2E732A |
| _ R200A26  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2A429D |
| _ R202A00  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2A0895 |
| _ R202A04  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD29AD40 |
| _ R202A14  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2E007F |
| _ R203B03  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2E3161 |
| _ R203B22  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2E3162 |
| _ R203B23  | ACTIVE   | SLU  |   9 |  0 |  1 | E7B3A7ABDD2E3163 |
| _ R410A16  | ACTIVE   | SLU  |   7 |  0 |  1 | E7B3A7ABDD2E528D |
+------------+----------+------+-----+----+----+------------------+

Command ===> _____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F14=Find  F15=Status_Display
```

Figure 147. LUs in Session with Applid Panel

On this panel you can use various action codes to display session information, control blocks, or VTAM tables for a selected LU. The actions and resulting displays are shown on the following pages.

Session Information for an LU

You can view more detail on an individual session by entering the **S** (Session information) action code next to the LU. This displays control block, send and receive counts, SNA, and additional session information as shown in the following figure.

```
____  Goto  Options  Help
--------------------------------------------------------------------------------
KONDASID            Session Information for CTSOA020

+-----------------------------------+ +-----------------------------------+
| APPLID  RGENZ010 | Subarea      1 | | Partner CTSOA020 | Subarea      1 |
| Acts as SLU      | Element   2128 | | Acts as PLU      | Element   2916 |
+-----------------------------------+ +-----------------------------------+
+-----------------------------------+ +-----------------------------------+
| SIB address . . . . . | 03961288 | | Date session started . . | 03/14/90 |
| FMCB address. . . . . | 02E101D0 | | Time session started . . | 14:55:48 |
| FMCB extension address | 02E226D8 | | APPC session . . . . . |       NO |
| Partner's RDT address . | 0388B0A4 | | Logmode entry name . . . | SNX32703 |
| Send count  . . . . . |       66 | | CID. . . . . | 060001C0 |
| Receive count . . . . . |       89 | | MAX RU in. . . . . |    3,840 |
| Adaptive pacing . . . . |      YES | | MAX RU out . . . . . |    1,024 |
+-----------------------------------+ +-----------------------------------+




Command ===>
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
F11=Print  F12=Cancel  F15=Status_Display
```

Figure 148. Session Information for Applid Panel

VTAM Control Blocks for a Session

When you enter the **I** (SIB) action code next to an LU on the LUs in Session with Applid panel (see Figure 147 on page 306), the contents of the SIB are displayed. The display is in dump format, which includes both hexadecimal and character representations of the data. Notice the actual address and the offset from zero that correspond to each line of data.

```
____  Goto  Options  Help
-------------------------------------------------------------15:55:51 12/03/92
KONDASCD                  SIB Data for LU: OPER005              System: SYSA
                        in Session with Applid: OIVG003

                                                              Lines 1 to 18 of 18
+----------+--------+-----------------------------------+------------------+
|  Address | Offset |              Hex Data             |  Character Data  |
+----------+--------+-----------------------------------+------------------+
| 05395C50 |  0000  | 9800F400 00000000 E7B3A5A7 F19064D5 | q.4.....X.vx1..N |
| 05395C60 |  0010  | 40404040 40404040 C4F4C2F3 F2F7F8F2 |         D4B32782 |
| 05395C70 |  0020  | C4F4C2F3 F2F7F8F2 A6AFD9EC 63232631 | D4B32782w.R.....  |
| 05395C80 |  0030  | 05396960 053932C0 00000000 00000000 | ...-...{........  |
| 05395C90 |  0040  | 00000000 05395D38 05395CF8 0535B164 | ......)...*8....  |
| 05395CA0 |  0050  | 50301001 00000008 053920F0 00000000 | &.........0....   |
| 05395CB0 |  0060  | 00000000 00000000 80000000 00000000 | ................  |
| 05395CC0 |  0070  | 00000000 00000000 00000000 00000000 | ................  |
| 05395CD0 |  0080  | 00000000 00000000 00000000 00000000 | ................  |
| 05395CE0 |  0090  | 00000000 00000000 00000000 00000000 | ................  |
| 05395CF0 |  00A0  | 00000000 00000000 00000000 00000000 | ................  |
| 05395D00 |  00B0  | D6D7C5D9 F0F0F540 E4E2C3C1 C3D6F0F1 | OPER005 USCACO01  |
| 05395D10 |  00C0  | 00000000 053D27B0 00000000 00107380 | ................  |
| 05395D20 |  00D0  | 68810000 001900AE 00000000 00000000 | .a..............  |
| 05395D30 |  00E0  | 00000000 00000000 00000000 00000000 | ................  |
| 05395D40 |  00F0  | D6C9E5C7 F0F0F340 E4E2C3C1 C3D6F0F1 | OIVG003 USCACO01  |
| 05395D50 |  0100  | 00000000 00000000 00000000 00000000 | ................  |
| 05395D60 |  0110  | 00000000 00000000 00000000 00000000 | ................  |
+----------+--------+-----------------------------------+------------------+

 Command ===> _____________________________________________________________
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 149. SIB Data for LU Panel

The SIB indicates the status of an LU-to-LU session. Session services uses an SIB to keep track of which sessions exist and how far session establishment or termination has proceeded for a session. There is one SIB for each session request received by VTAM.

RPL

When you enter the **L** (RPL) action code on the LUs in Session with Applid panel, the contents of the RPL for the selected LU are displayed in dump format. The RPL is a work element used by applications as a parameter list to present requests to VTAM. Once the request has been processed, the RPL is used as a feedback area to inform the application of the request processing results.

Because control blocks are transient, when you request an RPL, it is possible that it cannot be found. If possible, the CRPL is shown instead, and error message pop-up KONCV142 alerts you. The CRPL contains most of the data from the original RPL.

When you enter the C (COSTAB) action code on the LUs in Session with Applid panel, the entire COS table is displayed in dump format.

```
____  Goto  Options  Help
-------------------------------------------------------------15:47:54 12/03/92
KONDATAD                    COSTAB: ISTSDCOS                    System: SYSA
            for LU: OPER005 in Session with Applid: OIVG003

                                                              Lines 1 to 18 of 21
+----------+--------+-------------------------------------+------------------+
|  Address | Offset |              Hex Data               |  Character Data  |
+----------+--------+-------------------------------------+------------------+
| 006DBEA8 |  0000  | BF04000C 001C0000 C9E2E3E5 E3C3D6E2 | ........ISTVTCOS |
| 006DBEB8 |  0010  | 00020102 02020302 04020502 06020702 | ................ |
| 006DBEC8 |  0020  | 001C0000 D9D6E4E3 C8F0F0F1 00020102 | ....ROUTH001.... |
| 006DBED8 |  0030  | 02020302 04020502 06020702 001C0000 | ................ |
| 006DBEE8 |  0040  | D9D6E4E3 C8F0F0F2 00020102 02020302 | ROUTH002........ |
| 006DBEF8 |  0050  | 04020502 06020702 001C0000 D9D6E4E3 | ............ROUT |
| 006DBF08 |  0060  | C8F0F0F3 00020102 02020302 04020502 | H003............ |
| 006DBF18 |  0070  | 06020702 001C0000 D5C5E3D6 D7C5D940 | ........NETOPER  |
| 006DBF28 |  0080  | 00010101 02010301 04010501 06010701 | ................ |
| 006DBF38 |  0090  | 001C0000 C9D5E3C5 D9C1C3E3 00010101 | ....INTERACT.... |
| 006DBF48 |  00A0  | 02010301 04010501 06010701 001C0000 | ................ |
| 006DBF58 |  00B0  | C2C1E3C3 C8404040 00000100 02000300 | BATCH   ........ |
| 006DBF68 |  00C0  | 04000500 06000700 001C0000 C1C2C3C9 | ............ABCI |
| 006DBF78 |  00D0  | D5D5D1C5 00000100 02000300 04000500 | NNJE............ |
| 006DBF88 |  00E0  | 06000700 001C0000 C1C2C3C2 C1E3C3C8 | ........ABCBATCH |
| 006DBF98 |  00F0  | 00000100 02000300 04000500 06000700 | ................ |
| 006DBFA8 |  0100  | 001C0000 E5D4E3C5 E2E34040 01010001 | ....VMTEST ..... |
| 006DBFB8 |  0110  | 02010301 04010501 06010701 001C0000 | ................ |
+----------+--------+-------------------------------------+------------------+


Command ===> ____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  F8=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 150. COSTAB Panel

The class of service table (COSTAB) comprises sequential lists of virtual routes. The virtual routes are grouped according to specific characteristics such as transmission speed. In the MODETAB macro, there is a parameter called COS which specifies the name of the class-of-service to be used for a session that uses the logon mode. If the PLU is a cross-domain resource (CDRSC), the COSTAB data is unavailable in this domain. Error message KONCV126 gives you the name of the table.

When defining a route to the COSTAB, consider the performance requirements of a session. Batch jobs could use a lower priority route, while an interactive session would require a higher priority to provide better response time.

USSTAB

If you enter the **U** (USSTAB) action code, the entire USSTAB is displayed in dump format. The USSTAB contains definitions of VTAM commands and messages. VTAM is shipped with two IBM-supplied USS tables. You can redefine these VTAM commands and messages to reflect your site's requirements. If the SLU is a cross-domain resource (CDRSC), the USSTAB data and the name of the USS table are unavailable in this domain. Instead of the table display, you will see a pop-up of error message KONCV126.

You can use the USSTAB operand of a logical unit's LU definition statement to associate a USSTAB with the LU. Additionally, you can use the TYPE=USSTAB operand of the VTAM MODIFY TABLE operator command to specify a USS table for one or more LUs. You can use the SSCPFM and USSTAB operands of the APPL definition statement for a program operator application to designate a specific USS table for that application. If no replacement USS tables are specified, the default IBM-supplied tables are used.

MODETAB

When you enter the **M** (MODETAB) action code, the LOGMODE entry in the MODETAB for the selected LU is displayed in dump format.

The MODETAB table contains sets of session parameters representing session protocols to be used in a session. For the selected LU, the display shows an individual LOGMODE entry defined by the MODEENT macro. The MODETAB macro describes the MODETAB table, which is a set of MODEENTs. If the PLU is a cross-domain resource (CDRSC), its LOGMODE entry data is unavailable in this domain. Error message KONCV144 gives you the name of the LOGMODE entry.

VTAM has an IBM-supplied mode table (MODETAB) named ISTINCLM, which provides generally accepted session protocols for a basic list of IBM device types. You can modify or replace the IBM-supplied logon mode table, provided that the modified or replacement table has the same name as the IBM-supplied table and that the IBM-supplied table is deleted. However, it is recommended that you create supplementary tables instead of deleting the IBM-supplied table, since the IBM-supplied table might be needed for problem determination.

If you request a LOGMODE entry display, it is possible that the MODETAB was found but the LOGMODE entry could not be determined at the time of the request. Possible reasons include the following:

- The MODETAB was being dynamically refreshed.
- The session was in a transitional state such as initiation or termination.

In such cases, error message pop-up KONCV143 provides the name of the MODETAB. You can retry the request.

VTAM Control Blocks for Applid

When you enter action code **C** (Control Blocks) next to a selected applid on the Applications by APPLID panel (see Figure 144 on page 303), the following panel appears.

```
____  Actions  Goto  Options  Help
-------------------------------------------------------------16:50:16 09/02/92
KONDACBD           VTAM Control Blocks for OIVG003               System: SYSA

Select with a "/" or an action code.                        Lines 1 to 6 of 6
   S=Show data
+--------------------------------+-------------------------------+
| Address space name. : JOBVG003 | ACBNAME . . . . . : OIVG003   |
+--------------------------------+-------------------+-----------+
|                      Control Block                | Address   |
+---------------------------------------------------+-----------+
| _ ACB    Access Method Control Block . . . . . .  | 00043B40  |
| _ ACDEB  VTAM Data Extent Block. . . . . . . . .  | 049955A0  |
| _ LUCB   Logical Unit Control Block. . . . . . .  | 04CFFC90  |
| _ PST    Process Scheduling Tables . . . . . .    | 04A4F8F0  |
| _ RAP    Resource Definition Table Application Entry | 853750B0  |
| _ TCB    Task Control Block. . . . . . . . . . .  | 006EC190  |
+---------------------------------------------------+-----------+



Command ===> _____________________________________________________________________
F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 151. VTAM Control Blocks for APPLID

This panel provides the major VTAM control block addresses for an applid.

Each control block on this panel is selectable. Use action code **S** (Show Data) to display the contents of the control block.

ACB Data for Applid

If you select ACB, the contents of the ACB for the applid are displayed in dump format.

```
____  Goto  Options  Help
-------------------------------------------------------------15:58:27 12/03/92
KONDASFD                ACB Data for Applid: OIVG003             System: SYSA

                                                                Lines 1 to 7 of 7
+----------+--------+--------------------------------------+------------------+
|  Address | Offset |              Hex Data                |  Character Data  |
+----------+--------+--------------------------------------+------------------+
| 00043B40 |  0000  | A020006C 00000000 80D0C000 94000001 | ...%.....}{.m... |
| 00043B50 |  0010  | 00000000 00000000 80000008 00000000 | ................ |
| 00043B60 |  0020  | 00000000 00043BC0 FF000060 00000074 | .......{...-.... |
| 00043B70 |  0030  | 12000000 00000000 00000000 00000000 | ................ |
| 00043B80 |  0040  | 00000000 00000000 000430F4 41F00020 | ...........4.0.. |
| 00043B90 |  0050  | 07FE0000 00000000 00000000 00DFEFA8 | ...............y |
| 00043BA0 |  0060  | 006DCE58 00000000 00000000          | ._.......        |
+----------+--------+--------------------------------------+------------------+




 Command ===> _____________________________________________________________
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  **=Bkwd  **=Fwd  F9=Retrieve
 F10=Action Bar  F11=Print  F12=Cancel  F15=Status_Display
```

Figure 152. ACB Data for Applid Panel

A similar panel is displayed for each of the control blocks that relate to an applid:

ACB Represents a VTAM application. It defines the interface between application code and VTAM routines so that the application can use VTAM facilities.

ACDEB Built when an ACB is open, the ACDEB relates to the ACB. It is the beginning of the chain of control blocks that associate an application to VTAM routines and request VTAM processing for the application. It includes information for scheduling some data transfers and also controls application and session termination.

LUCB Anchors control blocks for an application's active and pending sessions between ACB open and close time.

PST Controls asynchronous functions such as I/O, completion, and session-request completion. There is one PST per application task.

RAP Entry in the VTAM resource definition table that defines a specific application.

TCB Contains task-related information and pointers. The control program writes into and reads from the TCB.

When you request one of the above control blocks, OMEGAMON II displays the data starting at the address shown on the Control Blocks for Applid panel. Possible reasons include the following:

- The data at that address is no longer valid because the address space cannot be swapped in.
- The address space is gone.
- The session has terminated.

In such cases an error message pop-up (KONCV137—KONCV141) will explain why the control block cannot be displayed. The SIB or RPL may still be available.

Control Block Usage

Control blocks and VTAM tables are vital debugging tools for session-related problems. Instead of perusing an entire address space dump, the control block and table displays directly provide information you need for problem determination.

To obtain a printout of a control block or table display, press F11 (Print). Also, you can use the the SNAP and VIEW commands to save the panel image for later retrieval and printing. For more information about the snapshot facility, see "Saving and Retrieving Panels" on page 69.

VTAM Exits for Applid

If you select action code **E** (Exits) next to a selected applid on the Applications by APPLID display (see Figure 144 on page 303), the following panel appears.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDAEXD               VTAM Exits for APPLID RGENZ02

+-----------------------------------+
| Address space name . . | DCON657  |
| ACBNAME. . . . . . . . | RGENZ02  |
| EXLST address. . . . . | 0000CB58 |
+-----------------------------------+
+-----------------------------------+ +-----------------------------------+
| RESP exit address. . . |       NA | | TPEND exit address. . . | 0005F400 |
| LOGON exit address . . | 00060840 | | LOSTERM exit address. . | 00060648 |
| SCIP exit address. . . | 0005F7F8 | | SYNAD exit address. . . | 0005F600 |
| DFASY exit address . . |       NA | | LERAD exit address. . . | 00060E50 |
| RELREQ exit address. . | 0005FFE0 | | NSEXIT exit address . . | 000602A8 |
+-----------------------------------+ +-----------------------------------+




 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
 F11=Print  F12=Cancel  F15=Status_Display
```

Figure 153. VTAM Exits for APPLID

This panel provides the VTAM systems programmer with the addresses of the exits that are used for an applid and indicates which exits are *not* being used. An application may be unprepared for certain network conditions if the proper exits are not provided. Thus, the display can be used to expose problems with an application. For example, suppose no LOSTERM exit exists for an application. This exit is driven when VTAM terminates a session. If a session with that application is terminated, the application does not receive that information.

For further information on VTAM exits, see the IBM manual *VTAM Programming*.

VTAM Definition Data

Enter action code **V** (VTAM definition) next to a selected applid on the Applications by APPLID display. The following panel appears.

```
 ____  Goto  Options  Help
 ------------------------------------------------------------------------------
 KONDACOD        VTAM Definition Data for APPLID RGENZ02

+-----------------------------------+ +-------------------------------------+
| Major node . . . . . | GENM090Z   | | Max private. . . . . | NO LIMIT     |
| EAS value. . . . . |       509    | | Parallel sessions. . . |        NO   |
| Modetab. . . . . | MODETAB1      | | APPC capable . . . . . |        NO   |
| DLOGMOD. . . . . | IBM3820       | | Vary Logon Logmode . . | D4A32783    |
| Exits in SRB mode. . . |      NO  | | VTAM FRR coverage. . . |        NO   |
+-----------------------------------+ +-------------------------------------+
+------------------------------------------------------------------------------+
| Authorizations:   NVPACE PASS ACQ                                            |
+------------------------------------------------------------------------------+









 Command ===>
 F1=Help  F2=Keys  F3=Exit  F5=Refresh  F6=Console  F9=Retrieve  F10=Action Bar
 F11=Print  F12=Cancel  F15=Status_Display
```

Figure 154. VTAM Definition Data for APPLID

This panel shows how the applid is defined in VTAMLST, including its:

Major node Where the applid is defined and where the systems programmer can make changes. It maps the applid to the member name in the VTAMLST dataset. The major node name is the same as the member name.

EAS value Estimated Application Sessions. The estimated number of sessions that the applid may have.

Modetab Modetable; the table of logon mode entries.

DLOGMOD Default logmode name.

Exits in SRB mode Whether the exits provided by the applid are scheduled in either the SRB (Service Control Block) or TCB (Task Control Block).

MAX private	Maximum amount of storage VTAM is allowed to queue into the address space.
Parallel sessions	Whether 2 LUs can have more than one session between them.
APPC capable	Capable of carrying on LU 6.2 type sessions.
Vary Logon Logmode	If non-blank, the default logmode was overridden by a VTAM operator command. If blank, the default logmode was *not* overridden by a VTAM operator command.
VTAM FRR coverage	Whether Functional Recovery Routine coverage is provided by VTAM (yes) or the user (no).
Authorizations	Authorized functions that have been enabled for the applid.

Case Study

The following case study is similar to one that may occur at your facility.

Users logged onto CICS at your facility are reporting slow response times. By using the OMEGAMON II response time feature (see "Response Time" on page 189), you determine the problem is in the host and not the network. Here are the steps you might then follow to resolve such a problem using Applications Analysis:

1. Enter the **A** (Analysis) action code for a selected applid on the Applications by APPLID panel.
2. The first panel is Applications by Address Space. Scroll through the CICS address space names until you find the applid you want (in this example, we use the name CICSPROD.)
3. Select the address space name with the **S** (Sessions) action code.
4. The APPLIDs in Address Space display appears for CICSPROD as shown in the following figure.

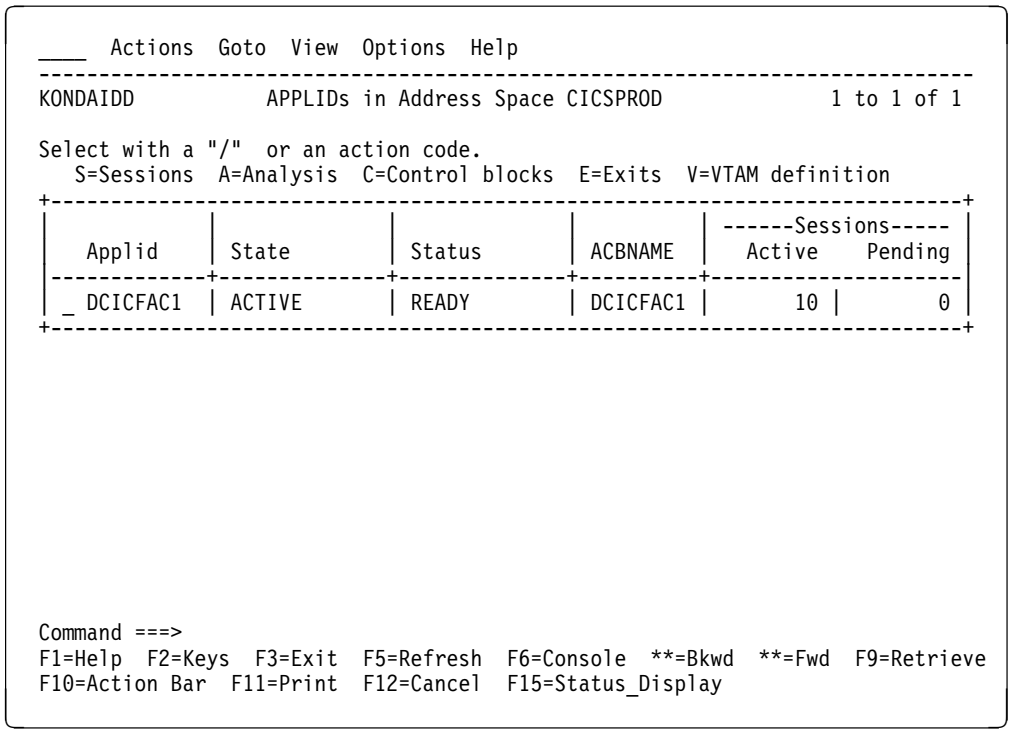


Figure 155. Case Study: APPLIDs in Address Space

5. You want Analysis information on CICSPROD. In particular, you want to examine the **Available REC ANY count**. Enter action code **A** (Analysis) next to the single applid labeled DCICFAC1.
6. The Analysis of APPLID panel appears as in the following figure.

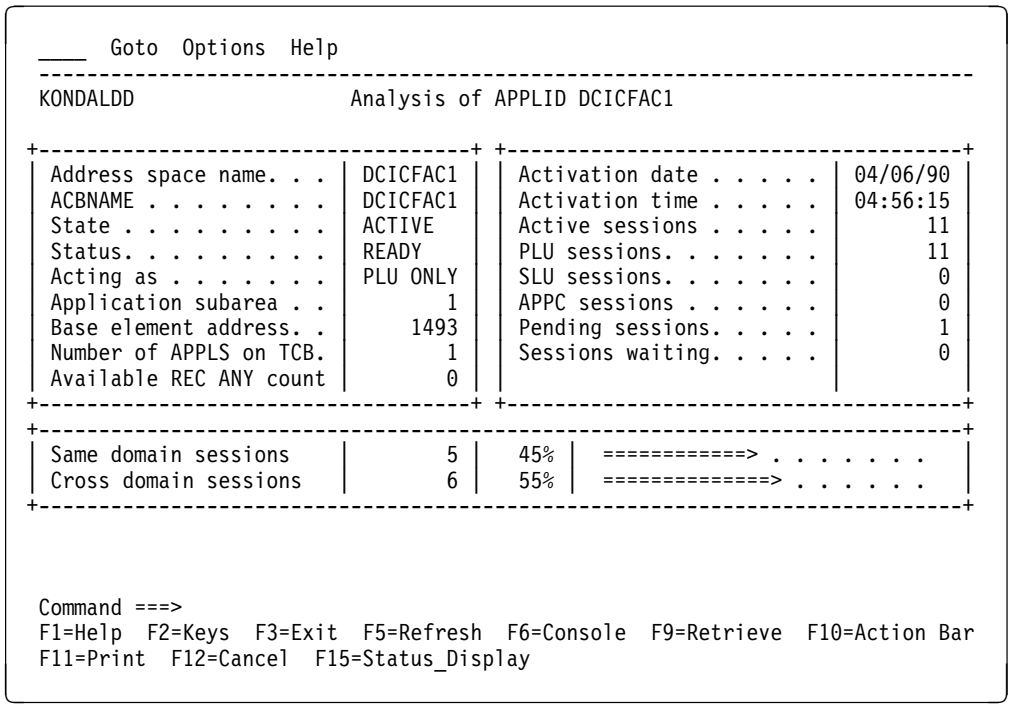
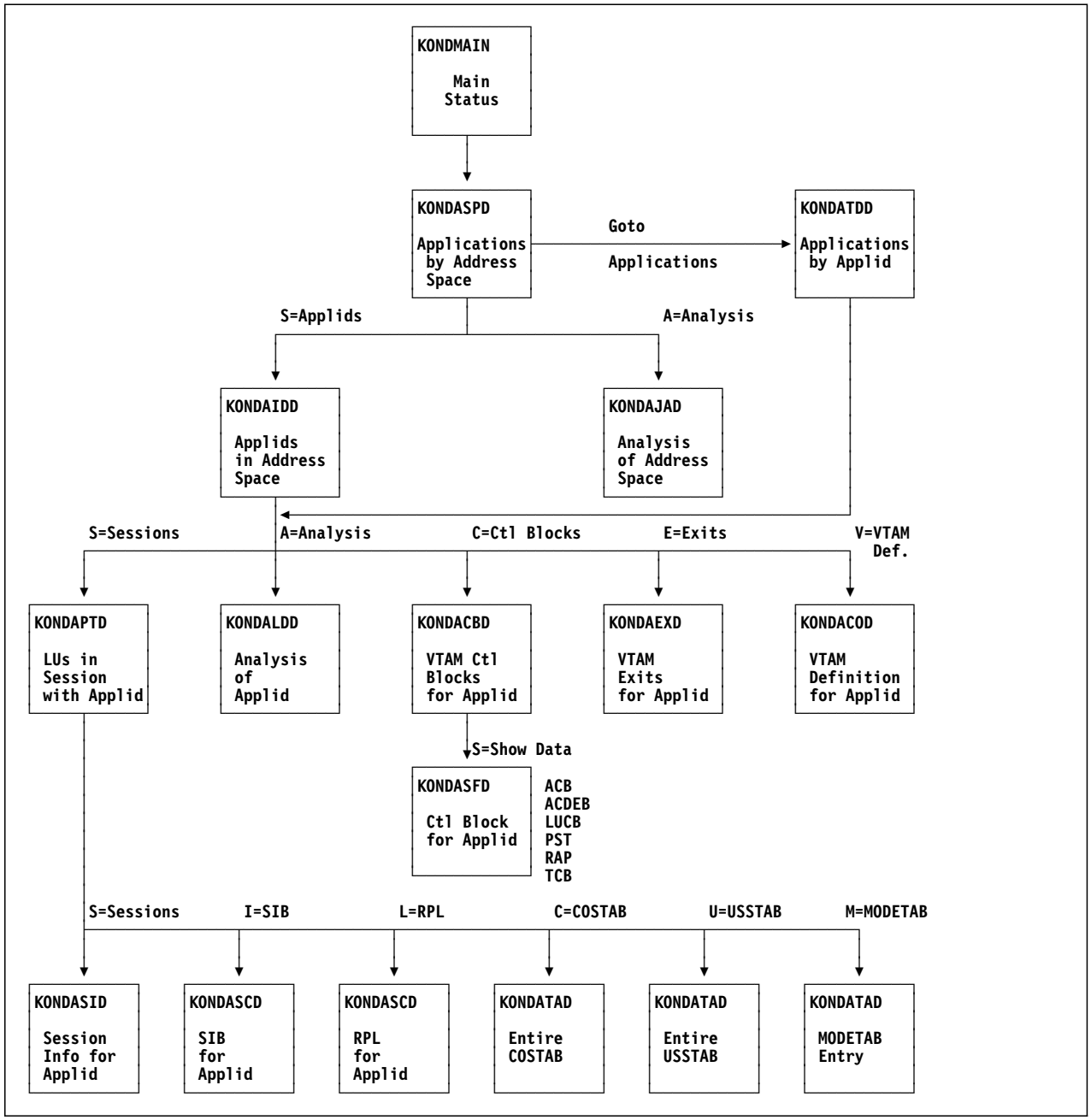


Figure 156. Case Study: Using the Analysis of APPLID Panel

7. The **Available REC ANY count** is presently one. However, after pressing Enter several times, you notice that the number oscillates between zero and one. When the **Available REC ANY count** is zero, incoming data to the application is queued into the private storage area rather than being processed.
8. From these facts, you deduce that you probably need to adjust CICS parameters MXT and RAPOOL to improve response times (referring to IBM CICS documentation on resource definition).

VTAM Applications Component Navigation



Part III: Setting OMEGAMON II Monitoring Options for Your Site

Chapter 14. Monitoring Options

Chapter Contents

Overview

The Monitoring Options pulldown includes selections for setting exception thresholds and global product defaults, logging exceptions, writing trend records to the VSAM log file and SMF, selecting VTAM and NCP resources to monitor, and other important options.

Only users with administrator authority can alter settings within the Monitoring Options selections. However, any user may view the current settings for these selections. A system administrator may grant authorization during an OMEGAMON II session via the User Authorities selection (see "User Authorities" on page 353).

OMEGAMON II provides an initial set of default values for Monitoring Options. However, since the characteristics of VTAM/NCP networks vary widely, you probably want to tailor the values to your specific network configuration.

Changes to monitoring options take effect at the next sampling interval except for changes to VTAM Environment, which take effect immediately.

For information about setting NCP resource monitoring options, see "Setting NCP Monitoring Options" in the *OMEGAMON II for Mainframe Networks NCP Monitoring Guide*.

Performance Objectives

OMEGAMON II enables you to set your own performance objectives by setting thresholds. A threshold is a value that indicates an unsatisfactory level of performance. A *critical* threshold indicates a more unsatisfactory or more severe condition than a *warning* threshold.

OMEGAMON II exception monitoring supports warning and critical conditions for all exceptions.

Warning and Critical Numeric Thresholds

For those exceptions where you specify numeric or percentage thresholds, you can specify both warning and critical values. We recommend setting both so that you are warned of an impending problem and also alerted when the problem needs immediate attention.

Warning and Critical Status

For those exceptions that monitor for the presence or absence of a specific activity, you can decide how severe the condition is (warning or critical) when it occurs at your site.

Determining the Status Lights

The thresholds and conditions that you specify with the Monitoring Options pop-ups determine the color of the status lights on OMEGAMON II performance displays. When OMEGAMON II detects that thresholds or conditions have been reached, status lights change from green (normal) to yellow (warning) to red (critical).

Be aware that exception recording must be active for normal, warning, and critical status lights and exception messages to display. Otherwise, the status lights are turquoise (idle).

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for the panel.

Monitoring Options Pulldown

Select **Monitoring Options** from the Options pulldown to display the menu shown in the following figure. The rest of this chapter describes selections on the Monitoring Options menu.

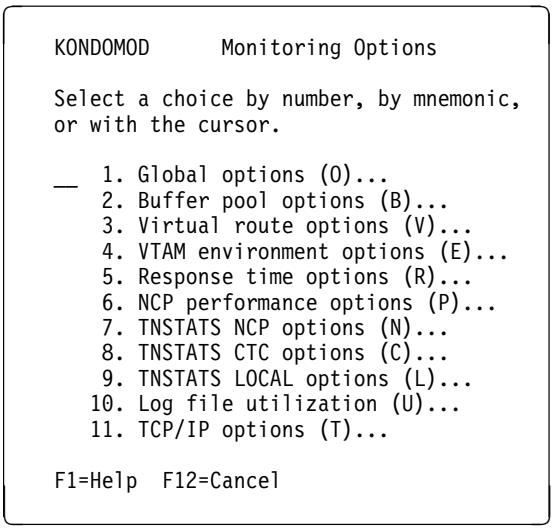


Figure 157. Monitoring Options Menu

Global Options

Select **Global Options** on the Monitoring Options menu to display the panel shown below. Use this panel to set parameters that determine how OMEGAMON II collects and archives different types of data and how it accesses the VTAM console.

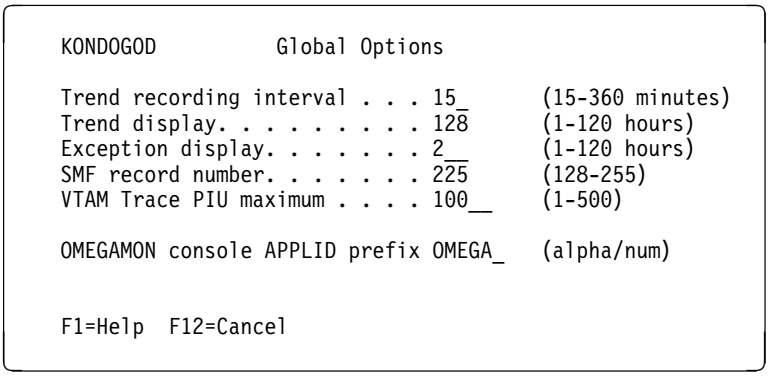


Figure 158. Global Options Panel

Trend recording interval

OMEGAMON II collects communications data and generates records for trending and historical information based on two time settings: the sampling and recording interval. The sampling interval is the number of seconds between collections of data samples. At the end of a sampling interval, OMEGAMON II writes any exception records to the Log File and/or SMF.

The recording interval is the number of minutes in which samples of communications data are accumulated into a single trend record. At the end of a recording interval, OMEGAMON II writes trend records to the Log File and/or SMF.

As an example, with a sampling interval of 30 seconds and a recording interval of 30 minutes, 60 samples would be collected in each trend record.

Trend display

How many hours to go back into the VSAM Log File when displaying trend records. You enable (or disable) trend recording for individual OMEGAMON II components (such as buffer pools, virtual routes, CTC tuning statistics) using monitoring options panels shown later in this chapter.

Exception display

How many hours to go back into the VSAM Log File when displaying exception records. You enable (or disable) exception recording for individual OMEGAMON II components (such as buffer pools, virtual routes, CTC tuning statistics) using monitoring options panels shown later in this chapter.

SMF record number

Unique, identifying number that is part of the SMF header for all OMEGAMON II records. For OMEGAMON II historical reporting to function, this number must be different from the SMF record number for any other SMF record type generated by your data center.

VTAM trace PIU maximum

Maximum number of PIUs to save for a single VTAM trace. The default value is 100 and the maximum is 500.

OMEGAMON console APPLID prefix

You can use the console facility of OMEGAMON II to issue VTAM commands via VTAM's Secondary Program Operator (SPO) facility. To use the console facility, a VTAM applid must be defined and available. As an administrator, you provide the applids by specifying their common 5-character prefix. Use the same prefix that was specified for terminal pool prefix during OMEGAMON II CICAT configuration.

OMEGAMON II appends a **C** followed by a 2-digit sequence number (beginning with C01) to this prefix to create a pool of applids. The list of applids is searched sequentially, when OMEGAMON II is started, and the first available applid is opened. For further detail, please refer to the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide*.

Buffer Pool Options

Select **Buffer Pool Options** on the Monitoring Options menu to display the menu panel shown below. Choose **Monitoring Options** from this menu to display a panel for modifying defaults and common thresholds for all buffer pools. Use the remaining menu options to enable or disable exceptions and set threshold values for individual buffer pools.

```
KONDOMB3   Buffer Pool Options

Select a choice by number, by mnemonic,
or with the cursor.

_ 1. Monitoring options (M)...
  2. IO00  Input/Output thresholds (I)...
  3. LP00  Large pageable thresholds (L)...
  4. CRPL  Copied RPL thresholds (C)...
  5. SP00  Small pageable thresholds (S)...
  6. LF00  Large fixed thresholds (F)...
  7. SF00  Small fixed thresholds (T)...
  8. AP00  Below 16meg line thresholds (A)...
  9. XD00  Exchange processing (X)...
 10. BS00  Boundary types 2.1, 2, 1 (B)...
 11. TT00  High performance data transfer (J)...
 12. CRA4  Component Recovery Area 4 (R)...
 13. CRA8  Component Recovery Area 8 (D)...


F1=Help  F12=Cancel
```

Figure 159. Buffer Pool Options Panel

Buffer Pool Monitor Options

Use the **Buffer Pool Monitor Options** panel to set parameters that control data collection and exception monitoring for all buffer pools.

```
KONDOMBM          Buffer Pool Monitor Options

Sampling interval . . . . .   30_     (20-300 seconds)
Exception recording . . . .   L   +   (N-None/L-Log/S-SMF/B-Both)
Trend recording . . . . . .   L   +   (N-None/L-Log/S-SMF/B-Both)

     Default Exceptions       Y/N            Condition
--------------------------   ---     --------------------------
Storage request queued  . .   Yes +   C +  (W-Warning/C-Critical)
Pool in slowdown  . . . . .   Yes +   C +  (W-Warning/C-Critical)
Pool expansions . . . . . .   Yes +   W +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 160. Buffer Pool Monitor Options Pop-up

The top part of this panel consists of three fields:

Sampling interval
Number of seconds between collections of buffer pool data samples. At the end of the sampling interval, exception records are written to the Log File and/or SMF.

Exception and Trend recording
Four choices are available:

N None. Do not write buffer pool exception/trend records to the VSAM Log File or to SMF.

L Log. Turn on the recording of buffer pool exceptions/trends to the VSAM Log File for display. The amount of data you can retain in the Log File is limited by the size of the file.

S SMF. Turn on the recording of buffer pool exceptions/trends to SMF for longterm historical analysis.

B Both. Enable both the L (Log) and S (SMF/Historical) options for buffer pool exceptions/trend records.

Note: For buffer pool status lights to display normal, warning, and critical conditions, you must activate exception recording to the Log File. Otherwise, the status displays as Idle.

In the bottom part of the panel, you can enable or disable exceptions and specify their thresholds or severity for each of the VTAM buffer pools, as shown in the follwing figures.

Individual Buffer Pool Thresholds

All buffer pools use the same set of exceptions as the IO00 pool shown below.

```
KONDOMBV            Buffer Pool Thresholds

                        Pool ID: IO00

       Exceptions            Y/N       Warning       Critical
------------------------     ---       --------      --------
Total buffers  . . . . .     Yes +     400_____      500_____
Active extents . . . . .     Yes +     3_______      5_______

Thrashing  . . . . . . .     Yes +     C +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 161. Buffer Pool Thresholds (except CRPL) Pop-up

In addition, the CRPL pool has an exception for pool usage by a single user, which is Buffer Allocation Percentage.

```
KONDOMBC            Buffer Pool Thresholds

                        Pool ID: CRPL

           Exceptions           Y/N      Warning     Critical
-----------------------------   ---      --------    --------
Total buffers . . . . . . . .   Yes +    400_____    500_____
Active extents. . . . . . . .   Yes +    3_______    5_______
Buffer allocation percentage.   Yes +    50_         60_

Thrashing . . . . . . . . . .   Yes +    C +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 162. Buffer Pool Thresholds for CRPL Pop-up

Virtual Route Options

Select **Virtual Route Monitor Options** on the Monitoring Options menu to choose which portions of your network you want to analyze and display. Virtual Route (VR) administration is divided into two parts:

Monitor Options Sets global defaults for Monitor controls and exceptions for monitoring all VRs. Includes changing the sampling interval, recording exceptions and trend data, and selecting the range of monitored VRs you want to display.

Monitor List Defines the list of VRs you want to monitor when Monitor Scope is L. You can select and set exception thresholds for subareas or specific VRs within subareas that you want to monitor.

When Monitor Scope is A, you use the list to specify settings for subareas that will override the global virtual route settings.

When you select **Virtual Route Options** from the Monitoring Options menu, a pop-up asks you to select either of the above virtual route monitoring choices.

Virtual Route Monitor Options

If you select **Monitor Options** the following panel appears.

```
KONDOMVM          Virtual Route Monitor Options

Sampling interval            30_       (20-300 seconds)
Monitor scope                A   +     (N-None/L-Monitor List/A-All)
Exception recording          L   +     (N-None/L-Log/S-SMF/B-Both)
Trend recording              L   +     (N-None/L-Log/S-SMF/B-Both)

   Default Exceptions        Y/N       Warning       Critical
-----------------------      ---       --------      --------
Flow rate (PIU/Sec)  . .     Yes +     10______      20______
Number of sessions . . .     Yes +     10______      25______

Virtual route blocked  .     Yes +     C +  (W-Warning/C-Critical)
Window size at minimum .     Yes +     W +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 163. Virtual Route Monitor Options Pop-up

The top group of selections on this panel contains the following fields:

Sampling interval

Number of seconds between collections of VR data samples. At the end of the sampling interval, exception records are written to the Log File and/or SMF.

For VTAM releases prior to 4.3, sampling interval should *not* exceed 30 seconds in order to insure significant data for PIUs/second.

Monitor scope

Range of monitored VRs you want displayed.

N Do not display or monitor any VRs.

L Use the monitor list to define thresholds, and enable and start monitoring only for specific subareas/virtual routes. To define the list, select Monitor List on the Virtual Route Monitoring Options menu.

A Display all monitored VRs using the exception and threshold settings defined on this panel. You can also use the Monitor List panel to override the global virtual route settings for individual subareas.

Note: When you set Monitor Scope to A (All) and trend recording to L (Log), monitoring of all VRs begins.

Exception and trend recording

Enable the recording of exception and trend data for VRs:

N None. Do not write VR exception/trend records to the VSAM Log File or SMF.

L Log. Turn on recording of VR exceptions/trends to the VSAM Log File for display.

S SMF. Turn on the recording of VR exceptions/trends to SMF for longterm historical analysis.

B Both. Enable both the L (log) and S (SMF) options for VR data.

Note: To monitor all or selected virtual routes/subareas, you must set Trend Recording to L (Log).

To display normal, warning, and critical conditions in the Virtual Route status lights, you must set Exception Recording to L (Log), otherwise status displays as Idle.

Use the bottom group of selections on the Virtual Route Monitor Options panel to specify exceptions, threshold values, and status light settings to be used when you set Monitor Scope to A (All). You can override these global settings for individual subareas by using the Monitor List.

When you enable the exceptions, you also must specify warning and critical threshold values or indicate the severity — OMEGAMON II generates a warning (yellow) or critical (red) condition when the exception is detected.

Virtual Route Monitor List

If you set Monitor Scope to **L** (Monitor List) on the Virtual Route Monitoring Options panel (see Figure 163 on page 331), you should then select **Monitor List** on the Virtual Route Monitoring Options menu to set exceptions and thresholds for specific VRs and subareas to be monitored.

You can also use this list when Monitor Scope is set to **A** (All) to override global options for individual subareas. All other subareas will use the global virtual route settings, and the subareas in the list will use the settings you specify in the list.

```
KONDOMVD              Virtual Route Monitor List
                 Subareas Defined from CCCDRM25 (Subarea 25)

Enter one of the following action codes.          Lines 1 to 10 of 24
   R=Start P=Stop C=Change D=Delete Q=Quickstart L=List U=Unlist
+-------------------------------------------------------------------+
|    Subarea   |  Destination  |  Status  |  Monitor  |  Thresholds  |
|--------------+---------------+----------+-----------+--------------|
| _  1         |   CCCDRM01    |  ACTIVE  |    YES    |   VR         |
| _  2         |   CCCDRM02    |  ACTIVE  |    NO     |              |
| _  4         |   CCCDRM04    |  INACT   |    NO     |              |
| _  6         |               |  INACT   |    NO     |              |
| _  7         |               |  ACTIVE  |    NO     |              |
| _  8         |               |  ACTIVE  |    NO     |              |
| _  9         |               |  ACTIVE  |    NO     |              |
| _  10        |   NCP10       |  ACTIVE  |    NO     |              |
| _  11        |               |  INACT   |    NO     |              |
| _  12        |   CCCDRM12    |  ACTIVE  |    NO     |              |
+-------------------------------------------------------------------+

F1=Help  F2=Show Subareas  F3=Show Virtual Routes  F4=Monitored Subareas
**=Bkwd  F8=Fwd  F12=Cancel  F14=Find
```

Figure 164. VR Monitor List Panel

This panel contains action codes for selecting the VRs and subareas you want to monitor:

R Start monitoring. Specify exceptions and thresholds for a subarea or VR.

P Stop monitoring.

C Change threshold settings for a subarea or VR. When you enter this action code, you specify your threshold settings on the panel that appears.

Q Quickstart. Start monitoring using predefined thresholds.

L List all the VRs for the selected subarea.

U Unlist, or remove from the display, the listed VRs for a selected subarea.

You can use the following function keys, which are unique to this function, to manipulate the VR Monitor List display:

F2 Displays all subareas in your network.

F3 Displays all VRs within each of the subareas and is the most comprehensive display.

F4 Shows only those subareas that are being monitored.

The following figure shows an example of a display of all VRs.

```
KONDOMVD              Virtual Route Monitor List
                 Subareas Defined from CCCDRM25 (Subarea 25)

Enter one of the following action codes.          Lines 1 to 10 of 154
   R=Start P=Stop C=Change D=Delete Q=Quickstart L=List U=Unlist
+-------------------------------------------------------------------+
|    Subarea   |  Destination  |  Status  |  Monitor  |  Thresholds  |
|--------------+---------------+----------+-----------+--------------|
| _  1         |   CCCDRM01    |  ACTIVE  |    YES    |   VR         |
| _       VR0  |               |  ACTIVE  |    NO     |              |
| _       VR1  |               |  INACT   |    YES    |   VR         |
| _  2         |   CCCDRM02    |  ACTIVE  |    NO     |              |
| _       VR0  |               |  ACTIVE  |    NO     |              |
| _       VR1  |               |  INACT   |    NO     |              |
| _  4         |   CCCDRM04    |  INACT   |    YES    |   SUBAREA    |
| _       VR0  |               |  INACT   |    YES    |   SUBAREA    |
| _       VR1  |               |  INACT   |    YES    |   SUBAREA    |
| _       VR2  |               |  INACT   |    YES    |   SUBAREA    |
+-------------------------------------------------------------------+

F1=Help  F2=Show Subareas  F3=Show Virtual Routes  F4=Monitored Subareas
**=Bkwd  F8=Fwd  F12=Cancel  F14=Find
```

Figure 165. VR Monitor List Showing All Virtual Routes

VTAM Environment Options

To set exceptions for VTAM environment problems, select **VTAM Environment Options** on the Monitoring Options menu. The panel shown in the following figure appears.

```
KONDOMED      VTAM Environment Options


       Exceptions     Y/N    Warning     Critical
-------------------- ---
CPU usage . . . . . . Yes +  2________   20_______
PAGING rate . . . . . Yes +  10_______   20_______
SIO rate. . . . . . . Yes +  50_______   90_______
CSA allocated . . . . Yes +  25_______   50_______
C24 allocated . . . . Yes +  20_______   30_______


F1=Help  F4=Prompt  F12=Cancel
```

Figure 166. VTAM Environment Thresholds Panel

You can enable or disable any or all of the five exceptions shown and specify their warning and critical threshold values. See the associated field-level help panels or “VTAM Environment” on page 237 for the meaning of these five exceptions and how they reflect system performance.

Response Time Options

The **Response Time Options** selection on the Monitoring Options menu displays a menu with two selections:

1. **Monitor Options** to set global parameters for background response time monitoring.
2. **Response Time SMF Options** to create and maintain a list of terminals and applications for background collection of response time data.

OMEGAMON II writes response time data to SMF. The data is then processed by SAS or SAS/GRAPH to create color graphs, nongraphic plots, and service-level reports. (See the *OMEGAMON II for Mainframe Networks Historical Reporting Guide*.)

Response Time monitoring requires the End-to-End Response Time Feature. See the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide* and the *End-to-End Response Time Feature Reference Manual* for more information about the End-to-End Response Time Feature.

Response Time Monitor Options

If you select **Monitor Options** on the Response Time Options menu, the following panel displays:

```
KONDOMRM       Response Time Monitor Options


 Trend recording . . . . . S +  (N-None/S-SMF)
 Response time DR frequency. . 1_   (1-99)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 167. Response Time Monitor Options

In the trend recording field, you enter **S** to record response time trend data on SMF or **N** to suppress recording.

In the Response Time DR Frequency field, you enter the frequency at which you want OMEGAMON II to substitute definite response (DR) processing for terminal groups. DR is performed outside of the application and therefore does not affect application performance because the application is unaware of the DR. The lower the DR frequency, the greater the precision in the response time calculation.

Response Time SMF Options

When you select **Response Time SMF Options** on the Response Time Options menu, the panel shown in the following figure appears. This panel displays how response time data is collected for each resource or resource group.

```
KONDOMRD           Response Time SMF Options


Enter one of the following action codes.
   A=Add  C=Change  D=Delete  V=View       1 of 4 of 4
+-------------------------------------------------+
|   Resource  | Type | DR  | Start | Stop  | Status  |
|-------------+------+-----+-------+-------+---------|
| _ ABCD*     |  T   |  N  | 00:00 | 00:00 | ACTIVE  |
| _ BCJK4     |  T   |  N  | 00:00 | 00:00 | ACTIVE  |
| _ RBCJ3*    |  T   |  N  | 00:00 | 00:00 | ACTIVE  |
| _ SNVK2*    |  T   |  N  | 16:05 | 16:10 | INACT   |
+-------------------------------------------------+


F1=Help  **=Bkwd  **=Fwd  F12=Cancel
```

Figure 168. Response Time SMF Options

Resource Resource or group name. The asterisk (*) wildcard in the last position of a name denotes a group (generic) definition.

Type Resource type. Can be one of the following:

T	Terminal group
A	Application group
N	NCP group
L	SDLC line group
P	SDLC physical unit group

T is the default.

DR Whether forced definite response (DR) is allowed for this resource; this is important when you are monitoring end-to-end response time.

Start Sampling start time in hours (0–23) and minutes (0–59). Zeros for both start and stop times indicate that collection is continuous. This field applies to background SMF recording; it does not affect foreground sampling.

Stop Sampling stop time in hours (0–23) and minutes (0–59). This field applies to background SMF recording; it does not affect foreground sampling.

Status Whether the resource is active, inactive, or pending. Groups already defined in the SMF Response Time Profile at the time OMEGAMON II is started are **ACTIVE**. If a new group is started, it will show a **PENDING** status. When the next recording interval begins, the status of that group changes to **ACTIVE**. If you change the interval, the new duration does not take effect until the current interval is complete.

INACTIVE appears when any of the following are true:

- End-to-End is unavailable.
- Recording is outside the data collection period.
- NCP resource is not found.

Response Time SMF Options for a Resource

From the **Response Time SMF Options** panel, you can enter action codes to add (A), change (C), or delete (D) resources, or simply view (V) the resource collection settings. These actions all invoke a similar pop-up panel.

The following figure shows the Add SMF Definition pop-up.

```
KONDOMRA            Add SMF Definition

Type the requested information, then press Enter.

Resource or group name. . . . . . . . ABCD*___
Resource type . . . . . . . . . . . . T   +    (A-Application/T-Terminal/
                                                N-NCP/L-SDLC/P-PU)

Force definite response (DR). . . . . No_ +    (Yes/No)
Collection start time . . . . . . . . 00 : 00  (HH:MM)
Collection stop time. . . . . . . . . 00 : 00  (HH:MM)

        Range 1      Range 2      Range 3      Range 4
        Upper Bnd    Upper Bnd    Upper Bnd    Upper Bnd

        secs tnths   secs tnths   secs tnths   secs tnths

Host     00 . 5       02 . 0       05 . 0       10 . 0
Network  00 . 5       02 . 0       05 . 0       10 . 0
Total    01 . 0       04 . 0       10 . 0       20 . 0

F1=Help  F4=Prompt  F12=Cancel
```

Figure 169. SMF Response Time Pop-up for Adding a Resource

In the top part of this panel you enter the information that displays on the Response Time SMF Options panel (see Figure 168 on page 337).

In the bottom part, you enter response time ranges. You can enter upper bound values for up to four ranges for both host and network components of a transaction. If you create service-level reports, you can view the total number of transactions and the percent of the transactions falling within each of the four response time ranges.

Once you have added an SMF definition, you can view its values using the **V** or **C** action code. However, you must change a resource definition with the **C** action code.

NCP Performance Options

For details about using the **NCP Performance Options** selection on the Monitoring Options menu, see "Setting NCP Monitoring Options" in the *OMEGAMON II for Mainframe Networks NCP Monitoring Guide*.

Tuning Statistics Options

There are three TNSTATs selections on the Monitoring Options menu for NCP, CTC, and Local tuning statistics. In these Monitoring Options panels, you set parameters that control collection and exception monitoring. Each panel consists of a monitoring control portion followed by an exceptions portion. The monitoring control portion is the same for all TNSTATs Monitoring Options panels. The exception settings portion is different for NCPs, CTCs, and Locals.

Tuning Statistics Monitoring Control Options

The three monitoring control fields and their choices are:

Sampling interval
Number of seconds between collection of TNSTATs data samples. Exception records are written to the Log File and/or SMF at the end of a sampling interval.

Exception and trend recording
Four choices are available:

N None. Do not record TNSTATs exceptions/trends on the Log file or SMF.

L Log. Turn on the recording of TNSTATs exceptions/trends to the VSAM Log File for display. The amount of data you can retain in the Log File is limited by the size of the file.

S SMF. Turn on the recording of TNSTATs exceptions/trends to SMF for longterm historical analysis.

B Both. Enable both the L (log) and S (SMF) options for TNSTATs data.

Note: For TNSTATs status lights to display normal, warning, and critical conditions, you must activate exception recording to the Log File. Otherwise, status displays as Idle.

See "Tuning Statistics Monitoring Control Options" on page 340 for an explanation of the monitoring control options in the upper portion of the panel: Sampling Interval, Exception Recording, and Trend Recording.

Use the exceptions portion of the TNSTATS NCP Options panel as shown below, to activate and change thresholds for channel-attached NCP exceptions.

```
KONDOMND              TNSTATS NCP Options

Sampling interval            30_       (20-300 seconds)
Exception recording          L   +     (N-None/L-Log/S-SMF/B-Both)
Trend recording              L   +     (N-None/L-Log/S-SMF/B-Both)

       Exceptions            Y/N       Warning       Critical
------------------------     ---       --------      --------
Queued PIUs outbound . .     Yes +     2_______      5_______
PIUs per channel read  .     Yes +     7_______      5_______ (Tenths)
PIUs per channel write .     Yes +     7_______      5_______ (Tenths)
ATTN per channel read  .     Yes +     50______      60______

Slowdown . . . . . .         Yes +     C +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 170. TNSTATS NCP Options Pop-up

The **PIUs per Channel Read** and **PIUs per Channel Write** fields display the values in tenths. Thus, a value of 20 in either of those fields means 20 tenths, or 2.0. See "NCP Tuning Statistics" on page 173 for details on using NCP TNSTATs.

Tuning Statistics Options for CTCs

See "Tuning Statistics Monitoring Control Options" on page 340 for an explanation of the monitoring control options in the upper portion of the panel: Sampling Interval, Exception Recording, and Trend Recording.

Use the exceptions portion of the TNSTATS CTC Options panel to enable or disable the CTC tuning statistics exceptions, specify warning and critical threshold values, indicate the severity of a slowdown condition, and set exception threshold values for MPC CTCs.

```
KONDOMCD                TNSTATS CTC Options

Sampling interval  . . . . . .   30      (20-300 seconds)
Exception recording  . . . . .   B   +   (N-None/L-Log/S-SMF/B-Both)
Trend recording  . . . . . . .   B   +   (N-None/L-Log/S-SMF/B-Both)

         Exceptions              Y/N      Warning      Critical
-------------------------------  ---
Percent of priority PIUs  (CTCA)  Yes +   5__          ____
Queued PIUs outbound . .  (CTCA)  Yes +   ________     2_______
PIUs per channel write .  (CTCA)  Yes +   5_______     ________ (Tenths)

Buffer utilization percent (MPC)  Yes +   80_          90______
Outbound PIUs per SIO  . . (MPC)  Yes +   10______     ________ (Tenths)

QSWEEPS  . . . . . . . . . (MPC)  Yes +   W +  (W-Warning/C-Critical)
TSWEEPs  . . . . . . . . . (MPC)  Yes +   C +  (W-Warning/C-Critical)
Slowdown . . . . . .  (Both)      Yes +   C +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 171. TNSTATs CTC Options

The **PIUs per Channel Write** field displays the values in tenths. Therefore, a value of 20 in this field means 20 tenths, or 2.0. See "CTC Tuning Statistics" on page 153 for details on using CTC TNSTATs.

Tuning Statistics Options for Locals

See "Tuning Statistics Monitoring Control Options" on page 340 for an explanation of the monitoring control options in the upper portion of the panel: Sampling Interval, Exception Recording, and Trend Recording.

Use the Exceptions field on the panel shown below to enable or disable the Slowdown exception and specify the severity (warning or critical) of a slowdown condition. See "Local Tuning Statistics" on page 182 for details on using Local TNSTATs.

```
KONDOMLD              TNSTATS LOCAL Options

Sampling interval            30_       (20-300 seconds)
Exception recording          L   +     (N-None/L-Log/S-SMF/B-Both)
Trend recording              L   +     (N-None/L-Log/S-SMF/B-Both)

       Exceptions            Y/N              Condition
-----------------------      ---       -------------------------
Slowdown . . . . . . . .     Yes +     C +  (W-Warning/C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 172. TNSTATS LOCAL Options Pop-up

Log File Utilization

Log File Utilization is the last selection on the Monitoring Options menu. OMEGAMON II writes its trend and exception records to two VSAM Log Files, a primary and an alternate, that are defined when OMEGAMON II is configured (see the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide*). The two Log Files operate in a wraparound fashion. When all space is used in the primary file, OMEGAMON II writes data to the alternate file. After the alternate file is filled, the process begins anew, with current data overwriting old data in the primary file.

The Log File Utilization panel shows the DASD used by trend and exception recording for each OMEGAMON II component.

```
KONDOMUD                  Log File Utilization

  Recording period. . 01/02/95 07:45 thru 01/06/95 13:16

+-------------------------------------------------------------------+
|                  |       Trend Recording     |   Exception Recording  |
|  Descriptions    |  Recs    Space    Pct     |  Recs    Space    Pct  |
|------------------+---------------------------+-------------------------+
| Buffer Pools     |   170 |    174 |   1% |  5426 |    413 |   2% |
| Virtual Routes   |   171 |   4102 |  23% |   661 |     50 |   0% |
| CTC TNSTATS      |   171 |    356 |   2% |  5226 |    398 |   2% |
| NCP TNSTATS      |   171 |    223 |   1% |  3341 |    254 |   1% |
| LOCAL TNSTATS    |     0 |      0 |   0% |     0 |      0 |   0% |
| NCP Perform.     |     0 |      0 |   0% |     0 |      0 |   0% |
+-------------------------------------------------------------------+

F1=Help  F12=Cancel
```

Figure 173. Log File Utilization Panel

For each component, this panel displays the number of records generated, the space in kilobytes occupied by those records, and the percentage of VSAM space used. Exception records are typically generated at much shorter intervals than trending records. Therefore, you typically see a greater number of exception records than trending records.

The Space value appears highlighted for each OMEGAMON II component that is currently writing exception or trend records.

TCP/IP Options

Use the **TCP/IP Options** on the Monitoring Options menu to specify the TCP/IP defaults for:

- address space monitoring options and thresholds
- buffer pool exceptions
- connection exceptions
- application exceptions
- device exceptions
- gateway exceptions

TCP/IP Default Options

When you select **TCP/IP Options** from the Monitoring Options menu, the following menu displays:

```
KONDOI0D  TCP/IP Default Options

Select a choice by number, by mnemonic,
or with the cursor.

  1. TCP/IP global options (O)...
  2. TCP/IP address space options (S)...
  3. Buffer pool exceptions (B)...
  4. Connection exceptions (C)...
  5. Application exceptions (A)...
  6. Device exceptions (D)...
  7. Gateway exceptions (G)...


F1=Help  F12=Cancel
```

Figure 174. TCP/IP Default Monitoring Options Menu

Select the type of options for which you want to specify defaults.

TCP/IP Global Options

When you select **TCP/IP Global Options** from the TCP/IP Default Options menu, the following panel displays.

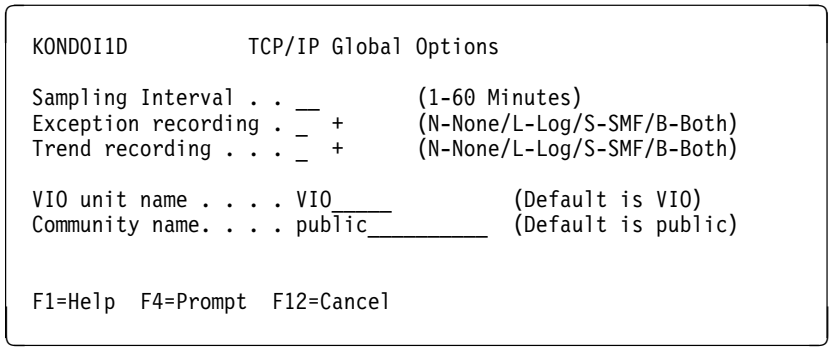


Figure 175. TCP/IP Global Options

These options apply as defaults to all the TCP/IP address spaces you monitor. You can change them from the TCP/IP Status Summary when you use action A (Add) to add an address space to the monitoring list or you use action C (Change) to change options for an already listed address space.

TCP/IP Address Space Exceptions

When you select **TCP/IP Address Space Options** from the TCP/IP Default Options menu, the following panel displays.

```
KONDOI7D   Default TCP/IP Address Space Exceptions   more: +

Exception Thresholds      Y/N
-----------------------   ---      Warning      Critical
CPU usage. . . . . . . .  Yes +     3__ %        5__ %
Paging rate. . . . . . .  Yes +     1__ %        2__ %
CSA usage. . . . . . . .  Yes +     2__ %        3__ %
C24 usage. . . . . . . .  Yes +     1__ %        2__ %

TELNET pool depletion. .  Yes +     80_ %        90_ %
Throughput in Kbytes/min  No_ +     5000_        10000_

IP input discards. . . .  Yes +     80_ %        90_ %
IP output discards . . .  Yes +     80_ %        90_ %
IP datagram reassembly .  Yes +     80_ %        90_ %
IP reassembly failures .  Yes +     80_ %        90_ %
IP datagram fragmentation Yes +     80_ %        90_ %
IP fragmentation failures Yes +     80_ %        90_ %



F1=Help  F4=Prompt  **=Bkwd  F8=Fwd  F12=Cancel
```

Figure 176. TCP/IP Address Space Exceptions (Panel 1)

Scroll forward (F8) to navigate to the remaining address space exceptions.

```
KONDOIFD   Default TCP/IP Address Space Exceptions   more:  -

Exception Thresholds      Y/N
-----------------------   ---      Warning      Critical
TCP retransmits. . . . .  Yes +     3__ %        5__ %
UDP discards . . . . . .  Yes +     1__ %        2__ %

SNMP agent failures. . .  Yes +    C +   (W-Warn, C-Critical)
SNMP subagent failures .  Yes +    C +   (W-Warn, C-Critical)


F1=Help  F4=Prompt  F7=Bkwd  **=Fwd  F12=Cancel
```

Figure 177. TCP/IP Address Space Exceptions (Panel 2)

Use these panels to specify defaults for monitoring TCP/IP address spaces. You can override these values for the address spaces you select with action code C (Change) on the TCP/IP Status Summary panel (see Figure 123 on page 278).

TCP/IP Buffer Pool Exceptions

When you select **Buffer Pool Exceptons** from the TCP/IP Default Options menu, the following panel displays.

```
KONDOI2D    Default TCP/IP Buffer Pool Exceptions

Exception Thresholds    Y/N       Warning      Critical
---------------------- ---
ACB. . . . . . . . . . Yes +     60_ %        85_ %
CCB. . . . . . . . . . Yes +     60_ %        85_ %
Dat buf. . . . . . . . Yes +     60_ %        85_ %
Sm dat buf . . . . . . Yes +     60_ %        85_ %
Tiny dat buf . . . . . Yes +     60_ %        85_ %
Env. . . . . . . . . . Yes +     60_ %        85_ %
Lrg env. . . . . . . . Yes +     60_ %        85_ %
RCB. . . . . . . . . . Yes +     60_ %        85_ %
SCB. . . . . . . . . . Yes +     60_ %        85_ %
SKCB . . . . . . . . . Yes +     60_ %        85_ %
TCB. . . . . . . . . . Yes +     60_ %        85_ %
UCB. . . . . . . . . . Yes +     60_ %        85_ %
Add Xlate. . . . . . . Yes +     60_ %        85_ %
IP route . . . . . . . Yes +     60_ %        85_ %


F1=Help  F4=Prompt  F12=Cancel
```

Figure 178. TCP/IP 3.2 Buffer Pool Exceptions

Use this panel to specify defaults for monitoring TCP/IP version 3.2 buffer pools. Later TCP/IP versions do not use buffer pools. You can override these values for the pool types you select with action code C (Change) on the the TCP/IP Buffer Pools panel (see Figure 125 on page 281).

TCP/IP Connection Exceptions

When you select **Connection Exceptions** from the TCP/IP Default Options panel, the following panel displays.

```
KONDOI3D      Default TCP/IP Connection Exceptions
Exceptions               Y/N     Warning      Critical
----------------------   ---     --------     --------
Round trip time . . . .: No_ +   ________     ________
Round trip varience . .: No_ +   ________     ________
Retransmits . . . . . .: No_ +   ________     ________
Throughput in Kbytes/min No_ +   ________     ________   >= +
Throughput in Dgrams/min No_ +   ________     ________   >= +

Not established . . . .: Yes +   W +  (W-Warn, C-Crit)
SYN-SENT. . . . . . . .: No_ +   W +  (W-Warn, C-Crit)
SYN-RECEIVED. . . . . .: No_ +   W +  (W-Warn, C-Crit)
FIN-WAIT-1. . . . . . .: No_ +   W +  (W-Warn, C-Crit)
FIN-WAIT-2. . . . . . .: No_ +   W +  (W-Warn, C-Crit)
CLOSE-WAIT. . . . . . .: No_ +   W +  (W-Warn, C-Crit)
CLOSING . . . . . . . .: No_ +   W +  (W-Warn, C-Crit)
LAST-ACK. . . . . . . .: No_ +   W +  (W-Warn, C-Crit)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 179. TCP/IP Connection Exceptions

Use this panel to specify defaults for monitoring TCP/IP connections. You can override these values for the applications you select with action code C (Change) on the TCP/IP Connections panels (for example, see Figure 127 on page 283).

TCP/IP Application Exceptions

When you select **Application Exceptions** from the TCP/IP Default Options menu, the following panel displays.

```
KONDOI4D   Default TCP/IP Application Exceptions

Application Exceptions   Y/N     Warning      Critical
----------------------   ---     --------     --------
Connection count . . . . No_ +   ________     ________
Retransmits. . . . . . . No_ +   ________     ________
Throughput in Kbytes/min No_ +   ________     ________   >= +
Throughput in Dgrams/min No_ +   ________     ________   >= +


F1=Help  F4=Prompt  F12=Cancel
```

Figure 180. TCP/IP Application Exceptions

Use this panel to specify the defaults for monitoring TCP/IP applications. You can override these values for the applications you select with action code C (Change) on the TCP/IP Application Status panel (see Figure 128 on page 285).

TCP/IP Device Exceptions

When you select **Device Exceptions** from the TCP/IP Default Options panel, the following panel displays.

```
KONDOI5D    Default TCP/IP Device Exceptions

Exceptions    Y/N             Warning    Critical
------------- ---             --------   --------
Not Ready. .: Yes +    W +  (W-Warning, C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 181. TCP/IP Device Exceptions

Use this panel to specify defaults for monitoring TCP/IP devices. You can override these values for the devices you select with action code C (Change) on the TCP/IP Device Status panel (see Figure 129 on page 287).

TCP/IP Gateway Exceptions

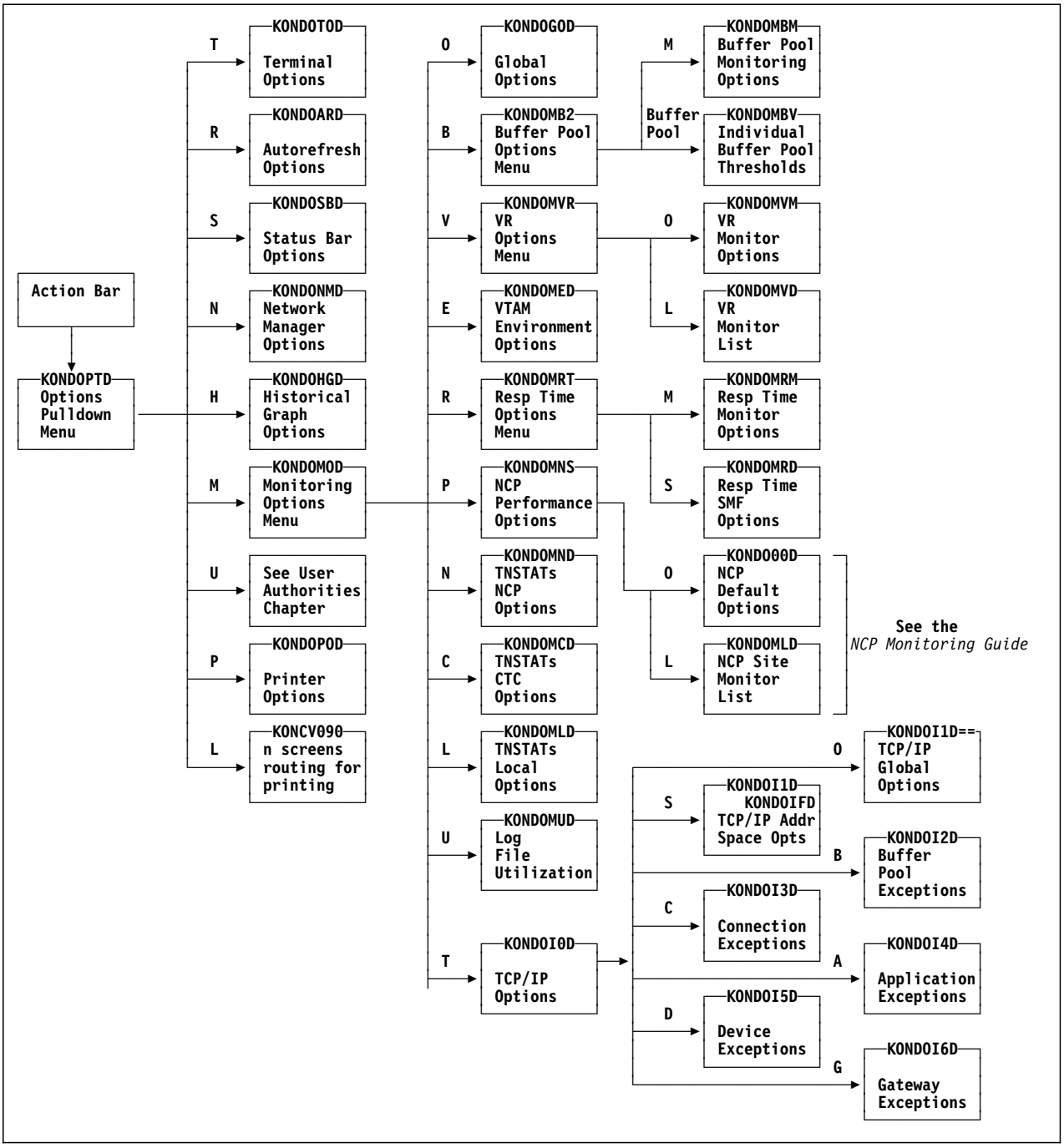
When you select **Gateway Exceptions** from the TCP/IP Default Options panel, the following panel displays.

```
KONDOI6D  Default TCP/IP Gateway Exceptions

Exceptions    Y/N            Warning     Critical
------------- ---            -------     --------
Link down . . Yes +    W +  (W-Warning, C-Critical)


F1=Help  F4=Prompt  F12=Cancel
```

Figure 182. TCP/IP Gateway Exceptions

Use this panel to specify defaults for monitoring TCP/IP gateways. If the link is down down, both the device and gateway show an alert condition on the address space panel. You can override these values for the gateways you select with action code C (Change) on the TCP/IP Gateway Status panel (see Figure 130 on page 288).

Monitoring Options Navigation



Chapter 15. User Authorities

Chapter Contents

Overview

This chapter describes the User Authorities choice on the Options pulldown. Use User Authorities to set and change authorization levels for user access to different features of the product. This chapter discusses the levels of access recognized by User Authorities and describes how to add, modify, and delete user authorizations.

See the information about setting security in the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide* for instructions on

- implementing an external security package to authorize logons
- maintaining the user IDs that users require to log onto OMEGAMON II
- implementing the external security package to authorize users to functions, as an alternative to using User Authorities

Access Levels

You must have administrator authority to modify the settings in the User Authorities path. However, any user may view the current settings. An administrator selects **User Authorities** to add, delete, or change user access levels.

The administrator determines the access levels of all other users, and may even designate other administrators. Users may be granted access to the following areas:

- system administration
- the response time feature
- the VTAM trace feature
- the VTAM console

Thus, there may be several classes of users with different types of product access. All user authority changes made by administrators are saved permanently.

An administrator is allowed to access all OMEGAMON II features, including viewing and changing of monitoring options as well as user authorities.

Users without administrator authority are allowed to view all monitoring options but are not allowed to change any of them. When a user without authority to either access a feature or change monitoring options attempts to do so, the message **AUTHORIZATION REQUIRED** displays. If you receive this message and you need to use the facility that generated the message, contact your system administrator.

User Authorities Startup

After OMEGAMON II is installed, the first person to log on causes two entries to be automatically created on the User Authorities display panel, as shown in Figure 183 on page 356.

1. A user ID of $DEFAULT with all authority flags set to NO.
2. The first user's logon ID with all authority flags set to YES.

This establishes the first OMEGAMON II user as an administrator. The administrator can then tailor the $DEFAULT authorities for the installation and add new user IDs if necessary.

Note: You may change the $DEFAULT user ID, but you may not delete it. The authority flags defined for the $DEFAULT user ID apply to all users who log onto OMEGAMON II without being defined in the User Authorities Table.

OMEGAVIEW Considerations

If you use OMEGAVIEW, you want to ensure that the response time options (profile) for the OMEGAVIEW collector session and zoomed to OMEGAMON II sessions are synchronized. As a product administrator, do the following:

1. Add the OMEGAVIEW collector session user ID, authorizing the user ID to access the OMEGAMON II Response Time feature.
2. Sign onto OMEGAMON II with the collector session user ID.
3. In the OMEGAMON II Response Time component, set the Response Time options required for using OMEGAVIEW. Make sure to specify **`Start at Logon`**.

Result: The response time profile for any OMEGAVIEW user who zooms to an OMEGAMON II session is automatically synchronized with the response time profile that you defined for the collection session user ID.

When you are using OMEGAMON II, you can press F1 if you need help. Helps include comprehensive field descriptions and detailed technical information. If your cursor is on an input or display field when you press F1, you get help for that field; otherwise, you get help for the panel.

User Authorities Options

To access User Authorities, select **Options** from any panel's action bar and then select **User Authorities**. This displays the User Authorities panel, which describes all user authorizations that have been defined.

Any user ID that is not listed assumes the default authorizations specified for $DEFAULT.

```
KONDOUAD                  User Authorities

Enter one of the following action codes.
  A=Add  C=Change  D=Delete  V=View                 Lines 1 to 12 of 27
+-------------------------------------------------------------------------+
|   Userid   |        Name          |   Dept    | ADM | CON | RT  | TRC  |
|------------+----------------------+-----------+-----+-----+-----+------|
| _ $DEFAULT | Default Authorities  | Network   | No  | No  | No  | No   |
| _ DCSP35   | Betsy Ross           | R&D       | Yes | Yes | Yes | Yes  |
| _ OMVIEW   | OMVIEW               | OMVIEW    | No  | No  | No  | No   |
| _ CSTS92   | Tom Jefferson        | Network   | No  | No  | No  | No   |
| _ CSDL31   | Martin King          | R&D       | Yes | Yes | Yes | Yes  |
| _ CSDF02   | John Paul Jones      | Network   | Yes | Yes | Yes | Yes  |
| _ CSDT10   | John Smith           | Network   | Yes | Yes | Yes | Yes  |
| _ CSDT14   | John Kennedy         | Network   | No  | Yes | Yes | Yes  |
| _ CSDT01   | John Adams           | Network   | No  | Yes | Yes | Yes  |
| _ CSNT10   | Ben Franklin         | Network   | No  | No  | No  | No   |
| _ CSDT12   | Abe Lincoln          | Network   | Yes | Yes | Yes | Yes  |
| _ CSDT08   | Susan Anthony        | Network   | Yes | Yes | Yes | Yes  |
+-------------------------------------------------------------------------+

F1=Help    **=Bkwd  F8=Fwd  F12=Cancel
```

Figure 183. Users Authorities Display Panel

This panel shows 4 columns which indicate the access authority each user has to the following OMEGAMON II facilities:

ADM Whether or not the user is an administrator. When ADM is Yes, all authorities for that user are Yes.

CON Whether or not the user is allowed to access the VTAM console.

RT Whether or not the user is allowed to access the Response Time feature.

TRC Whether or not the user is allowed to access the VTAM Trace feature.

Add User Authorities

To add a new user authorization to the User Authorities table, enter action code **A** (Add) next to any user ID on the User Authorities panel. The Add User Authorities panel displays.

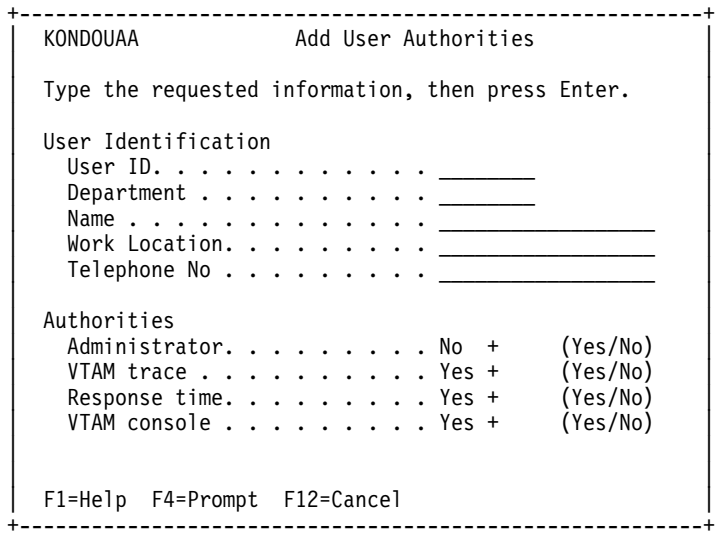


Figure 184. Add User Authorities Panel

This panel contains two sections. Complete the first section, which describes user identification, as follows:

User ID Individual user's system logon ID.

Department User's department. This field is informational only.

Name User's name. This field is informational only.

Work Location User's building or site identification. This field is informational only.

Telephone No User's telephone number or extension. This field is informational only.

The second part of the User Authorities panel in the previous figure describes the authorities. There are two levels of user access:

1. administrator
2. operator

The administrator, who manages User Authorities, has full product access. To grant administrative authority, enter **YES** under the ADM column. All of the remaining access columns automatically convert to YES.

The operator level of authority is set by the administrator. The following are the operator authorities that may be granted to each user:

VTAM trace Start a VTAM trace (Yes/No).
Response Time Initiate response time monitoring (Yes/No).
VTAM console Issue VTAM console commands (Yes/No).

For all authorities, the default is No.

Change User Authorities

To change access levels for an existing user authorization, enter action code **C** (Change) next to the user ID on the User Authorities panel. The Change User Authorities panel appears. Modify the current values in the fields or follow the procedure described in "Add User Authorities" on page 357.

```
+-----------------------------------------------------------+
|  KONDOUAC            Change User Authorities              |
|                                                           |
|  Type the requested information, then press Enter.        |
|                                                           |
|  User Identification                                      |
|    User ID. . . . . . . . . . . . TDDO12                  |
|    Department . . . . . . . . . . R&D                     |
|    Name . . . . . . . . . . . . . John Smith              |
|    Work Location. . . . . . . . . LA                      |
|    Telephone No . . . . . . . . . 555-1414                |
|                                                           |
|  Authorities                                              |
|    Administrator. . . . . . . . . No  +     (Yes/No)      |
|    VTAM trace . . . . . . . . . . Yes +     (Yes/No)      |
|    Response time. . . . . . . . . Yes +     (Yes/No)      |
|    VTAM console . . . . . . . . . Yes +     (Yes/No)      |
|                                                           |
|                                                           |
|  F1=Help  F4=Prompt  F12=Cancel                           |
+-----------------------------------------------------------+
```

Figure 185. Change User Authorities Panel

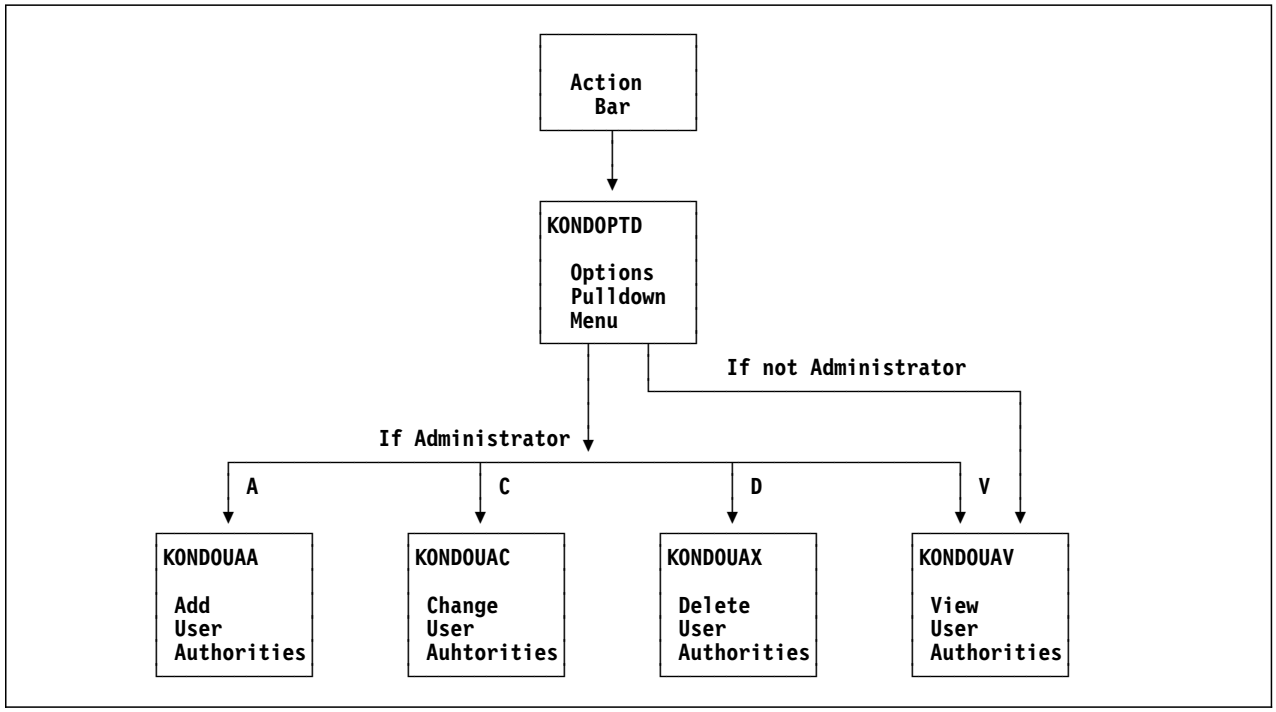
Delete User Authorities

To delete an existing user authorization, enter action code **D** (Delete) next to the appropriate user ID on the User Authorities panel. The Delete User Authorities panel appears for verification. Check to see if the information is correct. If so, press Enter to perform the deletion; otherwise press F12 to cancel.

```
+-------------------------------------------------------------+
|  KONDOUAX            Delete User Authorities                |
|                                                             |
|  Press enter to DELETE or F12 to CANCEL.                    |
|                                                             |
|  User Identification                                        |
|    User ID. . . . . . . . . . . . TDDO12                    |
|    Department . . . . . . . . . . R&D                       |
|    Name . . . . . . . . . . . . . John Smith                |
|    Work Location. . . . . . . . . LA                        |
|    Telephone No . . . . . . . . . 555-1414                  |
|                                                             |
|  Authorities                                                |
|    Administrator. . . . . . . . . No                        |
|    VTAM trace . . . . . . . . . . Yes                       |
|    Response time. . . . . . . . . Yes                       |
|    VTAM console . . . . . . . . . Yes                       |
|                                                             |
|                                                             |
|  F1=Help  F12=Cancel                                        |
+-------------------------------------------------------------+
```

Figure 186. Delete User Authorities Panel

User Authorities Navigation



Appendix A. OMEGAVIEW Zoom

Chapter Contents

Overview

In OMEGAVIEW® you can select a status bar and zoom into a direct session with OMEGAMON II for Mainframe Networks so that you can investigate the cause of the warning or critical condition indicated.

You can automatically navigate to one of several OMEGAMON II screens that shows you more detail about why the selected basic status light indicated a problem.

Zooming into OMEGAMON II

Zooming into OMEGAMON II from OMEGAVIEW is described below:

1. There are two different ways to zoom from an OMEGAMON II status light. Whether or not you can choose the zoom destination depends on how you set the Confirm Zoom to Session pop-up in OMEGAVIEW.
   a. If you enabled the Confirm Zoom to Session pop-up in OMEGAVIEW, you can select your zoom destination from a menu of zoom destination choices that are displayed on the pop-up.
   b. If you disabled the Confirm Zoom to Session pop-up in OMEGAVIEW, you will zoom directly to the default zoom destination.
2. Depending on Step 1 above, you will arrive at the selected or default OMEGAMON II panel as shown later in this chapter. Navigate within OMEGAMON II as necessary.
3. When you are ready to return to OMEGAVIEW, press the OMEGAVIEW trigger that you defined in OMEGAVIEW.

The following figure illustrates the relationship between OMEGAVIEW zoom source panels and OMEGAMON II zoom destination panels, when the OMEGAVIEW Confirm Zoom pop-up is enabled. (The first zoom choice is also the default zoom destination, which is used when the Confirm Zoom pop-up is disabled.)

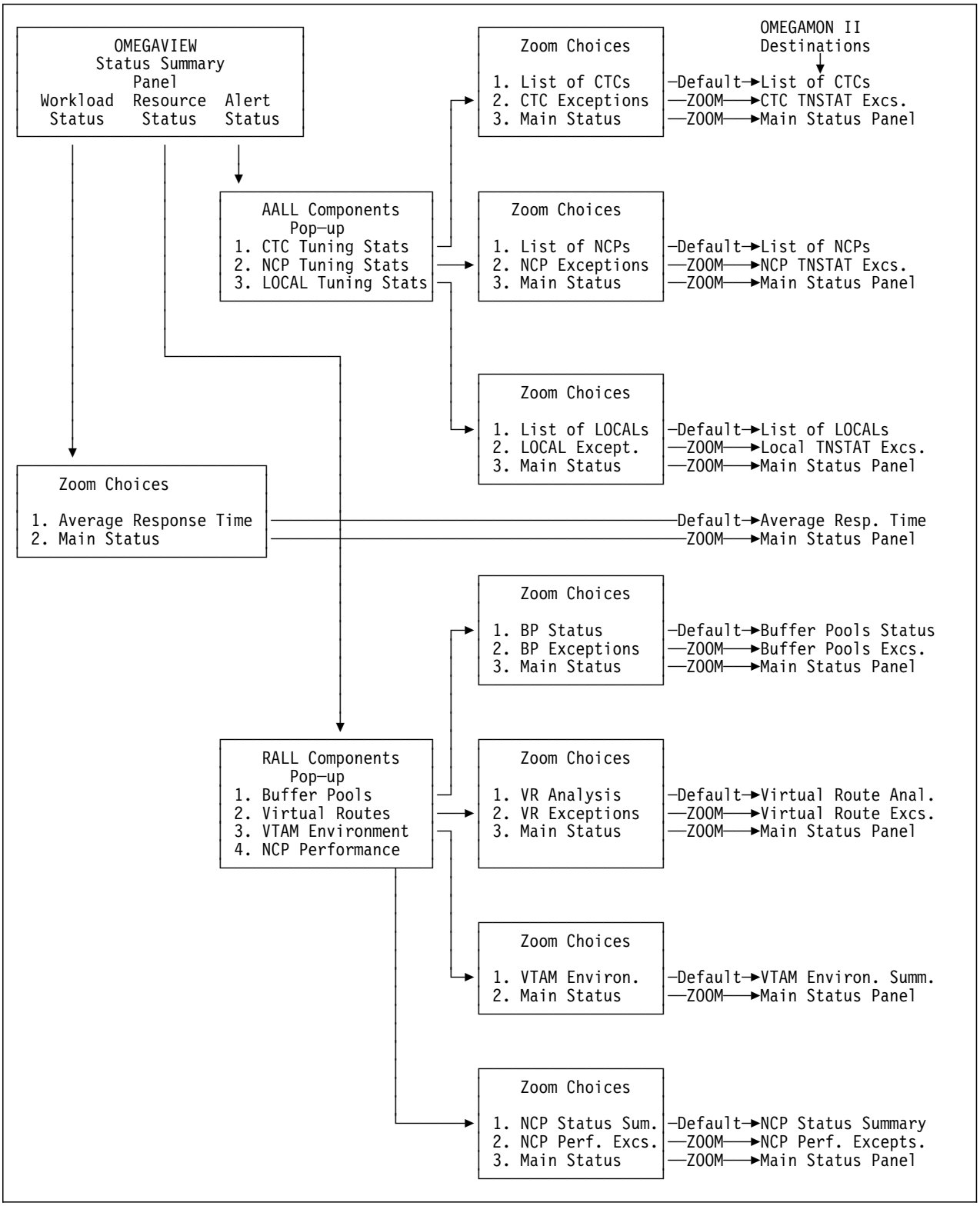


Figure 187. OMEGAVIEW to OMEGAMON II for Mainframe Networks Zoom Overview

Default Zoom Destinations

Following is a list of the default (first) zoom destination choices for each of the basic OMEGAVIEW status lights from which you can zoom.

Workload Status
Average Response Time panel. See Figure 85 on page 200.

Buffer Pool Resource Status
Buffer Pools Status Display panel. See Figure 39 on page 106.

Virtual Route Resource Status
Virtual Route Analysis panel. See Figure 53 on page 130.

VTAM Environment Resource Status
VTAM Environmental Summary panel. See Figure 102 on page 239.

NCP Performance Status
NCP Status Summary panel. See the *OMEGAMON II for Mainframe Networks NCP Monitoring Guide*.

CTC TNSTATS Alert
CTC TNSTATS - List of CTCs panel. See Figure 64 on page 157.

NCP TNSTATS Alert
NCP TNSTATS - List of NCPs panel. See Figure 77 on page 175.

LOCAL TNSTATS Alert
LOCAL TNSTATS - List of LOCALs panel. See Figure 80 on page 183.

Alternate Zoom Destinations

In addition to the default or first zoom destination choice, you have the choice of one or two alternate zoom destinations.

Exceptions - Second Choice

An alternate zoom destination or second choice for each basic status bar (except Response Time and VTAM Environment) is the associated Exceptions panel.

For example, when you zoom from the basic Buffer Pools status light and choose the second destination, you will zoom to the Buffer Pools Exceptions panel; when you zoom from the basic Virtual Route status light, you will zoom to the Virtual Route Exceptions panel.

Main Status - Third Choice

If you zoom from any basic status light, the other alternate or third zoom destination choice is the main status panel. See Figure 18 on page 58.

Usage

The benefit of this feature is that you can zoom *directly* to an OMEGAMON II panel that provides information about the selected OMEGAVIEW status light.

After you zoom into OMEGAMON II, you can navigate normally within the product. If you need more information than the zoom destination panel provides about the cause of the warning or critical OMEGAVIEW status light, you can investigate further within OMEGAMON II.

An OMEGAVIEW user can diagnose a variety of problems detected by OMEGAMON II without being thoroughly acquainted with OMEGAMON II. The more experienced OMEGAMON II user saves time by letting the zoom feature automatically navigate to the panel most likely to explain the problem.

Profile Synchronization

When you zoom to an OMEGAMON II session to investigate problems, you want the response time profile used in OMEGAMON II to be the same as the response time profile in OMEGAVIEW.

If your product administrator defined a response time profile for the OMEGAVIEW collector session user ID, any user who zooms into OMEGAMON II automatically operates under the same profile as the collector session.

For more administrator information, see “OMEGAVIEW Considerations” on page 355.

OMEGAVIEW Customized Panels

In addition to the OMEGAVIEW Default Status panel, if your custom-designed OMEGAVIEW panels include any of the OMEGAMON II for Mainframe Networks basic status lights, you can zoom from them to the destinations described in “Default Zoom Destinations” on page 366, “Alternate Zoom Destinations” on page 367, and “Main Status - Third Choice” on page 367.

OMEGAVIEW Zoom References

For more information about this feature, see

- the *OMEGAMON II for Mainframe Networks Configuration and Customization Guide* for requirements and installation instructions
- the OMEGAVIEW documentation set for OMEGAVIEW zoom procedures and panel customization

Appendix B.
Guide to Candle Customer Support

Introduction

Candle Corporation is committed to producing top-quality software products and services. To assist you with making effective use of our products in your business environment, Candle is also committed to providing easy-to-use, responsive customer support.

Precision, speed, availability, predictability—these terms describe our products and Customer Support services.

Included in this *Guide to Candle Customer Support* is information about the following:

- Base Maintenance Plan
  - Telephone Support
  - eSupport
  - Severity Levels
  - Service-Level Objectives
  - Recording and Monitoring Calls for Quality Purposes
  - Customer Support Escalations
  - Above and Beyond
- Enhanced Support Services
  - Assigned Support Center Representative (ASCR)
  - Maintenance Assessment Services (MAS)
  - Multi-Services Manager (MSM)
- Customer Support Contact Information
  - Worldwide Support Telephone and E-mail Information

Base Maintenance Plan

Overview

Candle offers a comprehensive Base Maintenance Plan to ensure that you realize the greatest value possible from your Candle software investments. We have more than 200 technicians providing support worldwide, committed to being responsive and to providing expedient resolutions to support requests. Technicians are available worldwide at all times during the local business day. In the event of an after-hours or weekend emergency, our computerized call management and forwarding system will ensure that a technician responds to Severity One situations within one hour. For customers outside of North America, after-hours and weekend support is provided in English language only by Candle Customer Support technicians located in the United States.

Telephone Support

Candle provides consistently reliable levels of service—thanks to our worldwide support network of dedicated experts trained for specific products and operating systems. You will always work with a professional who truly understands your problem.

We use an online interactive problem management system to log and track all customer-reported support requests. Your support request receives immediate attention by routing the issue to the appropriate technical resource, regardless of geographic location.

Level 0 Support is where your call to Candle Customer Support is first handled. Your support request is recorded in our problem management systems, then transferred to the appropriate Level 1 support team. We provide Level 0 manual interaction with our customers because we support more than 170 products. We feel our customers would prefer personal interaction to a complex VRU or IVR selection menu.

Level 1 Support is the service provided for initial support requests. Our Level 1 team offers problem determination assistance, problem analysis, problem resolutions, installation assistance, and preventive and corrective service information. They also provide product usage assistance.

Level 2 Support is engaged if Level 1 cannot provide a resolution to your problem. Our Level 2 technicians are equipped to analyze and reproduce errors or to determine that an error is not reproducible. Problems that cannot be resolved by Level 2 are escalated to Candle's Level 3 R&D support team.

Level 3 Support is engaged if a problem is identified in Candle product code. At Level 3, efforts are made to provide error correction, circumvention or notification that a correction or circumvention is not available. Level 3 support provides available maintenance modifications and maintenance delivery to correct appropriate documentation or product code errors.

eSupport

To facilitate the support process, Candle also provides **eSupport**, an electronic full-service information and customer support facility, using the World Wide Web at **www.candle.com/support/. eSupport** allows you to open a new service request and update existing service requests, as well as update information in your customer profile. New and updated service requests are queued to a support technician for immediate action. And we can respond to your request electronically or by telephone—it is your choice.

eSupport also contains a continually expanding knowledge base that customers can tap into at any time for self-service access to product and maintenance information.

The Candle Web site and **eSupport** can be accessed 24 hours a day, 7 days a week by using your authorized Candle user ID and password.

Description of Candle Severity Levels

Responses to customer-reported product issues and usage questions are prioritized within Candle according to Severity Code assignment. Customers set their own Severity Levels when contacting a support center. This ensures that we respond according to your individual business requirements.

Severity 1, Crisis A crisis affects your ability to conduct business, and no procedural workaround exists. The system or application may be down.

Severity 2, High A high-impact problem indicates significant business effect to you. The program is usable but severely limited.

Severity 3, Moderate A moderate-impact problem involves partial, non-critical functionality loss or a reasonable workaround to the problem. A fix may be provided in a future release.

Severity 4, Low A low-impact problem is a 'how to' or an advisory question.

Severity 5, Enhancement Request
This is a request for software or documentation enhancement. Our business units review all requests for possible incorporation into a future release of the product.

Candle Service-Level Objectives

Candle has established the following service-level goals by call status.

First Call Time to Answer

All Severities 90% within 1 minute.

Level 1 Response (normal business hours)

Severity 1 90% within 5 minutes

Severity 2—5 90% within 1 hour

Level 2 Response (normal business hours)

Severity 1 Warm transfer

Severity 2 90% within 2 hours

Severity 3—5 90% within 8 hours

Scheduled follow-up (status update)

Severity 1 Hourly or as agreed

Severity 2 Daily or as agreed,

Severity 3—4 Weekly or as agreed

Severity 5 Notification is made when an enhancement is incorporated into a generally available product.

When follow-up is scheduled, notification is made when a fix is incorporated into a generally available product.

The above information is for guideline purposes only. Candle does not guarantee or warrant the above service levels. This information is valid as of October 1999 and is subject to change without prior notice.

Recording and Monitoring Calls for Quality Purposes

Candle is committed to customer satisfaction. To ensure that our customers receive high levels of service, quality and professionalism, we'll monitor and possibly record incoming and outgoing Customer Support calls. The information gleaned from these calls will help us serve you better. If you prefer that your telephone call with Candle Customer Support in North America not be monitored or recorded, please advise the representative when you call us at **(800) 328-1811** or **(310) 535-3636**.

Customer Support Escalations

Candle Customer Support is committed to achieving high satisfaction ratings from our customers. However, we realize that you may occasionally have support issues that need to be escalated to Candle management. In those instances, we offer the following simple escalation procedure:

If you experience dissatisfaction with Candle Customer Support at any time, please escalate your concern by calling the Candle support location closest to you. Ask to speak to a Customer Support manager. During standard business hours, a Customer Support manager will be available to talk with you or will return your call. If you elect to hold for a manager, you will be connected with someone as soon as possible. If you wish a return call, please tell the Candle representative coordinating your call when you will be available. After contacting you, the Customer Support manager will develop an action plan to resolve your issue. All escalations or complaints received about support issues are logged and tracked to ensure responsiveness and closure.

Above and Beyond

What differentiates Candle's support services from our competitors? We go the extra mile by offering the following as part of our Base Maintenance Plan:

- Unlimited multi-language defect, installation and operations support.
- eSupport using the World Wide Web.
- Regularly scheduled product updates and maintenance provided at no additional charge.
- Over 200 specialized technicians providing expert support for your Candle products.

Enhanced Support Services

Overview

Our Base Maintenance Plan provides a high level of software support in a packages offering. However, in addition to this plan, we have additional fee-based support services to meet unique customer needs. The following are some examples of our added-value support services.

Assigned Support Center Representative Services (ASCR)

- An assigned focal point for managing support escalation needs.
- Proactive notification of available software fixes.
- Proactive notification of product version updates.
- Weekly conference calls with your ASCR to review active problem records.
- Monthly performance reviews of Candle Customer Support service levels.
- Optional on-site visits (extra charges may apply).

Maintenance Assessment Service (MAS)

- On-site assessment services.
- Advice about product maintenance and implementation.
- Training your staff to develop efficient and focused procedures to reduce overall cost of ownership of your Candle software products.
- Analysis of your Candle product environment: versions, updates, code correction history, incident history and product configurations.
- Reviews to ensure that purchased Candle products and solutions are used effectively.

Multi-Services Manager (MSM)

Multi-Services Manager provides highly valued services to customers requiring on-site full time expertise to complement their technical resources.

- Dedicated on-site Candle resource (6 months of one year) at your site to help ensure maximum use and effectiveness of your Candle products.
- Liaison for all Candle product support activities, coordination and assistance with implementation of all product updates and maintenance releases.
- Works with your staff to understand business needs and systems requirements.
- Possesses technical and systems management skills to enhance your staff's knowledge and expertise.
- Other projects as defined in Statement of Work for MSM services.

Customer Support Contact Information

Worldwide Support Telephone and E-mail Information

To contact Customer Support, the current list of telephone numbers and e-mail addresses can be found on the Candle Web site: **www.candle.com/support/.**

Select **Support Contacts** from the list on the left of the page.

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