Tivoli® OMEGAMON XE for Mainframe Networks

Version 4.1.0

Fix Pack 1 and 2 Readme and Documentation Addendum

GI11-8116-01

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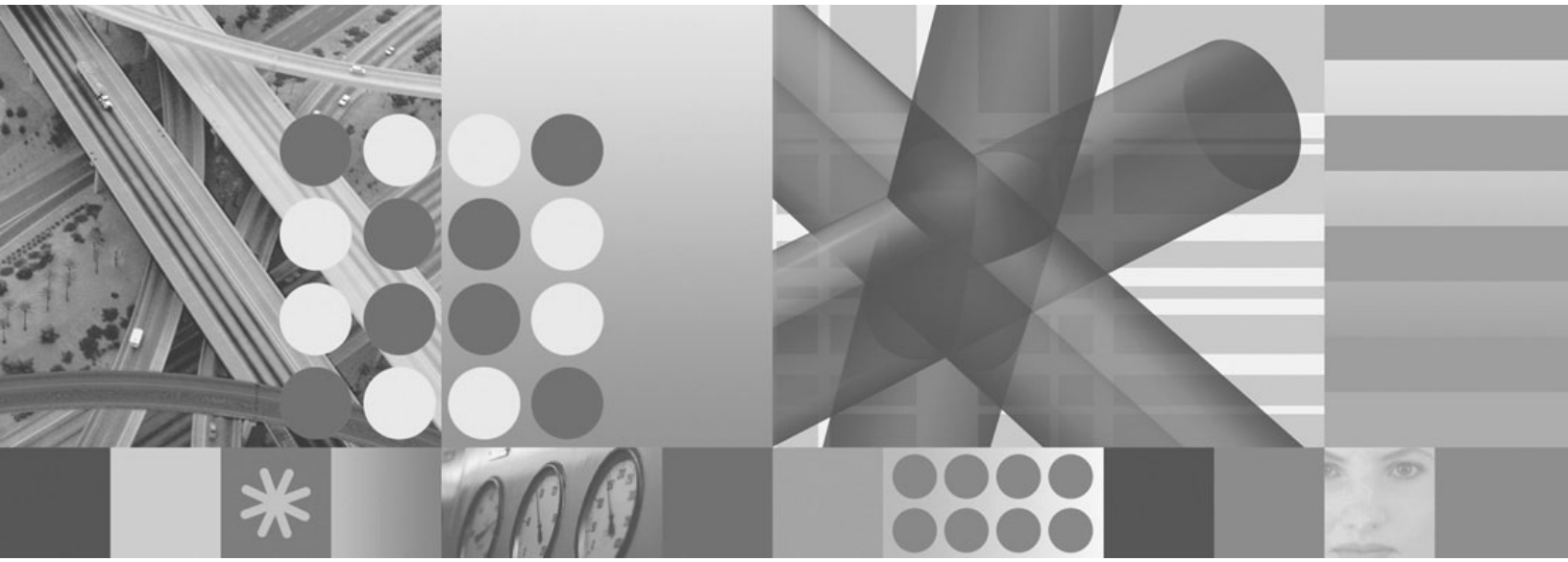

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Note

Before using this information and the product it supports, read the information in Appendix C, “Notices,” on page 227.

This edition applies to version 4, release 1, modification 0 of IBM Tivoli OMEGAMON XE for Mainframe Networks (program number 5698-A35) and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Chapter 1. What this book describes

This book describes the various updates to the IBM® Tivoli® OMEGAMON® XE for Mainframe Networks product since version 4 release 1 was released. Most of the updates made in Fix Pack 1 were made to support the z/OS® Communication Server network management interface (NMI) enhancements in z/OS versions 1.8 and 1.9 that enable IP Security (IPSec) monitoring. Most of the updates made in the Fix Pack 2 and Interim Feature for OSA-Express Enhancements (Fix Pack 2) were made to support OSA-Express2 10 Gigabit and OSA-Express3 adapters. Table 1 describes the contents of this book.

Table 1. Contents of this book

Description	Information
New planning considerations	Chapter 2, “New planning information,” on page 11
New configuration information	Chapter 3, “New configuration required for IPSec,” on page 25
New filters, attribute tables, and linking	Chapter 4, “New filters, attribute tables, and linking,” on page 31
New attribute groups	Chapter 5, “New and changed attribute groups,” on page 35
New and updated workspaces	Chapter 6, “New and updated workspaces,” on page 113
New situations	Chapter 7, “New situations,” on page 189
New commands	Chapter 8, “New and changed KN3FCCMD commands,” on page 197
New messages and problem determination	Chapter 9, “New and changed messages and problem determination,” on page 211

This section describes the following information:

New function introduced in Fix Pack 2

The following enhancements were added in IBM Tivoli OMEGAMON XE for Mainframe Networks Fix Pack 2:

- Support for z/OS version 1.10.

  If you are running z/OS version 1.10, you will notice some differences in the OMEGAMON XE for Mainframe Networks monitoring agent because of the z/OS Communications Server interface index related to the INTERFACE statement in the TCP/IP profile dataset. If you replaced the Device/Link statements in the TCPIP.PROFILE dataset with an IPv4 INTERFACE statement, you will notice these differences:

  – There is no row in the Gateways and Devices workspace summary tables. Instead, a row is displayed in the Interfaces workspace summary table.
  – The **Link Name** attribute in the OSA Ports workspace is blank.

  For more information about the INTERFACE statement, refer to the *z/OS Communications Server: IP Configuration* book.
- New workspaces and attribute groups to enable monitoring support for OSA-Express2 10 Gigabit and OSA-Express3 adapters. The new OSA workspaces are described in Table 2.

Table 2. New OSA-Express2 10 Gigabit and OSA-Express3 workspaces

Workspace name	New or changed attribute groups
“New OSA-Express2 10 Gigabit Port Control workspace” on page 116	“OSA 10Gigabit Ports Control Attributes” on page 35

Table 2. New OSA-Express2 10 Gigabit and OSA-Express3 workspaces (continued)

Workspace name	New or changed attribute groups
"New OSA-Express2 10 Gigabit Port Errors workspace" on page 118	"OSA 10Gigabit Ports Errors Attributes" on page 37
"New OSA-Express2 10 Gigabit Port Throughput Detail workspace" on page 120	"OSA 10Gigabit Ports Throughput Attributes" on page 44
"New OSA-Express2 10 Gigabit Ports Summary workspace" on page 113	"OSA 10Gigabit Ports Summary Attributes" on page 40
"New OSA-Express3 Port Control workspace" on page 126	"OSA Express3 Ports Control Attributes" on page 47
"New OSA-Express3 Port Errors workspace" on page 128	"OSA Express3 Ports Errors Attributes" on page 49
"New OSA-Express3 Port Throughput Detail workspace" on page 131	"OSA Express3 Ports Throughput Detail Attributes" on page 59
"New OSA-Express3 Ports Summary workspace" on page 123	"OSA Express3 Ports Summary Attributes" on page 53

- Additional and changed attributes. Table 3 is a list of existing workspaces that contain new or changed attributes.

Table 3. Enhancements to existing OSA workspaces

Workspace name	New or changed displayed attribute groups
OSA Channels Workspace	These changes were made to attributes in the OSA Channels workspace: • The default link from the OSA Channels workspace has been changed from OSA Ports to OSA LPARs. • Linking from the OSA Channels workspace to the appropriate OSA Ports workspace is now a conditional link based on the OSA channels **Subtype** attribute. • A new **Channel Hardware Level** attribute was added to identify the hardware model of the channel. • Additional values are provided for the existing **Subtype** attribute. • The **Device Name** attribute in the OSA Channels workspace has been changed to **Device or Port Name** to reflect the broader definition of this attribute possible under z/OS version 1.10.
OSA LPARS Workspace	These changes were made to attributes in the OSA LPARs workspace: • A new **LPAR Status** attribute has been added to the OSA-Express LPARs attribute group. On IBM eServer™ zSeries® 990 or later hardware, this indicates whether the LPAR is online or offline. For older hardware, the LPAR status will be displayed as unknown. • A new "Active OSA LPARs" query has been created for the OSA LPARs summary table that includes the new LPAR Status attribute as a filter. This query is listed in the query editor but is not enabled by default. You can edit the queries that retrieve data in predefined workspaces provided by your monitoring products, or create new queries to populate new views. For more information, see the chapter on creating custom queries in the *IBM Tivoli Monitoring: User's Guide*.

Table 3. Enhancements to existing OSA workspaces (continued)

Workspace name	New or changed displayed attribute groups
OSA Ports Workspace	The following changes were made to attributes that are displayed in the OSA Ports workspace: • The **Port Type** attribute has been enhanced to support a port type of "one thousand Base-T Ethernet." • The Channel footers in the OSA Ports workspace have been removed because the **Channel Number** attribute is no longer displayed by default in the table view. • A new **Disabled Status** attribute has been added. This attribute is identical to the existing **Disabled Status** attribute except that it is now displayed as a hexadecimal value (hex) to be consistent with the other port tables. The existing field is not displayed. • The name of the table view has been renamed to "Port Summary for Channel xyz." • The **Port Number** attribute in this workspace is now displayed as a decimal value. Previously it was displayed as a hex value. • The caption for the existing Burn In MAC Address attribute in the OSA-Express Ports Summary Table has been changed to **Burned In MAC Address**. • If you are running under z/OS version 1.10, the **Link Name** attribute is blank if you have replaced the Device/Link statements in the TCPIP.PROFILE dataset with an IPv4 Interface Statement. • The OSA Ports workspace is no longer the default workspace from the OSA navigator item. It is now a conditional workspaces accessed in the following manner: 1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace. 2. If the value for the OSA channel **Subtype** attribute in the Port Summary for Channel *abc* Table is gigabitEthernet, fastEthernet or oneThousandBaseTEthernet, right-click the **Link** icon by this table row. 3. A conditional link is displayed in the list of available links. Select **OSA Ports** to navigate you to the OSA Ports workspace.

- New predefined situations for OSA-Express2 10 Gigabit and OSA-Express3. The new situations are as follows:
  - N3T_OSA2_Missed_Packets
  - N3T_OSA2_Not_Stored_Frames
  - N3T_OSA3_Missed_Packets
  - N3T_OSA3_Not_Stored_Frames
- The EE Connections and EE Connection Details attribute groups and workspaces have been updated to add the attribute **PU Name** and use this attribute instead of the EE Connection ID attribute for views in the EE Connections workspace. Table 4 is a list of existing workspaces that contain new or changed attributes and views.

Table 4. Enhancements to existing EE and HPR workspaces

Workspace name	New or changed displayed attributes or links
EE Connection Details Workspace	The following changes were made to attributes and views displayed in the EE Connection Detail workspace: • The **PU Name** attribute has been added to this workspace. This attribute is defined as the name of the local physical unit (PU). • The **EE Connection ID** attribute is not displayed by default.

Table 4. Enhancements to existing EE and HPR workspaces (continued)

Workspace name	New or changed displayed attributes or links
EE Connections Workspace	The following changes were made to attributes and views displayed in the EE Connections workspace: • The view **Packet Retransmission Rate > 0** now defines the X-axis as PU Name, not Connection ID, so that the bar chart shows the number of HPR network-layer packets, by *PU Name*, that were retransmitted per minute over this EE connection during the most recent interval. • The view **EE Connections w/ Byte Rate > 0** now defines the X-axis as PU Name, not Connection ID, so that the bar chart shows the number of EE Connections, by *PU Name*, that were sent and received, per minute, during the most recent interval. • The view **RTP Pipes > 10 or Sessions > 1000** now defines the X-axis as PU Name, not Connection ID, so that the bar chart displays the number of RTP pipes that are flowing over this *PU Name* and the number of LU-to-LU sessions that are flowing over this *PU Name*. • The view **EE Connections w/Packet Rates > 0** now defines the X-axis as PU Name, not Connection ID, so that the bar chart shows the number of HPR network-layer packets that were sent on this *PU Name*, per minute, during the most recent interval. • The attribute **PU Name** has been added to this workspace. This attribute is defined as the name of the local physical unit (PU). • The **EE Connection ID** attribute is not displayed by default.

- Serviceability is improved by the addition of support for more granular tracing. When diagnosing a reported problem, IBM Software Support can use this more detailed tracing information to pinpoint problems more easily.
- With faster hardware and improvements to software, it is now more likely for attributes that display the number of bytes since the last collection interval to exceed the maximum value, 2,147,483,647. This is most likely to occur in byte or octet attributes for OSA-Express3 adapters and TCP/IP stacks. When the number of bytes since the last collection interval exceeds 2,147,483,647, the attribute will contain the maximum value. You will see this restriction placed on the octet attributes in the OSA-Express3 Ports Summary Workspace and on the Byte Rate attribute in the TCP/IP Summary Workspace.

New function introduced in Fix Pack 1

By applying OMEGAMON XE for Mainframe Networks Fix Pack 1, you added support for the following features:

- Support for z/OS version 1.9, including toleration for Address Space (ASID) reuse. Support was delivered in a previous APAR.

  The z/OS ASID Reuse function enables an address space to be created with a reusable ASID. If you use the End to End Response Time Monitor (ETE™), you can now specify REUSASID=YES on the ETE startup procedures.
- Monitoring IP filters and IPSec tunnels on z/OS version 1.8 or higher.
- New workspaces and attribute groups to enable monitoring of the IP security (IPSec) enhancement available in z/OS version 1.8. IPSec is an emerging Internet security standard developed by the IETF (Internet Engineering Task Force). It defines security extensions to the Internet Protocol (IP) that allows any two IP machines (such as hosts, routers, or gateways) to communicate securely over the Internet by authenticating and encrypting the traffic between them. By securing data at the IP layer, IPSec also provides transparent security to higher-layer protocols and applications. These new workspaces enable you to:
  - Monitor the effect of IP filters defined for the TCP/IP stacks of a z/OS system on traffic traversing the stacks.
  - Monitor the performance of IPSec tunnels for which a z/OS system TCP/IP stack is an endpoint.

– Monitor the performance of Internet Key Exchange (IKE) tunnels for which the IKE daemon on a z/OS system is an endpoint.
– Perform™ problem determination for problems related to filters and IPSec security associations.

Table 5. New IPSec workspaces

Workspace name	New or changed displayed attributes
IPSec Status	"IPSec Status Attributes" on page 99
IP Filters Statistics	"IPSec Status Attributes" on page 99
Current IP Filters	"Current IP Filters Attributes" on page 75
Current IP Filters by Destination Address	"Current IP Filters Attributes" on page 75
Current IP Filters by Filter Rule Definition Name	"Current IP Filters Attributes" on page 75
Current IP Filters in Scan Order	"Current IP Filters Attributes" on page 75
Dynamic IP Tunnels Statistics	"IPSec Status Attributes" on page 99
Dynamic IP Tunnels	"Dynamic IP Tunnels Attributes" on page 84
Dynamic IP Tunnels by Destination Address	"Dynamic IP Tunnels Attributes" on page 84
Dynamic IP Tunnel by Filter Rule Definition Name	"Dynamic IP Tunnels Attributes" on page 84
Dynamic IP Tunnel by Tunnel ID	"Dynamic IP Tunnels Attributes" on page 84
Dynamic IP Tunnels with Byte Rate < 2048	"Dynamic IP Tunnels Attributes" on page 84
Manual IP Tunnels	"Manual IP Tunnels attributes" on page 106
Manual IP Tunnels by Tunnel ID	"Manual IP Tunnels attributes" on page 106
IKE Tunnels Statistics	"IPSec Status Attributes" on page 99
IKE Tunnels	"Internet Key Exchange (IKE) Tunnels Attributes" on page 93
IKE Tunnels with Byte Rate < 2048	"Internet Key Exchange (IKE) Tunnels Attributes" on page 93
IKE Tunnels by Security Endpoint	"Internet Key Exchange (IKE) Tunnels Attributes" on page 93
IKE Tunnels by Tunnel ID	"Internet Key Exchange (IKE) Tunnels Attributes" on page 93
IKE Tunnels with Byte Rate < 1024	"Internet Key Exchange (IKE) Tunnels Attributes" on page 93

- Additional and changed attributes. Table 3 on page 2 includes a list of existing workspaces that contain new or changed attributes.

Table 6. Enhancements to existing workspaces

Workspace name	New or changed displayed attributes
Connections, Applications Connections, and TCP Connections	Three additional attributes were added: • Local IP address (new in this fix pack) • Application Name and Port (new in this fix pack) • DVIPA (new in this fix pack)
Interfaces and Interfaces History	This attribute was changed. • Physical Address The existing attribute was deprecated.

Table 6. Enhancements to existing workspaces (continued)

Workspace name	New or changed displayed attributes
Gateways and Devices (TCP/IP Gateways summary table)	The following attributes were changed to accommodate IPv6 addresses: • First Hop • Network Address • Subnet Mask • Subnet Value The existing attributes are deprecated. New attributes with the same name but a longer length have been added to accommodate the longer IPv6 addresses. The Packet Size attribute is no longer displayed.

- Support for two new formula functions that measure a rate of change. These formula functions are CHANGE and PCTCHANGE and are available in the Situation Editor. For additional information on these formula functions, see the Situation Editor help.
- New predefined situations for IPSec. The list of new situations is as follows:
  - N3T_IPSec_Dyn_Act_Fail
  - N3T_IPSec_Dyn_Act_Fail_IKE_Tnl
  - N3T_IPSec_Dyn_Act_Fail_IKE_TnR
  - N3T_IPSec_IKE_Act_Fail
  - N3T_IPSec_Key_Msgs_Auth_Fail
  - N3T_IPSec_Key_Msgs_Invalid
  - N3T_IPSec_Key_Msgs_Replayed
  - N3T_IPSec_Key_Msgs_Rtrnsmttd
  - N3T_IPSec_Pkts_Denied_DENY
  - N3T_IPSec_Pkts_Denied_Mismatch
  - N3T_IPSec_QUICKMODE_Invalid
  - N3T_IPSec_QUICKMODE_Replayed
  - N3T_IPSec_QUICKMODE_Rtrnsmttd
- Additional dynamic linking from selected Tivoli OMEGAMON XE for Mainframe Networks workspaces to IBM Tivoli NetView® for z/OS workspaces.

Upgrading to Fix Packs 1 and 2 overview

This section describes the following topics:

- Changes to the navigation tree introduced by the fix packs
- Manual help installation instructions for US English users running IBM Tivoli Monitoring version 6.2
- Limitations you will notice in online help for globalized environments
- Known limitation of IBM Tivoli Monitoring version 6.1 fix pack 6
- Impact of the fix packs on historical data collection
- IPSec migration issues you should be aware of if you installed Fix Pack 1 and are now installing Fix Pack 2

Changes to the navigation tree

With IPSec enabled, new entries were added to the navigation tree in Fix Pack 1, and the default workspace for the TCP/IP branch is changed, as shown in Figure 1 on page 7. In addition to the existing three OSA workspaces, two new sets of OSA workspaces for OSA-Express2 10 Gigabit and

OSA-Express3 are also available.

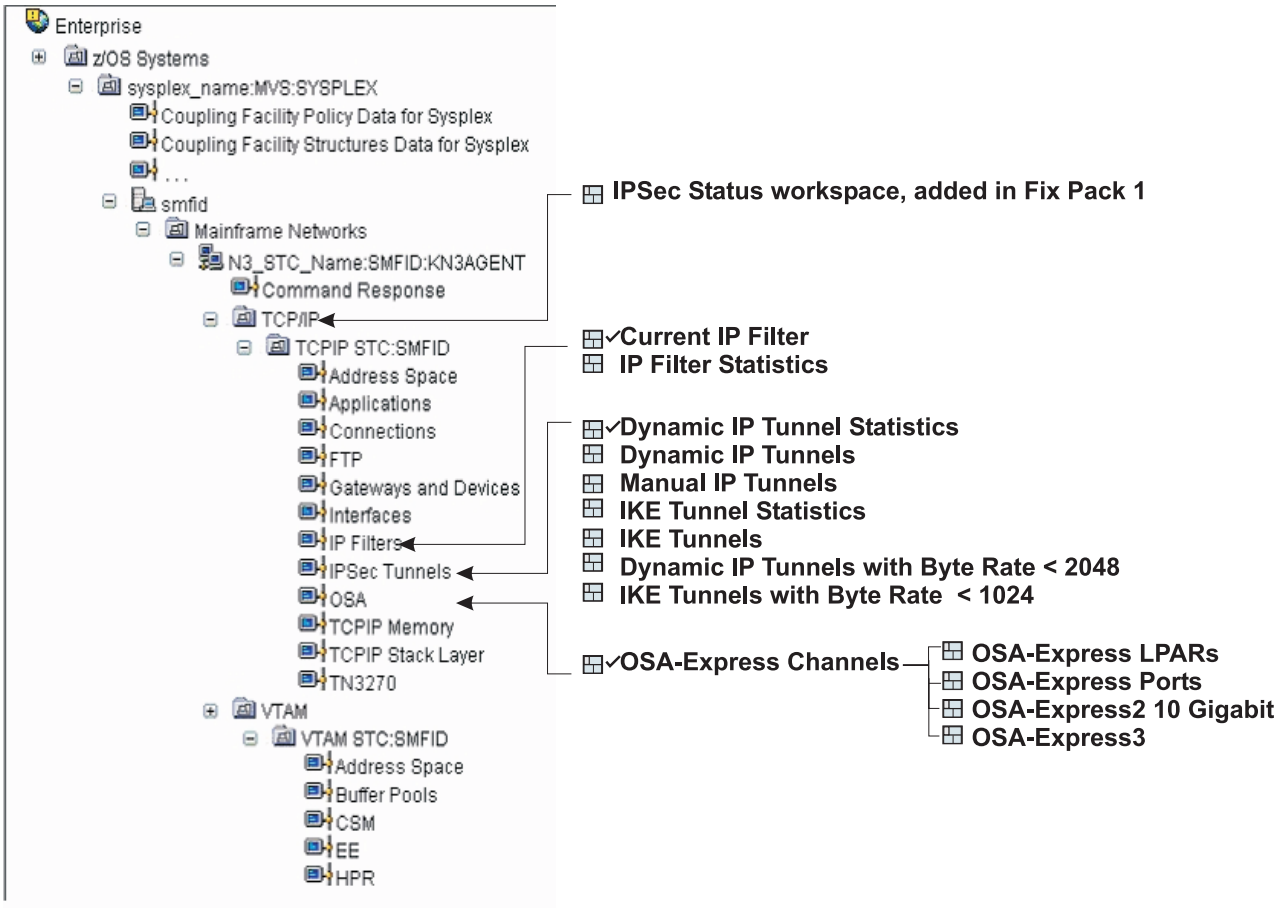


Figure 1. Updates to the navigation tree

The TCP/IP branch of the Navigator provides access to the following IPSec workspaces for each TCP/IP stack being monitored:

- TCP/IP node added a workspace named IPSec Status.
- IP Filters, which includes the following;
  - IP Filters Statistics (Default)
  - Current IP Filters
- IPSec Tunnels, which includes the following:
  - Dynamic IP Tunnels Statistics (Default)
  - Dynamic IP Tunnels
  - Dynamic IP Tunnels With Byte Rate < 2048
  - Manual IP Tunnels
  - IKE Tunnels Statistics
  - IKE Tunnels
  - IKE Tunnels With Byte Rate < 1024

The OSA branch of the Navigator provides access to the following OSA workspaces:

- OSA Channels (updated and default)
  - OSA LPARs (updated and now default)

– OSA Ports (updated)
– OSA-Express2 10 Gigabit Ports Summary, from which these workspaces can be accessed:
  - OSA-Express2 10 Gigabit Port Control
  - OSA-Express2 10 Gigabit Port Errors
  - OSA-Express2 10 Gigabit Port Throughput Detail
– OSA-Express3 Ports Summary, from which these workspaces can be accessed:
  - OSA-Express3 Port Control
  - OSA-Express3 Port Errors
  - OSA-Express3 Port Throughput Detail

Manual help installation instructions for US English users running IBM Tivoli Monitoring version 6.2

If you are running IBM Tivoli Monitoring version 6.2, you can expect to see hover help available as usual. However, the full-text help delivery system is in transition. The version 4.1 OMEGAMON XE monitoring agents on z/OS (based on IBM Tivoli Monitoring version 6.1 infrastructure) were delivered help using a web help facility; IBM Tivoli Monitoring version 6.2 delivers help on Eclipse.

To enable full-text help, do the following at the Tivoli Enterprise Portal Server:

1. Download the appropriate help archive file from the same web page as the fix pack:

   Locate the appropriate help archive file that was downloaded as part of the fix pack:
   - **On a Windows® TEPS**: MfN_FP2_Help_Updates_ITM62.zip
   - **On a UNIX® or Linux® TEPS**: MfN_FP2_Help_Updates_ITM62.tar

   These files contain replacements for the com.ibm.kn3.doc subdirectory and its contents. The existing com.ibm.kn3.doc subdirectory will be overlaid.
2. Stop the Tivoli Enterprise Portal, Tivoli Enterprise Portal Server, and the Eclipse Help Server. Refer to the *IBM Tivoli Monitoring: Installation and Setup Guide* for information about stopping and starting these components.
3. Make a backup copy of the existing com.ibm.kn3.doc directory, and then unzip or untar the updated help archive:

   On Windows systems:

   a. Make a backup copy of *install_dir*>\HELPSVR\eclipse\plugins\com.ibm.kn3.doc.

   b. Unzip MfN_FP2_Help_Updates_ITM62.zip into the installation directory (*install_dir*).

   On UNIX or Linux systems:

   a. Make a backup copy of <*install_dir*>\/*$platform*/kf/eclipse/plugins/com.ibm.kn3.doc, where *$platform* is one of the following:
      - li6243 or li6263 for Intel® Linux
      - ls3263 for zSeries Linux
      - aix513 or aix533 for AIX®
      - sol283 for Solaris

   b. Navigate to <*install_dir*>/$platform/kf.

   c. Untar MfN_FP2_Help_Updates_ITM62.tar using this command:

      ```
      tar -cvf (download directory)/MfN_FP2_Help_Updates_ITM62.tar
      ```
4. Start Tivoli Enterprise Portal Server.
5. Start the Eclipse Help Server if it was not started automatically when the Tivoli Enterprise Portal Server started.

6. To validate that you have installed this plugin correctly, start Tivoli Enterprise Portal, launch full-text help (select **Help** from the menu bar), select OMEGAMON XE for Mainframe Networks, and click on **New in this release**. The first topic should be a description of Fix Pack 2 contents.

Full-text help for attribute groups, situations, and workspaces is also available in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: NetworksFix Pack 1 and 2 Readme and Documentation Addendum* book.

Limited help available for globalized environments

This fix pack is not globalized. When you install this PTF, the new workspaces and attributes found in the fix pack are displayed in the user interface in English. The new navigator items are merged in English into the nationalized navigation tree. You can expect these behaviors:

- New or modified workspaces and their associated attributes: English-only
- Hover help for new workspaces: available but English-only
- Full-text (PF1) help for new workspaces and their associated attributes: not available. Use the information in this book.
- New attributes added to these existing workspaces are displayed in English-only and no hover help is available:
  - Connections
  - Applications Connections
  - EE Connections
  - EE Connections Details
  - Gateways and Devices
  - OSA Channels
  - OSA LPARs
  - OSA Ports

Known limitation of IBM Tivoli Monitoring version 6.1 fix pack 6

For multi-byte languages like Japanese, the help pane of the Situation Editor Condition panel displays unreadable text until a situation attribute is selected. At that time, the correct language help for that attribute is displayed. The unreadable text is redisplayed every time a situation is selected from the tree.

For information about this problem and possible workarounds, refer to the *IBM Tivoli Monitoring Fix Pack 6 Readme and Documentation Addendum, Revised 2007/12/03 Version 6.1* (GI11-8125-00) available in the IBM Tivoli Monitoring and OMEGAMON Information Center: http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.1/itmfp6_readme09.htm. This problem will also be addressed in the language pack that accompanies the next IBM Tivoli Monitoring version 6.1 fix pack.

Impact of the fix packs on historical data collection

New tables and associated attributes added by Fix Pack 1 and Fix Pack 2, as well as attributes added by these Fix Packs to previously existing tables, are automatically added in the persistent data store and Tivoli Data Warehouse. No action on your part is required.

IPSec migration issues

Changes were made in Fix Pack 2 to the encoding of IPSec attributes introduced in Fix Pack 1. Some values that were stored as 45-character strings by the monitoring agent in Fix Pack 1 are now being stored as UTF-8–encoded 45-character strings at the monitoring agent. The UTF-8–encoded character strings are transferred unchanged to the Tivoli Enterprise Portal instead of being converted from EBCDIC to UTF-8 during the transfer. The attributes groups and attributes shown in Table 7 on page 10 are affected:

Table 7. Attribute groups and attributes affected by IPSec UTF-8 encoding change

Attribute group	Attributes
Current IP Filters	• Destination Address • Source Address • Upper Destination Address • Upper Source Address
Dynamic IP Tunnels	• Destination Address • Local Security Endpoint • Remote Security Endpoint • Source Address • Upper Destination Address • Upper Source Address
IKE Tunnels	• Local Security Endpoint • Remote Security Endpoint
Manual IP Tunnels	• Local Security Endpoint • Remote Security Endpoint

For more information about these updates, see “Updated IPSec attribute groups and attributes in Fix Pack 2” on page 63. Updates to workspaces are indicated in “New and updated in Fix Pack 1” on page 141 with change bars (|). Queries and situations are unaffected by this change.

The TMS/Engine and the Tivoli Enterprise Portal Server make all the necessary conversions to make these attribute function correctly. These changes do not affect any tables being warehoused.

After you upgrade the Tivoli Enterprise Portal, the Tivoli Enterprise Portal Server, and the Tivoli Enterprise Monitoring Server with the application support for Mainframe Networks 4.1.0 Fix Pack 2, IP addresses in the IPSec Tunnels and IP Filters workspaces will not display correctly until you also upgrade the Mainframe Networks agent that is monitoring IPSec activity by applying the Fix Pack 2 PTF.

Chapter 2. New planning information

This section provides the following updated planning information:

- Worksheets to identify configuration information
- Information to help you determine what kinds of data to collect
- Worksheets for determining space allocations in the persistent data store

Updated planning worksheets

This section provides updates to the planning worksheets found in Chapter 5 of the version 4.1.0 *IBM Tivoli OMEGAMON XE for Mainframe Networks: Planning Guide*.

Use this table to identify the configuration settings you will provide for each RTE.

RTE Name		
VIO Name		
Collection Interval	**TCP/IP**	
	SNA	
TCP/IP Data File		
SNMP Configuration File		

Provide the TCP/IP procedure name and specify the types of data that will be collected for each TCP/IP address space.

TCP/IP Proc Name	**TCP/IP Connections**	**IPSec**	**Routing Table**		**TN3270**		**FTP**	
			Collect? Y/N	Frequency	Collect? Y/N	Display Interval	Collect? Y/N	Display Interval

In the Configuration Tool, you will be asked for a global setting for each of the above types of data, as well as for CSM and EE/HPR data. Specify the global setting for each of the following.

	TCP/IP Connections	**IPSec**	**Routing Table**		**TN3270**		**FTP**		**CSM**	**EE/HPR**	
			Collect? Y/N	Fre-quency	Collect? Y/N	Display Interval	Collect? Y/N	Display Interval		Collect? Y/N	allhpr?
Global Setting											

Updates to "Determining which types of real-time data to collect" in the planning guide

The *IBM Tivoli OMEGAMON XE for Mainframe Networks: Planning Guide* includes the following section in "Chapter 6: Performance and Storage Consideration." The information in *italics* in this section has been added either to accommodate the addition of new functionality introduced in fix packs or to correct known problems. The section follows.

By default, the IBM Tivoli OMEGAMON XE for Mainframe Networks monitoring agent is configured to monitor all resources (TCP/IP address spaces, TN3270 server sessions, High Performance Routing connections, Enterprise Extender connections, FTP sessions and transfers, OSA adapters, TCP/IP connections, interfaces, gateways, Communication Storage Manager, VTAM® buffer pools, and VTAM environment). The monitoring agent always collects a required minimum amount of real-time data. You may choose to disable one or more of the following optional types of data:

- TCP/IP Connection and Application Performance statistics collection
- Routing Table statistics collection
- TN3270 server statistics collection
- FTP data collection
- Enterprise Extender and High Performance Routing statistics collection
- Communications Storage Manager (CSM) buffer reporting
- Buffer Pool and VTAM Environment data collection

You may choose to enable the following optional types of data (by default, data collection for these types of data is disabled):

- *IPSec security collection*

The following tables show the storage costs for monitoring the required and optional types of resources. These tables are provided to inform you of the relative size of attribute tables and the frequency in which data is collected. You might use this information to determine what to monitor: which types of resources, which systems and at what collection interval.

The data shown in Table 8 on page 14 is collected once every collection interval and stored in memory (in a dataspace). The memory will be reused each collection interval. When a user navigates to a workspace, a query will result in the monitoring agent retrieving the appropriate data from a dataspace. Use this table to calculate the memory usage by multiplying the row size by the number of resources. Total the memory usage column to obtain the total memory used to hold data collected in an interval for a TCP/IP address space. Perform these calculations for each TCP/IP address space you are monitoring.

Table 8. Data collected once every collection interval

LPAR Name				
TCP/IP Address Space				
Name Type of Data	**Real-Time Data Attribute Table**	**Row Size in Bytes**	**Frequency Per Interval**	**Memory Usage**
TCP/IP and VTAM (required collection)	TCPIP Address Space	*560*	1 row per TCPIP address space	
	TCPIP Devices	*422*	1 row per Device	
	Interfaces	468	1 row per interface	
	OSA Express Channels	*416*	1 row per OSA channel	
	OSA Express LPARS	*106*	16 rows per OSA Channel per LPAR per local channel subsystem	
	OSA Express Ports	*754*	*1 row per OSA channel of channel subtype: gigabitEthernet,fastEthernet or oneThousandBaseTEthernet per port*	
	OSA 10Gigabit Ports Control	*390*	*1 row per OSA channel of channel subtype: tenGigabitEthernet per port*	
	OSA 10Gigabit Ports Errors	*420*	*1 row per OSA channel of channel subtype: tenGigabitEthernet per port*	
	OSA 10Gigabit Ports Summary	*468*	*1 row per OSA channel of channel subtype: tenGigabitEthernet per port*	
	OSA 10Gigabit Ports Throughput	*420*	*1 row per OSA channel of channel subtype: tenGigabitEthernet per port*	
	OSA Express3 Ports Control	*390*	*1 row per OSA channel of channel subtype: osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet or osaexp3tenGigabitEthernet per port*	
	OSA Express3 Ports Errors	*476*	*1 row per OSA channel of channel subtype: osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet or osaexp3tenGigabitEthernet per port*	
	OSA Express3 Ports Summary	*578*	*1 row per OSA channel of channel subtype: osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet or osaexp3tenGigabitEthernet per port*	
	OSA Express3 Ports Throughput	*484*	*1 row per OSA channel of channel subtype: osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet or osaexp3tenGigabitEthernet per port*	
	TCPIP Memory Statistics	392	1 row per TCP/IP address space	
	TCPIP Stack Layer	552	1 row per TCP/IP address space	
TCP/IP Connection and Application Performance statistics collection	TCPIP Applications	568	1 row per TCP/IP application	
	TCPIP Connections	*600*	1 row per TCPIP connection	
	TCPIP Details	*396*	1 row per TCP connection	
	TCP Listener	*204*	1 row per TCP listener	
	UDP Connections	304	1 row per UDP endpoint	
Routing Table Statistics Collection	TCPIP Gateways	*584*	1 row per TCP/IP gateway	

Table 8. Data collected once every collection interval (continued)

LPAR Name				
TCP/IP Address Space				
Name Type of Data	**Real-Time Data Attribute Table**	**Row Size in Bytes**	**Frequency Per Interval**	**Memory Usage**
IPSec Security Collection	*IPSec Status*	*360*	*1 row per TCP/IP address space*	
	Current® IP Filters	*812*	*1 row per IP filter*	
	Dynamic IP Tunnels	*1024*	*1 row per dynamic IP tunnel*	
	IKE Tunnels	*664*	*1 row per IKE tunnel*	
	Manual IP Tunnels	*364*	*1 row per manual IP tunnel*	

The data shown in Table 9 is collected once every collection interval and stored in memory. This data is collected for each LPAR you monitor. The memory will be reused each collection interval. Use this table to calculate the memory usage by multiplying the row size by the number of resources. Total the memory usage column to obtain the total memory used to hold data collected in an interval for these resources.

Table 9. Data collected for each monitored LPAR

LPAR Name				
Type of Data	**Real-Time Data Attribute Table**	**Row Size in Bytes**	**Frequency Per Interval**	**Memory Usage**
TCP/IP and VTAM (required collection)	VTAM Summary Statistics	72	1 row	
Enterprise Extender (EE) and High Performance Routing (HPR) statistics collection	EE Connections	*224*	1 row per EE connection	
	EE Connections Details	*220*	5 rows per EE connection	
	HPR RTP Connections	536	1 row per HPR RTP connection	
Communications Storage Manager (CSM) buffer reporting	CSM Storage	112	1 row	
Buffer Pool and VTAM Environment data collection	VTAM Address Space	244	1 row	
	VTAM I/O	72	*1 row for each of 6 resources*	
	VTAM Buffer Pools	*156*	*1 row for each of 14 resources*	
	VTAM Buffer Pool Extents	96	1 row per buffer pool extent	
	VTAM Buffer Usage by Address Space	72	*1 row per address space using IO00 or CRPL buffers*	
	VTAM Buffer Usage by Application	*80*	1 row per application per address space using IO00 buffers	
	VTAM Buffer Usage by Category	68	*1 row for each of 12 resources*	

The FTP data shown in Table 10 on page 16 is collected when a new session or transfer is opened or when an existing session or transfer is closed. This data is collected when z/OS Communications Server notifies the monitoring agent when data is available and therefore does not adhere to a collection interval. As explained above, new records are appended to the previously collected data until the table in the dataspace is full, at which time the table wraps. Therefore, over time 256 MB per TCP/IP address space will be used to hold FTP data.

This data is collected for each TCP/IP stack where FTP is running.

Table 10. FTP data collected

LPAR Name				
TCP/IP Address Space Name				
Type of Data	**Real-Time Data Attribute Table**	**Row Size in Bytes**	**Frequency**	**Maximum Rows Stored**
FTP Data Collection	FTP Sessions	348	2 rows per FTP session	25,000
	TCPIP FTP	2420	2 rows per FTP transfer	100,000

The TN3270 session workspaces display information about open, closed and active TN3270 sessions for a TCP/IP address space. Data for open and closed sessions is provided when z/OS Communications Server notifies the monitoring agent that data is available and therefore is not driven by a collection interval. On an LPAR running z/OS 1.8 or higher, data for active sessions is collected once per collection interval.

Memory used to store data for one session will be reused for the same session each collection interval and for the data collected when the session is closed. Approximately 24 hours after a session is closed, the memory used to hold that session's data will be made available for a new session.

Use Table 11 to calculate the memory usage by multiplying the row size by the number of resources. Total the memory usage column to obtain the total memory used to hold TN3270 data collected for a TCP/IP address space. Perform these calculations for each TCP/IP address space you are monitoring.

Note: The TN3270 Response Time Buckets table is not collected or stored as a separate table. Instead, it is a different view into the TN3270 Server Sess Avail table. When a query is issued to retrieve TN3270 Response Time Buckets data, the appropriate TN3270 Response Time Buckets rows (one row for each of the five response time buckets) are created from the corresponding row in the TN3270 Server Sess Avail table.

Table 11. TN3270 data collected

LPAR Name				
TCP/IP Address Space Name				
Type of Data	**Real-Time Data Attribute Table**	**Row Size in Bytes**	**Frequency**	**Maximum Rows Stored**
TN3270 Server Statistics Collection	TN3270 Server Sess Avail	400®	1 row per TN3270 server session that is active or was closed in the last 24 hours	
	TN3270 Response Time Buckets	204	0 rows	0

Use the Configuration Tool or the z/OS `MODIFY` command to enable or disable data collection for specific types of data. Refer to the KN3FCCMD commands appendix in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* book.

Note: OMEGAMON II for Mainframe Networks is capable of collecting TCP/IP performance data. However, this option is disabled by default. IBM Tivoli OMEGAMON XE for Mainframe Networks provides more extensive coverage of TCP/IP and its resources and provides a more efficient monitoring solution. Be aware that enabling both OMEGAMON II for Mainframe Networks and IBM Tivoli OMEGAMON XE for Mainframe Networks to monitor TCP/IP generates unnecessary

processing overhead. It is highly recommended to use IBM Tivoli OMEGAMON XE for Mainframe Networks to monitor TCP/IP resources in your enterprise.

Updated historical data tables in Appendix E of the configuration guide

Changes made in Fix Pack 1 and Fix Pack 2 require new information for the new attribute tables and updated attribute tables.

Updates to the "Historical data tables" section

The *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* includes the following section in "Appendix E: Disk space requirements for historical data tables." The information in *italics* in this section has been added either to accommodate the addition of new functionality introduced in fix packs or to correct known problems. In the original document, this information is included in Table 40. The section follows.

Table 12 lists the IBM Tivoli OMEGAMON XE for Mainframe Networks attribute tables available for historical collection. This table displays the storage used when monitoring one resource for 24 hours.

Table 12. Historical data tables

Attribute Table	Filename	Default	Estimated Storage Required for One Data Set (in KB)	Estimated Storage Required for One Data Set (3390 Cylinders; No. of Cylinders = KB/717)
TCPIP Address Space	KN3TAS	Yes	56	0.0781
TCPIP Devices	KN3TDV	Yes	43	0.0600
Interfaces	KN3TIF	Yes	*47*	0.0654
IPSec Status	KN3ISS	Yes	*37*	*0.0507*
OSA Express Channels	KN3TCH	Yes	*42*	*0.0581*
OSA Express LPARS	KN3TLP	Yes	*201*	*0.2803*
OSA Express Ports	KN3TPO	Yes	*74*	*0.1022*
OSA 10Gigabit Ports Control	*KN3TTC*	*No*	*40*	*0.0547*
OSA 10Gigabit Ports Errors	*KN3TTE*	*Yes*	*42*	*0.0586*
OSA 10Gigabit Ports Summary	*KN3TTS*	*Yes*	*47*	*0.0649*
OSA 10Gigabit Ports Throughput	*KN3TTT*	*No*	*42*	*0.0586*
OSA Express3 Ports Control	*KN3THC*	*No*	*40*	*0.0547*
OSA Express3 Ports Errors	*KN3THE*	*Yes*	*48*	*0.0659*
OSA Express3 Ports Summary	*KN3THS*	*Yes*	*57*	*0.0792*
OSA Express3 Ports Throughput	*KN3THT*	*No*	*48*	*0.0669*
TCPIP Memory Statistics	KN3TPV	Yes	40	0.0558
TCPIP Stack Layer	KN3TSL	Yes	55	0.0767
TCPIP Applications	KN3TAP	Yes	56	0.0781

Table 12. Historical data tables (continued)

Attribute Table	Filename	Default	Estimated Storage Required for One Data Set (in KB)	Estimated Storage Required for One Data Set (3390 Cylinders; No. of Cylinders = KB/717)
TCPIP Connections	KN3TCN	Yes	*59*	*0.0823*
TCPIP Details	KN3TCP	Yes	*40*	*0.0558*
TCP Listener	KN3TCL	Yes	22	0.0307
UDP Connections	KN3UDP	Yes	32	0.0446
TCPIP Gateways	KN3TGA	Yes	*58*	*0.0809*
VTAM Summary Statistics	KN3SNA	Yes	10	0.0139
EE Connections	KN3EEC	Yes	24	0.0329
EE Connections Details	KN3EED	Yes	117	0.1621
HPR RTP Connections	KN3HPR	Yes	53	0.0739
CSM Storage	KN3CSM	Yes	*13*	*0.0181*
VTAM Address Space	KN3VAS	Yes	*26*	*0.0363*
VTAM I/O	KN3VIO	Yes	*57*	*0.0795*
VTAM Buffer Pools	KN3BPD	Yes	*242*	*0.3368*
VTAM Buffer Pool Extents	KN3BPE	No	*12*	*0.0167*
VTAM Buffer Usage by Address Space	KN3BPS	Yes	*10*	*0.0098*
VTAM Buffer Usage by Category	KN3BPG	Yes	*108*	*0.1055*
FTP Sessions	KN3FSE	Yes	0.74	0.0010
TCPIP FTP (FTP transfers)	KN3FTP	Yes	4.78	0.0067
TN3270 Server Sess Avail	KN3TNA	Yes	14	0.0195
Total			*1917.52 KB*	*2.674 cylinders*

Updates to historical data storage tables for new and changed attribute tables

This section provides the information you will need to determine space allocations for storing historical data in the persistent data store for the new and changed attribute tables for each monitoring agent. Therefore, the disk space requirements in the tables in this section are for short-term history, which is stored on z/OS in the OMEGAMON XE persistent data store. For more information about these tables and methods for determining store requirements, refer to "Appendix E: Disk space requirements for historical data tables" in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide*.

TCP/IP historical data storage

Attribute group record sizes:

This data is collected once every collection interval for each TCP/IP stack. If you have an LPAR with multiple TCP/IP stacks, combine the storage required for each stack you will monitor.

Table 13. Data collected once every collection interval

Type of Data	Real-Time Data Attribute Group	Row Size in Bytes	Frequency Per Interval	Subtotal Storage Required (KB)
TCP/IP and VTAM (required collection)	IPSec Status (new)	*388*	1 row per TCP/IP address space	37
TCP/IP Connection and Application Performance statistics collection	Interfaces (updated)	*496*	1 row per interface	47
	OSA Express Channels (updated)	*444*	1 row per OSA Channel	42
	OSA Express LPARS (updated)	*134*	1 row per OSA LPAR	201
	OSA Express Ports (updated)	*782*	1 row per OSA Port	74
	OSA 10Gigabit Ports Control (new)	*418*	1 row per OSA-Express 2 10 Gigabit Port	40
	OSA 10Gigabit Ports Errors (new)	*448*	1 row per OSA-Express 2 10 Gigabit Port	42
	OSA 10Gigabit Ports Summary (new)	*496*	1 row per OSA-Express 2 10 Gigabit Port	47
	OSA 10Gigabit Ports Throughput (new)	*448*	1 row per OSA-Express 2 10 Gigabit Port	42
	OSA Express3 Ports Control (new)	*418*	1 row per OSA-Express3 Port	40
	OSA Express3 Ports Errors (new)	*504*	1 row per OSA-Express3 Port	48
	OSA Express3 Ports Summary (new)	*606*	1 row per OSA-Express3 Port	57
	OSA Express3 Ports Throughput (new)	*512*	1 row per OSA-Express3 Port	48
	TCPIP Connections (updated)	*628*	1 row per TCPIP connection	59
	TCPIP Details (updated)	*424*	1 row per TCP connection	40
Routing Table Statistics Collection	TCPIP Gateways (updated)	*612*	1 row per TCP/IP gateway	58

IPSec Status (KN3ISS) worksheet (new):

Interval	Record Size	Formula	TCP/IP Address Space Resources	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	388	4 x 24 x 388 x 1 x 1 / 1024	1	1	37 KB

Table 24: Interfaces (KN3TIF) worksheet (updated):

Interval	Record Size	Formula	TCP/IP Connections	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	488	4 x 24 x 488 x 1 x 1 x 1 / 1024	1	1	46 KB

Table 28: OSA Express Channels (KN3TCH) worksheet (updated):

Interval	Record Size	Formula	OSA Express Channels	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	*444*	*4 x 24 x 444 x 1 x 1 x 1 / 1024*	1	1	*42 KB*

Table 29: OSA Express LPARS (KN3TLP) worksheet (updated):

Interval	Record Size	Formula	OSA Express LPARS	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	*134*	*4 x 24 x 134 x 1 x 16 x 1 / 1024*	1	1	*201*

Table 30: OSA Express Ports (KN3TPO) worksheet (updated):

Interval	Record Size	Formula	OSA Express Ports	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	*782*	*4 x 24 x 782 x 1 x 1 x 1 / 1024*	1	1	*74 KB*

New OSA 10Gigabit Ports Control (KN3TTC) worksheet:

Interval	Record Size	Formula	OSA 10Gigabit Ports Control	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	418	4 x 24 x 418 x 1 x 1 x 1 / 1024	1	1	40

New OSA 10Gigabit Ports Errors (KN3TTE) worksheet:

Interval	Record Size	Formula	OSA 10Gigabit Ports Errors	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	448	4 x 24 x 448 x 1 x 1 x 1 / 1024	1	1	42

New OSA 10Gigabit Ports Summary (KN3TTS) worksheet:

Interval	Record Size	Formula	OSA 10Gigabit Ports Summary	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	496	4 x 24 x 496 x 1 x 1 x 1 / 1024	1	1	47

New OSA 10Gigabit Ports Throughput (KN3TTT) worksheet:

Interval	Record Size	Formula	OSA 10Gigabit Ports Throughput	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	448	4 x 24 x 448 x 1 x 1 x 1 / 1024	1	1	42

New OSA Express3 Ports Control (KN3THC) worksheet:

Interval	Record Size	Formula	OSA Express3 Ports Control	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	418	4 x 24 x 418 x 1 x 1 x 1 / 1024	1	1	40

New OSA Express3 Ports Errors (KN3THE) worksheet:

Interval	Record Size	Formula	OSA Express3 Ports Errors	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	504	4 x 24 x 504x 1 x 1 x 1 / 1024	1	1	48

New OSA Express3 Ports Summary (KN3THS) worksheet:

Interval	Record Size	Formula	OSA Express3 Ports Summary	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	606	4 x 24 x 606 x 1 x 1 x 1 / 1024	1	1	57

New OSA Express3 Ports Throughput (KN3THT) worksheet:

Interval	Record Size	Formula	OSA Express3 Ports Throughput	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	512	4 x 24 x 512 x 1 x 1 x 1 / 1024	1	1	48

Table 31: TCPIP Connections (KN3TCN) worksheet (updated):

Interval	Record Size	Formula	TCP/IP Connections	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	628	4 x 24 x 628 x 1 x 1 x 1 / 1024	1	1	59 KB

Table 32: TCPIP Details (KN3TCP) worksheet (updated):

Interval	Record Size	Formula	TCP Connections	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	424	4 x 24 x 424 x 1 x 1 x 1 / 1024	1	1	40 KB

Table 35: TCPIP Gateways (KN3TGA) worksheet (updated):

Interval	Record Size	Formula	Gateways	TCP/IP Stack	Expected Storage Required for 24 Hours
15 minutes	604	4 x 24 x 604 x 1 x 1 x 1 / 1024	1	1	57 KB

VTAM historical data storage

Attribute group record sizes: The following data is collected once every historical collection interval. This data is collected for each LPAR you will monitor.

Table 14. Data collected once every collection interval

Type of Data	Real-Time Data Attribute Group	Row Size in Bytes	Frequency Per Interval	Subtotal Storage Required in KB
TCP/IP and VTAM (minimum collection)	VTAM Summary Statistics	100	1 row	10
Enterprise Extender (EE) and High Performance Routing (HPR) statistics collection	EE Connections	252	1 row per EE connection	24
	EE Connections Details	248	5 rows per EE connection	117
	HPR RTP Connections	564	1 row per HPR RTP connection	53
Communications Storage Manager (CSM) buffer reporting	CSM Storage	140	1 row	13
Buffer Pool and VTAM environment collection	VTAM Address Space	272	1 row	26
	VTAM I/O	100	1 row for each of 6 resources	57
	VTAM Buffer Pools	184	1 row for each of 14 resources	242
	VTAM Buffer Pool Extents	124	1 row per buffer pool extent	12
	VTAM Buffer Usage by Address Space	100	1 row per address space using IO00 or CRPL buffers	10
	VTAM Buffer Usage by Category	96	1 row for each of 12 resources	108

Table 39: EE Connections (KN3EEC) worksheet (updated):

Interval	Record Size	Formula	EE Connection Resources	Expected Storage Required for 24 Hours
15 minutes	252	4 x 24 x 252 x 1 x 5 / 1024	1	24 KB

Table 40: EE Connection Details (KN3EED) worksheet (updated):

Interval	Record Size	Formula	EE Connection Resources	Expected Storage Required for 24 Hours
15 minutes	248	4 x 24 x 248 x 1 x 5 / 1024	1	117 KB

Table 43: VTAM I/O (KN3VIO) worksheet (updated):

Interval	Record Size	Formula	Number of Resources	Expected Storage Required for 24 Hours
15 minutes	100	4 x 24 x 100x 6 x 1 / 1024	6	57 KB

Table 44: VTAM Buffer Pools (KN3BPD) worksheet (updated):

Interval	Record Size	Formula	Number of Resources	Expected Storage Required for 24 Hours
15 minutes	184	4 x 24 x 184 x 14 x 1 / 1024	14	242 KB

Table 45: VTAM Buffer Pool Extents (KN3BPE) worksheet (updated):

Interval	Record Size	Formula	Number of Resources	Expected Storage Required for 24 Hours
15 minutes	124	4 x 24 x 124 x 1 x 1 / 1024	1	12 KB

Table 46: VTAM Buffer Usage by Address Space (KN3BPS) worksheet (updated):

Interval	Record Size	Formula	Number of Resources	Expected Storage Required for 24 Hours
15 minutes	100	4 x 24 x 100 x 1 x 1 / 1024	1	10 KB

Table 48: VTAM Buffer Usage by Category (KN3BPG) worksheet (updated):

Interval	Record Size	Formula	Number of Resources	Expected Storage Required for 24 Hours
15 minutes	96	4 x 24 x 96 x 12 x 1 / 1024	12	108 KB

Chapter 3. New configuration required for IPSec

When you are ready to monitor IP filters and IPSec tunnels, you will need to prepare your z/OS system and modify your RTE configuration. The following sections describe how to prepare your z/OS systems and how to run the Configuration Tool to configure each RTE to collect data for IP filters and IPSec tunnels.

Note: If you applied Fix Pack 1 and performed these configuration steps at that time, you do not need to repeat them as you install Fix Pack 2. Likewise, if you apply Fix Pack 2 but do not want to enable monitoring of IP tunnels and IPSec filters, you do not need to perform these configuration steps.

New steps to prepare your z/OS environment

Chapter 2 of the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* describes how to prepare your z/OS environment. In addition to the steps provided in Chapter 2, prepare your z/OS environment by performing the following on each z/OS system where you will monitor IP filters and IPSec tunnels:

- "Enabling IPSec monitoring"
- "Verifying IKE daemon and Policy Agent daemon are started"

Enabling IPSec monitoring

The NMI for IP filters and IPSec tunnels is available for monitoring agents without updating the TCP/IP profile. The IKE daemon and Policy Agent daemon must be started for IP filters and IPSec tunnels to be monitored.

Verifying IKE daemon and Policy Agent daemon are started

Confirm that the IKE daemon and Policy Agent daemon have started:

```
D A,L
```

If the daemons have not started, start them. Refer to the *z/OS Communications Server IP Configuration Guide* (SC31-8775) for more information about the IKE daemon and Policy Agent daemon.

Changes to Configuration Tool panels

Chapter 8 of the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* describes how to configure a monitoring agent. To direct the monitoring agent to collect IP filters and IPSec tunnels data, you will need to change the value for the **IPSec Security Collection** question that has been added to the configuration panels and then run both the N3#5xxxx job to create the TCP/IP monitored systems member (kn3tcpmo) and the N3#3xxxx job to create the runtime members for the OMEGAMON XE for Mainframe Networks agent. Details about performing these steps follow.

1. Navigate in the Configuration Tool panels to the panel titled SPECIFY COMPONENT CONFIGURATION (PAGE 2), found in Chapter 8 of the Configuration Guide under **Step 2 Specify configuration parameters** in Figure 32 on page 64 of the existing configuration guide. The panel is replaced by Figure 2 on page 26.

```
------------------- SPECIFY COMPONENT CONFIGURATION (Page 2)---------------
Command ===>

 Specify the following global information:

    TCP/IP Connection and Application Performance Statistics Collection:
          ==> Y   (Y,N)

    IP Filters and IPSec Tunnels Statistics Collection: ==> N   (Y,N)

    Routing Table Statistics Collection: ==> Y   (Y,N)
    Routing Table Collection Frequency:  ==> 10  (1-99)      (Optional)

    TN3270 Server Statistics Collection: ==> Y   (Y,N)
    TN3270 Data Display Interval:        ==> 2   (1-24 hours)(Optional)

    FTP Data Collection:                 ==> Y   (Y,N)
    FTP Data Display Interval:           ==> 2   (1-24 hours)(Optional)

    SNMP Configuration file (USER.SNMP(SNMPCONF)):
          ==> USER.SNMP(SNMPCONF)

 Enter=Next  F1=Help  F3=Back
```

Figure 2. Specify component configuration (page 2) panel

The new IPSec Security Collection configuration parameter is defined as shown below.

IP Filters and IPSec Tunnels Statistics Collection
Determines whether or not to collect IPSec security data. **Y** indicates IPSec Security data will be collected. **N** indicates IPSec Security data will not be collected (the default).

Specify **Y** to collect IPSec Security data. Verify that all displayed values are correct and press **Enter** to continue.

2. Continue navigating in the Configuration Tool to the panel titled **SPECIFY TCP/IP MONITORED SYSTEMS INFORMATION**, which is Figure 35 on page 68 of the existing configuration guide.
3. On the SPECIFY TCP/IP MONITORED SYSTEMS INFORMATION panel, type **A** for a row and press **Enter** to navigate to the panel titled **ADD TCP/IP MONITORED SYSTEMS INFO**. This panel can be found in Figure 38 on page 71 of the existing configuration guide. The panel is replaced by Figure 3.

```
-------------- ADD TCP/IP MONITORED SYSTEMS INFO / RTE: HUBN3IRA ------------
COMMAND ===>

 Complete the items on this panel:

   Sys                  ==>

   TCP/IP address space ==>

   TCP/IP profile dataset name:  ==>
     Member name        ==>                                      (Optional)

   TCP/IP Connection Collection Override            ==>     (Y,N)  (Optional)

   IP Filters and IPSec Tunnels Collection Override ==>     (Y,N)  (Optional)

   Routing Table Collection Override                ==>     (Y,N)  (Optional)
   Routing Table Collection Frequency               ==>     (1-99) (Optional)



 Enter=Next  F1=Help  F3=Back
```

Figure 3. Add TCP/IP monitored systems information panel

The new IPSec Security Collection configuration parameter is defined as shown below.

IP Filters and IPSec Tunnels Collection Override

Determines whether or not to collect IP Security and tunnel data for this address space. **Y** indicates IP Security data will be collected. **N** indicates IP Security data will not be collected. Leaving the field blank indicates that IP Security Data collection will use the default. See Notes® below for additional restrictions.

Specify **Y** to collect IPSec Security data. Verify that all displayed values are correct and press **Enter** to continue.

Note: This new configuration parameter has also been added to the following similar configuration panels:

- View TCP/IP Monitoring Systems Info
- Update TCP/IP Monitoring Systems Info

4. When you have finished adding configuration information for the monitored TCP/IP address spaces, you will be returned to the SPECIFY TCP/IP MONITORED SYSTEMS INFORMATION panel. Press **F3** to view the N3#5xxxx JCL job that is generated to created the TCP/IP monitored systems member, *&rhilev.&midlev.*RKANPARU(KN3TCPMO). Review and submit the JCL. You might want to change the jobname to match the member name so that you can easily identify this job (N3#5xxxx) later on. Verify that the job completes successfully.
5. Press **F3** to exit the job. Press **F3** a second time to exit the SPECIFY TCP/IP MONITORED SYSTEM INFORMATION panel.
6. Type **4** and press **Enter** to display the **Create Runtime Members** panel for job N3#3xxxx. Review and submit the JCL. Verify that the job completes successfully.
7. Perform the steps described in section “New steps to "Loading the runtime libraries and completing the configuration".”

New steps to "Loading the runtime libraries and completing the configuration"

Chapter 9 of the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* describes the steps required to load the runtime libraries and complete the configuration. Perform the following for each RTE in your environment:

- Load the runtime libraries for each RTE (follow the instructions in Chapter 9, section “Loading the runtime libraries”). KN3ATR, KN3CAT, KN3PDICT, and load modules were updated. The LOAD job will copy these members to the appropriate libraries. If your RTE shares the SMP/E target libraries, you can run the following jobs instead of the LOAD job:
  - To copy KN3ATR and KN3CAT, follow the instructions in “Step 1: Register with local TEMS” in Chapter 9.
  - To copy KN3PDICT, follow the instructions for option “3 Create runtime members” under “Step 5: Configure Persistent datastore (in Agent)” in Chapter 9.
- Edit and run the KN3LINK job, if appropriate for your environment. Read the information in “Operating system considerations,” located in Chapter 9 in section “Completing the Configuration.”
- Define monitoring agent access to the NMI for each z/OS system where you will monitor IP filters and IPSec tunnels.

Defining monitoring agent access to the NMI

Note

This is an update to an existing section that is currently part of Chapter 9 in the configuration guide. Updates are in *italics*.

If your site has the security groups defined for z/OS Communications Server Network Management Interface (NMI), then the OMEGAMON XE for Mainframe Networks monitoring agent must be authorized to access this interface. *One or more of the following security groups may be defined in the SERVAUTH class:*

- *EZB.NETMGMT.systemname.tcpipprocname.**
- *EZB.NETMGMT.systemname.tcpipprocname.SYSTCPCN*
- *EZB.NETMGMT.systemname.tcpipprocname.SYSTCPSM*
- *EZB.NETMGMT.systemname.tcpipprocname.IPSEC.DISPLAY*
- *IST.NETMGMT.systemname.SNAMGMT*

If the resources are not defined, then the user ID that the monitoring agent procedure runs under needs to be a superuser, which is a user that has been permitted to the BPX.SUPERUSER resource in the FACILITY class.

The Configuration Tool placed a sample JCL job in the *&rhilev.&midlev*.RKANSAMU library called KN3UAUTH that will create a new KN3USER user and grant access to *all of the z/OS Communications Server Network Manager Interface APIs by granting the monitoring agent access to the IST.NETMGMT.systemname.SNAMGMT and EZB.NETMGMT.systemname.tcpipprocname.* resources.*

This job is run outside of the Configuration Tool. Make the following changes to this job before you run it:

- Change **omvsgrp** to a valid OMVS group in RACF® and **password** to a valid password for your enterprise.
- Change **systemname** to the system name where the monitoring agent will run.
- Change **agentproc** to the started procedure name for the IBM Tivoli OMEGAMON XE for Mainframe Networks monitoring agent. The default is **CANSN3**.
- Change **tcpipprocname** to your TCP/IP startup procedure name for the TCP/IP stack that you want to monitor. Repeat this pair of lines (RDEFINE and PERMIT) for every TCP/IP address space you want to monitor.

  Notes:

  1. The RDEFINE and PERMIT statements for IST.NETMGMT* do not need to be repeated if you have more than one TCP/IP address space you are monitoring.
  2. If you start your TCP/IP address space using the `S procedure` syntax, use procedure for *tcpipprocname*. If you start your TCP/IP address space using the `S procedure.identifier` syntax, use identifier for *tcpipprocname*.

For information about values in this job that you need to edit, refer to comments in the JCL job.

Your security administrator must run this job from a user ID that has RACF SPECIAL and UID(0) authority or code USERID and PASSWORD on the jobcard for an ID that has RACF SPECIAL and UID(0) authority. KN3USER is the default user ID. If you choose to use a different ID, change all occurrences of KN3USER in the job. Make these changes and review this job before you provide it to your security department. It should run with a zero return code.

The KN3UAUTH job will be created every time you go through the configuration process. Copy this job into another data set and customize it for your environment and leave *&rhilev.&midlev.*RKANSAMU as a backup copy. This job should not be run more than once for this started task.

Potential changes to the batch parameter deck

If you manually edit the batch parameter deck and choose to override any of the global parameters for a TCP/IP address space, you must also ensure that the KN3_TCPX_OGBL parameter is set to **Y** for each address space that you modify. This designation is found in the batch job near the section that includes the following parameters:

```
KN3_TCPX_ROW
KN3_TCPX_SYS_NAME         0023
KN3_TCPX_ADDR_SPACE       TCPCS5
KN3_TCPX_PROF_DATASET     CS390.BASE.TCPPARMS
KN3_TCPX_OGBL             Y
KN3_TCPX_OTCPC
KN3_TCPX_OIPSEC           Y
KN3_TCPX_ORTC
KN3_TCPX_ORTF
KN3_TCPX_OFTPC
KN3_TCPX_FTP_INT_SPEC
KN3_TCPX_OTNC
KN3_TCPX_TNC_INT_SPEC
KN3_TCPX_PROF_MEMBER      TCPCS5S
```

Chapter 4. New filters, attribute tables, and linking

IBM Tivoli OMEGAMON XE for Mainframe Networks Fix Pack 1 added new functionality to support IPSec. Fix Pack 2 adds new OSA workspaces and functionality. New filters, attributes tables, and links are shown in this chapter. This chapter includes the following:

Fix Pack 2 OSA additions

This section discusses filters and attributes groups for the eight new OSA workspaces.

OSA Filters

The filters provided with the new and updated OSA workspaces in Tivoli OMEGAMON XE for Mainframe Networks are shown in Table 15.

Table 15. Filters provided with Tivoli OMEGAMON XE for Mainframe Networks for the OSA

Attribute group	Table prefix	Workspace	Source filters	Other filters
OSA Express Channels	KN3TCH	OSA Channels Workspace	Channel Number	None
OSA Express LPARS	KN3TLP	OSA LPARs Workspace	Channel Number	None
OSA Express Ports	KN3TPO	OSA Ports Workspace	Channel Number	Subtype (Channel)
OSA 10Gigabit Ports Errors	KN3TTE	OSA-Express2 10 Gigabit Port Errors Workspace	Channel Number and Port Number	Subtype (Channel)
OSS 10Gigabit Ports Control	KN3TTC	OSA-Express2 10 Gigabit Port Control Workspace	Channel Number and Port Number	Subtype (Channel)
OSA 10Gigabit Ports Summary	KN3TTS	OSA-Express2 10 Gigabit Ports Summary Workspace	Channel Number	Subtype (Channel)
OSA 10Gigabit Ports Throughput	KN3TTT	OSA-Express2 10 Gigabit Port Throughput Detail Workspace	Channel Number and Port Number	Subtype (Channel)
OSA Express3 Ports Control	KN3THC	OSA-Express3 Port Control Workspace	Channel Number and Port Number	Subtype (Channel)
OSA Express3 Ports Errors	KN3THE	OSA-Express3 Port Errors Workspace	Channel Number and Port Number	Subtype (Channel)
OSA Express3 Ports Summary	KN3THS	OSA-Express3 Ports Summary Workspace	Channel Number	Subtype (Channel)
OSA Express3 Ports Throughput	KN3THT	OSA-Express3 Port Throughput Detail Workspace	Channel Number and Port Number	Subtype (Channel)

Mapping of new Fix Pack 2 OSA workspaces to attribute tables

Tivoli OMEGAMON XE for Mainframe Networks provides workspaces that are accessed from the Navigator. Each of these workspaces display tables that can be altered or replaced, to meet your needs.

Table 16 shows which attribute tables display in which workspaces as well as the table prefix. These are the source tables for the Tivoli Data Warehouse.

Table 16. Mapping Navigator workspaces to attribute tables

Workspace	Attribute table	Table prefix
OSA-Express2 10 Gigabit Port Errors	OSA 10Gigabit Ports Errors	KN3TTE
OSA-Express2 10 Gigabit Port Control	OSA 10Gigabit Ports Control	KN3TTC
OSA-Express2 10 Gigabit Ports Summary	OSA 10Gigabit Ports Summary	KN3TTS
OSA-Express2 10 Gigabit Port Throughput Detail	OSA 10Gigabit Ports Throughput	KN3TTT
OSA-Express3 Port Control	OSA Express3 Ports Control	KN3THC
OSA-Express3 Port Errors	OSA Express3 Ports Errors	KN3THE
OSA-Express3 Ports Summary	OSA Express3 Ports Summary	KN3THS
OSA-Express3 Port Throughput Detail	OSA Express3 Ports Throughput	KN3THT

Fix Pack 1 IPSec additions

This section discusses filters and attributes groups for the 23 new IPSec workspaces.

IPSec Filters

The filters provided with the IPSec workspaces in Tivoli OMEGAMON XE for Mainframe Networks are shown in Table 17.

Table 17. Filters provided with Tivoli OMEGAMON XE for Mainframe Networks for the IPSec additions

Attribute table	Table prefix	Workspace	Source filters	Other filters
IPSec Status	KN3ISS	IPSec Status	None	None
	KN3ISS	IP Filter Statistics	None	None
	KN3ISS	Dynamic IP Tunnel Statistics	None	None
	KN3ISS	IKE Tunnel Statistics	None	None
Current IP Filters	KN3IFC	Current IP Filters	None	PAGE = “0000”
Dynamic IP Tunnels	KN3ITD	Dynamic IP Tunnels	None	Byte Rate >= 2048
	KN3ITD	Dynamic IP Tunnels with Byte Rate < 2048	None	Byte Rate < 2048
Manual IP Tunnels	KN3ITM	Manual IP Tunnels	None	None
IKE Tunnels	KN3ITI	IKE Tunnels	None	Byte Rate >= 1024
	KN3ITI	IKE Tunnels with Byte Rate < 1024	None	Byte Rate < 1024

Mapping of new Fix Pack 1 IPSec workspaces to attribute tables

Tivoli OMEGAMON XE for Mainframe Networks provides workspaces that are accessed from the Navigator. Each of these IPSec workspaces display tables that can be altered or replaced, to meet your needs. Table 18 shows which attribute tables display in which workspaces as well as the table prefix. These are the source tables for the Tivoli Data Warehouse.

Table 18. Mapping Navigator workspaces to attribute tables

Workspace	Attribute table	Table prefix
IPSec Status	IPSec Status	KN3ISS

Table 18. Mapping Navigator workspaces to attribute tables (continued)

Workspace	Attribute table	Table prefix
IP Filter Statistics	IPSec Status	KN3ISS
Dynamic IP Tunnel Statistics	IPSec Status	KN3ISS
Current IP Filters	Current IP Filters	KN3IFC
Dynamic IP Tunnels	Dynamic IP Tunnels	KN3ITD
IKE Tunnels	IKE Tunnels	KN3ITI
IKE Tunnels Statistics	IPSec Status	KN3ISS
Manual IP Tunnels	Manual IP Tunnels	KN3ITM

Tivoli OMEGAMON XE for Mainframe Networks also provides workspaces that are accessed by linking from other workspaces. Each of these IPSec workspaces also displays tables that can be altered or replaced, to meet your needs. Table 19 shows which attribute tables display in which linked workspaces as well as the table prefix for each.

Table 19. Mapping linked workspaces to attribute tables

Workspace	Attribute table	Table prefix
Current IP Filters by Destination Address	Current IP Filters	KN3IFC
Current IP Filters by Rule Name	Current IP Filters	KN3IFC
Current IP Filters in Scan Order	Current IP Filters	KN3IFC
Dynamic IP Tunnels by Destination Address	Dynamic IP Tunnels	KN3ITD
Dynamic IP Tunnels by Filter Name	Dynamic IP Tunnels	KN3ITD
Dynamic IP Tunnels by Tunnel ID	Dynamic IP Tunnels	KN3ITD
Dynamic IP Tunnels with Byte Rate < 2048	Dynamic IP Tunnels	KN3ITD
IKE Tunnels by Security Endpoint	IKE Tunnels	KN3ITI
IKE Tunnels by Tunnel ID	IKE Tunnels	KN3ITI
IKE Tunnels with Byte Rate < 1024	IKE Tunnels	KN3ITI
Manual IP Tunnels by Tunnel ID	Manual IP Tunnels	KN3ITM

Corrected dynamic linking to cross-product workspaces

Release 4.1.0 first exploited dynamic workspace links, a feature that allows you to easily navigate between workspaces that are provided by multiple products. This feature aids problem determination and improves integration across the monitoring products, allowing you to quickly determine the root cause of a problem. Predefined cross-product links provided by the OMEGAMON XE products allow you to obtain additional information about systems, subsystems, resources, or network components that are being monitored by other monitoring agents. Refer to the *IBM Tivoli OMEGAMON XE for Mainframe Networks: User's Guide* for more information about dynamic workspace links.

Some links published in the version 4.101 user's guide were incorrect. This list has been updated to correct those problems. Refer to the workspace descriptions in Chapter 6, “New and updated workspaces,” on page 113 for information about the predefined links provided with each new or updated workspace. Table 20 on page 34 summarizes the dynamic links available from the IBM Tivoli OMEGAMON XE for Mainframe Networks version 4.1.0 product.

Table 20. Links from IBM Tivoli OMEGAMON XE for Mainframe Networks to other agents and applications

IBM Tivoli OMEGAMON XE for Mainframe Networks workspace	**Target application or monitoring agent**	**Name of workspace in target application or monitoring agent**	**Attributes used to locate target workspace**	**Attributes used to filter data in target workspace**
Applications	IBM Tivoli OMEGAMON XE for DB2® Performance Expert on z/OS	Thread Activity By Plan	SMFID	DB2 Application Name
Applications	IBM Tivoli OMEGAMON XE for IMS™ on z/OS	IMS Connect TCPIP Usage	Application Name (Job Name)	None
Connections **Note:** This link is available only if the new DVIPA attribute in this workspace has the value of **Yes**.	IBM Tivoli NetView for z/OS	IBM Tivoli NetView for z/OS DVIPA Definition and Status Workspace	• Sysplex name • SMFID	Local IP Address
TCP Connections **Note:** This link is available only if the new DVIPA attribute in this workspace has the value of **Yes**.	IBM Tivoli NetView for z/OS	IBM Tivoli NetView for z/OS DVIPA Definition and Status Workspace	• Sysplex name • SMFID	Local IP Address
TCP Listeners	IBM Tivoli NetView for z/OS	IBM Tivoli NetView for z/OS DVIPA Sysplex Distributors	• Sysplex name • SMFID	None
TCP Listeners	IBM Tivoli OMEGAMON XE for IMS on z/OS	IMS Connect TCPIP Usage	Application Name (Job Name)	None

Chapter 5. New and changed attribute groups

This chapter describes the new and updated attribute groups delivered in the two updates delivered since version 4.1.0 of OMEGAMON XE for Mainframe Networks became available. This chapter includes the following:

- "New and changed attribute groups in Fix Pack 2"
- "New and changed attribute groups in Fix Pack 1" on page 75

New and changed attribute groups in Fix Pack 2

The following new attribute groups or tables were added to the OMEGAMON XE for Mainframe Networks product to support OSA updates and other changes described in "New function introduced in Fix Pack 1" on page 4.

- "OSA 10Gigabit Ports Control Attributes"
- "OSA 10Gigabit Ports Errors Attributes" on page 37
- "OSA 10Gigabit Ports Summary Attributes" on page 40
- "OSA 10Gigabit Ports Throughput Attributes" on page 44
- "OSA Express3 Ports Control Attributes" on page 47
- "OSA Express3 Ports Errors Attributes" on page 49
- "OSA Express3 Ports Summary Attributes" on page 53
- "OSA Express3 Ports Throughput Detail Attributes" on page 59

These attributes groups were updated:

- "Updated EE Connections Attributes" on page 62
- "Updated EE Connection Details Attributes" on page 63
- "Updated HPR Connections Attributes" on page 63
- "Current IP Filters Attribute Group" on page 63
- "Dynamic IP Tunnels Attribute Group" on page 64
- "Internet Key Exchange (IKE) Tunnels Attribute Group" on page 65
- "Manual IP Tunnels Attribute Group" on page 66
- "OSA Express Channels Attributes" on page 66
- "OSA Express LPARS Attributes" on page 70
- "OSA Express Ports Attributes" on page 71

For more information about the workspaces associated with these attribute groups, see Chapter 6, "New and updated workspaces," on page 113.

New attribute groups in Fix Pack 2

This section includes the eight new attribute groups added for Fix Pack 2 in alphabetical order.

OSA 10Gigabit Ports Control Attributes

Use the OSA 10Gigabit Ports Control attributes to monitor the data associated with a port on an OSA-Express2 10 Gigabit Ethernet feature.

Transmitter on (XON) and transmitter off (XOFF) packets are flow-control packets between the OSA and the switch to which it is connected. They are used to provide flow control between the two ports, and are of particular interest if the port is at 100% utilization.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:
- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:
- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Pause MAC Packets Received The number of valid Pause MAC control packets received by the OSA during the most recent time interval. The format is an unsigned integer.

Pause MAC Packets Transmitted The number of valid Pause MAC control packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 16-character alphanumeric string.

Port Number The physical port number for this port. Currently, this value can be only zero (0). The format is an integer.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Pause MAC Packets Received The number of valid Pause MAC control packets received by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Pause MAC Packets Transmitted The number of valid Pause MAC control packets transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total XOFF Packets Received The number of XOFF (Transmitter OFF) packets received by the OSA since the last time the OSA port was reset. XOFF packets can use the global address or the station address. Receiving XOFF packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

Total XOFF Packets Transmitted The number of XOFF (Transmitter OFF) packets transmitted by the OSA since the last time the OSA port was reset. Sending XOFF packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

Total XON Packets Received The number of XON (Transmitter ON) packets received by the OSA since the last time the OSA port was reset. XON packets can use the global address or the station address. Receiving XON packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

Total XON Packets Transmitted The number of XON (Transmitter ON) packets transmitted by the OSA since the last time the OSA port was reset. Sending XON packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

Trap Control Flags The value of this object determines which traps will be generated by the OSA. The value of this object is initially all zeros, indicating that all traps will be sent to the OSA subagent. Setting the appropriate bit prevents a particular trap from being sent to the subagent. When the bit value of the disableEthLANChange bit is set to zero (0), then the trap ibmOSAExp10GigEthLANStateChange is sent. The format is a 4–digit hexadecimal number. Valid values are:

- x'0000' meaning the trap is enabled.
- x'8000' meaning the trap is disabled.

XOFF Packets Received The number of XOFF (Transmitter OFF) packets received by the OSA during the most recent time interval. XOFF packets can use the global address or the station address. Sending XOFF packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

XOFF Packets Transmitted The number of XOFF (Transmitter OFF) packets transmitted by the OSA during the most recent time interval. Sending XOFF packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

XON Packets Received The number of XON (Transmitter ON) packets received by the OSA during the most recent time interval. XON packets can use the global address or the station address. Receiving XON packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

XON Packets Transmitted The number of XON (Transmitter ON) packets transmitted by the OSA during the most recent time interval. Sending XON packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

OSA 10Gigabit Ports Errors Attributes

Use the OSA 10Gigabit Ports Errors attributes to monitor the data associated with a port on an OSA-Express2 10 Gigabit Ethernet feature.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:

mm/dd/yy hh:mm:ss

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format CYYMMDDHHMMSSmmm (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

CRC Errors The number of cyclic redundancy check (CRC) errors on packets received on the LAN during the most recent time interval. The format is an unsigned integer.

Deferred Events The number of events deferred during the most recent time interval. A deferred event occurs when the transmitter cannot immediately send a packet because the medium is busy, XOFF (Transmitter OFF) frames are being sent, or the link is not up. The format is an unsigned integer.

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Jabber Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering, were longer than maximum size, and had a bad cyclic redundancy check (CRC). The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Length Error Packets Received The number of length-error packets received by the OSA during the most recent time interval. A length error occurs if an incoming packet passes the filter criteria but the Length field does not match the number of bytes counted in the Data field. In the case of MAC control frames (including Pause), this attribute determines if the Data field is correctly padded to 46 bytes. The format is an unsigned integer.

Local Faults The number of times that local faults were detected during the most recent time interval. Local faults are errors on the local side of the link (that is, at the OSA card). The format is an unsigned integer.

Missed Packets The number of packets missed by the OSA during the most recent time interval. Packets are missed when the receiving FIFO (first in, first out) buffer has insufficient space to store the incoming packet. This could be due to too few buffers being allocated, or because there is insufficient bandwidth on the I/O bus. The format is an unsigned integer.

Not Stored Frames Received The number of times that frames were received by the OSA during the most recent time interval when no descriptor buffers were available to store frames. The format is an unsigned integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Oversized Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering and were longer than the maximum size, regardless of whether or not the cyclic redundancy check (CRC) was valid. The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 16-character alphanumeric string.

Port Number The physical port number for this port. Currently, this value can be only zero (0). The format is an integer.

Remote Faults The number of times that remote faults were detected during the most recent time interval. Remote faults are errors on the remote side of the link (for example, a client or switch endpoint). The format is an unsigned integer.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total CRC Errors The number of cyclic redundancy check (CRC) errors on packets received on the LAN by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Deferred Events The number of events deferred by the OSA since the last time the OSA port was reset. A deferred event occurs when the transmitter cannot immediately send a packet because the medium is busy, XOFF (Transmitter OFF) frames are being sent, or the link is not up. The format is an unsigned integer.

Total Jabber Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering, were longer than maximum size, and had a bad cyclic redundancy check (CRC). The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but

could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Total Length Error Packets Received The number of length-error packets received by the OSA since the last time the OSA port was reset. A length error occurs if an incoming packet passes the filter criteria but the Length field does not match the number of bytes counted in the Data field. In the case of MAC control frames (including Pause), this attribute determines if the Data field is correctly padded to 46 bytes. The format is an unsigned integer.

Total Local Faults The number of times that local faults were detected by the OSA since the last time the OSA port was reset. Local faults are errors on the local side of the link (that is, at the OSA card). The format is an unsigned integer.

Total Missed Packets The number of packets missed by the OSA since the last time the OSA port was reset. Packets are missed when the receiving FIFO (first in, first out) buffer has insufficient space to store the incoming packet. This could be due to too few buffers being allocated, or because there is insufficient bandwidth on the I/O bus. The format is an unsigned integer.

Total Not Stored Frames Received The number of times that frames were received by the OSA since the last time the OSA port was reset when no descriptor buffers were available to store frames. The format is an unsigned integer.

Total Oversized Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering and were longer than the maximum size, regardless of whether or not the cyclic redundancy check (CRC) was valid. The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Total Remote Faults The number of times that remote faults were detected by the OSA since the last time the OSA port was reset. Remote faults are errors on the remote side of the link (for example, client or switch endpoint). The format is an unsigned integer.

Total Undersized Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering, and were smaller than the minimum size of 64 bytes (regardless of whether the cyclic redundancy check (CRC) was valid). Packets shorter then 64 bytes have to be padded and may indicate that the LAN is incorrectly configured and not performing up to capacity. The format is an unsigned integer.

Undersized Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering and were smaller than the minimum size of 64 bytes (regardless of whether the cyclic redundancy check (CRC) was valid). Packets shorter then 64 have to be padded and may indicate that the LAN is incorrectly configured and not performing up to capacity. The format is an unsigned integer.

OSA 10Gigabit Ports Summary Attributes

Use the OSA 10Gigabit Ports Summary attributes to monitor the data associated with a port on an OSA-Express2 10 Gigabit Ethernet feature.

Active MAC Address A 6-byte octet string that contains the current MAC address in use on the OSA. The values are in canonical format. The format is a 12–digit hexadecimal string.

Active Speed Mode The actual speed and mode in which the OSA running. This value is stored as an integer but displayed as a string. The possible values are:

- 1 = unknown
- 8 = tenGigabitFullDuplex

Burned In MAC Address A 6-byte octet string that contains the burned-in MAC address on the OSA. The values are in canonical format. The format is a 12–digit hexadecimal string.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Disabled Status A more detailed explanation of the LAN Traffic State attribute value of 5. When the value of ibmOsaExp10GigEthLanTrafficState is not disabled (a value other than 5 in the LAN Traffic State field), the value of this object will be stored as zero and displayed as zeros. When the value of the LAN Traffic State field is 5 (disabled), this object explains the reason for the disabled state. This value is stored as an integer and displayed as a 2–byte hexadecimal number mapped by the bit settings below:

- 0 = reserved0
- 1 = internalPortFailure
- 2 = reserved2
- 3 = reserved3
- 4 = reserved4
- 5 = reserved5
- 6 = portTemporarilyDisabled
- 7 = reserved7
- 8 = reserved8
- 9 = serviceProcessorRequest
- 10 = networkRequest

- 11 = osasfRequest
- 12 = configurationChange
- 13 = linkFailureThresholdExceeded
- 14 = reserved14
- 15 = reserved15

For more information about these values, refer to the *zSeries Open Systems Adapter-Express Customer's Guide and Reference*.

Good Packets Received The number of good (without error) packets received by the OSA with a length of >= 64 bytes and <= 1518 bytes during the most recent time interval. The format is an unsigned integer.

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

LAN Traffic State The LAN state, expressed as a value between 0 and 8 inclusive. A value of 5, disabled, is further explained in the Disabled Status field. This value is stored as an integer but displayed as a string. The possible values are:

- 0 = undefined
- 1 = unavailable
- 2 = enabling
- 3 = disabling
- 4 = enabled
- 5 = disabled
- 6 = linkMonitor
- 7 = definitionError
- 8 = configuredOffline

For more information about these values, refer to the *zSeries Open Systems Adapter-Express Customer's Guide and Reference*.

Octet Rate The average number of octets received or transmitted by the OSA, per minute, during the most recent time interval. The format is an unsigned integer.

Octets Received The number of good (without error) octets received by the OSA during the most recent time interval. The format is an unsigned integer.

Octets Received or Transmitted The number of octets received or transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Octets Transmitted The total number of octets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Packet Rate The average number of packets received or transmitted by the OSA, per minute, during the most recent time interval. The format is an unsigned integer.

Packets Received The number of packets received by the OSA during the most recent time interval. The format is an unsigned integer.

Packets Received or Transmitted The number of packets received or transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 16-character alphanumeric string.

Port Number The physical port number for this port. Currently, this value can be only zero (0). The format is an integer.

Port Type The physical port type. The format is an integer. Currently, this value can be only type 145 (displayed as tenGigabitEthernet), indicating that this is a 10 Gigabit adapter.

Service Mode An indicator of whether or not the processor is in service mode. This value is stored as an integer but displayed as a string. The possible values are:

- 0 = NotInServiceMode
- 1 = InServiceMode

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Good Packets Received The number of good (without error) packets received by the OSA with a length of >= 64 bytes and <= 1518 bytes since the last time the OSA port was reset. When the value in the Total Good Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Packets Received (in G) field, and the remainder is stored in the Total Good Packets Received field. The format is an unsigned integer.

Total Good Packets Received (in G) The number of good (without error) packets received by the OSA with a length of >= 64 bytes and <= 1518 bytes since the last time the OSA port was reset, expressed in G. When the value in the Total Good Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Packets Received (in G) field, and the remainder is stored in the Total Good Packets Received field. The format is an unsigned integer.

Total Octets The number of octets received or transmitted by the OSA since the last time the OSA port was reset. When the value in the Total Octets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets (in G) field, and the remainder is stored in the Total Octets field. The format is an unsigned integer.

Total Octets (in G) The number of octets received or transmitted by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Octets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets (in G) field, and the remainder is stored in the Total Octets field. The format is an unsigned integer.

Total Octets Received The number of good (without error) octets received by the OSA since the last time the OSA port was reset. When the value in the Total Octets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Received (in G) field, and the remainder is stored in the Total Octets Received field. The format is an unsigned integer.

Total Octets Received (in G) The number of good (without error) octets received by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Octets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Received (in G) field, and the remainder is stored in the Total Octets Received field. The format is an unsigned integer.

Total Octets Transmitted The number of octets transmitted by the OSA since the last time the OSA port was reset. When the value in the Total Octets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Transmitted (in G) field, and the remainder is stored in the Total Octets Transmitted field. The format is an unsigned integer.

Total Octets Transmitted (in G) The number of octets transmitted by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Octets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Transmitted (in G) field, and the remainder is stored in the Total Octets Transmitted field. The format is an unsigned integer.

Total Packets The number of packets received or transmitted by the OSA since the last time the OSA port was reset. When the value in the Total Packets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets (in G) field, and the remainder is stored in the Total Packets field. The format is an unsigned integer.

Total Packets (in G) The number of packets received or transmitted by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Packets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets (in G) field, and the remainder is stored in the Total Packets field. The format is an unsigned integer.

Total Packets Received The number of packets received by the OSA since the last time the OSA port was reset. When the value in the Total Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Received (in G) field and the remainder is stored in the Total Packets Received field. The format is an unsigned integer.

Total Packets Received (in G) The number of packets that received by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Received (in G) field, and the remainder is stored in the Total Packets Received field. The format is an unsigned integer.

Total Packets Transmitted This is the number of packets transmitted by the OSA since the last time the OSA port was reset. When the value in the Total Packets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Transmitted (in G) field, and the remainder is stored in the Total Packets Transmitted field. The format is an unsigned integer.

Total Packets Transmitted (in G) This is the number of packets transmitted by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Packets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Transmitted (in G) field, and the remainder is stored in the Total Packets Transmitted field. The format is an unsigned integer.

OSA 10Gigabit Ports Throughput Attributes

Use the OSA 10Gigabit Ports Throughput attributes to monitor a port on an OSA-Express2 10 Gigabit Ethernet feature.

Broadcast Packets Received The number of good (without error) broadcast packets received by the OSA during the most recent time interval. The format is an unsigned integer.

Broadcast Packets Transmitted The number of broadcast packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:
- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:
- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Jumbo Packets Received The number of good (without error) packets received by the OSA of jumbo size (defined as > 1518 bytes and <= maxFrameSize) during the most recent time interval. The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Jumbo Packets Transmitted The number packets of jumbo size (defined as > 1518 bytes and <= maxFrameSize) transmitted by the OSA during the current collection period. The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Multicast Packets Received The number of good (without error) multicast packets received by the OSA during the most recent time interval. The format is an unsigned integer.

Multicast Packets Transmitted The number of multicast packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 16-character alphanumeric string.

Port Number The physical port number for this port. Currently, this value can be only zero (0). The format is an integer.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Broadcast Packets Received The number of good (without error) broadcast packets received by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Broadcast Packets Transmitted The number of broadcast packets transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Jumbo Packets Received The number of good (without error) packets received by the OSA of jumbo size (defined as > 1518 bytes and <= maxFrameSize) by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Total Jumbo Packets Transmitted The number packets of jumbo size (defined as > 1518 bytes and <= maxFrameSize) transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. In Queued Direct I/O (QDIO) mode, the MTU size used by the OSA feature is 8992 bytes. In non-QDIO mode, the MTU size used by the OSA is 1492 bytes. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*.

Total Multicast Packets Received The number of good (without error) multicast packets received by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Multicast Packets Transmitted The number of multicast packets transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Unicast Packets Received The number of good (without error) Unicast packets received by the OSA since the last time the OSA port was reset. The number does not include Pause packets with matching Unicast destination addresses. The format is an unsigned integer.

Total Unicast Packets Transmitted The number of Unicast packets transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total VLAN Packets Received The number of good (without error) packets received by the OSA over a virtual LAN (VLAN) since the last time the OSA port was reset. The format is an unsigned integer.

Total VLAN Packets Transmitted The number of virtual LAN (VLAN) packets transmitted by the OSA since the last time the OSA port was reset. This number does not include flow-control or MAC-control packets. The format is an unsigned integer.

Unicast Packets Received The number of good (without error) Unicast packets received by the OSA during the most recent time interval. This number does not include Pause packets with matching Unicast destination addresses. The format is an unsigned integer.

Unicast Packets Transmitted The number of Unicast packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

VLAN Packets Received The number of good (without error) packets received by the OSA over a virtual LAN during the most recent time interval. The format is an unsigned integer.

VLAN Packets Transmitted The number of virtual LAN (VLAN) packets transmitted by the OSA during the most recent time interval. This number does not include flow-control or MAC-control packets. The format is an unsigned integer.

OSA Express3 Ports Control Attributes

Use the OSA Express3 Ports Control attributes to monitor individual ports on a OSA-Express3 feature.

There can be two physical ports on each OSA channel path identifier, each with different data. On z/OS verion 1.10 or later, when two ports are present, each one is assigned a separate ifIndex by the operating system. Each ifIndex contains the data for the corresponding port.

Transmitter on (XON) and transmitter off (XOFF) packets are flow-control packets between the OSA and the switch to which it is connected. They are used to provide flow control between the two ports, and are of particular interest if the port is at 100% utilization.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month

- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 32-character alphanumeric string.

Port Number The physical port number for this port. The format is an integer.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total XOFF Packets Received The number of valid XOFF (Transmitter OFF) packets received by the OSA since the last time the OSA port was reset. XOFF packets can use the global address or the station address. Receiving XOFF packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

Total XOFF Packets Transmitted The number of XOFF (Transmitter OFF) packets transmitted by the OSA since the last time the OSA port was reset. Sending XOFF packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

Total XON Packets Received The number of XON (Transmitter ON) packets received by the OSA since the last time the OSA port was reset. XON packets can use the global address or the station address. Receiving XON packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

Total XON Packets Transmitted The number of XON (Transmitter ON) packets transmitted by the OSA since the last time the OSA port was reset. Sending XON packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

Trap Control Flags The value of this object determines which traps will be generated by the OSA. The value of this object is initially all zeros, indicating that all traps will be sent to the OSA subagent. Setting the appropriate bit prevents a particular trap from being sent to the subagent. When the bit value of the disableEthLANChange bit is set to zero (0), then the trap ibmOSAExp10GigEthLANStateChange is sent. The format is a 4–digit hexadecimal number. Valid values are:

- x'0000' meaning the trap is enabled.
- x'8000' meaning the trap is disabled.

XOFF Packets Received The number of XOFF (Transmitter OFF) packets received by the OSA during the most recent time interval. XOFF packets can use the global address or the station address. Receiving XOFF packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

XOFF Packets Transmitted The number of XOFF (Transmitter OFF) packets transmitted by the OSA during the most recent time interval. Sending XOFF packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

XON Packets Received The number of XON (Transmitter ON) packets received by the OSA during the most recent time interval. XON packets can use the global address or the station address. Receiving XON packets indicates that the sender experienced a problem with a queue filling up or some other software-initiated action. The format is an unsigned integer.

XON Packets Transmitted The number of XON (Transmitter ON) packets transmitted by the OSA during the most recent time interval. Sending XON packets indicates that the queue is filling up or some software-initiated action has occurred. The format is an unsigned integer.

OSA Express3 Ports Errors Attributes

Use the OSA Express3 Ports Errors attributes to monitor error and control data for individual ports on a OSA-Express3 feature.

There can be two physical ports on each OSA channel path identifier, each with different data. On z/OS verion 1.10 or later, when two ports are present, each one is assigned a separate ifIndex by the operating system. Each ifIndex contains the data for the corresponding port.

Alignment Errors The number of packets received during the most recent time interval with alignment errors (the packet is not an integer number of bytes in length). This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

CRC Errors The number of packets received with cyclic redundancy check (CRC) errors during the most recent time interval. The format is an unsigned integer.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Deferred Events The number of events that were deferred by the OSA during the most recent time interval. A deferred event occurs when the transmitter cannot immediately send a packet because the medium is busy for one of these reasons:

- A device other than the OSA is transmitting.
- The inter-packet gap (IPG) timer has not expired.
- Problems occurred when receiving transmitter off (XOFF) frames.
- The link is down.

This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Excessive Collisions The number of times that a packet successfully transmitted by the OSA encountered more than 16 collisions during the most recent time interval. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Fragmented Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering, were smaller than the minimum size of 64 bytes, and had a bad cyclic redundancy check (CRC). The format is an unsigned integer.

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Jabber Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering, were greater than maximum size in length, and had a bad cyclic redundancy check (CRC). The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference*..

Late Collisions The number of late collisions encountered by the OSA during the most recent time interval. Late collisions occur under the following circumstances:

- After the 64-byte time into the transmissions of the packet while working in 10-100 Mb/sec data rate.
- After the 512-byte time into the transmission of the packet while working in the 1000 Mb/sec data rate.

This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsgined integer.

Length Error Packets Received The number of length-error packets received by the OSA during the most recent time interval. A length error occurs if an incoming packet passes filter criteria, but is undersized or oversized. The format is an unsigned integer.

Missed Packets The number of packets that were missed by the OSA during the most recent time interval because not enough space was available to store the incoming packet. The format is an unsigned integer.

Multiple Collisions The number of times that a packet successfully transmitted by the OSA encountered more than 1 collision, but fewer than 16, during the most recent time interval. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Not Stored Frames Received The number of times that frames were received by the OSA during the most recent time interval when no buffers were available in host memory to store those frames. The format is an unsigned integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Oversized Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering and had a valid cyclic redundancy check (CRC), but were longer than the maximum size of 1522 bytes for operating-system embedded (OSE) non-queued direct I/O (non-QDIO) features or 16384 bytes for open source definition (OSD) queued direct I/O (QDIO) features. The format is an unsigned integer.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 32-character alphanumeric string.

Port Number The physical port number for this port. The format is an integer.

Sequence Errors The number of sequence error events by the OSA during the most recent time interval. The proper sequence of 8b/10b symbols is as follows:

- Idle
- Start-of-frame
- Data
- Pad
- End-of-frame
- Fill

This count increments for any illegal sequence of delimiters. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Single Collisions The number of times that a packet successfully transmitted by the OSA encountered a single collision during the most recent time interval. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Alignment Errors The number of packets received by the OSA since the last time the OSA port was reset with alignment errors (the packet is not an integer number of bytes in length). This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total CRC Errors The number of packets received by the OSA with cyclic redundancy check (CRC) errors since the last time the OSA port was reset. The format is an unsigned integer.

Total Deferred Events The number of events deferred by the OSA since the last time the OSA port was reset. A deferred event occurs when the transmitter cannot immediately send a packet because the medium is busy for one of these reasons:

- A device other than the OSA is transmitting.
- The inter-packet gap (IPG) timer has not expired.
- Problems occurred when receiving transmitter off (XOFF) frames.
- The link is down.

This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total Excessive Collisions The number of times that a packet successfully transmitted by the OSA encountered more than 16 collisions by the OSA since the last time the OSA port was reset. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total Fragmented Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering, were smaller than the minimum size of 64 bytes, and had a bad cyclic redundancy check (CRC). The format is an unsigned integer.

Total Jabber Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering, were greater than maximum size in length, and had a bad cyclic redundancy check (CRC). The format is an unsigned integer.

The maximum transmission unit (MTU) is the maximum packet size, in bytes, that can be sent on an interface. You can set the MTU size (as long as you stay within the limits and maximum values of the OSA) using TCP/IP profile statements. You can also set the parameters of the neighboring network interface card (NIC) and port (usually a port on a switch, but could be another OSA). For information about setting maximum size for OSA devices, refer to the *IBM z/OS Communications Server: IP Configuration Reference.*.

Total Length Error Packets Received The number of packet length-error events received by the OSA since the last time the OSA port was reset. A length error occurs if an incoming packet passes filter criteria, but is undersized or oversized. The format is an unsigned integer.

Total Late Collisions The number of late collisions encountered by the OSA since the last time the OSA port was reset. Late collisions occur under the following circumstances:

- After the 64-byte time into the transmissions of the packet while working in 10-100 Mb/sec data rate.
- After the 512-byte time into the transmission of the packet while working in the 1000 Mb/sec data rate.

This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total Missed Packets The number of packets that were missed by the OSA since the last time the OSA port was reset because too little space was available to store the incoming packet. The format is an unsigned integer.

Total Multiple Collisions The number of times that a packet successfully transmitted by the OSA encountered more than 1 collision, but fewer than 16, since the last time the OSA port was reset. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total Not Stored Frames Received The number of times that frames were received by the OSA since the last time the OSA port was reset when no buffers were available in host memory to store those frames. The format is an unsigned integer.

Total Oversized Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering and had a valid cyclic redundancy check (CRC), but were longer than the maximum size of 1522 bytes for operating-system embedded (OSE) non-queued direct I/O (non-QDIO) features or 16384 bytes for open source definition (OSD) queued direct I/O (QDIO) features. The format is an unsigned integer.

Total Sequence Errors The number of sequence error events experienced by the OSA since the last time the OSA port was reset. The proper sequence of 8b/10b symbols is as follows:

- Idle
- Start-of-frame
- Data
- Pad

- End-of-frame
- Fill

This count increments for any illegal sequence of delimiters. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total Single Collisions The number of times that a packet successfully transmitted by the OSA encountered a single collision by the OSA since the last time the OSA port was reset. This field is not valid for 10 gigabit features and will be zero (0) for these devices. The format is an unsigned integer.

Total Undersized Frames Received The number of frames received by the OSA since the last time the OSA port was reset that passed address filtering, were smaller than the minimum size of 64 bytes, and had a valid cyclic redundancy check (CRC). Packets shorter then 64 bytes must be padded and may indicate that the LAN is incorrectly configured and not performing up to capacity. The format is an unsigned integer.

Undersized Frames Received The number of frames received by the OSA during the most recent time interval that passed address filtering, were smaller than the minimum size of 64 bytes, and had a valid cyclic redundancy check (CRC). Packets shorter then 64 bytes must be padded and may indicate that the LAN is incorrectly configured and not performing up to capacity. The format is an unsigned integer.

OSA Express3 Ports Summary Attributes

Use the OSA Express3 Ports Summary attributes to monitor individual ports on a OSA-Express3 feature.

There can be two physical ports on each OSA channel path identifier, each with different data. On z/OS verion 1.10 or later, when two ports are present, each one is assigned a separate ifIndex by the operating system. Each ifIndex contains the data for the corresponding port.

Active Speed Mode The actual speed at which the OSA is running. This value is stored as an integer but displayed as a string. The possible values are:

- 0 = unknown
- 1 = tenMegabits
- 2 = tenMbFullDuplex
- 3 = oneHundredMbHalfDuplex
- 4 = oneHundredMbFullDuplex
- 6 = oneThousandMbFullDuplex
- 8 = tenGigabitFullDuplex

Active MAC Address A 6-byte octet string that contains the current MAC address in use on the adapter. The values are in canonical format. The format is a 12–digit hexadecimal string.

Burned In MAC Address A 6-byte octet string that contains the burned-in MAC address on the OSA. The values are in canonical format. The format is a 12–digit hexadecimal string.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year

- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Configuration Name The name of the configuration on the OSA. This value is set using the Open Systems Adapter/Support Facility (OSA/SF). It is not used by the OSA. The format is a string of up to 34 characters.

Configuration Speed Mode The configured port speed. This field shows the speed that was configured by the user for the OSA-Express Fast Ethernet feature. It is not used by OSA-Express Gigabit or 10 Gigabit Ethernet feature. This value is stored as an integer and displayed as a string with the following possible values:

- -1 = notValidGigabit
- 0 = autoNegotiate
- 1 = tenMbHalfDuplex
- 2 = tenMbFullDuplex
- 3 = oneHundredMbHalfDuplex
- 4 = oneHundredMbFullDuplex
- 6 = oneThousandMbFullDuplex
- 8 = tenGigabitFullDuplex

Disabled Status Reasons for the disabled state. When the value of the LAN Traffic State attribute is disabled (5), this attribute explains the reasons for the disabled state. The value for this object may be a combination of the bits shown in the list which follows. This value is stored as a hexadecimal integer and displayed as a 4–digit hexadecimal number mapped by the bit settings below:

- 0 = reserved
- 1 = internalPortFailure
- 2 = reserved
- 3 = reserved
- 4 = reserved
- 5 = reserved
- 6 = portTemporarilyDisabled
- 7 = reserved
- 8 = reserved
- 9 = serviceProcessorRequest
- 10 = networkRequest
- 11 = osasfRequest

- 12 = configurationChange
- 13 = linkFailureThresholdExceeded
- 14 = reserved
- 15 = reserved

Exclusive Usage ID Specifies the exclusive usage ID that, when paired with the corresponding Exclusive Usage Media Access Control (MAC), defines one of multiple Ethernet ports that can be used in parallel to increase the link speed beyond the limits of any single port. The format is an 8-character text string

Exclusive Usage MAC Specifies the exclusive usage Media Access Control (MAC) that, when paired with the corresponding Exclusive Usage ID, defines one of multiple Ethernet ports that can be used in parallel to increase the link speed beyond the limits of any single port. The format is a 12–digit hexadecimal string.

Good Octets Received The number of good (without error) octets received by the OSA during the most recent time interval. This count does not include flow-control octets. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an unsigned integer.

Good Octets Transmitted The number of good (without error) octets transmitted by the OSA during the most recent time interval. This count does not include flow-control octets. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an unsigned integer.

Good Packets Received The number of good packets of any length received by the OSA during the most recent time interval. This count does not include received flow-control packets and packets that fail filtering. The format is an unsigned integer.

Good Packets Transmitted The number of good packets of any length transmitted by the OSA during the most recent time interval. A good packet is defined as one that is 64 or more bytes in length. This count does not include flow-control packets The format is an unsigned integer.

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

LAN Traffic State The LAN state, expressed in value ranges from 0 to 8. A value of 5 (disabled) is further explained by the LAN Traffic State attribute. This value is stored as an integer and displayed as a string. The possible values are:

- 0 = undefined
- 1 = unavailable
- 2 = enabling
- 3 = disabling
- 4 = enabled
- 5 = disabled
- 6 = linkMonitor
- 7 = definitionError
- 8 = configuredOffline

For more information about these values, refer to the *zSeries Open Systems Adapter-Express Customer's Guide and Reference*.

Octet Rate The average number of octets received or transmitted by the OSA, per minute, during the most recent time interval. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an unsigned integer.

Octets Received The number of octets received by the OSA during the most recent time interval. This count includes octets of all lengths, octets containing errors, and flow-control octets. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an unsigned integer.

Octets Received or Transmitted The number of octets received or transmitted by the OSA during the most recent time interval. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an unsigned integer.

Octets Transmitted The number of octets transmitted by the OSA during the most recent time interval. This count includes octets of all lengths and flow-control octets. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an unsigned integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Packet Rate The average number of packets received or transmitted by the OSA, per minute, during the most recent time interval. The format is an unsigned integer.

Packets Received The number of packets received by the OSA during the most recent time interval. All packets are counted, including packets of all lengths and flow-control packets. The format is an unsigned integer.

Packets Received or Transmitted The number of packets received or transmitted by the OSA during the most recent time interval. All packets are counted, including packets of all lengths, packets containing errors, and flow-control packets. The format is an unsigned integer.

Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval. All packets are counted, including packets of all lengths, packets containing errors, and flow-control packets. The format is an unsigned integer.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 32-character alphanumeric string.

Port Number The physical port number for this port. The format is an integer.

Port Type The physical port type. This value is stored as an integer but displayed as a string. Valid values are:

- 161 = osaexp3gigabitEthernet
- 177 = osaexp3oneThousandBaseTEthernet
- 193 = osaexp3tenGigabitEthernet

Service Mode An indicator of whether or not the processor is in service mode. This value is stored as an integer but displayed as a string. The possible values are:

- 0 = NotInServiceMode
- 1 = InServiceMode

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Good Octets Received The number of good (without error) octets received by the OSA since the last time the OSA port was reset. This count does not include flow-control octets. When the value in the

Total Good Octets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Octets Received (in G) field, and the remainder is stored in the Total Good Octets Received field. The format is an unsigned integer.

Total Good Octets Received (in G) The number of good (without error) octets received by the OSA since the last time the OSA port was reset, expressed in G. This count does not include flow-control octets. When the value in the Total Good Octets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Octets Received (in G) field, and the remainder is stored in the Total Good Octets Received field. The format is an unsigned integer.

Total Good Octets Transmitted The number of good (without error) octets transmitted by the OSA since the last time the OSA port was reset. This count does not include flow-control octets. When the value in the Total Good Octets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Octets Transmitted (in G) field, and the remainder is stored in the Total Good Octets Transmitted field. The format is an unsigned integer.

Total Good Octets Transmitted (in G) The number of good (without error) octets transmitted by the OSA since the last time the OSA port was reset, expressed in G. This count does not include flow-control octets. When the value in the Total Good Octets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Octets Transmitted (in G) field, and the remainder is stored in the Total Good Octets Transmitted field. The format is an unsigned integer.

Total Good Packets Received The number of good packets of any length received by the OSA since the last time the OSA port was reset. This count does not include received flow-control packets and packets that fail filtering. When the value in the Total Good Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Packets Received (in G) field and the remainder is stored in the Total Good Packets Received field. The format is an unsigned integer.

Total Good Packets Received (in G) The number of good packets of any length received by the OSA since the last time the OSA port was reset, expressed in G. This count does not include received flow-control packets and packets that fail filtering. When the value in the Total Good Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Packets Received (in G) field, and the remainder is stored in the Total Good Packets Received field. The format is an unsigned integer.

Total Good Packets Transmitted The number of good packets of any length transmitted by the OSA since the last time the OSA port was reset. A good packet is defined as one that is 64 or more bytes in length. This count does not include flow-control packets. When the value in the Total Good Packets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Packets Transmitted (in G) field, and the remainder is stored in the Total Good Packets Transmitted field. The format is an unsigned integer.

Total Good Packets Transmitted (in G) The number of good packets of any length transmitted by the OSA since the last time the OSA port was reset, expressed in G. A good packet is defined as one that is 64 or more bytes in length. This count does not include flow-control packets. When the value in the Total Good Packets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Good Packets Transmitted (in G) field, and the remainder is stored in the Total Good Packets Transmitted field. The format is an unsigned integer.

Total Octets The number of octets received or transmitted by the OSA since the last time the OSA port was reset. When the value in the Total Octets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets (in G) field, and the remainder is stored in the Total Octets field. The format is an unsigned integer.

Total Octets (in G) The number of octets received or transmitted by the OSA since the last time the OSA port was reset, expressed in G. When the value in the Total Octets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets (in G) field, and the remainder is stored in the Total Octets field. The format is an unsigned integer.

Total Octets Received The number of octets received by the OSA since the last time the OSA port was reset. This count includes octets of all lengths, octets containing errors, and flow-control octets. When the value in the Total Octets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Received (in G) field, and the remainder is stored in the Total Octets Received field. The format is an unsigned integer.

Total Octets Received (in G) The number of octets received by the OSA since the last time the OSA port was reset, expressed in G. This count includes octets of all lengths, octets containing errors, and flow-control octets. When the value in the Total Octets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Received (in G) field, and the remainder is stored in the Total Octets Received field. The format is an unsigned integer.

Total Octets Transmitted The number of octets transmitted by the OSA since the last time the OSA port was reset. This count includes octets of all lengths, octets containing errors, and flow-control octets. When the value in the Total Octets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Transmitted (in G) field, and the remainder is stored in the Total Octets Transmitted field. The format is an unsigned integer.

Total Octets Transmitted (in G) The number of octets transmitted by the OSA since the last time the OSA port was reset, expressed in G. This count includes octets of all lengths, octets containing errors, and flow-control octets. When the value in the Total Octets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Octets Transmitted (in G) field, and the remainder is stored in the Total Octets Transmitted field. The format is an unsigned integer.

Total Packets The number of packets received or transmitted by the OSA since the last time the OSA port was reset. All packets are counted, including packets of all lengths and flow-control packets. When the value in the Total Packets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets (in G) field, and the remainder is stored in the Total Packets field. The format is an unsigned integer.

Total Packets (in G) The number of packets received or transmitted by the OSA since the last time the OSA port was reset, expressed in G. All packets are counted, including packets of all lengths and flow-control packets. When the value in the Total Packets field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets (in G) field, and the remainder is stored in the Total Packets field. The format is an unsigned integer.

Total Packets Received The number of packets received by the OSA since the last time the OSA port was reset. All packets are counted, including packets of all lengths, packets containing errors, and flow-control packets. When the value in the Total Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Received (in G) field, and the remainder is stored in the Total Packets Received field. The format is an unsigned integer.

Total Packets Received (in G) The number of packets received by the OSA since the last time the OSA port was reset, expressed in G. All packets are counted, including packets of all lengths, packets containing errors, and flow-control packets. When the value in the Total Packets Received field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Received (in G) field, and the remainder is stored in the Total Packets Received field. The format is an unsigned integer.

Total Packets Transmitted The number of packets transmitted by the OSA since the last time the OSA port was reset. All packets are counted, including packets of all lengths and flow-control packets. When

the value in the Total Packets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Transmitted (in G) field, and the remainder is stored in the Total Packets Transmitted field. The format is an unsigned integer.

Total Packets Transmitted (in G) The number of packets transmitted by the OSA since the last time the OSA port was reset, expressed in G. All packets are counted, including packets of all lengths and flow-control packets. When the value in the Total Packets Transmitted field exceeds 1,073,741,823 (1 G), the number is divided by 1,073,741,824. The quotient is stored in the Total Packets Transmitted (in G) field, and the remainder is stored in the Total Packets Transmitted field. The format is an unsigned integer.

OSA Express3 Ports Throughput Detail Attributes

Use the OSA Express3 Ports Throughput Detail attributes to monitor individual ports on an OSA-Express3 feature.

There can be two physical ports on each OSA channel identifier, and each contains different data. On z/OS verion 1.10 or later, when two ports are present, each one is assigned a separate ifIndex by the operating system. Each ifIndex contains the data for the corresponding port.

64 Byte Packets Received The number of packets received by the OSA during the most recent time interval that are exactly 64 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

Note: 64 bytes is the minimum length for an Ethernet packet. Packets shorter then 64 bytes have to be padded. This value is of interest because it indicates whether the LAN is configured incorrectly and not performing up to capacity.

64 Byte Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval that are exactly 64 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

Note: 64 bytes is the minimum length for an Ethernet packet. Packets shorter then 64 bytes have to be padded. This value is of interest because it indicates whether the LAN is configured incorrectly and not performing up to capacity.

65 to 127 Byte Packets Received The number of packets received by the OSA during the most recent time interval that are 65 to 127 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

65 to 127 Byte Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval that are 65 to 127 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

128 to 255 Byte Packets Received The number of packets received by the OSA during the most recent time interval that are 128 to 255 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

128 to 255 Byte Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval that are 128 to 255 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

256 to 511 Byte Packets Received The number of packets received by the OSA during the most recent time interval that are 256 to 511 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

256 to 511 Byte Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval that are 256 to 511 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

512 to 1023 Byte Packets Received The number of packets received by the OSA during the most recent time interval that are 512 to 1023 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

512 to 1023 Byte Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval that are 512 to 1023 bytes in length. This count does not include flow-control packets. The format is an unsigned integer.

1024 to Max Byte Packets Received The number of packets received by the OSA during the most recent time interval that are 1024 bytes or longer in length. This count does not include flow-control packets. The format is an unsigned integer.

1024 to Max Byte Packets Transmitted The number of packets transmitted by the OSA during the most recent time interval that are 1024 bytes or longer in length. This count does not include flow-control packets. The format is an unsigned integer.

Broadcast Packets Received The number of good (without error) broadcast packets received by the OSA during the most recent time interval. The format is an unsigned integer.

Broadcast Packets Transmitted The number of broadcast packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a 2–byte hexadecimal string.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Multicast Packets Received The number of good (without error) multicast packets received by the OSA during the most recent time interval. The format is an unsigned integer.

Multicast Packets Transmitted The number of multicast packets transmitted by the OSA during the most recent time interval. The format is an unsigned integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Port Name The name of the port as specified by the VTAM Transport Resource List Entry (TRLE). The format is a 32-character alphanumeric string.

Port Number The physical port number for this port. The format is an integer.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total 64 Byte Packets Received The number of packets received by the OSA that are exactly 64 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Note: 64 bytes is the minimum length for an Ethernet packet. Packets shorter then 64 bytes have to be padded. This value is of interest because it indicates whether the LAN is configured incorrectly and not performing up to capacity.

Total 64 Byte Packets Transmitted The number of packets transmitted by the OSA that are exactly 64 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Note: 64 bytes is the minimum length for an Ethernet packet. Packets shorter then 64 bytes have to be padded. This value is of interest because it indicates whether the LAN is configured incorrectly and not performing up to capacity.

Total 65 to 127 Byte Packets Received The number of packets received by the OSA that are 65 to 127 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 65 to 127 Byte Packets Transmitted The number of packets transmitted by the OSA that are 65 to 127 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 128 to 255 Byte Packets Received The number of packets received by the OSA that are 128 to 255 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 128 to 255 Byte Packets Transmitted The number of packets transmitted by the OSA that are 128 to 255 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 256 to 511 Byte Packets Received The number of packets received by the OSA that are 256 to 511 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 256 to 511 Byte Packets Transmitted The number of packets transmitted by the OSA that are 256 to 511 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 512 to 1023 Byte Packets Received The number of packets received by the OSA that are 512 to 1023 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 512 to 1023 Byte Packets Transmitted The number of packets transmitted by the OSA that are 512 to 1023 bytes in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 1024 to Max Byte Packets Received The number of packets received by the OSA that are 1024 bytes or longer in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total 1024 to Max Byte Packets Transmitted The number of packets transmitted by the OSA that are 1024 bytes or longer in length since the last time the OSA port was reset. This count does not include flow-control packets. The format is an unsigned integer.

Total Broadcast Packets Received The number of good (without error) broadcast packets received by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Broadcast Packets Transmitted The number of broadcast packets transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Multicast Packets Received The number of good (without error) multicast packets received by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Total Multicast Packets Transmitted The count of the number of multicast packets transmitted by the OSA since the last time the OSA port was reset. The format is an unsigned integer.

Updated attribute groups in Fix Pack 2

These attributes groups were updated in Fix Pack 2:

- "Updated EE Connections Attributes"
- "Updated EE Connection Details Attributes" on page 63
- "Updated HPR Connections Attributes" on page 63
- "Updated IPSec attribute groups and attributes in Fix Pack 2" on page 63
- "Updated TCP/IP Summary Attributes" on page 66
- "OSA Express Channels Attributes" on page 66. For details about changed attributes, see "Updated OSA Channels workspace" on page 134.
- "OSA Express LPARS Attributes" on page 70. For details about changed attributes, see "Updated OSA LPARs workspace" on page 135.
- "OSA Express Ports Attributes" on page 71. For details about changed attributes, see "Updated OSA Ports workspace" on page 135.

Updated EE Connections Attributes

The EE Connections attributes were updated as shown below.

- The attribute **PU Name** has been added to this workspace.

- The attribute **EE Connection ID** is no longer displayed by default.

EE Connection ID
The unique identifier of this Enterprise Extender connection. The format is a hexadecimal string up to 16 characters in length.

PU Name
The name of the local physical unit (PU). The format is an alphanumeric string no longer than 8 characters.

Updated EE Connection Details Attributes

The EE Connection Details attributes were updated as shown below.

- The attribute **PU Name** has been added to this workspace.
- The attribute **EE Connection ID** is no longer displayed by default.

EE Connection ID
The unique identifier of this Enterprise Extender connection. The format is a hexadecimal string up to 16 characters in length.

PU Name
The name of the local physical unit (PU). The format is an alphanumeric string no longer than 8 characters.

Updated HPR Connections Attributes

The HPR Connections attributes were updated as shown below.

- The attribute **PU Name** has been added to this workspace.
- The attribute **EE Connection ID** is no longer hidden. It is not displayed by default.

EE Connection ID
The unique identifier of the Enterprise Extender connection that this HPR connection is associated with. The format is a hexadecimal string up to 16 characters in length. A value of "0000000000000000" indicates that this HPR connection is not associated with an EE connection.

PU Name
The name of the local physical unit (PU). The format is an alphanumeric string no longer than 8 characters.

Updated IPSec attribute groups and attributes in Fix Pack 2

Changes were made in Fix Pack 2 to the encoding of IPSec attributes introduced in Fix Pack 1. In Fix Pack 1, some values that were stored as 45-character strings are now being stored as UTF-8–encoded character strings at the monitoring agent. The UTF-8–encoded character strings are transferred unchanged to the Tivoli Enterprise™ Portal instead of being converted from EBCDIC to UTF-8 during the transfer. These attributes and attribute groups were affected:

- "Current IP Filters Attribute Group"
- "Dynamic IP Tunnels Attribute Group" on page 64
- "Internet Key Exchange (IKE) Tunnels Attribute Group" on page 65
- "Manual IP Tunnels Attribute Group" on page 66

Current IP Filters Attribute Group: These attributes were changes in the Current IP Filters Attribute Group.

Destination Address (New value)
Destination IP address or addresses affected by the current filter. This address may be in IPv4 or IPv6 format. Filters apply to either IPv4 addresses or IPv6 addresses, but not both. If the filter applies to all destination IP addresses, the field will be displayed as blank and a value of ″0″ is stored in the table. If the filter is for a range of destination IP addresses, this is the lower address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Destination Address (Old value)
Destination IP address or addresses affected by the current filter. This address may be in IPv4 or IPv6 format. Filters apply to either IPv4 addresses or IPv6 addresses, but not both. If the filter applies to all destination IP addresses, the field will be displayed as blank and a value of “0” is stored in the table. If the filter is for a range of destination IP addresses, this is the lower address in the range. This value is represented as a 45-character string.

Source Address (New value)
Source IP address or addresses that the filter applies to. This address may be in IPv4 or IPv6 format. Filters apply to either IPv4 addresses or IPv6 addresses, but not both. If the filter applies to all destination IP addresses, the field will be displayed as blank and a value of ″0″ is stored in the table. If the filter is for a range of destination IP addresses, this is the lower address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Source Address (Old value)
Source Address Source IP address or addresses that the filter applies to. This address may be in IPv4 or IPv6 format. Filters apply to either IPv4 addresses or IPv6 addresses, but not both. If the filter applies to all destination IP addresses, the field will be displayed as blank and a value of “0” is stored in the table. If the filter is for a range of destination IP addresses, this is the lower address in the range. This value is represented as a 45-character string.

Upper Destination Address (New value)
If the filter is for a range of destination IP addresses, this is the high value for the range. If the filter does not apply to a range of destination IP addresses, the field is displayed as blank and a value of zero ″0″ is stored in the table. The format is a UTF-8 encoded character string of up to 45 characters.

Upper Destination Address (Old value)
If the filter is for a range of destination IP addresses, this is the high value for the range. If the filter does not apply to a range of IP addresses, the field will be displayed as blank and a value of “0” is stored in the table. This value is represented as a 45-character string.

Upper Source Address (New value)
If the filter is for a range of source IP addresses, this is the high value for the range. If the filter does not apply to a range of destination IP addresses, the field is displayed as blank and a value of zero ″0″ is stored in the table. The format is a UTF-8 encoded character string of up to 45 characters.

Upper Source Address (Old value)
If the filter is for a range of source IP addresses, this is the high value for the range. If the filter does not apply to a range of IP addresses, the field will be displayed as blank and a value of “0” is stored in the table. This value is represented as a 45-character string.

Dynamic IP Tunnels Attribute Group: These attributes were changes in the Dynamic IP Tunnels Attribute Group.

Destination Address (New value)
Destination IP address for data protected by the tunnel. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel may have any destination IP address, this field is displayed as blanks and stored as ″0″. If the traffic protected by the tunnel is a range of destination IP addresses, the value displayed is the lower address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Destination Address (Old value)
Destination IP address for data protected by the tunnel. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel may have any destination IP address, this field is displayed as blanks and stored as ″0″. If the traffic protected by the tunnel is a range of destination IP addresses, the value displayed is the lower address in the range. This value is represented as a 45-character string.

Local Security Endpoint (New value)
The IP address of the local security endpoint responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters

Local Security Endpoint (Old value)
The IP address of the local security endpoint responsible for negotiating the tunnel. The format is a character string of up to 45 characters.

Remote Security Endpoint (New value)
The IP address of the remote security endpoint responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Remote Security Endpoint (Old value)
The IP address of the remote security endpoint responsible for negotiating the tunnel. The format is a character string of up to 45 characters.

Source Address (New value)
Source IP address for data protected by this tunnel. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel may have any destination IP address, this field is displayed as blanks and stored as ″0″. If the traffic protected by the tunnel is a range of destination IP addresses, the value displayed is the lower address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Source Address (Old value)
Source IP address for data protected by this tunnel. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel may have any destination IP address, this field is displayed as blanks and stored as ″0″. If the traffic protected by the tunnel is a range of destination IP addresses, the value displayed is the lower address in the range. This value is represented as a 45-character string.

Upper Destination Address (New value)
If the traffic protected by the tunnel is a range of destination IP addresses, this is the upper address in the range. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel is not a range of addresses, this field is displayed as blanks and stored as ″0″. The format is a UTF-8 encoded character string of up to 45 characters.

Upper Destination Address (Old value)
If the traffic protected by the tunnel is a range of destination IP addresses, this is the upper address in the range. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel is not a range of addresses, this field is displayed as blanks and stored as ″0″. This field is represented as a 45-character string.

Upper Source Address (New value)
If the traffic protected by the tunnel is a range of source IP addresses, this is the upper address in the range. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel is not a range of addresses, this field is displayed as blanks and stored as ″0″. The format is a UTF-8 encoded character string of up to 45 characters.

Upper Source Address (Old value)
If the traffic protected by the tunnel is a range of source IP addresses, this is the upper address in the range. If the traffic protected by the tunnel is a range of destination IP addresses, this is the upper address in the range. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel is not a range of addresses, this field is displayed as blanks and stored as ″0″. This field is represented as a 45-character string.

Internet Key Exchange (IKE) Tunnels Attribute Group: These attributes were changes in the Internet Key Exchange (IKE) Tunnels Attribute Group.

Local Security Endpoint (New value)
The IP address of the local security endpoint (IKE) responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Local Security Endpoint (Old value)
The IP address of the local security endpoint (IKE) responsible for negotiating the tunnel. The format is a character string of up to 45 characters.

Remote Security Endpoint (New value)
The IP address of the remote security endpoint (IKE) responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Remote Security Endpoint (Old value)
The IP address of the remote security endpoint (IKE) responsible for negotiating the tunnel. The format is a character string of up to 45 characters.

Manual IP Tunnels Attribute Group: These attributes were changes in the Manual IP Tunnels Attribute Group.

Local Security Endpoint (New value)
The IP address of the local security endpoint responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Local Security Endpoint (Old value)
The IP address of the local security endpoint responsible for negotiating the tunnel. The format is an alphanumeric string of up to 45 characters.

Remote Security Endpoint (New value)
The IP address of the remote security endpoint responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Remote Security Endpoint (Old value)
The IP address of the remote security endpoint responsible for negotiating the tunnel. The format is an alphanumeric string of up to 45 characters.

Updated TCP/IP Summary Attributes

With faster hardware and improvements to software, it is now more likely for attributes that display the number of bytes since the last collection interval to exceed the maximum value, 2,147,483,647. This is most likely to occur in byte or octet attributes for OSA-Express3 adapters and TCP/IP stacks. When the number of bytes since the last collection interval exceeds 2,147,483,647, the attribute will contain the maximum value.

This change affects the Byte Rate in the TCP/IP Summary attribute group.

Byte Rate (New value)
The number of bytes received or sent, per minute, during the most recent time interval. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an integer.

Byte Rate (Old value)
The number of bytes received or sent, per minute, during the most recent time interval. The format is an integer.

OSA Express Channels Attributes

Use the OSA Express Channels attributes to create situations that monitor OSA-Express channels usage.

Channel Hardware Level The hardware model of the channel. This value is stored as an integer but displayed as a string. The possible values are:

- 0 = unavailable: This value indicates that the hardware level of the channel is unavailable.
- 1 = unknown: This value indicates that the hardware level is unknown.
- 2 = osaExp150: This value indicates a hardware level of 1.50, which defines this feature as OSA-Express.

- 3= osaExp175: This value indicates a hardware level of 1.75, which defines this feature as OSA-Express.
- 4 = osaExp300: This value indicates a hardware level of 3.00, which defines this feature as OSA-Express2.
- 5 = osaExp400: This value indicates a hardware level of 4.00, which defines this feature as OSA-Express3.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Channel Type The type of channel for this interface. This value is stored as an integer but displayed as a string. The possible values are:

- 16 = OSAExpress
- 17 = OSADirectExpress

Collection Time The time and date of the data sampling. This time is displayed in the following format:

`mm/dd/yy hh:mm:ss`

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Control Unit Number The logical control unit number associated with the OSA-Express Channel. The format is an integer, displayed as 2 hex digits in the range of 0 to 'FFF'x.

Note: This field is not available for the OSA direct SNMP interface.

Current LPAR Name The name of the LPAR from which this data was retrieved. The format is an alphanumeric string, with a maximum of 8 characters.

Note: This field is not available for the OSA direct SNMP interface.

Current LPAR Number The number of the LPAR from which this data was retrieved. The format is an integer.

Note: This field is not available for the OSA direct SNMP interface.

Device or Port Name The name of the TCP/IP device or port associated with this channel. The format is an alphanumeric string, with a maximum of 16 characters.

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Managing LPAR Name The LPAR name of the OSA Support Facility managing this channel. Only one OSA/SF can manage an OSA-Express Channel within an z/OS Sysplex, though multiple OSA/SFs can retrieve information from the same OSA-Express Channel. The format is an alphanumeric string, with a maximum of 8 characters.

Note: This field is not available for the OSA direct SNMP interface.

Managing LPAR Number The LPAR number of the OSA Support Facility managing this channel (set to 0xFFFF if not being managed by an OSA/SF). The format is an integer and 0xFFFF is displayed as spaces.

Note: This field is not available for the OSA direct SNMP interface.

Micro Code Level The firmware (or micro code level) of the OSA feature. The format is an integer 2 bytes in length that is represented as 3 hex digits in the range of 0 to 'FFF' x.

Mode The configured mode of the OSA-Express adapter. The mode is set to **nothingConfigured** for channels that are not configured for LAN Emulation. This value is stored as an integer but displayed as a string. The possible values are:

- ' ' = 0 (blank)
- 1 = nothingConfigured
- 2 = passThruMode
- 3 = snaMode
- 4 = passThruAndSna
- 5 = atmLePassThru
- 6 = atmLeSna
- 7= atmLePassThruAndSna
- 8 = atmNative
- 9 = atmLe

Note: This field is not available for the OSA direct SNMP interface.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

PCI Utilization Per Five Minutes The average, over a 5-minute interval, of the percentage of time that the PCI bus was utilized to transfer data. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%.

PCI Utilization Per Minute The average, over a 1-minute interval, of the percentage of time that the PCI bus was utilized to transfer data. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%.

PCI Utilization Per One Hour The average, over a 1-hour interval, of the percentage of time that the PCI bus was utilized to transfer data. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%.

Port Count The number of ports on the OSA-Express adapter. For ATM155 QDIO LAN Emulation mode adapters, the value can be 1 or 2, depending on the number of logical ports configured. The format is an unsigned integer.

Processor Utilization Per Five Minutes The average, over a 5 minute interval, of the percentage of time that the channel path identifier (CHPID) processor was utilized to transfer data. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%.

Processor Utilization Per Minute The average, over a 1 minute interval, of the percentage of time that the channel path identifier (CHPID) processor was utilized to transfer data. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%.

Processor Utilization Per One Hour The average, over a 1 hour interval, of the percentage of time that the channel path identifier (CHPID) processor was utilized to transfer data. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%.

Share Indicator Indicates whether or not the OSA-Express feature can be shared across multiple LPARs. This value is stored as an integer but displayed as a string. The possible values are:

- 0 = notShared
- 1 = shared

State The state of the hardware channel. This value is stored as an integer but displayed as a string. The possible values are:

- 0= null
- 1 = online
- 3 = notInstalled
- 5 = offline

Note: This field is not available for the OSA direct SNMP interface.

Subtype The type of OSA feature present. This value is stored as an integer but displayed as a string. The possible values are:

- 1 = unknown
- 2 = gigabit
- 3 = fastEthernet
- 4 = atmNative
- 5 = atmLanEmulation
- 6 = noPortsDefined
- 7 = oneLogicalEthPort
- 8 = oneLogicalTokenRingPort
- 9 = twoLogicalEthPorts
- 10 = twoLogicalTokenRingPorts
- 11 = logicalEthernetAndTokenRingPorts
- 12 = logicalTokenRingAndEthPorts
- 65 = gigabitEthernet
- 81 = fastEthernet
- 82 = tokenRing
- 97 = oneThousandBaseTEthernet
- 145 = tenGigabitEthernet
- 161 = osaexp3gigabitEthernet

- 177 = osaexp3oneThousandBaseTEthernet
- 193 = osaexp3tenGigabitEthernet
- 2304 = atmEmulatedEthernet

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

OSA Express LPARS Attributes

Use the OSA Express LPARS attributes to create situations that monitor OSA-Express LPARS usage.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of two hexadecimal characters.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:
- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:
- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Kilobyte Rate In Per Minute The average, over a 1 minute interval, of the number of kilobytes received that were processed for the specific LPAR. When the Processor Utilization Per Minute attribute for a specific LPAR has a value of -1, then the interval data was not retrieved from the adapter and this attribute has a value of 0. The format is an unsigned integer.

Kilobyte Rate In Per Five Minutes The average, over a 5 minute interval, of the number of kilobytes received that were processed for the specific LPAR. When the Processor Utilization Per Five Minutes attribute for a specific LPAR has a value of -1, then the interval data was not retrieved from the adapter and this attribute has a value of 0. The format is an unsigned integer.

Kilobyte Rate In Per Hour The average, over a 1 hour interval, of the number of kilobytes received that were processed for the specific LPAR. When the Processor Utilization Per Hour attribute for a specific LPAR has a value of -1, then the interval data was not retrieved from the adapter and this attribute has a value of 0. The format an unsigned integer.

Kilobyte Rate Out Per Minute The average, over a 1 minute interval, of the number of kilobytes sent that were processed for the specific LPAR. The format is an unsigned integer.

Kilobyte Rate Out Per Five Minutes The average, over a 5 minute interval, of the number of kilobytes sent that were processed for the specific LPAR. When the Processor Utilization Per Five Minutes attribute for a specific LPAR has a value of -1, then the interval data was not retrieved from the adapter and this attribute has a value of 0. The format is an unsigned integer.

Kilobyte Rate Out Per Hour The average, over a 1 hour interval, of the number of kilobytes sent that were processed for the specific LPAR. When the Processor Utilization Per Hour attribute for a specific LPAR has a value of -1, then the interval data was not retrieved from the adapter and this attribute has a value of 0. The format is an unsigned integer.

LPAR Logical Channel Subsystem The logical channel subsystem to which the performance data refers. For an IBM eServer zSeries 800 or 900 system, there is only one logical channel subsystem that is indicated by a value of **0** (zero). For a IBM eServer zSeries 990 system, there can be multiple logical channels. They are numbered starting with zero (for example, five subsystems would be number 0 to 4). The format is an unsigned integer.

LPAR Name The name of the logical partition from which this data was retrieved. This is not necessarily the z/OS system ID. The format is an alphanumeric string, with a maximum of 8 characters.

LPAR Number The number of the logical partition from which this data was retrieved. The format is an unsigned integer.

LPAR Status The status of the LPAR. This attribute is valid for IBM eServer zSeries 990 or greater hardware only and indicates whether the LPAR is unknown, online, or offline. This value is stored as an unsigned integer and displayed as a string. The possible values are:

- 0 = unknown
- 1 = offline
- 2 = online

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Processor Utilization Per Five Minutes The average, over a 5 minute interval, of the percentage of time that the channel path identifier (CHPID) processor was used to transfer data for the specific LPAR. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%. The format is an unsigned integer.

Processor Utilization Per Minute The average, over a 1 minute interval, of the percentage of time that the channel path identifier (CHPID) processor was used to transfer data for the specific LPAR. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%. The format is an unsigned integer.

Processor Utilization Per Hour The average, over a 1 hour interval, of the percentage of time that the channel path identifier (CHPID) processor was used to transfer data for the specific LPAR. This count does not include idle time or time used by routine maintenance tasks. The range for this value is from 0% to 100%. A value of -1 indicates that the value was not retrieved from the adapter. The format is an unsigned integer.

OSA Express Ports Attributes

Use the OSA Express Ports attributes to create situations that monitor OSA-Express ports usage.

Active MAC Address The current MAC address in use on the adapter. The format is a 12–digit hexadecimal string.

Active Speed The actual speed and mode in which the OSA is running. The format is an integer with the following possible values:

- 0 = unknown
- 1 = tenMbHalfDuplex
- 2 = tenMbFullDuplex
- 3 = oneHundredMbHalfDuplex
- 4 = oneHundredMbFullDuplex
- 6 = oneThousandMbFullDuplex

Burned In MAC Address The burned-in MAC address on the OSA. The format is a 12–digit hexadecimal string.

Channel Number The channel path identifier (CHPID) corresponding to this device. The format is a string of 2 hexadecimal characters. This attribute is not displayed.

Collection Time The time and date of the data sampling. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Configuration Name The name of the configuration that is on the OSA. It is set using OSA/SF. It is not used by OSA. The format is an alphanumeric string, with a maximum of 34 characters.

Configuration Speed The configured port speed in megabits per second. This field shows the speed that was configured for the OSA-Express Fast Ethernet feature. It is not used by OSA. Express gigabit features are displayed as n/a. The format is an integer with the following possible values:

- 0 = autoNegotiate
- - 1 = notValidGigabit
- 1 = tenMbHalfDuplex
- 2 = tenMbFullDuplex

- 3 = oneHundredMbHalfDuplex
- 4 = oneHundredMbFullDuplex
- 6 = oneThousandMbFullDuplex

Current Broadcast Frames The count of the number of broadcast frames received by this port during the most recent time interval. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer.

Current Group Frames In The count of the number of group frames received by this port during the most recent time interval. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer.

Current Packets In The count of the number of packets received by this port during the most recent time interval. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer.

Current Packets Out The count of the number of packets transmitted from this port during the most recent time interval. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer.

Current Unknown IP Frames The count of the number of packets that were discarded during the most recent time interval because they did not have a matching IP address. There was neither a primary nor a secondary router default defined. This object is not supported for Fast Ethernet adapters so the value is zero. The format is an unsigned integer.

Disabled Status When the value of the Hardware State attribute is disabled, this attribute explains the reasons for the disabled state. The format is a string of up to 180 characters. This field can contain any combination of the following reasons:
- Internal port failure
- Service processor request
- Network request
- OSA/SF request
- Configuration change
- Link failure threshold exceeded
- Port temporarily disabled
- Unknown

Disabled Status When the value of the Hardware State attribute is disabled, this attribute explains the reasons for the disabled state. This value is stored as a hexadecimal integer and displayed as a 4–digit hexadecimal number mapped by the bit settings below:
- 0 = reserved
- 1 = internalPortFailure
- 2 = reserved
- 3 = reserved
- 4 = reserved
- 5 = reserved
- 6 = portTemporarilyDisabled
- 7 = reserved
- 8 = reserved
- 9 = serviceProcessorRequest
- 10 = networkRequest

- 11 = osasfRequest
- 12 = configurationChange
- 13 = linkFailureThresholdExceeded
- 14 = reserved
- 15 = reserved

Hardware State The state of the port. If the port is disabled, see **Disabled Status** for details. This value is stored as an integer but displayed as a string. These are the possible values:
- 0 = undefined
- 1 = unavailable
- 2 = enabling
- 3 = disabling
- 4 = enabled
- 5 = disabled
- 6 = linkMonitor
- 7 = definitionError
- 8 = configuredOffline
- 17 = unknown
- 18 = linkFailure
- 19 = disabled
- 20 = enabled

Host Name The host name of the TCP/IP stack. The format is an alphanumeric string no longer than 255 characters.

Link Name The name of the TCP/IP link associated with this port. The format is an alphanumeric string no longer than 16 characters. If this monitoring agent is running under z/OS version 1.10, this field will be blank.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters.

Port Name Specifies the port name that must also be entered at the connection manager on the host and the application. The format is an alphanumeric string no longer than 16 characters.

Port Number The physical port number for this port. The format is an integer.

Port Type The physical port type. This value is stored as an integer and displayed as a string. Possible port types are:
- 65 = gigabitEthernet
- 81 = fastEthernet
- 97 = oneThousandBaseTEthernet
- 145 = tenGigabitEthernetThis

Service Mode Indicates whether or not the processor is in service mode. The format is an integer. The possible values are:
- 0 = NotInServiceMode
- 1 = InServiceMode

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Broadcast Frames (K) The total number of broadcast frames received by this port. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer.

Total Group Frames In (K) The count of the number of group frames received by this port. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer, in units of K (1024).

Total Packets In (K) The total number of packets received by this port. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer, in units of K (1024).

Total Packets Out (K) The total number of packets transmitted from this port. A channel path identifier (CHPID) reset causes this value to be reset to zero. The format is an unsigned integer, in units of K (1024).

Total Unknown IP Frames (K) The total number of packets that were discarded because they did not have a matching IP address. There was neither a primary nor a secondary router default defined. This object is not supported for Fast Ethernet adapters so the value is zero. The format is an unsigned integer, in units of K (1024).

User Data The data set by the user, expressed as a string. It is ignored by the OSA. The format is an alphanumeric string no longer than 32 characters.

User Data (Hex) The data set by the user, expressed in hexadecimal format. This is the same data as the User Data attribute, except that the display is in hexadecimal format. It is ignored by the OSA. The format is a string of 64 hex characters.

New and changed attribute groups in Fix Pack 1

The following new attribute groups or tables were added to the OMEGAMON XE for Mainframe Networks product to support IPSec. These attributes are used in the table views in the various product-defined workspaces that support IPSec.

- "Current IP Filters Attributes"
- "Dynamic IP Tunnels Attributes" on page 84
- "Internet Key Exchange (IKE) Tunnels Attributes" on page 93
- "IPSec Status Attributes" on page 99
- "Manual IP Tunnels attributes" on page 106

These attributes groups were updated:

- "Interfaces Attributes (KN3TIF)" on page 110
- "Connections Attributes (KN3TCN)" on page 110
- "TCP/IP Details Attributes (KN3TCP)" on page 110
- "TCPIP Gateways Attributes (KN3TGA)" on page 111

For more information about the workspaces associated with these attribute groups, see Chapter 6, "New and updated workspaces," on page 113.

Current IP Filters Attributes

Use the Current IP Filters attributes to display IP filter information for the filters currently in use by the TCP/IP stack.

This data is available for monitoring agents running under z/OS version 1.8 or higher.

Action The action to be applied to the packet when filter's condition is met. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = PERMIT
- 2 = DENY
- 3 = IPSEC

Collection Time The time and date of the data sampling. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Create Time The time when the filter was created, based on how the filter was created.

- For a statically defined filter originating from the Policy Agent configuration, this field represents the time that the filter was first defined to the current instance of the Policy Agent. Filters of this type have the value of **1** meaning Policy for the Filter Set attribute.
- For a filter originating from the TCP/IP profile, this field represents the time that the profile filter configuration was last replaced. Filters of this type have the value of **0** meaning Default for the Filter Set attribute.
- For dynamically defined filters, this field is blank. Dynamically defined filters have a value of **DYNAMIC**, **NATTDYN**, or **NRF**.

This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute

- ss = Seconds

The stored format is a string no longer than 16 characters in the format CYYMMDDHHMMSSmmm (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

I **Destination Address** Destination IP address or addresses affected by the current filter. This address may
I be in IPv4 or IPv6 format. Filters apply to either IPv4 addresses or IPv6 addresses, but not both. If the
I filter applies to all destination IP addresses, the field will be displayed as blank; a value of "0" padded to
I the right with blanks will be stored in the table. If the filter is for a range of destination IP addresses, this is
I the lower address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Destination Address Granularity Indicates the origin of the destination address used for on-demand activations of tunnels associated with a dynamic anchor filter. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>: This is not a dynamic anchor filter.
- 1 = FILTER: Destination address for the tunnel is from the filter definition.
- 2 = PACKET: Destination address for the tunnel is from the packet requiring the tunnel activation.

Destination Port Granularity Indicates the origin of the destination port used for on-demand activations of tunnels associated with a dynamic anchor filter. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>: This is not a dynamic anchor filter
- 1 = FILTER: The destination address for the tunnel is from the filter definition.
- 2 = PACKET: The destination address for the tunnel is from the packet requiring the tunnel activation.

A value of FILTER indicates the destination port comes from the filter definition. A value of PACKET indicates the destination port comes from the packet. This field is significant if the filter type indicates this is a dynamic anchor filter. If the filter is not a dynamic anchor filter, a value of zero (0) is stored and blanks are displayed in the field.

Direction Indicates the direction of the IP traffic. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = INBOUND
- 2 = OUTBOUND

Filter Rule Definition Name The name specified for an IP filter rule definition. This column is stored as a 48-character string.

Filter Set Identifies which filter set is currently in use by the TCP/IP stack. One of two filter sets may be in use at any time.

- The default filter set, which is made up of filters defined in the TCP/IP profile.

- The policy filter set, which is made up of filters defined in the Policy Agent configuration files.

This value is stored as an integer and displayed as a string. Valid values are:

- 0 = Default
- 1 = Policy

Filter Use Indicator The value in this column is used to identify the filters that are matching the most packets. Values 1 to 4 are used to identify the 5 filters with the most matches, the most denies by DENY and the most denies by mismatch. Value 5 is used to identify filters 6 to 100 with the most matches. A query can return the 5 filters with the most matches by using a where clause like:

```
(Filter Use Indicator = 1) OR (Filter Use Indicator = 3)
```

A query can return the 100 filters with the most matches by adding another OR clause to the previous condition:

```
(Filter Use Indicator = 5)
```

This value is stored as a one character string and is displayed as a string. Valid values are:

- 1 = MostMatched: The filter is one of the 5 most-matched filters.
- 2 = MostDENY: The filter is one of the 5 filters with a DENY action that has the most matched packets. This also means that the filter has denied the most packets due to DENY.
- 3 = MostMatchedAndMostDeny: The filter is both one of the five most matched filters and one of the five filters that has denied the most packets by DENY.
- 4 = MostMismatched: The filter is one of the 5 filters that has the most matched packets.
- 5 = MostMatchedAndMosMismatched: The filter is both one of the five most matched filters and one of the five most mismatched filters.
- 6 = MostMatched6to100: The filter is one of the 6 to 100 filters that has the most matches.

This field is not displayed.

Group Name The name of the filter group that the filter rule is associated with. This field is stored as blanks if the filter rule is not associated with a filter group. The format is an alphanumeric string of up to 48 characters.

ICMP Code The Internet Control Message Protocol (ICMP) code that qualifies the ICMP Type Code attribute. This field is stored as blanks if the filter applies to all ICMP codes. This field is defined as an integer of up to 2 characters. 0 is a defined ICMP code. The value in this field is not meaningful unless a non-blank value appears in the ICMP Type Code field.

ICMP Type Code The Internet Control Message Protocol (ICMP) code that identifies the ICMP traffic to be filtered. This field is stored as blanks if the filter applies to all ICMP types. This field is defined as an integer of up to 2 characters. 0 is a defined ICMP Type Code.

IP Address Version The version of the IP addresses being used for the traffic descriptor and the security endpoints. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = IPv4: The traffic descriptor and the security endpoints are using IPv4 addresses.
- 1 = IPv6: The traffic descriptor and the security endpoints are using IPv6 addresses.

Last Page The value in this column saves the page number of the last page of filters. It is used in queries to determine whether or not more pages of filters are available to retrieve. This value is stored as a 4-character string, with 0000 representing the first page.

Local Start Action Name The name specified for an IpLocalStartAction statement that is referenced by this filter. The IpLocalStartAction statement specifies how to determine the local IP, remote IP, local port,

remote port, and protocol specification for the local activation of a dynamic virtual private network (VPN). This field is stored as blanks if no local start action name is associated with this filter. This field is stored as a 48-character string.

Log Indicator Indicates which packets to log. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE: Do not log any packets.
- 1 = PERMIT: Log packets permitted by the filter.
- 2 = DENY: Log packets denied by the filter.
- 3 = ALL: Log all packets that match this filter.

Lower Destination Address The lower address in a range of IP addresses being filtered. If the filter is for a range of destination IP addresses, this is the lower address in the range. Otherwise, this field is stored as blanks. The format is a string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Lower Destination Port If the filter is for a range of destination IP port addresses, this is the low value for the range. This field is stored as blanks if the filter is not for a range of IP port addresses and applies to all ports. This value is represented as a 5-character string.

Lower Source Port If the filter is for a range of IP ports, this is the low value for the range. This field is stored as blanks if the filter is not for a range of IP port addresses and applies to all ports. This value is represented as a 5-character string.

NAPT Indicator Indicates whether a network address port translation (NAPT) has been detected in front of the IPSec peer. This field is significant for filters with a type of dynamic. If the filter is not dynamic, this field is stored as blanks. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

NAT Indicator Indicates whether network address translation (NAT) has been detected in front of the IPSEC peer. This field is significant for filters with a type of dynamic. If the filter is not dynamic, this field is stored as blanks. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

NAT Traversal Gateway Indicates that the peer is acting as an IPSec gateway and the tunnel uses UDP encapsulation. This field is significant for dynamic filters. If the filter is not dynamic, this field is stored as blanks. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

NATT Client ID If the peer is behind a NAT and a gateway and the peer supplied a client ID, indicates the NAT traversal gateway (NATT) client ID. This field contains an IPv4 dotted decimal address if the NATT Client ID Type is IPv4_ADDR. This field contains an IPv4 dotted decimal address if the NATT Client ID Type is IPv4_ADDR_RANGE. The address in the field is the lower address for the range. This field will have an MD5 hash of the client ID if the NATT Client ID Type is OTHER. If the NATT Client ID Type is 0, this field is stored as blanks. The format is a string of up to 32 characters.

NATT Client ID Type If the peer is behind a NAT and a gateway and the peer supplied a client ID, indicates what type of client ID was supplied. Otherwise, this field is stored as blanks. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE
- 1 = IPv4_ADDR
- 2 = IPv4_ADDR_RANGE
- 3 = IPv4_ADDR_RANGE
- 4 = OTHER

NATT Peer UDP Port If this is a dynamic filter for UDP-encapsulated NAT Traversal (NATT) traffic, this is the UDP port for the IKE peer. Otherwise, this field is stored as blanks. This field is represented as a character string of up to 5 characters.

NRF Original Port If this is a NAT Traversal Resolution Filter (NRF), this field contains the original remote port for the TCP or UDP traffic. Otherwise this field is stored as blanks. This field is represented as a character string of up to 5 characters.

On Demand Indicator Indicates whether or not on-demand activations are allowed for the traffic described for this filter. On demand activations are activations of tunnels initiated automatically when traffic requiring the use of the tunnel is sent. This field is meaningful if the filter type is one of the following:

- Dynamic anchor filter
- Dynamic filter
- Network Address Translation (NAT) Traversal anchor filter
- NAT Traversal dynamic filter

This value is stored as an integer and displayed as a string. The field contains a zero (0) when the filter type is not one of these. Valid values are:

- 0 = <blank>
- 1 = NOT_PERMITTED
- 2 = PERMITTED

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters. This field is not displayed.

OSPF Type Identifies Open Shortest Path First (OSPF) protocol traffic to be filtered. This field is stored as blanks if the filter applies to all OSPF traffic. The format is an integer.

Packets Denied by Mismatch The number of packets denied due to a mismatch with this filter's action during the most recent collection interval. The format is an integer.

Packets Matched The total number of packets that matched this filter's condition and action during the most recent collection interval. The format is an integer.

Page The value in this column is used to group the filters into logical pages. Each page contains 500 filters. Links are implemented so that you can request all the filters on a particular page. This value is stored as a 4-character string, with 0000 representing the first page.

Percent Total Packets Denied by Mismatch The percentage of total packets denied due to an action mismatch by this filter compared to the total packets denied due to an action mismatch by all filters on the TCP/IP stack since the stack was started. The format is a number between 0 and 100 inclusive.

Percent Total Packets Matched The percentage of total packets matched by this filter compared to the total packets matched by all filters on the TCP/IP stack since the stack was started. The format is a number between 0 and 100 inclusive.

Protocol Granularity Indicates the origin of the protocol used for on-demand activations of tunnels associated with a dynamic anchor filter. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>: This is not a dynamic anchor filter
- 1 = FILTER: The protocol for the tunnel is from the filter definition.
- 2 = PACKET: The protocol for the tunnel is from the packet requiring the tunnel activation.

Protocol Number IP protocol number to match in the IPv4 or IPv6 header of packets. If the filter applies to all IP protocols, this field is stored as blanks. This value is expressed as a string of up to 3 characters. 0 is a valid IP protocol number.

Rule ID This column concatenates the Filter Rule Definition Name, Rule Tag and Tunnel ID into a single string that can be used to uniquely identify filter rules. The Rule ID is used to identify rules on graph views so that the values displayed on the graphs can be correlated with the rows in the table view. The three components of the Rule ID are separated by a colon (:) character. If the rule is not associated with a Tunnel ID, that component of the ID is omitted. This column is represented as a character string of 106 characters. This field is not displayed.

Rule Tag The filter rule definition name extension. The extension is assigned by the stack to identify related rules derived from the same definition. The column is stored as an 8-character string. This field is not displayed.

Scope The type of traffic that this filter applies to. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = LOCAL
- 2 = ROUTED
- 3 = SCOPEALL.

Security Class The IP filter security class. This filter is applied to all packets traversing the IP interfaces, and these interfaces are associated with security classes. This value is expressed as an integer between 0 and 255 inclusive. A value of zero (0) means that all security classes are filtered. If a non-zero value is specified for the security class, then the filter applies to data traversing all interfaces associated with the specified security class.

Sequence Number The value in this column is used to ensure that filters are displayed in the order that the Network Management Interface (NMI) returns them. This value is represented as an integer.

Source Address Source IP address or addresses that the filter applies to. Filters apply to either IPv4 addresses or IPv6 address, but not both. If the filter applies to all source IP addresses, the field is displayed as blank; a value of “0” padded to the right with blanks is stored in the table for this case. If the filter is for a range of source IP addresses, this field displays the lower address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Source Address Granularity Indicates the origin of the source address used for on-demand activations of tunnels associated with a dynamic anchor filter. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>: This is not a dynamic anchor filter.

- 1 = FILTER: The source address for the tunnel is from filter definition.
- 2 = PACKET: The source address for the tunnel is from the packet requiring the tunnel activation.

Source Port Granularity Indicates the origin of the source port used for on-demand activations of tunnels associated with a dynamic anchor filter. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>: This is not a dynamic anchor filter
- 1 = FILTER: The source port for tunnel is from the filter definition.
- 2 = PACKET: The source port for tunnel is from the packet requiring the tunnel activation

State Current filter state. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = ACTIVE
- 1 = INACTIVE

SWSA Shadow Indicator Indicates whether or not the filter originated from a distributing stack (SHADOW) or the local stack (NOT_SHADOW). This value is only meaningful for dynamic filters. If the filter type is not dynamic, the value is set to 0 and a blank is displayed. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = NOT_SHADOW
- 2 = SHADOW

A value of SHADOW indicates that the filter originated from a distributing stack. This indicator is significant if filter type is dynamic. If the filter type is not dynamic, a value of zero (0) is stored and blanks are displayed in the field.

Sysplex Name The name of the sysplex that the monitored system is part of. This field is not displayed.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters. This field is not displayed.

TCP Connect Indicates what types of TCP connect attempts are to be filtered. TCP connect attempts (SYN packets) in the direction opposite that specified in this field do not match this filter. This field is meaningful for generic or anchor filters only. It is zero (0) when the filter is not one of these types. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE
- 1 = INBOUND
- 2 = OUTBOUND

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters. This field is not displayed.

Total Packets Denied by Mismatch The total number of packets denied due to a mismatch with this filter's action since the start of the TCP/IP stack. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Packets Denied by Action Mismatch (in G) column to calculate the cumulative number of packets denied by action mismatch. The format is an integer.

Total Packets Denied by Mismatch (in G) The total number of packets denied due to a mismatch with this filter's action since the start of the TCP/IP stack, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Packets Denied By Action Mismatch column to calculate the cumulative number of packets denied by action mismatch. The format is an integer.

Total Packets Matched The total number of packets that matched this filter's condition and action since the start of the TCP/IP stack. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Packets Matched (in G) column to calculate the cumulative number of packets matched. The format is an integer.

Total Packets Matched (in G) The total number of packets that matched this filter's condition and action since the start of the TCP/IP stack, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Packets Matched column to calculate the cumulative number of packets matched. The format is an integer.

Tunnel ID Identifier for the associated tunnel. The tunnel ID is generated by the stack. It is not unique. Several related tunnels may have the same tunnel ID. The related tunnels are different instances of the same security association. Usually the related instances exist due to the expiration and refresh of tunnels.This field will be blank if filter is not associated with a tunnel. The ID is a character string of up to 48 characters.

Type Indicates the filter type. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = GENERIC
- 2 = MANUAL
- 3 = DYNANCHOR
- 4 = DYNAMIC
- 5 = NATTANCHOR
- 6 = NATTDYN
- 7 = NRF

Update Time The time when the filter was updated, based on how the filter was created.

- For a statically defined filter originating from the Policy Agent configuration, this field represents the time that the filter's attributes were last updated in the current instance of the Policy Agent. Filters of this type have the value of **1** meaning Policy for the Filter Set attribute.
- For a filter originating from the TCP/IP profile, this field represents the time that the profile filter configuration was last replaced. Filters of this type have the value of **0** meaning Default for the Filter Set attribute.
- For dynamically defined filters, this field is blank. Dynamically defined filters have a filter type of **DYNAMIC**, **NATTDYN**, or **NRF**.

This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month

- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Upper Destination Address If the filter is for a range of destination IP addresses, this is the high value for the range. This field will be displayed as blank if destination is not a range of addresses or the filter is for all destination addresses; a value of “0” padded to the right with blanks is stored in the table. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Upper Destination Port If the filter is for a range of destination IP port addresses, this is the high value for the range. This field is stored as blanks if the filter is not for a range of IP port addresses and applies to all ports. This value is represented as a 5-character string.

Upper NATT Client ID If the peer is behind a NAT and a gateway and the peer supplied a client ID, indicates the upper address range of the NAT traversal gateway (NATT) client ID. This field contains an IPv4 dotted decimal address if the NATT Client ID Type is IPv4_ADDR_RANGE. If the NATT Client ID Type is 0, 1, or 4, this field is stored as blanks. This field is a character string of up to 15 characters.

Upper Source Address If the filter is for a range of source IP addresses, this is the high value for the range. This field will be displayed as blank if the source address is not a range or the filter applies to all source IP addresses; a value of “0” padded to the right with blanks will be stored in the table for this case. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Upper Source Port If the filter is for a range of source IP port addresses, this is the high value for the range. This field is stored as blanks if filter is not for a range of IP port addresses and applies to all ports. This value is represented as a 5-character string.

VPN Action Name The name specified on a virtual private network (VPN) action definition statement. The VPN action describes how to protect the traffic that flows on the tunnel. It specifies attributes of the tunnel, such as what type of encryption to use. The name is a character string of up to 48 characters.

Dynamic IP Tunnels Attributes

Use the Dynamic IP Tunnels attributes to display the availability and performance statistics for dynamic IP tunnels known to the Internet Key Exchange (IKE) daemon and the TCP/IP stack.

This data is available for monitoring agents running under z/OS version 1.8 or higher.

Activation Method Indicates how the tunnel was activated. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = USER: User activation from the command line.
- 2 = REMOTE: Remote activation from the IPSec peer.
- 3 = ONDEMAND: On-demand activation caused by IP traffic.
- 5 = TAKEOVER: Sysplex-Wide Security Associations (SWSA) activation as a result of a Dynamic Virtual IP Addressing (DVIPA) takeover.
- 6 = AUTOACT: Auto-activation.

Authentication Algorithm Identifies the authentication algorithm used for this tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 38 = MD5
- 39 = SHA1

Authentication Protocol Identifies the authentication protocol to be used by the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 51 = AH
- 50 = ESP

Bytes The number of inbound and outbound bytes for this tunnel during the most recent time interval. The format is an integer.

Byte Rate The number of inbound or outbound bytes, per minute, for this tunnel during the most recent time interval. The format is an integer.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Current Life Size The number of bytes of data that have traversed the tunnel since the tunnel was activated. This value is zero (0) if no life size was negotiated for the tunnel. The format is an integer.

Dest NAT-OA Payload The destination network address translation original address (NAT-OA) payload. NAT-OA payloads are exchanged only for certain UDP-encapsulated tunnels. During NAT traversal negotiations, the Internet Key Exchange (IKE) peer sends the known destination IPv4 address. If NAT traversal negotiation does not occur, or if peer does not send a source NAT-OA payload, this column is blank. This column is stored as a 15-character string. This field is not displayed.

I **Destination Address** Destination IP address for data protected by the tunnel. This value may be an IPv4
I or IPv6 address. If the traffic protected by the tunnel may have any destination IP address, this field is

I stored as blanks. If the traffic protected by the tunnel is a range of destination IP addresses, the value
I displayed is the lower address in the range. The format is a UTF-8 encoded character string of up to 45
I characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Destination Port Destination port for traffic protected by the tunnel. If the tunnel protects data for all destination ports, this value is 0. This field is represented by a 5-character string.

Diffie-Hellman Group Diffie-Hellman group used to generate keying material for the tunnel. Each group identifies the number of bits to be used in a prime number that is used to generate keying material. This column is blank if PFS (perfect forward security) was not negotiated for the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 99 = <blank>
- 0 = NONE
- 1 = GROUP1
- 2 = GROUP2
- 5 = GROUP5
- 14 = GROUP14

Encapsulation Mode Encapsulation mode to be used by the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = TUNNEL
- 2 = TRANSPORT

Encryption Algorithm Tunnel encryption algorithm. This field is undefined if the tunnel state is PENDING or INCOMPLETE. A value of 99 is assigned to the field in this case and blanks are displayed. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE
- 3 = 3DES
- 11 = NULL
- 12 = AES
- 18 = DES
- 99 = <blank>

Extended State Indicates progress of tunnel negotiation. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = INIT: No key exchange messages have been initiated.
- 1 = KEP: Key exchange messages have been initiated.
- 2 = DONE: All key exchange messages have been completed, and the tunnel is usable for traffic.
- 3 = PENDING_NOTIFY: Key exchange messages have been completed, waiting to receive connection notification.
- 4 = PENDING_START: Waiting for the activation of an Internet Key Exchange (IKE) tunnel.

Filter Rule Definition Name The name specified for the filter rule definition that this tunnel is associated with. This column is stored as a 48-character string.

Inbound Authentication SPI Tunnel inbound authentication security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This field is an unsigned 4-byte integer

and is displayed in hexadecimal. This field is undefined and displayed as blanks if the state of the tunnel is PENDING or INCOMPLETE. This field is not displayed.

Inbound Bytes The number of inbound bytes for this tunnel during the most recent time interval. The format is an integer.

Inbound Encryption SPI Tunnel inbound encryption security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This is an unsigned 4-byte integer and is displayed in hexadecimal. This field is undefined and displayed as blanks if the state of the tunnel is PENDING or INCOMPLETE. This field is not displayed.

Inbound Packets The number of inbound packets for this tunnel during the most recent time interval. The format is an integer.

Initiation Indicator Indicates if the local security endpoint may initiate dynamic tunnel negotiations with the remote security endpoint. Either security endpoint may initiate refreshes regardless of the value of this indicator. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

IP Address Version The version of the IP addresses being used for the traffic descriptor and the security endpoints. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = IPv4: The traffic descriptor and the security endpoints are using IPv4 addresses.
- 1 = IPv6: The traffic descriptor and the security endpoints are using IPv6 addresses.

This field is not displayed.

Life Expiration Time The time at which the tunnel will expire. This column is blank if no life time was negotiated. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Life Refresh Time The time at which the tunnel is refreshed. This column is blank if no life time was negotiated. This time is displayed in the following format:

mm/dd/yy hh:mm:ss

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format CYYMMDDHHMMSSmmm (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Life Size The number of bytes of data that may traverse the tunnel over the life of the tunnel. This value is zero (0) if no life size was negotiated for the tunnel. The format is an integer.

Local Client ID The Internet Security Associations Key Management Protocol (ISAKMP) identity of local client. A string containing an identifier as described by Local Client ID Type. Some of the ID strings can get as long as 2048 characters. The ID is always truncated at 100 characters. If no IDs are exchanged, this fields contains blanks. The format is a string of up to 100 characters. This field is not displayed.

Local Client ID Type Internet Security Associations Key Management Protocol (ISAKMP) identity type for the local client ID as defined in RFC 2407. If client IDs were not exchanged during negotiation, this column is blank. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = IPv4_ADDR
- 2 = FQDN
- 3 = USER_FQDN
- 4 = IPv4_ADDR_SUBNET
- 5 = IPv6_ADDR
- 6 = IPv6_ADDR_SUBNET
- 7 = IPv4_ADDR_RANGE
- 8 = IPv6_ADDR_RANGE
- 9 = DER_ASN1_DN
- 10 = DER_ASN1_GN
- 11 = KEY_ID

This field is not displayed.

Local Dynamic VPN Rule Name The name specified on a z/OS Communications Server Policy Agent LocalDynVpnRule configuration statement. The statement describes traffic that is to be protected by a tunnel that is activated on demand using the ipsec command or when the Internet Key Exchange (IKE)

daemon or the TCP/IP stack is started or both. This field is stored as blanks if the tunnel is not associated with a local rule. The name is a character string of up to 48 characters.

Local NAT Indicator Indicates if a NAT has been detected in front of the local security endpoint. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

I **Local Security Endpoint** The IP address of the local security endpoint responsible for negotiating the
I tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters. This field is not displayed.

Outbound Authentication SPI Tunnel outbound authentication security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This is an unsigned 4-byte integer and is displayed in hexadecimal. This field is undefined and displayed as blanks if the state of the tunnel is PENDING or INCOMPLETE. This field is not displayed.

Outbound Bytes The number of outbound bytes for this tunnel during the most recent time interval. The format is an integer.

Outbound Encryption SPI Tunnel outbound encryption security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This is an unsigned 4-byte integer and is displayed in hexadecimal. This field is undefined and displayed as blanks if the state of the tunnel is PENDING or INCOMPLETE. This field is not displayed.

Outbound Packets The number of outbound packets for this tunnel during the most recent time interval. The format is an integer.

Packet Rate The number of inbound or outbound packets, per minute, for this tunnel during the most recent time interval. The format is an integer.

Packets The number of inbound and outbound packets for this tunnel during the most recent time interval. The format is an integer.

Parent IKE Tunnel ID Tunnel ID for this tunnel's parent IKE (Phase 1) tunnel. The Internet Key Exchange (IKE) tunnel is used to negotiate the IP tunnel. This field is represented as a 48-character string.

Pending New Indicator Pending new activation indicator. If set, this field indicates that dynamic IP tunnel is in the pending state and it represents a new activation rather than a refresh. If it is not set, the tunnel is either not in pending state or is not a new activation. For z/OS Communications Server Version 1.7, the value will always be 0. This value is stored as an integer and displayed as a string. Valid values are

- 0 = <blank>
- 1 = Yes

Protocol The IP protocol number for the data to be carried in the tunnel. A value of zero (0) indicates that tunnel protects data for any protocol. The format is an integer representing an Internet Engineering Task Force (IETF)-defined protocol number.

Refresh Life Size The number of bytes that may traverse the tunnel before a refresh is needed. This value is zero (0) if no life size was negotiated. The format is an integer.

Remote Client ID Internet Security Associations Key Management Protocol (ISAKMP) identity of remote client. A string containing an identifier as described by Remote Client ID Type. Some of the ID strings can

get as long as 2048 characters. The ID is always truncated at 100 characters. If no IDs are exchanged, this field contains blanks. The format is a string of up to 100 characters. This field is not displayed.

Remote Client ID Type Internet Security Associations Key Management Protocol (ISAKMP) identity type for the remote client ID as defined in RFC 2407. If the client IDs were not exchanged during negotiation, this column is blank. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = IPv4_ADDR
- 2 = FQDN
- 3 = USER_FQDN
- 4 = IPv4_ADDR_SUBNET
- 5 = IPv6_ADDR
- 6 = IPv6_ADDR_SUBNET
- 7 = IPv4_ADDR_RANGE
- 8 = IPv6_ADDR_RANGE
- 9 = DER_ASN1_DN
- 10 = DER_ASN1_GN
- 11 = KEY_ID

This field is not displayed.

Remote IKE UDP Port The IKE UDP port of the remote security endpoint. This column is blank when UDP encapsulation is not being used by the tunnel. This column is stored as a 5-character string.

Remote NAPT Indicator Indicates if a network address port translation (NAPT) has been detected in front of the remote security endpoint. It is possible that an NAPT may exist but is detected only as a NAT. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

Remote NAT Indicator Indicates if a NAT has been detected in front of the remote security endpoint. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

Remote NAT Traversal Gateway Indicator Indicates if the remote security endpoint is acting as a NAT traversal gateway. If the remote security endpoint is acting as a NAT traversal gateway, the tunnel uses UDP encapsulation and the remote security endpoint is acting as an IPSec gateway. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

I **Remote Security Endpoint** The IP address of the remote security endpoint responsible for negotiating the
I tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Remote zOS Indicator Indicates if the remote peer is a z/OS system. This can be detected only if NAT traversal is enabled. Even if NAT traversal is enabled, it is possible for the remote peer to be a z/OS system and this indicator not to be set. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

I **Source Address** Source IP address for data protected by this tunnel. This address may be an IPv4 or
I IPv6 address. If the traffic protected by the tunnel may have any source IP address, the address is blank.
I If the traffic protected by the tunnel is a range of source IP addresses, the value displayed is the lower
I address in the range. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Source NAT-OA Payload The source network address translation original address (NAT-OA) payload. NAT-OA payloads are exchanged only for certain UDP-encapsulated tunnels. During NAT traversal negotiations, the Internet Key Exchange (IKE) peer sends the source IPv4 address that it is aware of. If NAT traversal negotiation did not occur, or if peer did not send a source NAT-OA payload, this column is blank. This column is stored as a 15-character string. This field is not displayed.

Source Port Source port for traffic protected by tunnel. If the tunnel protects data for all source ports, this value is 0. This field is represented by a 5-character string.

State Current state of tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 2 = PENDING: Waiting for negotiation to start.
- 3 = INCOMPLETE: Negotiation in progress.
- 4 = ACTIVE: Tunnel is active and ready for use.
- 5 = EXPIRED: Expired and cannot be used.

SWSA Shadow Indicator Sysplex-Wide Security Associations shadow indicator. If this value is set, the tunnel is a SWSA shadow tunnel. This value is stored as an integer and displayed as a string.

- 0 = <blank>
- 1 = Yes

Sysplex Name The name of the sysplex that the monitored system is part of. This field is not displayed.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters. This field is not displayed.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters. This field is not displayed.

Total Bytes The total number of inbound and outbound bytes for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Bytes (in G) column to calculate the total bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Bytes (in G) The total number of inbound and outbound bytes for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Bytes column to calculate the total bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Inbound Bytes The total number of inbound bytes for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Inbound Bytes (in G) column to calculate the total inbound bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Inbound Bytes (in G) The total number of inbound bytes for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Inbound Bytes column to calculate the total inbound bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Inbound Packets The total number of inbound packets for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Inbound Packets (in G) column to calculate the total inbound packets for the tunnel. For SWSA tunnels, the value is for packets that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Inbound Packets (in G) The total number of inbound packets for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Inbound Packets column to calculate the total inbound packets for the tunnel. For SWSA tunnels, the value is for packets that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Outbound Bytes The total number of outbound bytes for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Outbound Bytes (in G) column to calculate the total outbound bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Outbound Bytes (in G) The total number of outbound bytes for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Outbound Bytes column to calculate the total outbound bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Outbound Packets The total number of outbound packets for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Outbound Packets (in G) column to calculate the total outbound packets for the tunnel. For SWSA tunnels, the value is for packets that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Outbound Packets (in G) The total number of outbound packets for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Outbound Packets column to calculate the total outbound packets for the tunnel. For SWSA tunnels, the value is for packets that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Packets The total number of inbound and outbound packets for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Packets (in G) column to calculate the total packets for the tunnel. For SWSA tunnels, the value is for packets that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Packets (in G) The total number of inbound and outbound packets for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Packets column to calculate the total packets for the tunnel. For SWSA tunnels, the value is for packets that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Tunnel ID Tunnel identifier. This identifier is generated by TCP/IP and is not unique. Multiple related tunnels may have the same tunnel ID. The format is an alphanumeric string of up to 48 characters.

Upper Destination Address If the traffic protected by the tunnel is a range of destination IP addresses, this is the upper address in the range. This value may be an IPv4 or IPv6 address. If the traffic protected by the tunnel is not a range of addresses or all addresses, this field is stored as blanks. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

Upper Source Address If the traffic protected by the tunnel is a range of source IP addresses, this is the upper address in the range. This may be an IPv4 or IPv6 address. If the traffic protected by the tunnel is not a range of addresses or is all addresses, this field is stored as blanks. The format is a UTF-8 encoded character string of up to 45 characters.

Note: For comparison, leading zeros are added for unspecified digits in IPv4 and IPv6 addresses when they are stored.

VPN Action Name The name specified on a virtual private network (VPN) action definition statement. The VPN action describes how to protect the traffic that flows through the tunnel. It specifies attributes of the tunnel, such as what type of encryption to use. The format of the name is a character string of up to 48 characters.

VPN Life Expiration Time The time at which the tunnel should no longer be refreshed. This column is blank if no life time was negotiated for the VPN (security attributes implemented by the tunnel). This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Internet Key Exchange (IKE) Tunnels Attributes

Use the IKE tunnels attribute to display availability and performance statistics for IKE tunnels known to the IKE daemon for a specific stack. IKE tunnels are used by a security endpoint (IKE daemon) to negotiate dynamic IP tunnels.

This data is available for monitoring agents running under z/OS version 1.8 or higher.

Active Dynamic Tunnels Current count of active dynamic tunnels associated with this Internet Key Exchange (IKE) tunnel. The format is an integer.

Authentication Algorithm The authentication algorithm used for this tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 38 = MD5
- 39 = SHA1

Byte Rate The number of bytes protected, per minute, for this tunnel during the most recent time interval. The format is an integer.

Bytes The number of bytes protected by this tunnel during the most recent time interval. The format is an integer.

Collection Time The time and date of the data sampling. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Diffie-Hellman Group Diffie-Hellman group used to generate keying material for the tunnel. Each group identifies the number of bits to be used in a prime number that is used to generate keying material. This column is blank if PFS (perfect forward security) was not negotiated for the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE
- 1 = GROUP1
- 2 = GROUP2
- 5 = GROUP5
- 14 = GROUP14

Encryption Algorithm Encryption algorithm used by the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 3 = 3DES
- 12 = AES

- 18 = DES

Exchange Mode Exchange mode used by a tunnel. This value is stored as an integer and displayed as a string. Valid values are:
- 2 = MAIN
- 4 = AGGRESSIVE

Extended State Indicates the progress of the tunnel negotiation. This value is stored as an integer and displayed as a string. Valid values are:
- 0 = INIT: No key exchange messages have been initiated.
- 1 = WAIT_SA: The first key exchange message has been sent and the endpoint is waiting for a response.
- 2 = IN_KE: A key exchange response has been sent.
- 3 = WAIT_KE: A key exchange message has been sent and the endpoint is waiting on a response.
- 4 = DONE: All key exchange messages have been completed and the tunnel is ready for data traffiic.
- 5 = EXPIRED: Tunnel has exceeded its life time or life size and is not available for data traffic.

In Progress Dynamic Tunnels Current count of in-progress dynamic tunnels associated with this Internet Key Exchange (IKE) tunnel. The format is an integer.

Initiation Indicator Indicates if the local security endpoint may initiate Internet Key Exchange (IKE) tunnel negotiations with the remote security endpoint. Either security endpoint may initiate refreshes regardless of the value of this indicator. This value is stored as an integer and displayed as a string. Valid values are:
- 0 = <blank>
- 1 = Yes

Initiator Cookie A string of hexadecimal digits that, when combined with the Responder Cookie, uniquely identifies the SA for the tunnel. This value is stored as a 16-character string. This field is not displayed.

IP Address Version The version of the IP addresses being used for the security endpoints.This value is stored as an integer and displayed as a string. Valid values are:
- 0 = IPv4: The traffic descriptor and the security endpoints are using IPv4 addresses.
- 1 = IPv6: The traffic descriptor and the security endpoints are using IPv6 addresses.

This value is not displayed.

Key Exchange Action Name The name specified on a z/OS Communications Server Policy Agent KeyExchangeAction configuration statement. This name identifies the action being used to activate this Internet Key Exchange (IKE) tunnel. Key exchange actions describe how key exchanges between security endpoints should be protected. This field is stored as a 48-character string.

Key Exchange Rule Name The name specified on a z/OS Communications Server Policy Agent KeyExchangeRule configuration statement. This name identifies the rule being used to activate this Internet Key Exchange (IKE) tunnel. Key exchange rules identify the security endpoints for an IKE tunnel and the policy to be used for the tunnel by referencing a key exchange action. This field is stored as a 48-character string.

Life Expiration Time The time at which the tunnel will expire. This column is blank if no life time was negotiated. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:
- mm = Month

- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Life Refresh Time The time at which the tunnel is refreshed. This column is blank if no life time was negotiated. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Life Size The number of bytes of data that may traverse the tunnel over the life of the tunnel. This value is 0 if no life size was negotiated for the tunnel. The format is an integer.

Life Time The amount of time, in seconds, that the tunnel is to remain active. The format is an integer.

Local NAT Indicator Indicates if network address translation (NAT) has been detected in front of the local security endpoint. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

Local Security Endpoint The IP address of the local security endpoint (IKE) responsible for negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Local Security Endpoint ID Internet Security Associations Key Management Protocol (ISAKMP) identity of local security endpoint. This field is a string containing an identifier, as described by local security endpoint ID type. Some ID strings can be as long as 2048 characters. The ID is always truncated at 100 characters. If no IDs are exchanged, this field is stored as blanks. This field is not displayed.

Local Security Endpoint ID Type Internet Security Associations Key Management Protocol (ISAKMP) identity type for the local security endpoint as defined in RFC 2407. If client IDs were not exchanged during negotiation, this column is blank. ISAKMP peers exchange and verify each other's identities as part of the Internet Key Exchange (IKE) tunnel (Phase 1) negotiation. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = IPv4_ADDR
- 2 = FQDN
- 3 = USER_FQDN
- 4 = IPv4_ADDR_SUBNET
- 5 = IPv6_ADDR
- 6 = IPv6_ADDR_SUBNET
- 7 = IPv4_ADDR_RANGE
- 8 = IPv6_ADDR_RANGE
- 9 = DER_ASN1_DN
- 10 = DER_ASN1_GN
- 11 = KEY_ID

This field is not displayed.

NAT Traversal Indicator Indicates if the network address translation (NAT) traversal function is enabled for the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

NAT Traversal Support Level Indicates the type of network address translation (NAT) traversal support being used. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE: No NAT traversal support. Support is either not configured or not negotiated.
- 1 = RFCD2: RFC 3947 draft 2 support.
- 3 = RFCD3: RFC 3947 draft 3 support.
- 4 = RFC: RFC 3947 support with non-z/OS peer.
- 5 = ZOS: RFC 3947 support with z/OS peer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters. This field is not displayed.

Peer Authentication Method Peer authentication method. This value is stored as an integer and displayed as a string. Valid values are:

- 3 = PRESHAREDKEY
- 2 = RSASIGNATURE

Percent Failed Activations The percent of dynamic tunnel activations that have failed for this Internet Key Exchange (IKE) tunnel. The format is a number between 0 and 100 inclusive.

Percent In Progress Dynamic Tunnels The percentage of dynamic tunnels in progress compared to active dynamic tunnels. The format is a number between 0 and 100 inclusive.

Remote IKE UDP Port Remote UDP port used for Internet Key Exchange (IKE) negotiations. This column is stored as a 5-character string.

Remote NAT Indicator Indicates if a NAT has been detected in front of the remote security endpoint. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

Remote NAPT Indicator Indicates if a network address port translation (NAPT) has been detected in front of the remote security endpoint. It is possible that a NAPT may exist but is detected only as a NAT. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = Yes

I **Remote Security Endpoint** The IP address of the remote security endpoint (IKE) responsible for
I negotiating the tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Remote Security Endpoint ID Internet Security Associations Key Management Protocol (ISAKMP) identity of remote security endpoint. This field is a string containing an identifier, as described by remote security endpoint ID type. Some ID strings can be as long as 2048 characters. The ID is always truncated at 100 characters. If no IDs are exchanged, this field is stored as blanks. This field is not displayed.

Remote Security Endpoint ID Type Internet Security Associations Key Management Protocol (ISAKMP) identity type for the remote security endpoint as defined in RFC 2407. If client IDs were not exchanged during negotiation, this column is blank. ISAKMP peers exchange and verify each other's identities as part of the Internet Key Exchange (IKE) tunnel (Phase 1) negotiation. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = IPv4_ADDR
- 2 = FQDN
- 3 = USER_FQDN
- 4 = IPv4_ADDR_SUBNET
- 5 = IPv6_ADDR
- 6 = IPv6_ADDR_SUBNET
- 7 = IPv4_ADDR_RANGE
- 8 = IPv6_ADDR_RANGE
- 9 = DER_ASN1_DN
- 10 = DER_ASN1_GN
- 11 = KEY_ID

This field is not displayed.

Responder Cookie A string of hexadecimal digits that, when combined with the Initiator Cookie, uniquely identifies the SA for the tunnel. This value is stored as a 16-character string. This field is not displayed.

Role Role of the local security endpoint in the activation of the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = INITIATOR
- 2 = RESPONDER

State Current state of the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 3 = INCOMPLETE: Tunnel negotiation is in progress.
- 4 = ACTIVE: Tunnel is active and ready for use.
- 5 = EXPIRED: Tunnel has expired and cannot be used.

Sysplex Name The name of the sysplex that the monitored system is part of. This field is not displayed.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters. This field is not displayed.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters. This field is not displayed.

Total Bytes The cumulative number of bytes protected by this tunnel since the tunnel was activated. The value in this column can be added to the product of 1,073,741,823 and the value in the Total Bytes (in G) column to calculate the total bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Bytes (in G) The cumulative number of bytes protected by this tunnel since the tunnel was activated, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,823 and added to the value in the Total Bytes column to calculate the total bytes for the tunnel. The format is an integer.

Total Failed Local Activations Cumulative count of failed locally initiated dynamic tunnel activations for this Internet Key Exchange (IKE) tunnel. The format is an integer.

Total Failed Remote Activations Cumulative count of failed remotely initiated dynamic tunnel activations for this Internet Key Exchange (IKE) tunnel. The format is an integer.

Total Successful Local Activations Cumulative count of successful locally initiated dynamic tunnel activations for this Internet Key Exchange (IKE) tunnel. The format is an integer.

Total Successful Remote Activations Cumulative count of successful remotely initiated dynamic tunnel activations for this Internet Key Exchange (IKE) tunnel. The format is an integer.

Tunnel ID Tunnel identifier. This identifier is generated by the Internet Key Exchange (IKE) daemon and is not unique. Multiple related tunnels may have the same tunnel ID. This value is a character string of up to 48 characters.

IPSec Status Attributes

Use the IPSec Status attributes to display IP stack security configuration information and IP stack security statistics.

This data is available for monitoring agents running under z/OS version 1.8 or higher.

Active Dynamic SWSA Shadow Tunnels The current number of active dynamic Sysplex-Wide Security Associations shadow tunnels known to the TCP/IP stack. The format is an integer.

Active Dynamic Tunnels The current number of active dynamic tunnels known to the TCP/IP stack. This number does not include Sysplex-Wide Security Associations (SWSA) shadow tunnels or manual tunnels. The format is an integer.

Active IKE Tunnels The number of Internet Key Exchange (IKE) tunnels that are currently active. The format is an integer.

Collection Time The time and date of the data sampling. This time is displayed in the following format:
`mm/dd/yy hh:mm:ss`

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute
- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Dynamic Tunnels in Progress The number of dynamic tunnels in progress. The state of the tunnel is either PENDING or IN NEGOTIATION. The format is an integer where:

- 0 means PENDING
- 1 means IN NEGOTIATION

Expired Dynamic Tunnels The number of dynamic tunnels that are currently expired. This value includes shadow and non-shadow tunnels. The format is an integer.

Expired IKE Tunnels The number of Internet Key Exchange (IKE) tunnels that are currently expired. The format is an integer.

Filter Logging Indicates whether or not filter logging is enabled for the TCP/IP stack. Filter logging was enabled by coding the LOGENABLE parameter of the IPSEC statement in the TCP/IP profile. For more information about the IPSEC statement, refer to the most recent edition of the z/OS Communication Server *IP Configuration Guide* or *IP Configuration Reference*. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = Disabled
- 1 = Enabled

Filter Set In Use Identifies which filter set is currently in use by the TCP/IP stack. One of two filter sets may be in use at any time:

- The default filter set that is made up of filters defined in the TCP/IP profile.
- The policy filter set that is made up of filters defined in Policy Agent configuration files.

This value is stored as an integer and displayed as a string. Valid values are:

- 0 = Default
- 1 = Policy

IKE Bytes Protected The number of bytes protected by Internet Key Exchange (IKE) tunnels in the last interval. The format is an integer.

IKE Inbound Bytes Protected The number of inbound bytes protected by IKE tunnels in the last interval. The format is an integer.

IKE Inbound Protected Byte Rate The number of inbound bytes flowing through Internet Key Exchange (IKE) tunnels every minute. The format is an integer.

IKE Outbound Bytes Protected The number of outbound bytes protected by Internet Key Exchange (IKE) tunnels in the last interval. The format is an integer.

IKE Outbound Protected Byte Rate The number of outbound bytes flowing through Internet Key Exchange (IKE) tunnels every minute. The format is an integer.

IKE Protected Byte Rate The number of bytes flowing through Internet Key Exchange (IKE) tunnels every minute. The format is an integer.

IKE Total Bytes Protected The cumulative number of inbound and outbound bytes of Internet Key Exchange (IKE) traffic protected by IKE tunnels since the IKE daemon was started. The value in this column can be added to the product of 1,073,741,824 and the value in the IKE Total Bytes Protected (in G) column to calculate the cumulative total bytes of IKE traffic protected by IKE tunnels. The format is an integer.

IKE Total Bytes Protected (in G) The cumulative number of inbound and outbound bytes of Internet Key Exchange (IKE) traffic protected by IKE tunnels since the IKE daemon was started, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the IKE Total Bytes Protected column to calculate the cumulative total bytes of IKE traffic protected by IKE tunnels. The format is an integer.

IKE Total Inbound Bytes Protected The cumulative number of inbound bytes of IKE traffic protected by IKE tunnels since the IKE daemon was started. The value in this column can be added to the product of 1,073,741,824 and the value in the IKE Inbound Bytes Protected (in G) column to calculate the cumulative number of IKE Inbound Bytes Protected. The format is an integer.

IKE Total Inbound Bytes Protected (in G) The cumulative number of inbound bytes of IKE traffic protected by dynamic tunnels since the start of the IKE daemon, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the IKE Inbound Bytes Protected column to calculate the cumulative number of IKE inbound bytes protected. The format is an integer.

IKE Total Invalid Key Messages Cumulative number of invalid key exchange (phase 1) messages received since the Internet Key Exchange (IKE) daemon was started. This does not include message authentication failures. The format is an integer.

IKE Total Key Message Authentication Failures The cumulative number of key exchange (phase 1) message authentication failures since the Internet Key Exchange (IKE) daemon was started. The format is an integer.

IKE Total Outbound Bytes Protected The cumulative number of outbound bytes of IKE traffic protected by IKE tunnels since the IKE daemon was started. The value in this column can be added to the product of 1,073,741,824 and the value in the IKE Outbound Bytes Protected (in G) column to calculate the cumulative number of IKE Outbound Bytes Protected. The format is an integer.

IKE Total Outbound Bytes Protected (in G) The cumulative number of outbound bytes of IKE traffic protected by dynamic tunnels since the start of the IKE daemon, divided by 1,073,741,824. The value in

this column can be multiplied by 1,073,741,824 and added to the value in the IKE Outbound Bytes Protected column to calculate the cumulative number of IKE outbound bytes protected. The format is an integer.

IKE Total Replayed Key Messages The cumulative number of replayed key exchange (phase 1) messages received since the Internet Key Exchange (IKE) daemon was started. The format is an integer.

IKE Total Retransmitted Key Messages The cumulative number of retransmitted key exchange (phase 1) messages that were sent since the Internet Key Exchange (IKE) daemon was started. The format is an integer.

IKE Tunnels in Progress The number of Internet Key Exchange (IKE) tunnels currently in progress. The format is an integer where:

- 0 means PENDING
- 1 means IN NEGOTIATION

IP Bytes Protected The number of bytes of IP traffic protected by dynamic IP tunnels in the last interval. The format is an integer.

IP Inbound Bytes Protected The number of inbound bytes protected by IP tunnels in the last interval. The format is an integer.

IP Inbound Protected Byte Rate The number of inbound bytes flowing through IP tunnels every minute. The format is an integer.

IP Outbound Bytes Protected The number of outbound bytes protected by IP tunnels in the last interval. The format is an integer.

IP Outbound Protected Byte Rate The number of outbound bytes flowing through IP tunnels every minute. The format is an integer.

IP Protected Byte Rate The number of bytes of IP traffic flowing through dynamic IP tunnels every minute. The format is an integer.

IP Security Indicates whether or not IP security functions are enabled for IPv4 interfaces. IP security was enabled by coding IPCONFIG IPSECURITY in the TCP/IP profile. For more information about the IPSEC statement, refer to the most recent edition of the z/OS Communication Server *IP Configuration Guide* or *IP Configuration Reference*. This value is stored as an integer and displayed as a string. Valid values are:

- 0=Disabled
- 1=Enabled

IP Total Bytes Protected The cumulative number of inbound and outbound bytes of IP traffic protected by dynamic tunnels since the TCP/IP stack was started. The value in this column can be added to the product of 1,073,741,824 and the value in the IP Total Bytes Protected (in G) column to calculate the cumulative total bytes of IP traffic protected by dynamic tunnels. The format is an integer.

IP Total Bytes Protected (in G) The cumulative number of inbound and outbound bytes of IP traffic protected by dynamic tunnels since the TCP/IP stack was started, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the IP Total Bytes Protected column to calculate the cumulative total bytes of IP traffic protected by dynamic tunnels. The format is an integer.

IP Total Inbound Bytes Protected The cumulative number of inbound bytes of IP traffic protected by dynamic tunnels since the start of the TCP/IP stack. The value in this column can be added to the product

of 1,073,741,823 and the value in the IP Inbound Bytes Protected (in G) column to calculate the cumulative number of IP Inbound Bytes Protected. The format is an integer.

IP Total Inbound Bytes Protected (in G) The cumulative number of inbound bytes of IP traffic protected by dynamic tunnels since the start of the TCP/IP stack, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,823 and added to the value in the IP Inbound Bytes Protected column to calculate the cumulative number of IP inbound bytes protected. The format is an integer.

IP Total Outbound Bytes Protected The cumulative number of outbound bytes of IP traffic protected by dynamic tunnels since the start of the TCP/IP stack. The value in this column can be added to the product of 1,073,741,823 and the value in the IP Outbound Bytes Protected (in G) column to calculate the cumulative number of IP Outbound Bytes Protected. The format is an integer.

IP Total Outbound Bytes Protected (in G) The cumulative number of outbound bytes of IP traffic protected by dynamic tunnels since the start of the TCP/IP stack, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,823 and added to the value in the IP Outbound Bytes Protected column to calculate the cumulative number of IP outbound bytes protected. The format is an integer.

IPv6 Security Indicates whether or not IP security functions are enabled for IPv6 interfaces. IPv6 security was enabled by coding IPCONFIG IPSECURITY and IPCONFIG6 IPSECURITY in the TCP/IP profile. For more information about the IPSEC statement, refer to the most recent edition of the z/OS Communication Server *IP Configuration Guide* or *IP Configuration Reference*. This value is stored as an integer and displayed as a string. Valid values are:

- 0=Disabled
- 1=Enabled

NAT Keep Alive Interval The NAT keep-alive interval, in seconds. The interval is used to regulate the sending of NAT keep-alive messages for a NAT traversal tunnel when a NAT is detected in front of the local host. The format is an integer expressed in seconds.

Number of Configured Filters The number of configured IP Filters for this stack. The format is an integer.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters. This field is not displayed.

Packets Denied by DENY The number of packets denied by a DENY action on any filter during the most recent collection interval. The format is an integer.

Packets Denied by Mismatch The number of packets denied by a mismatched action on any filter during the most recent interval. The format is an integer.

Packets Filtered The number of packets filtered by the filter rule set during the most recent collection interval. The format is an integer.

Packets Matched The number of packets that matched the condition and action for any filter during the most recent interval. The format is an integer.

Packets Permitted The number of packets permitted by any filter during the most recent interval. The format is an integer.

Percent Packets Denied by DENY The percentage of packets denied by a DENY action on any filter during the most recent interval. The format is a number between 0 and 100 inclusive.

Percent Packets Denied by Mismatch The percentage of packets denied by a mismatched action on any filter during the most recent interval. The format is a number between 0 and 100 inclusive.

Percent Packets Permitted The percentage of packets permitted by any filter during the most recent interval. The format is a number between 0 and 100 inclusive.

Percent Total Packets Denied by DENY The percentage of total packets denied by a DENY action on any filter since the TCP/IP stack was started. The format is a number between 0 and 100 inclusive.

Percent Total Packets Denied by Mismatch The percentage of total packets denied due to a mismatch with any filter action since the stack was started. The format is a number between 0 and 100 inclusive.

Percent Total Packets Permitted The percentage of total packets that were permitted by any filter since the TCP/IP stack was started. The format is a number between 0 and 100 inclusive.

Pre-Decapsulation Filtering Indicates whether or not pre-decapsulation filtering is enabled. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = Disabled
- 1 = Enabled

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters. This field is not displayed.

Sysplex Name The name of the sysplex that the monitored system is part of. This field is not displayed.

Sysplex-Wide Security Associations (SWSA) Indicates whether or not sysplex-wide security associations (SWSA) are enabled. SWSA was enabled by coding the DVIPSEC parameter on the IPSEC statement in the TCP/IP profile. For more information about the IPSEC statement, refer to the most recent edition of the z/OS Communication Server *IP Configuration Guide* or *IP Configuration Reference*. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = Disabled
- 1 = Enabled

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters.

Total Active Dynamic Tunnels The total number of currently active dynamic tunnels. This includes active dynamic System-Wide Security Association (SWSA) shadow tunnels and dynamic IP tunnels. The format is an integer.

Total Failed Dynamic Tunnel Activations The cumulative number of failed dynamic tunnel activations since the TCP/IP stack was started. The format is an integer.

Total Failed IKE Tunnel Activations The cumulative number of failed Internet Key Exchange (IKE) tunnel activations that were initiated locally or remotely since the IKE daemon was started. The format is an integer.

Total Failed Local IKE Tunnel Activations The cumulative number of failed Internet Key Exchange (IKE) tunnel activations that were initiated locally since the IKE daemon was started. The format is an integer.

Total Failed Remote IKE Tunnel Activations The cumulative number of failed remote Internet Key Exchange (IKE) tunnel activations since the IKE daemon was started. The format is an integer.

Total Invalid QUICKMODE Messages The cumulative number of invalid QUICKMODE (phase 2) messages received since the Internet Key Exchange (IKE) daemon was started. The format is an integer.

Total Packets Denied by DENY The total number of packets denied by a DENY action on any filter since the TCP/IP stack was started. If the value in the Total Packets Denied By DENY (in G) column is not 0, then the value in this column can be added to the product of 1,073,741,824 and the value in the Total Packets Denied by DENY (in G) column to calculate the packets denied by DENY for any filter. The format is an integer.

Total Packets Denied by DENY (in G) The total number of packets denied by a DENY action on any filter since the TCP/IP stack was started, divided by 1,073,741,824. If the value in this column is not 0, then it can be multiplied by 1,073,741,824 and added to the value in the Total Packets Denied by DENY column to calculate the packets denied by DENY for any filter. The format is an integer.

Total Packets Denied by Mismatch The total number of packets denied due to a mismatch with any filter action since the TCP/IP stack was started. If the value in the Total Packets Denied By Action Mismatch (in G) column is not 0, then the value in this column can be added to the product of 1,073,741,824 and the value in the Packets Denied by Action Mismatch (in G) column to calculate the packets permitted. The format is an integer.

Total Packets Denied by Mismatch (in G) The total number of packets denied due to a mismatch with any filter action since the TCP/IP stack was started, divided by 1,073,741,824. If the value in this column is not 0, then it can be multiplied by 1,073,741,824 and added to the value in the Total Packets Denied by Action Mismatch column to calculate the packets denied by an action mismatch. The format is an integer.

Total Packets Filtered The total number of packets processed by the filter rule set since the TCP/IP stack was started. If the value in the Total Packets Filtered (in G) column is not 0, then the value in this column can be added to the product of 1,073,741,824 and the value in the Total Packets Filtered (in G) column to calculate the total packets processed. The format is an integer.

Total Packets Filtered (in G) The total number of packets processed by the filter rule set since the TCP/IP stack was started, divided by 1,073,741,824. If the value in this column is not 0, then it can be multiplied by 1,073,741,824 and added to the value in the Total Packets Filtered column to calculate the total packets processed. The format is an integer.

Total Packets Matched The total number of packets that matched both the condition and action for any filter since the TCP/IP stack was started. If the value in the Total Packets Matched (in G) column is not 0, then the value in this column can be added to the product of 1,073,741,824 and the value in Total Packets Matched (in G) column to calculate the total packets matched. The format is an integer.

Total Packets Matched (in G) The total number of packets that matched both the condition and action for any filter since the TCP/IP stack was started, divided by 1,073,741,824. If the value in this column is not 0, then it can be multiplied by 1,073,741,824 and added to the value in the Total Packets Matched column to calculate the total packets matched. The format is an integer.

Total Packets Permitted The total number of packets that were permitted by any filter since the TCP/IP stack was started. If the value in the Total Packets Permitted (in G) column is not 0, then the value in this column can be added to the product of 1,073,741,824 and the value in Total Packets Permitted (in G) column to calculate the packets permitted. The format is an integer.

Total Packets Permitted (in G) The total number of packets that were permitted by any filter, divided by 1,073,741,824. If the value in this column is not 0, then it can be multiplied by 1,073,741,824 and added to the value in the Total Packets Permitted column to calculate the packets permitted. The format is an integer.

Total Replayed QUICKMODE Messages The cumulative number of replayed QUICKMODE (phase 2) messages received since the Internet Key Exchange (IKE) daemon was started. The format is an integer.

Total Retransmitted QUICKMODE Messages The cumulative number of retransmitted QUICKMODE (phase 2) messages sent since the Internet Key Exchange (IKE) daemon was started. The format is an integer.

Total Successful Dynamic Tunnel Activations The cumulative number of successful dynamic tunnel activations since the TCP/IP stack was started. The format is an integer.

Total Successful IKE Tunnel Activations The cumulative number of successful Internet Key Exchange (IKE) tunnel activations that were initiated locally or remotely since the IKE daemon was started. The format is an integer.

Total Successful Local IKE Tunnel Activations The cumulative number of successful locally initiated Internet Key Exchange (IKE) tunnel activations since the IKE daemon was started. The format is an integer.

Total Successful Remote IKE Tunnel Activations The cumulative number of successful Internet Key Exchange (IKE) tunnel activations that were initiated locally or remotely since the IKE daemon was started. The format is an integer.

Manual IP Tunnels attributes

Use the Manual IP Tunnels attributes to display information about manually defined IP tunnels known to the TCP/IP stack.

This data is available for monitoring agents running under z/OS version 1.8 or higher.

Authentication Algorithm Identifies the authentication algorithm used for this tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 38 = MD5
- 39 = SHA1

Authentication Protocol Identifies the authentication protocol to be used by the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 51 = AH
- 50 = ESP

Byte Rate The number of inbound or outbound bytes, per minute, for this tunnel during the most recent collection interval. The format is an integer.

Bytes The number of inbound and outbound bytes for this tunnel during the most recent collection interval. The format is an integer.

Collection Time The time and date of the data sampling. This time is displayed in the following format:

```
mm/dd/yy hh:mm:ss
```

Where:

- mm = Month
- dd = Day of the month
- yy = Year
- hh = Hour
- mm = Minute

- ss = Seconds

The stored format is a string no longer than 16 characters in the format `CYYMMDDHHMMSSmmm` (as in 1020315064501000 for 03/15/02 06:45:01) where:

- C = Century (0 for 20th, 1 for 21st)
- Y = Year
- M = Month
- D = Day
- H = Hour
- M = Minute
- S = Second
- m = Millisecond

Encapsulation Mode Tunnel encapsulation mode to be used by the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = <blank>
- 1 = TUNNEL
- 2 = TRANSPORT

Encryption Algorithm Encryption algorithm to be used by the tunnel. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = NONE
- 3 = 3DES
- 11 = NULL
- 12 = AES
- 18 = DES
- 99 = <blank>

Inbound Authentication SPI Tunnel inbound authentication security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This is an unsigned 4-byte integer and displayed in hexadecimal. This value is not displayed.

Inbound Bytes The number of inbound bytes for this tunnel during the most recent collection interval. The format is an integer.

Inbound Encryption SPI Tunnel inbound encryption security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This is an unsigned 4-byte integer and displayed in hexadecimal. This value is not displayed.

Inbound Packets The number of inbound packets for this tunnel during the most recent collection interval. The format is an integer.

IP Address Version The version of the IP addresses being used for the security endpoints. This value is stored as an integer and displayed as a string. Valid values are:

- 0 = IPv4: The traffic descriptor and the security endpoints are using IPv4 addresses.
- 1 = IPv6: The traffic descriptor and the security endpoints are using IPv6 addresses.

This value is not displayed.

I **Local Security Endpoint** The IP address of the local security endpoint responsible for negotiating the
I tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

Origin Node The unique identifier for the TCP/IP stack being displayed. The format is an alphanumeric string no longer than 32 characters. This field is not displayed.

Outbound Authentication SPI Tunnel outbound authentication security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This field is an unsigned 4-byte integer and displayed in hexadecimal. This value is not displayed.

Outbound Bytes The number of outbound bytes for this tunnel during the most recent collection interval. The format is an integer.

Outbound Encryption SPI Tunnel outbound encryption security parameter index (SPI). This SPI, combined with the other three SPIs, uniquely identifies a tunnel. This field is an unsigned 4-byte integer and displayed in hexadecimal. This value is not displayed.

Outbound Packets The number of outbound packets for this tunnel during the most recent time interval. The format is an integer.

Packet Rate The number of inbound or outbound packets, per minute, for this tunnel during the most recent collection interval. The format is an integer.

Packets The number of inbound and outbound packets for this tunnel during the most recent collection interval. The format is an integer.

I **Remote Security Endpoint** The IP address of the remote security endpoint responsible for negotiating the
I tunnel. The format is a UTF-8 encoded character string of up to 45 characters.

State Current tunnel state. This value is stored as an integer and displayed as a string. Valid values are:

- 1 = INACTIVE
- 4 = ACTIVE

Sysplex Name The name of the sysplex that the monitored system is part of. This field is not displayed. This field is not displayed.

System ID The SMF system ID. The format is an alphanumeric string no longer than 4 characters. This field is not displayed.

TCPIP STC Name The name of the TCP/IP job. The format is an alphanumeric string no longer than 8 characters. This field is not displayed.

Total Bytes The total number of inbound and outbound bytes for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Bytes (in G) column to calculate the total bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer.

Total Bytes (in G) The total number of inbound and outbound bytes for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Bytes column to calculate the total bytes for the tunnel. For SWSA tunnels, the value is for bytes that have traversed the tunnel since it was assigned to this stack only. The format is an integer. The format is an integer.

Total Inbound Bytes The total number of inbound bytes for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Inbound Bytes (in G) column to calculate the total inbound bytes for the tunnel. The format is an integer.

Total Inbound Bytes (in G) The total number of inbound bytes for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Inbound Bytes column to calculate the total inbound bytes for the tunnel. The format is an integer.

Total Inbound Packets The total number of inbound packets for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Inbound Packets (in G) column to calculate the total inbound packets for the tunnel. The format is an integer.

Total Inbound Packets (in G) The total number of inbound packets for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Inbound Packets column to calculate the total inbound packets for the tunnel. The format is an integer.

Total Outbound Bytes The total number of outbound bytes for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Outbound Bytes (in G) column to calculate the total outbound bytes for the tunnel. The format is an integer.

Total Outbound Bytes (in G) The total number of outbound bytes for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Outbound Bytes column to calculate the total outbound bytes for the tunnel. The format is an integer.

Total Outbound Packets The total number of outbound packets for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Outbound Packets (in G) column to calculate the total outbound packets for the tunnel. The format is an integer.

Total Outbound Packets (in G) The total number of outbound packets for this tunnel since the tunnel was established, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,823 and added to the value in the Total Outbound Packets column to calculate the total outbound packets for the tunnel. The format is an integer.

Total Packets The total number of inbound and outbound packets for this tunnel since the tunnel was installed. The value in this column can be added to the product of 1,073,741,824 and the value in the Total Packets (in G) column to calculate the total packets for the tunnel. The format is an integer.

Total Packets (in G) The total number of inbound and outbound packets for this tunnel since the tunnel was installed, divided by 1,073,741,824. The value in this column can be multiplied by 1,073,741,824 and added to the value in the Total Packets column to calculate the total packets for the tunnel. The format is an integer.

Tunnel ID Tunnel identifier. This identifier is generated by TCP/IP and is not unique. Multiple related tunnels may have the same tunnel ID. The format is an alphanumeric string of up to 48 characters.

VPN Action Name The virtual private network (VPN) Action Name is the name associated with the definition of a security association. The security association describes the attributes of the tunnel. An example is the encryption algorithm to be used. The name is a character string of up to 48 characters.

Updated attribute groups

The following attributes groups were updated in this fix pack.

Interfaces Attributes (KN3TIF)

In APAR OA21641, a user discovered that the Physical Address attribute in the Interfaces and Interfaces History workspaces was not returning the intended data. In Fix Pack 1, this problem has been corrected. The old Physical Address attribute definition has been deprecated, and a new definition has been added.

Old Value:

Physical Address
(deprecated) The address of the interface at the protocol sub-layer. The format is a string up to four characters in length.

New Value:

Physical Address
The address of the interface at the protocol sub-layer or blank. The format is a string up to 12 characters in length. This field will be blank when the interface is not active or is not one of the following types:

- ATM
- HYPERchannel
- LCS Ethernet
- MPCIPA OSA Express QDIO

Connections Attributes (KN3TCN)

The Connections attributes were updated as shown below.

Application Name and Port The Application Name and Local Port are combined in this attribute, separated by a colon. The format is a string up to 15 characters in length.

DVIPA Identifies when the Local IP Address is a Dynamic Virtual IP Addressing (DVIPA) address. This value is stored as an integer and displayed as a string. The following are valid values:

- 0 = [blank] - Not available.
- 1 = Yes
- 2 = No

Note: This information is available only on z/OS version 1.9 or higher.

Local IP Address The local IP address for this connection. For UDP endpoints, a value of 0.0.0.0 (or ::) in this field indicates that the UDP endpoint is accepting datagrams from any local IP address. For TCP listeners, this IP address is 0.0.0.0 (or ::) when the application is accepting connections to any local IP address. The format is a string up to 45 characters in length.

TCP/IP Details Attributes (KN3TCP)

The TCPIP Details attributes were updated as shown below.

Application Name and Port The Application Name and Local Port are combined in this attribute, separated by a colon. The format is a string up to 15 characters in length.

DVIPA Identifies when the Local IP Address is a Dynamic Virtual IP Addressing (DVIPA) address. This value is stored as an integer and displayed as a string. The following are valid values:

- 0 = [blank] - Not available.
- 1 = Yes
- 2 = No

Note: This information is available only on z/OS version 1.9 or higher.

Local IP Address The local IP address for this connection. The format is a string up to 45 characters in length.

TCPIP Gateways Attributes (KN3TGA)

The TCPIP Gateways attributes were updated as shown below.

First Hop The first router in the path to the remote network. The format is an alphanumeric string no longer than 45 characters. This special value may be displayed as follows:

<direct> – First Hop is a host IP address.

Network Address The network address of this gateway. The format is an alphanumeric string no longer than 45 characters. Special values may be displayed as follows:

- *Defaultnet* – The Network Address is a host IP address.
- *Default* – The Network Address is 0.

Link-local IPv6 addresses are displayed in the following format:

FE80::<interface ID>%<interface name>

Subnet Mask The 32-bit (for IPv4 addresses) or 128-bit (for IPv6 addresses) mask for the subnetwork address in the IP address host portion. The format is an alphanumeric string no longer than 45 characters.

The following special values are displayed:

- <none> - Subnet Mask contains zeros
- HOST – Subnet Mask is a host IP address

Subnet Value The subnet identifier. A subnet composes a group of nodes within the same network ID. The format is an alphanumeric string no longer than 45 characters.

Chapter 6. New and updated workspaces

This chapter describes the new and updated workspaces in Fix Packs 1 and 2. This chapter includes the following:

New and updated in Fix Pack 2

The following workspaces have been added or updated in Fix Pack 2:

Table 21. New and updated workspaces in Fix Pack 2

Workspace name	Attribute group	New or updated?
"New OSA-Express2 10 Gigabit Ports Summary workspace"	KN3TTS	New
"New OSA-Express2 10 Gigabit Port Control workspace" on page 116	KN3TTC	New
"New OSA-Express2 10 Gigabit Port Errors workspace" on page 118	KN3TTE	New
"New OSA-Express2 10 Gigabit Port Throughput Detail workspace" on page 120	KN3TTT	New
"New OSA-Express3 Ports Summary workspace" on page 123	KN3THS	New
"New OSA-Express3 Port Control workspace" on page 126	KN3THC	New
"New OSA-Express3 Port Errors workspace" on page 128	KN3THE	New
"New OSA-Express3 Port Throughput Detail workspace" on page 131	KN3THT	New
"Updated OSA Channels workspace" on page 134	KN3TCH	Updated
"Updated OSA LPARs workspace" on page 135	KN3TLP	Updated
"Updated OSA Ports workspace" on page 135	KN3TPO	Updated
"Updated EE Connections workspace" on page 137	KN3EED	Updated
"Updated EE Connection Details workspace" on page 139	KN3EEC	Updated

New and updated TCP/IP workspaces

The following TCP/IP workspaces are new and updated in Fix Pack 2.

New OSA-Express2 10 Gigabit Ports Summary workspace

The OSA-Express2 10 Gigabit Ports Summary workspace displays performance data for the OSA-Express2 10 Gigabit Ethernet adapters.

To display the OSA-Express2 10 Gigabit Ports Summary workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is tenGigabitEthernet, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express2 10 Gigabit Ports** to display the **OSA-Express2 10 Gigabit Ports Summary** workspace.

Links to Other Workspaces:

Right-click on the **Link** icon by a row in the Port Summary for Channel *xyz* summary table in this workspace to display the following additional workspaces:

- **OSA-Express2 10 Gigabit Port Throughput Detail workspace** (default): Displays performance data for the OSA-Express2 10 Gigabit Ethernet adapters.
- **OSA-Express2 10 Gigabit Port Control workspace**: Displays control data for the OSA-Express2 10 Gigabit Ethernet adapters.
- **OSA-Express2 10 Gigabit Port Errors workspace**: Displays error data for the OSA-Express2 10 gigabit Ethernet adapters.

Data Source:

IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:

Channel Number attribute

Figure 4 shows the OSA-Express2 10 Gigabit Ports Summary workspace

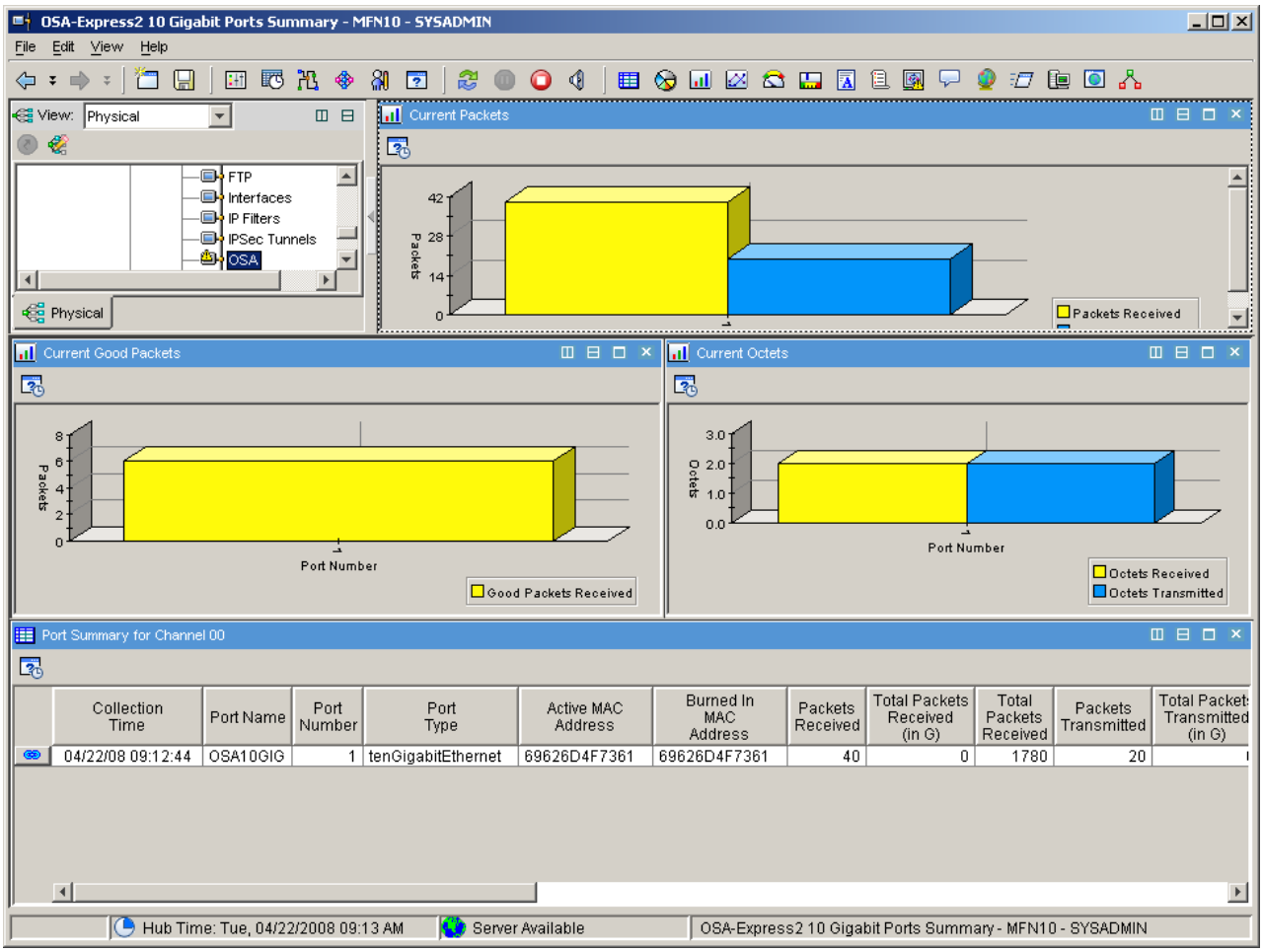


Figure 4. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express2 10 Gigabit Ports Summary workspace

The OSA-Express2 10 Gigabit Ports Summary workspace contains the following views:

- **Current Packets**: Displays the number of packets received or packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of packets received over the current collection period.
  - Blue represents the number of packets transmitted over the current collection period.

  This data applies to a channel selected from the OSA Channels workspace.

- **Current Good Packets**: Displays the number of good (without error) packets with a length of >= 64 bytes and <= 1518 bytes received by the specified port over the current collection interval. This data applies to a channel selected from the OSA Channels workspace.
- **Current Octets**: Displays the number of octets received or octets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of octets received over the current collection period.
  - Blue represents the number of octets transmitted over the current collection period.

  This data applies to a channel selected from the OSA Channels workspace.
- **Port Summary for Channel** *xyz* **summary table**: Provides summary data for the selected OSA-Express2 10 Gigabit port summary data, where *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Summary for Channel *xyz* summary table."

Port Summary for Channel** xyz **summary table: The following attributes are displayed in the Port Summary for Channel *xyz* summary table:

- Collection Time
- Port Name
- Port Number
- Port Type
- Active MAC Address
- Burned In MAC Address
- Packets Received
- Total Packets Received (in G)
- Total Packets Received
- Packets Transmitted
- Total Packets Transmitted (in G)
- Total Packets Transmitted
- Packets Received or Transmitted
- Packet Rate
- Total Packets (in G)
- Total Packets
- Good Packets Received
- Total Good Packets Received (in G)
- Total Good Packets Received
- Octets Received
- Total Octets Received (in G)
- Total Octets Received
- Octets Transmitted
- Total Octets Transmitted (in G)
- Total Octets Transmitted
- Octets Received or Transmitted
- Octet Rate
- Total Octets (in G)
- Total Octets
- LAN Traffic State
- Service Mode
- Disabled Status

- Active Speed Mode

For more information about these attributes, refer to the “OSA 10Gigabit Ports Summary Attributes” on page 40.

New OSA-Express2 10 Gigabit Port Control workspace: The OSA-Express2 10 Gigabit Port Control workspace displays control data for the OSA-Express2 10 Gigabit Ethernet adapters. The OSA-Express2 10 Gigabit Port Control workspace is accessed only as a drill down from the OSA-Express2 10 Gigabit Ports Summary workspace using Channel Number and Port Number as link attributes.

Transmitter ON (XON), transmitter OFF (XOFF), and Pause MAC packets are flow control packets between the OSA and the switch to which it is connected. They are used to provide flow control between the two ports. These attributes are of particular interest when the port is at 100% utilization.

To display the OSA-Express2 10 Gigabit Port Control workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is tenGigabitEthernet, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express2 10 Gigabit Ports** to display the OSA-Express2 10 Gigabit Ports Summary workspace.
4. Click the **Link** icon by one of the rows of the Port Summary for Channel *xyz* summary table.
5. Select **OSA-Express2 10 Gigabit Port Control.**

Links To Other Workspaces:
None.

Data Source:
IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:
Channel Number and Port Number attributes

Figure 5 on page 117 shows the OSA-Express2 10 Gigabit Port Control workspace

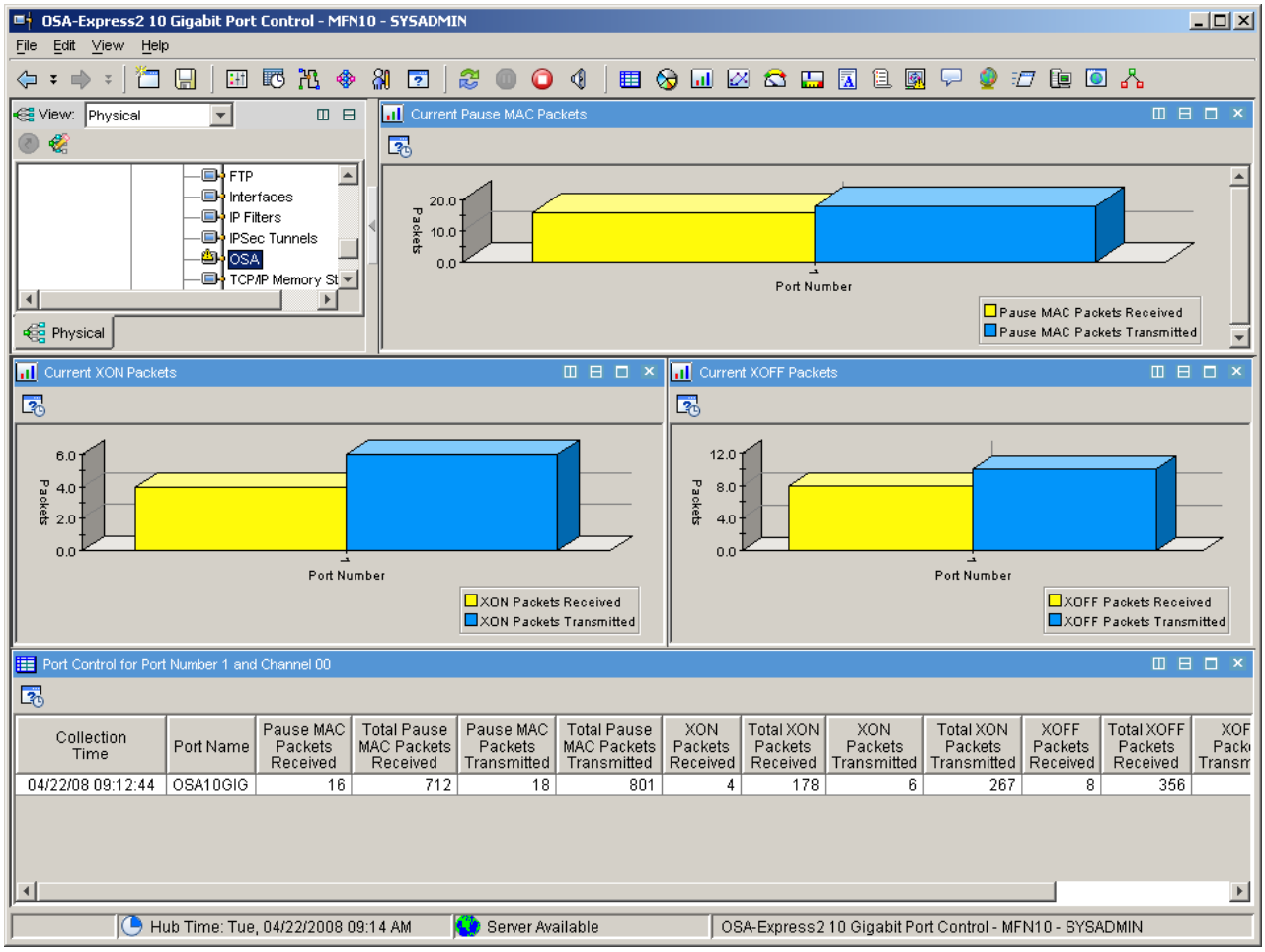


Figure 5. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express2 10 Gigabit Port Control workspace

The OSA-Express2 10 Gigabit Port Control workspace contains the following views:

- **Current Pause MAC Packets**: This bar chart displays the number of pause MAC packets received or the pause MAC packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of pause MAC packets received over the current collection period.
  - Blue represents the number of pause MAC packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current XOFF Packets**: Displays the number of Transmitter OFF (XOFF) packets received or the XOFF packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of XOFF packets received over the current collection period.
  - Blue represents the number of XOFF packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current XON Packets**: Displays the number of Transmitter ON (XON) packets received or the XON packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of XON packets received over the current collection period.
  - Blue represents the number of XON packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.

- **Port Control for Port Number** *abc* **and Channel** *xyz* **summary table**: Provides the OSA-Express2 10 Gigabit control data for the specific port and channel, where *abc* is the selected port number link attribute and *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Control for Port Number *abc* and Channel *xyz* summary table."

Port Control for Port Number abc and Channel xyz summary table: The following attributes are displayed in the Port Control for Port Number *abc* and Channel *xyz* summary table:

- Collection Time
- Port Name
- Pause MAC Packets Received
- Total Pause MAC Packets Received
- Pause MAC Packets Transmitted
- Total Pause MAC Packets Transmitted
- XON Packets Received
- Total XON Packets Received
- XON Packets Transmitted
- Total XON Packets Transmitted
- XOFF Packets Received
- Total XOFF Packets Received
- XOFF Packets Transmitted
- Total XOFF Packets Transmitted
- Trap Control Flags

For more information about these attributes, refer to the "OSA 10Gigabit Ports Control Attributes" on page 35.

New OSA-Express2 10 Gigabit Port Errors workspace: The OSA-Express2 10 Gigabit Port Errors workspace displays error data for the OSA-Express2 10 gigabit Ethernet adapters. The OSA-Express2 10 Gigabit Port Errors workspace is accessed only as a drill down from the OSA-Express2 10 Gigabit Ports Summary workspace using Channel Number and Port Number as link attributes.

To display the OSA-Express2 10 Gigabit Port Errors workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is tenGigabitEthernet, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express2 10 Gigabit Ports** to display the OSA-Express2 10 Gigabit Ports Summary workspace.
4. Click the **Link** icon by one of the rows of the Port Summary for Channel *xyz* summary table.
5. Select **OSA-Express2 10 Gigabit Port Errors**.

Links To Other Workspaces:
None.

Data Source:
IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:
Port Number attribute

Figure 6 on page 119 shows the OSA-Express2 10 Gigabit Port Errors workspace

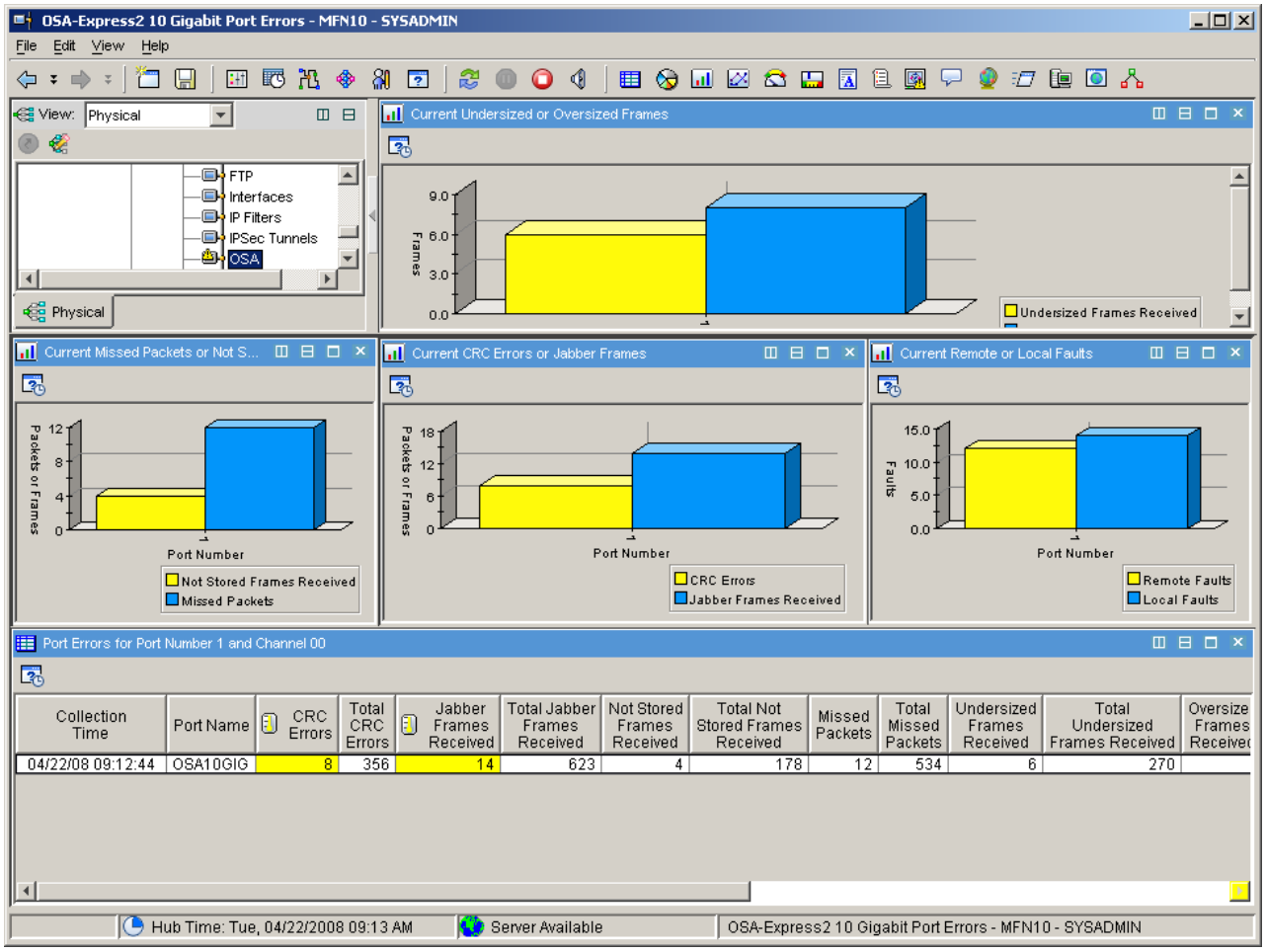


Figure 6. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express2 10 Gigabit Port Errors

The OSA-Express2 10 Gigabit Port Errors workspace contains the following views:

- **Current CRC Errors or Jabber Frames**: Displays the number of cyclic redundancy check (CRC) errors on packets received on the LAN or the number of jabber frames received by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of packets with CRC errors received over the current collection period.
  - Blue represents the number of jabber frames received over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current Missed Packets or Not Stored Frames**: Displays the number of missed packets received or the number of frames received when there were no available descriptor buffers available to store frames by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of not stored frames received over the current collection period.
  - Blue represents the number of missed packets received over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current Undersized or Oversized Frames**: Displays the number of undersized frames received or oversized frames received by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of undersized frames received over the current collection period.
  - Blue represents the number of oversize frames received over the current collection period.

This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.

- **Current Remote or Local Faults**. This bar chart displays the number of remote faults detected or local faults detected by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of remote faults detected over the current collection period.
  - Blue represents the number of local faults detected over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Port Errors for Port Number** *abc* **and Channel** *xyz* **summary table**: Provides OSA-Express2 10 Gigabit error data for the specified port and channel, where *abc* is the selected port number link attribute and *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Errors for Port Number *abc* and Channel *xyz* summary table."

Port Errors for Port Number abc and Channel xyz summary table: The following attributes are displayed in the Port Errors for Port Number *abc* and Channel *xyz* summary table:

- Collection Time
- Port Name
- CRC Errors
- Total CRC Errors
- Jabber Frames Received
- Total Jabber Frames Received
- Not Stored Frames Received
- Total Not Stored Frames Received
- Missed Packets
- Total Missed Packets
- Undersized Frames Received
- Total Undersized Frames Received
- Oversized Frames Received
- Total Oversized Frames Received
- Length Error Packets Received
- Total Length Error Packets Received
- Deferred Events
- Total Deferred Events
- Remote Faults
- Total Remote Faults
- Local Faults
- Total Local Faults

For more information about these attributes, refer to the "OSA 10Gigabit Ports Errors Attributes" on page 37.

New OSA-Express2 10 Gigabit Port Throughput Detail workspace: The OSA-Express2 10 Gigabit Port Throughput Detail workspace displays performance data for the OSA-Express2 10 Gigabit Ethernet adapters. The OSA-Express2 10 Gigabit Port Throughput Detail workspace is accessed only as a drill down from the OSA-Express2 10 Gigabit Ports Summary workspace using Channel Number and Port Number as link attributes.

To display the OSA-Express2 10 Gigabit Port Throughput Detail workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.

2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is tenGigabitEthernet, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express2 10 Gigabit Ports** to display the OSA-Express2 10 Gigabit Ports Summary workspace.
4. Click the **Link** icon by one of the rows of the Port Summary for Channel *xyz* summary table.
5. Select **OSA-Express2 10 Gigabit Port Throughput Detail.**

Additional Workspaces:
None.

Links To Other Workspaces:
None.

Data Source:
IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:
Channel Number and Port Number attributes

Figure 7 shows the OSA-Express2 10 Gigabit Port Throughput Detail workspace

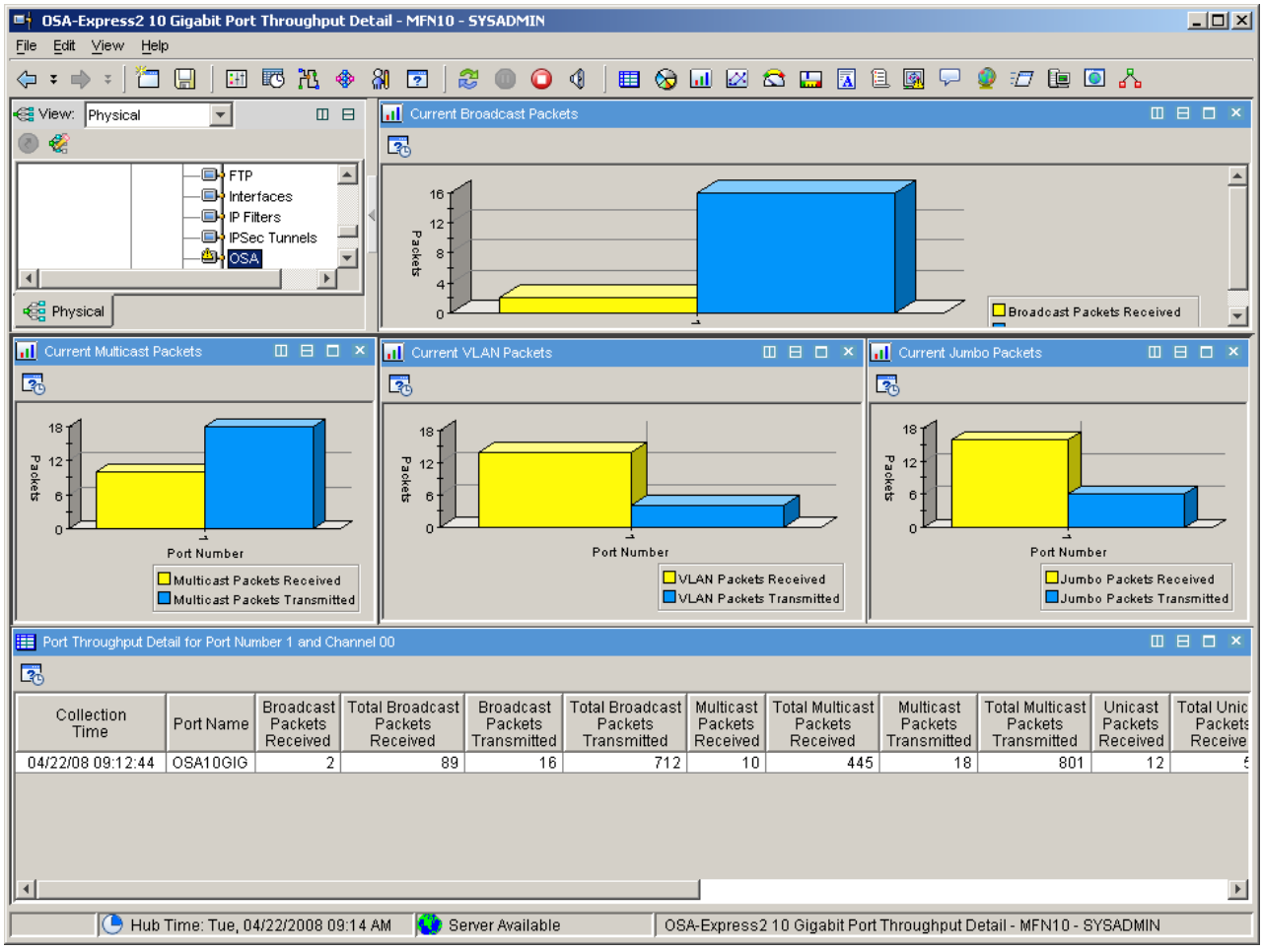


Figure 7. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express2 10 Gigabit Port Throughput Detail workspace

The OSA-Express2 10 Gigabit Port Throughput Detail workspace contains the following views:

- **Current Broadcast Packets**: Displays the number of broadcast packets received or broadcast packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of broadcast packets received over the current collection period.
  - Blue represents the number of broadcast packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current Multicast Packets**: Displays the number of multicast packets received or multicast packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of multicast packets received over the current collection period.
  - Blue represents the number of multicast packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current VLAN Packets**: Displays the number of virtual LAN (VLAN) packets received or VLAN packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of VLAN packets received over the current collection period.
  - Blue represents the number of VLAN packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Current Jumbo Packets**: Displays the number of jumbo packets received or jumbo packets transmitted by the specified port over the current collection interval. A packet is considered Jumbo size if it is more than 1518 bytes and less than or equal to maxFrameSize. The information is presented in a bar graph where:
  - Yellow represents the number of jumbo packets received over the current collection period.
  - Blue represents the number of jumbo packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express2 10 Gigabit Ports Summary workspace.
- **Port Throughput Detail for Port Number***abc* **and Channel** *xyz* **summary table**: Provides OSA-Express2 10 Gigabit throughput data for the specified port number and channel, where *abc* is the selected port number link attribute and *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Throughput Detail for Port Number *abc* and Channel *xyz* summary table."

Port Throughput Detail for Port Number abc and Channel xyz summary table: The following attributes are displayed in the Port Throughput Detail for Port Number *abc* and Channel *xyz* summary table:

- Collection Time
- Port Name
- Broadcast Packets Received
- Total Broadcast Packets Received
- Broadcast Packets Transmitted
- Total Broadcast Packets Transmitted
- Multicast Packets Received
- Total Multicast Packets Received
- Multicast Packets Transmitted
- Total Multicast Packets Transmitted
- Unicast Packets Received
- Total Unicast Packets Received
- Unicast Packets Transmitted
- Total Unicast Packets Transmitted

- VLAN Packets Received
- Total VLAN Packets Received
- VLAN Packets Transmitted
- Total VLAN Packets Transmitted
- Jumbo Packets Received
- Total Jumbo Packets Received
- Jumbo Packets Transmitted
- Total Jumbo Packets Transmitted

For more information about these attributes, refer to the “OSA 10Gigabit Ports Throughput Attributes” on page 44.

New OSA-Express3 Ports Summary workspace

The OSA-Express3 Ports Summary workspace displays performance data for the OSA-Express3 Ethernet adapters. The OSA-Express3 Ports Summary workspace is accessed only as a drill-down from the existing OSA Channels workspace. The drill-down link from the OSA Channels workspace is enabled only when the OSA channel **Subtype** attribute value defines the adapter as an OSA-Express3. The OSA channel **Subtype** attribute is a field contained in the OSA-Express Channels Summary Table workspace.

To display the OSA-Express3 Ports Summary workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the Port Summary for Channel *abc* Summary Table is osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet, or osaexp3tenGigabitEthernet,, right-click the **Link** icon by one of the rows of the Port Summary for Channel *xyz* summary table.
3. A conditional link is displayed in the list of available links. Select **OSA-Express3 Ports** to display the **OSA-Express3 Ports Summary** workspace.

Note: Some OSA-Express3 Gigabit adapter can have 2 ports per OSA CHPID or four per physical card/feature.

Links To Other Workspaces:

Right-click on the **Link** icon by a row in the Port Summary for Channel *xyz* summary table in this workspace to display the following additional workspaces:

- **OSA-Express3 10 Gigabit Port Throughput Detail workspace** (default): Displays performance data for the OSA-Express3 Ethernet adapters.
- **OSA-Express3 Port Errors workspace**: Displays error data for the OSA-Express3 Ethernet adapters.
- **OSA-Express3 Port Control workspace**: Displays control data for the OSA-Express3 Ethernet adapters.

Data Source:

IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:

Channel Number attribute

Figure 8 on page 124 shows the OSA-Express3 Ports Summary workspace

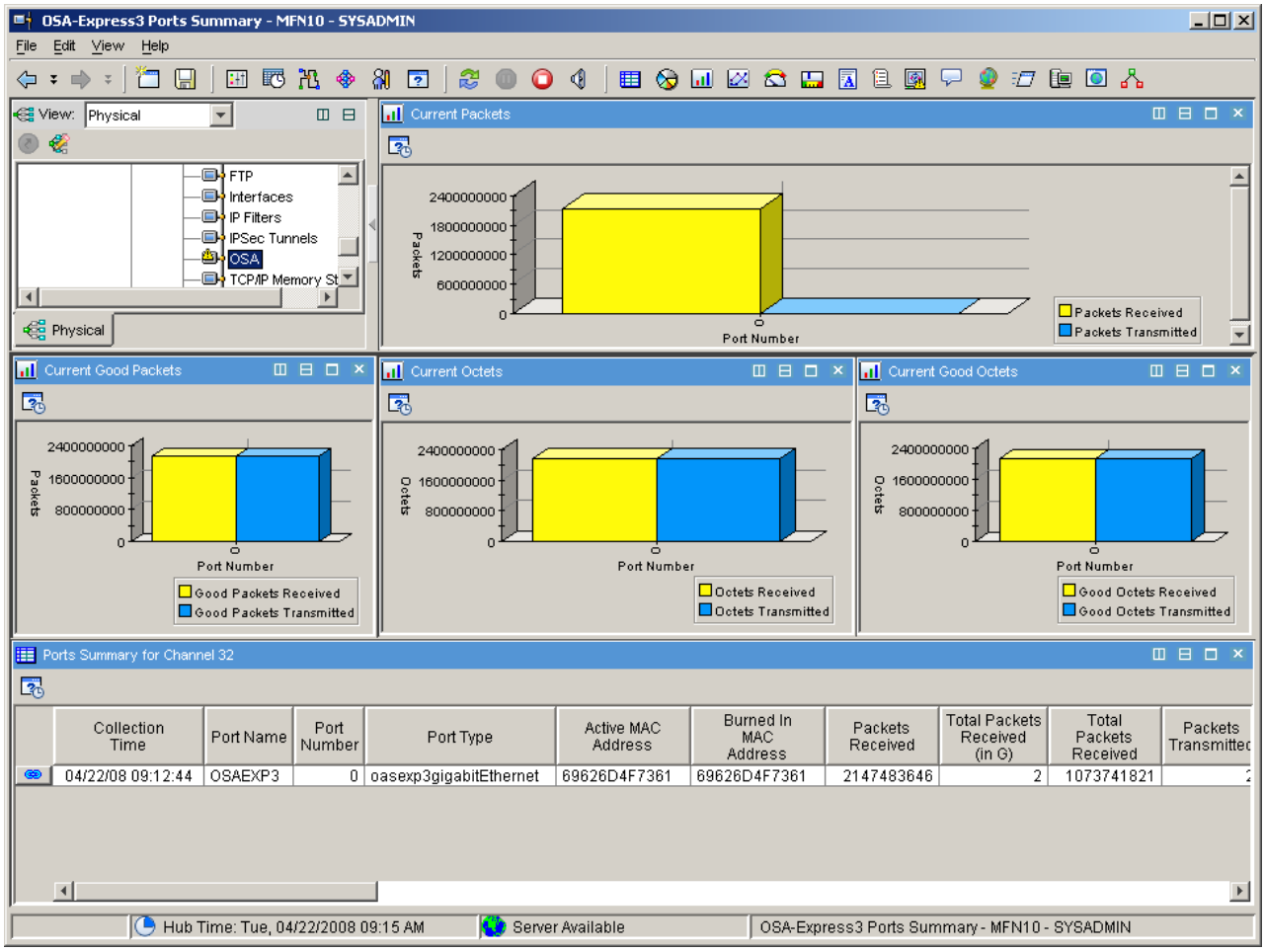


Figure 8. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express3 Ports Summary workspace

The OSA-Express3 Ports Summary workspace contains the following views

- **Current Packets**: Displays the number of packets received or packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of packets received over the current collection period
  - Blue represents the number of packets transmitted over the current collection period

  This data applies to a channel selected from the OSA Channels workspace.
- **Current Good Packets**: Displays the number of good (without error) packets with a length of >= 64 bytes and <= 1518 bytes received by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of good (without error) packets received over the current collection period
  - Blue represents the number of good (without error) packets transmitted over the current collection period

  This data applies to a channel selected from the OSA Channels workspace.
- **Current Octets**: Displays the number of octets received or octets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of octets received over the current collection period
  - Blue represents the number of octets transmitted over the current collection period

  This data applies to a channel selected from the OSA Channels workspace.

- **Current Good Octets**: Displays the number of octets received or octets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of good (without error) octets received over the current collection period
  - Blue represents the number of good (without error) octets transmitted over the current collection period

  This data applies to a channel selected from the OSA Channels workspace.
- **Port Summary for Channel** *xyz* **summary table**: Provides summary data for the selected OSA-Express3 port summary data, where *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Summary for Channel *xyz* summary table."

Port Summary for Channel** xyz **summary table: The following attributes are displayed in the Port Summary for Channel *xyz* summary table:

- Collection Time
- Port Name
- Port Number
- Port Type
- Active MAC Address
- Burned In MAC Address
- Packets Received
- Total Packets Received (in G)
- Total Packets Received
- Packets Transmitted
- Total Packets Transmitted (in G)
- Total Packets Transmitted
- Packets Received or Transmitted
- Packet Rate
- Total Packets (in G)
- Total Packets
- Good Packets Received
- Total Good Packets Received (in G)
- Total Good Packets Received
- Good Packets Transmitted
- Total Good Packets Transmitted (in G)
- Total Good Packets Transmitted
- Octets Received
- Total Octets Received (in G)
- Total Octets Received
- Octets Transmitted
- Total Octets Transmitted (in G)
- Total Octets Transmitted
- Octets Received or Transmitted
- Octet Rate
- Total Octets (in G)
- Total Octets
- Good Octets Received

- Total Good Octets Received (in G)
- Total Good Octets Received
- Good Octets Transmitted
- Total Good Octets Transmitted (in G)
- Total Good Octets Transmitted
- LAN Traffic State
- Service Mode
- Disabled Status
- Configuration Name
- Configuration Speed Mode
- Active Speed Mode
- Exclusive Usage ID
- Exclusive Usage MAC

For more information about these attributes, refer to the “OSA Express3 Ports Summary Attributes” on page 53.

New OSA-Express3 Port Control workspace: The OSA-Express3 Port Control workspace displays control data for the OSA-Express3 Ethernet adapters. The OSA-Express3 Port Control workspace is accessed only as a drill down from the OSA-Express3 Ports Summary workspace using Channel Number and Port Number as link attributes.

Transmitter ON (XON), transmitter OFF (XOFF), and Pause MAC packets are flow control packets between the OSA and the switch to which it is connected. They are used to provide flow control between the two ports. These attributes are of particular interest when the port is at 100% utilization.

To display the OSA-Express3 Port Control workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet, or osaexp3tenGigabitEthernet,, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express3 Ports** to display the **OSA-Express3 Ports Summary** workspace.
4. Right-click on the **Link** icon by one of the rows in the Port Summary for Channel *xyz* summary table and select **OSA-Express3 Port Control**.

Links To Other Workspaces:
None.

Data Source:
IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:
Channel Number and Port Number attributes

Figure 9 on page 127 shows the OSA-Express3 Port Control workspace

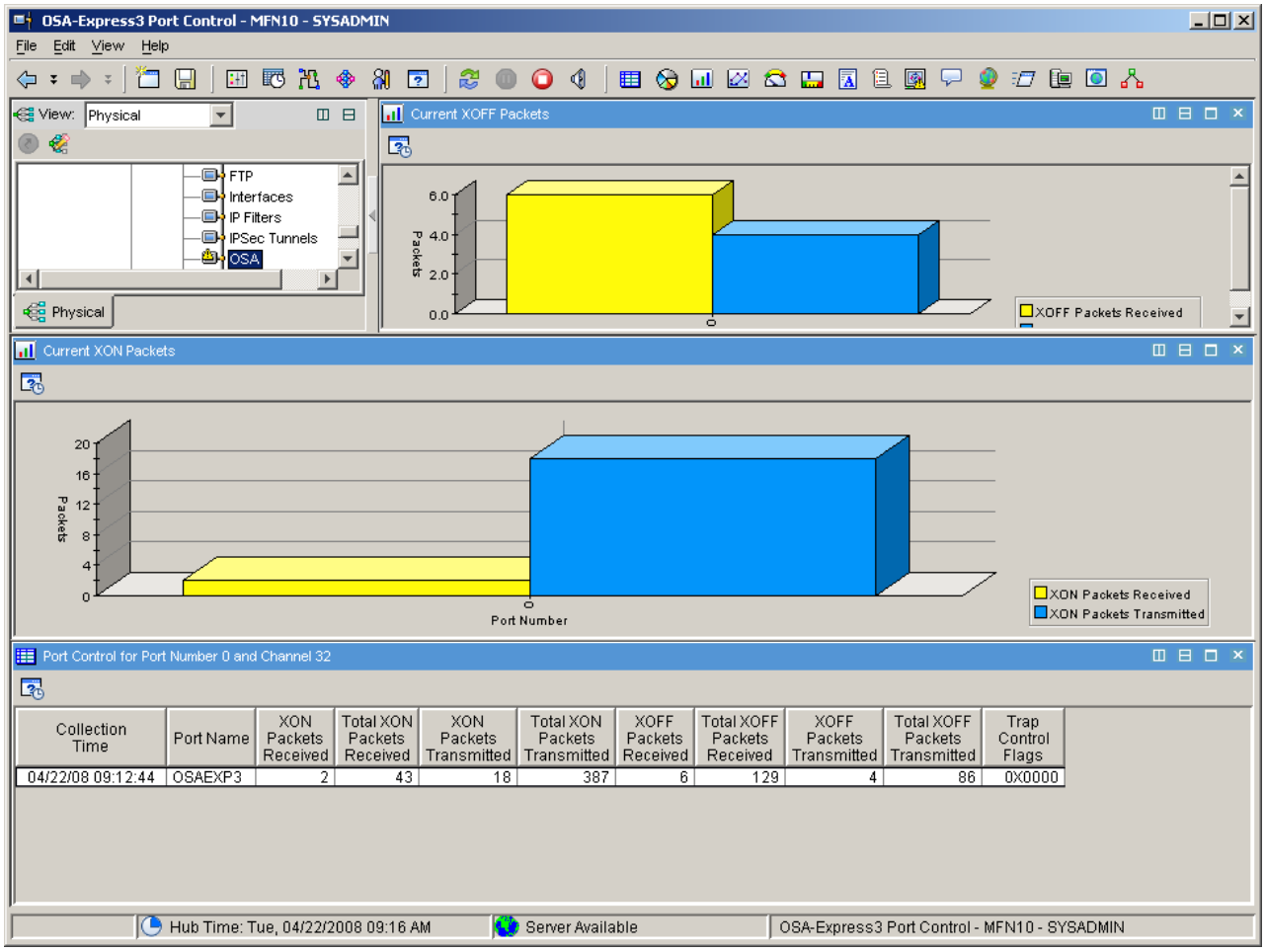


Figure 9. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express3 Port Control workspace

The OSA-Express3 Port Control workspace contains the following views:

- **Current XOFF Packets**: Displays the number of Transmitter OFF (XOFF) packets received or the XOFF packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of XOFF packets received over the current collection period.
  - Blue represents the number of XOFF packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Current XON Packets**: Displays the number of Transmitter ON (XON) packets received or the XON packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of XON packets received over the current collection period.
  - Blue represents the number of XON packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Port Control for Port Number** *abc* **and Channel** *xyz* **summary table**: Provides the OSA-Express3 control data for the specific port and channel, where *abc* is the selected port number link attribute and *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Control for Port Number *abc* and Channel *xyz* summary table."

Port Control for Port Number abc and Channel xyz summary table: The following attributes are displayed in the Port Control for Port Number *abc* and Channel *xyz* summary table:

- Collection Time
- Port Name
- XON Packets Received
- Total XON Packets Received
- XON Packets Transmitted
- Total XON Packets Transmitted
- XOFF Packets Received
- Total XOFF Packets Received
- XOFF Packets Transmitted
- Total XOFF Packets Transmitted
- Trap Control Flags

For more information about these attributes, refer to the “OSA Express3 Ports Control Attributes” on page 47.

New OSA-Express3 Port Errors workspace: The OSA-Express3 Port Errors workspace displays error data for the OSA-Express3 Ethernet adapters. The OSA-Express3 Port Errors workspace is accessed only as a drill down from the OSA-Express3 Ports Summary workspace using Channel Number and Port Number as link attributes.

To display the OSA-Express3 Port Errors workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet, or osaexp3tenGigabitEthernet,, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express3 Ports** to display the **OSA-Express3 Ports Summary** workspace.
4. Right-click on the **Link** icon by one of the rows in the Port Summary for Channel *xyz* summary table and select **OSA-Express3 Port Errors**.

Links To Other Workspaces:
None.

Data Source:
IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:
Channel Number and Port Number attributes

Figure 10 on page 129 shows the OSA-Express3 Port Errors workspace

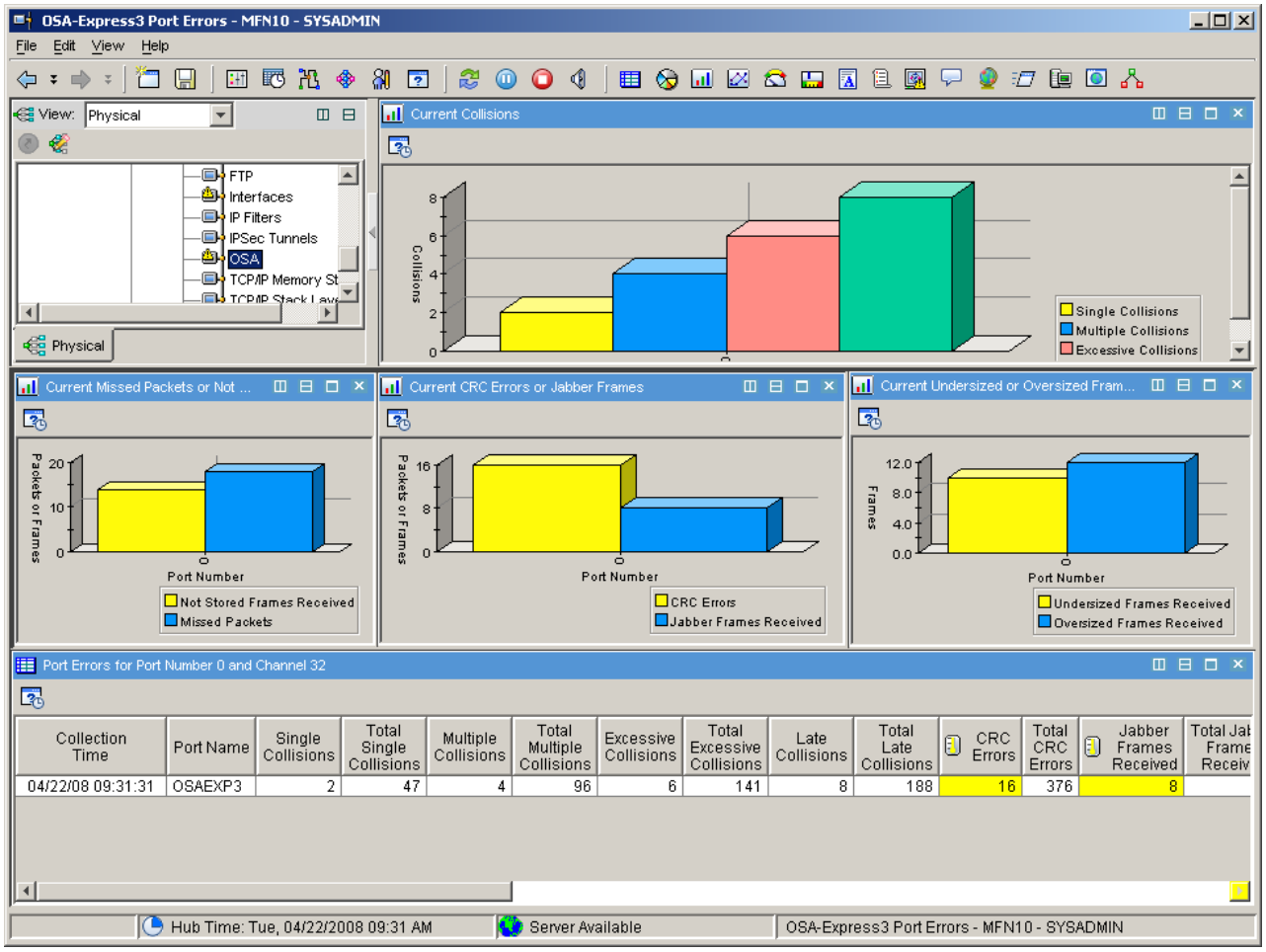


Figure 10. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express3 Port Errors workspace

The OSA-Express3 Port Errors workspace contains the following views:

- **Current Collisions**: Displays the number of single collisions, multiple collisions, excessive collisions or late collisions encountered by a successfully transmitted packet over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of single collisions over the current collection period.
  - Blue represents the number of multiple collisions over the current collection period.
  - Pink represents the number of excessive collisions over the current collection period.
  - Green represents the number of late collisions over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace
- **Current Missed Packets or Not Stored Frames**: Displays the number of missed packets received or the number of frames received when there were no available descriptor buffers available to store frames by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of not stored frames received over the current collection period.
  - Blue represents the number of missed packets received over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Current CRC Errors or Jabber Frames**: Displays the number of cyclic redundancy check (CRC) errors on packets received on the LAN or the number of jabber frames received by the specified port over the current collection interval. The information is presented in a bar graph where:

  - Yellow represents the number of packets with CRC errors received over the current collection period.
  - Blue represents the number of jabber frames received over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Current Undersized or Oversized Frames**: Displays the number of undersized frames received or oversized frames received by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of undersized frames received over the current collection period.
  - Blue represents the number of oversize frames received over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Port Errors for Port Number** *abc* **and Channel** *xyz* **summary table**: Provides OSA-Express3 port error data for the specified port and channel, where *abc* is the selected port number link attribute and *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Errors for Port Number *abc* and Channel *xyz* summary table."

Port Errors for Port Number abc and Channel xyz summary table: The following attributes are displayed in the Port Errors for Port Number *abc* and Channel *xyz* summary table:

- Collection Time
- Port Name
- Single Collisions
- Total Single Collisions
- Multiple Collisions
- Total Multiple Collisions
- Excessive Collisions
- Total Excessive Collisions
- Late Collisions
- Total Late Collisions
- CRC Errors
- Total CRC Errors
- Jabber Frames Received
- Total Jabber Frames Received
- Not Stored Frames Received
- Total Not Stored Frames Received
- Missed Packets
- Total Missed Packets
- Undersized Frames Received
- Total Undersized Frames Received
- Oversized Frames Received
- Total Oversized Frames Received
- Length Error Packets Received
- Total Length Error Packets Received
- Deferred Events
- Total Deferred Events
- Sequence Errors
- Total Sequence Errors
- Fragmented Frames Received
- Total Fragmented Frames Received

- Alignment Errors
- Total Alignment Errors

For more information about these attributes, refer to the “OSA Express3 Ports Errors Attributes” on page 49.

New OSA-Express3 Port Throughput Detail workspace: The OSA-Express3 10 Gigabit Port Throughput Detail workspace displays performance data for the OSA-Express3 Ethernet adapters. The OSA-Express3 Port Throughput Detail workspace is accessed only as a drill down from the OSA-Express3 Ports Summary workspace using Channel Number and Port Number as link attributes.

To display the OSA-Express3 Port Throughput Detail workspace, do the following:

1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
2. If the value for the OSA channel **Subtype** attribute in the OSA-Express Channels Summary Table is osaexp3gigabitEthernet, osaexp3oneThousandBaseTEthernet, or osaexp3tenGigabitEthernet,, right-click the **Link** icon by this table row.
3. A conditional link is displayed in the list of available links. Select **OSA-Express3 Ports** to display the **OSA-Express3 Ports Summary** workspace.
4. Right-click on the **Link** icon by one of the rows in the Port Summary for Channel *xyz* summary table and select **OSA-Express3 Port Throughput Detail**.

Links To Other Workspaces:
None.

Data Source:
IBM OSA-Express Direct SNMP Enterprise Specific MIB

Default Filter:
Channel Number attribute

Figure 11 on page 132 shows the OSA-Express3 Port Throughput Detail workspace

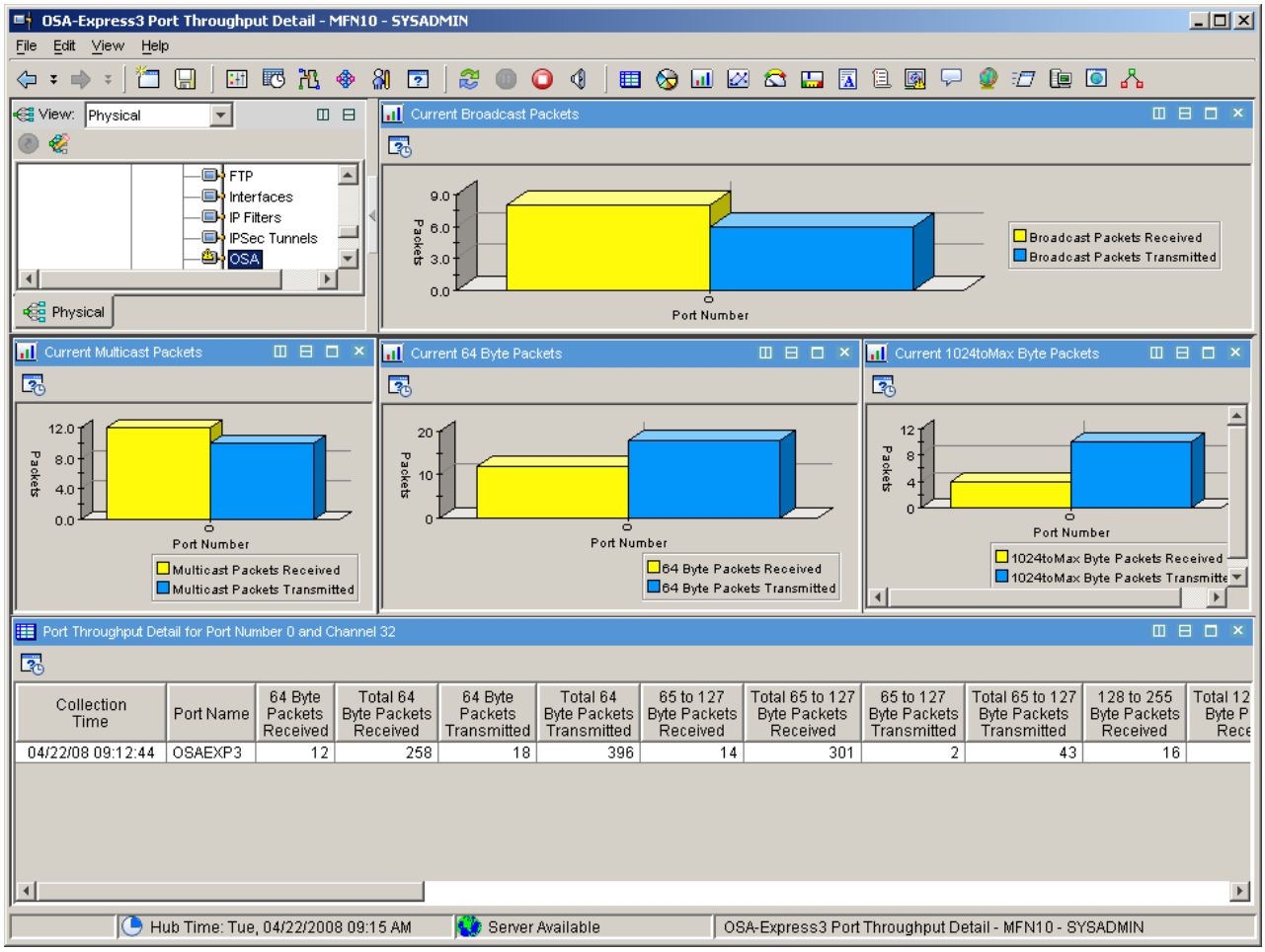


Figure 11. The Tivoli OMEGAMON XE for Mainframe Networks OSA-Express3 Port Throughput Detail workspace

The OSA-Express3 Port Throughput Detail workspace contains the following views:

- **Current Broadcast Packets**: Displays the number of broadcast packets received or broadcast packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of broadcast packets received over the current collection period.
  - Blue represents the number of broadcast packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Current Multicast Packets**: Displays the number of multicast packets received or multicast packets transmitted by the specified port over the current collection interval. The information is presented in a bar graph where:
  - Yellow represents the number of multicast packets received over the current collection period.
  - Blue represents the number of multicast packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Current 64 Byte Packets**: Displays the number of packets received or transmitted by the specified port over the current collection interval that are exactly 64 bytes in length. The information is presented in a bar graph where:
  - Yellow represents the number of 64 byte packets received over the current collection period.
  - Blue represents the number of 64 byte packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.

- **Current 1024toMax Byte Packets**: Displays the number of packets received or transmitted by the specified port over the current collection interval that are 1024 bytes or greater in length. The information is presented in a bar graph where:
  - Yellow represents the number of 1024toMax byte packets received over the current collection period.
  - Blue represents the number of 1024toMax byte packets transmitted over the current collection period.

  This data applies to a port selected from the OSA-Express3 Ports Summary workspace.
- **Port Throughput Detail for Port Number** *abc* **and Channel** *xyz* **summary table**: Provides OSA-Express3 throughput data for the specified port number and channel, where *abc* is the selected port number link attribute and *xyz* is the selected channel number link attribute. The attributes displayed in this table are shown in "Port Throughput Detail for Port Number *abc* and Channel *xyz* summary table."

Port Throughput Detail for Port Number abc and Channel xyz summary table: The following attributes are displayed in the Port Throughput Detail for Port Number *abc* and Channel *xyz* summary table:

- Collection Time
- Port Name
- 64 Byte Packets Received
- Total 64 Byte Packets Received
- 64 Byte Packets Transmitted
- Total 64 Byte Packets Transmitted
- 65 to 127 Byte Packets Received
- Total 65 to 127 Byte Packets Received
- 65 to 127 Byte Packets Transmitted
- Total 65 to 127 Byte Packets Transmitted
- 128 to 255 Byte Packets Received
- Total 128 to 255 Byte Packets Received
- 128 to 255 Byte Packets Transmitted
- Total 128 to 255 Byte Packets Transmitted
- 256 to 511 Byte Packets Received
- Total 256 to 511 Byte Packets Received
- 256 to 511 Byte Packets Transmitted
- Total 256 to 511 Byte Packets Transmitted
- 512 to 1023 Byte Packets Received
- Total 512 to 1023 Byte Packets Received
- 512 to 1023 Byte Packets Transmitted
- Total 512 to 1023 Byte Packets Transmitted
- 1024 to Max Byte Packets Received
- Total 1024 to Max Byte Packets Received
- 1024 to Max Byte Packets Transmitted
- Total 1024 to Max Byte Packets Transmitted
- Broadcast Packets Received
- Total Broadcast Packets Received
- Broadcast Packets Transmitted
- Total Broadcast Packets Transmitted
- Multicast Packets Received
- Total Multicast Packets Received

- Multicast Packets Transmitted
- Total Multicast Packets Transmitted

For more information about these attributes, refer to the “OSA Express3 Ports Throughput Detail Attributes” on page 59.

Updated OSA Channels workspace

These changes were made to the OSA Channels workspace:

- The default link from the OSA Channels workspace has been changed from OSA Ports to the OSA LPARs.
- Linking from the OSA Channels workspace to the appropriate OSA Ports workspace is now a conditional link based on the OSA channels **Subtype** attribute.
- A new **Channel Hardware Level** attribute was added to identify the hardware model of the channel.

  Channel Hardware Level

  The hardware model of the channel. This value is stored as an integer but displayed as a string. The possible values are:

  – 0 = unavailable: This value indicates that the hardware level of the channel is unavailable.
  – 1 = unknown: This value indicates that the hardware level is unknown.
  – 2 = osaExp150: This value indicates a hardware level of 1.50, which defines this feature as OSA-Express.
  – 3= osaExp175: This value indicates a hardware level of 1.75, which defines this feature as OSA-Express.
  – 4 = osaExp300: This value indicates a hardware level of 3.00, which defines this feature as OSA-Express2.
  – 5 = osaExp400: This value indicates a hardware level of 4.00, which defines this feature as OSA-Express3.
- Additional values are provided for the existing **Subtype** attribute.

  Subtype

  The type of OSA feature present. This value is stored as an integer but displayed as a string. The possible values are:

  – 1 = unknown
  – 2 = gigabit
  – 3 = fastEthernet
  – 4 = atmNative
  – 5 = atmLanEmulation
  – 6 = noPortsDefined
  – 7 = oneLogicalEthPort
  – 8 = oneLogicalTokenRingPort
  – 9 = twoLogicalEthPorts
  – 10 = twoLogicalTokenRingPorts
  – 11 = logicalEthernetAndTokenRingPorts
  – 12 = logicalTokenRingAndEthPorts
  – 65 = gigabitEthernet
  – 81 = fastEthernet
  – 82 = tokenRing
  – 97 = oneThousandBaseTEthernet
  – 145 = tenGigabitEthernet
  – 161 = osaexp3gigabitEthernet

  - 177 = osaexp3oneThousandBaseTEthernet
  - 193 = osaexp3tenGigabitEthernet
  - 2304 = atmEmulatedEthernet
- The **Device Name** attribute in the OSA Channels workspace has been changed to **Device or Port Name** to reflect the broader definition of this attribute possible under z/OS version 1.10.

  Here is the old version:

  Device Name
  The name of the TCP/IP device associated with this channel. The format is an alphanumeric string, with a maximum of 16 characters.

  Here is the new version:

  Device or Port Name
  The name of the TCP/IP device or port associated with this channel. The format is an alphanumeric string, with a maximum of 16 characters.

Updated OSA LPARs workspace

These changes were made to attributes in the OSA LPARs workspace:

- A new query "Active OSA LPARs" has been created for the OSA LPARs summary table that includes the new LPAR Status attribute as a filter. This query is listed in the query editor but is not enabled by default. You can edit the queries that retrieve data in predefined workspaces provided by your monitoring products, or create new queries to populate new views. Refer to the *IBM Tivoli Monitoring: Administrator's Guide* for information about changing which query the view is using.
- A new **LPAR Status** attribute has been added to the OSA-Express LPARs attribute group. On IBM eServer zSeries 990 or later hardware, this indicates whether the LPAR is online or offline. For older hardware, the LPAR status will be displayed as unknown. This attribute is shown below:

  LPAR Status
  The status of the LPAR. This attribute is valid for IBM eServer zSeries 990 or greater hardware only and indicates whether the LPAR is unknown, online, or offline. This value is stored as an unsigned integer and displayed as a string. The possible values are:
  - 0 = unknown
  - 1 = offline
  - 2 = online
- The TCPIP Host Name attribute has been shortened to **Host Name**.

Updated OSA Ports workspace

The following changes were made to attributes displayed in the OSA Ports workspace:

- The Channel footers in the OSA Ports workspace have been removed because the **Channel Number** attribute is no longer being displayed by default in the table view.
- The name of the table view has been renamed to "Port Summary for Channel *xyz*", where *xyz* is the selected channel number link attribute.
- The **Port Type** attribute has been enhanced to support a port type of one thousand Base-T Ethernet. Here is the new definition of that attribute:

  Port Type
  The physical port type. This value is stored as an integer and displayed as a string. Possible port types are:
  - 65 = gigabitEthernet
  - 81 = fastEthernet
  - 97 = oneThousandBaseTEthernet
- A new **Disabled Status** attribute has been added. This attribute is identical in meaning to the existing **Disabled Status** attribute except that it is now displayed in hex to be consistent with the other port

tables. The value for Disabled Status displayed depends on whether you are monitoring an OSA-Express2 10 Gigabit adapter or an OSA-Express3 adapter.

Disabled Status

When the value of the Hardware State attribute is disabled, this attribute explains the reasons for the disabled state. This value is stored as a hexadecimal integer and displayed as a 4–digit hexadecimal number mapped by the bit settings below:

- 0 = reserved
- 1 = internalPortFailure
- 2 = reserved
- 3 = reserved
- 4 = reserved
- 5 = reserved
- 6 = portTemporarilyDisabled
- 7 = reserved
- 8 = reserved
- 9 = serviceProcessorRequest
- 10 = networkRequest
- 11 = osasfRequest
- 12 = configurationChange
- 13 = linkFailureThresholdExceeded
- 14 = reserved
- 15 = reserved

- The **Port Number** attribute in this workspace is now displayed as an integer. Previously it was displayed as a hex value.
- The caption for the existing Burn In MAC Address attribute in the OSA-Express Ports Summary Table has been changed to **Burned In MAC Address**.

  Burned In MAC Address

  The burned-in MAC address on the OSA. The format is a 12–digit hexadecimal string.
- If you are running under z/OS version 1.10, the **Link Name** attribute will be blank if you have replaced the Device/Link statements in the TCPIP.PROFILE dataset with an IPv4 Interface Statement.

  Link Name

  The name of the TCP/IP link associated with this port. The format is an alphanumeric string no longer than 16 characters. If this monitoring agent is running under z/OS version 1.10, this field will be blank.
- The OSA Ports workspace is no longer the default workspace from the OSA navigator item. It is now a conditional workspaces accessed in the following manner:
  1. Click the **OSA** navigator item for a specific TCP/IP stack to display the OSA Channels workspace.
  2. If the value for the OSA channel **Subtype** attribute in the Port Summary for Channel *abc* Table is gigabitEthernet, fastEthernet or oneThousandBaseTEthernet, right-click the **Link** icon by this table row.
  3. A conditional link is displayed in the list of available links. Select **OSA Ports** to navigate you to the OSA Ports workspace.

Updated TCP/IP Summary Workspace

With faster hardware and improvements to software, it is now more likely for attributes that display the number of bytes since the last collection interval to exceed the maximum value, 2,147,483,647. This is most likely to occur in byte or octet attributes for OSA-Express3 adapters and TCP/IP stacks. When the number of bytes since the last collection interval exceeds 2,147,483,647, the attribute will contain the maximum value.

This change affects the Byte Rate attribute in the TCP/IP Summary Workspace.

Byte Rate (New value)
The number of bytes received or sent, per minute, during the most recent time interval. When the measured value exceeds 2,147,483,647 (the maximum value), the attribute will be set to 2,147,483,647. The format is an integer.

Byte Rate (Old value)
The number of bytes received or sent, per minute, during the most recent time interval. The format is an integer.

Updated VTAM workspaces in Fix Pack 2

The descriptions of the EE Connection Details and EE Connections workspaces have been updated, as shown in the sections that follow.

Updated EE Connections workspace

The EE Connections workspace provides information about performance data for the Enterprise Extender (EE) links when the IP address for one end of an EE link is located on a monitored z/OS system image. An EE link is uniquely defined by the local IP address and remote IP address.

This workspace is displayed by clicking on the EE Navigator item.

Links To Other Workspaces:
Right-click on the **Link** icon by a row in the EE Connections Summary Table in this workspace to display the following additional workspaces:

- **EE Connection Details workspace** (default): Provides information about performance data for the Enterprise Extender (EE) links defined by the system name and the **PU Name** attribute in the EE Connections workspace.
- **HPR Connections workspace:** Displays performance data for High-Performance Routing (HPR) Rapid Transfer Protocol (RTP) connections (pipes) when one endpoint of an HPR connection is located on a monitored z/OS system image. An HPR connection is uniquely defined by a system name and the name of a local RTP physical unit (PU).

Data Source:
z/OS Communications Server Network Management Interface

Default Filter:
None.

Figure 12 on page 138 shows the EE Connections workspace.

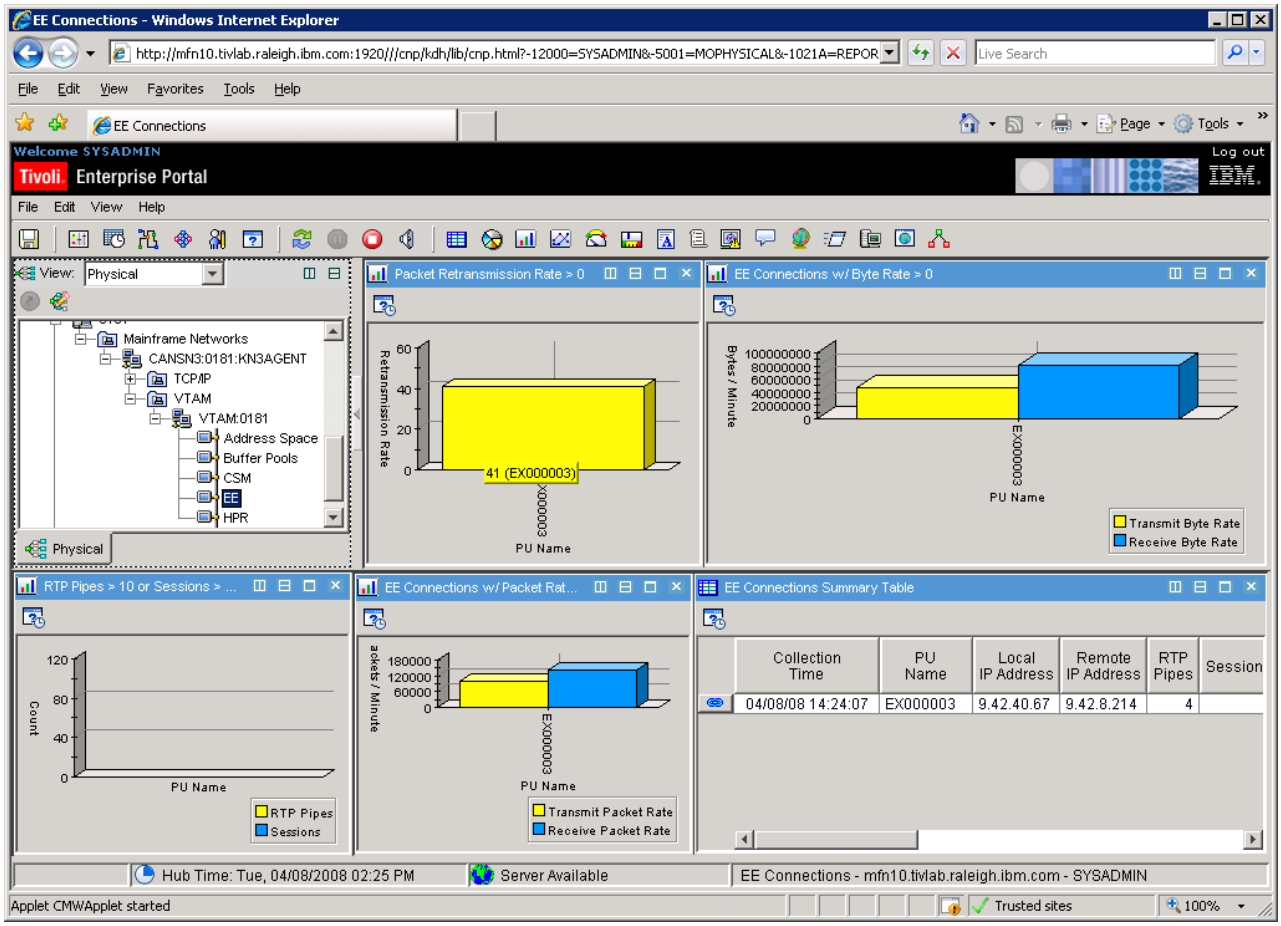


Figure 12. The Tivoli OMEGAMON XE for Mainframe Networks EE Connections workspace

The EE Connections workspace contains the following views:

- **Packet Retransmission Rate > 0 Chart**: Provides the number of HPR network-layer packets, by PU Name, that were retransmitted per minute over this EE connection during the most recent interval. This information is presented in a bar graph where:
  - **Yellow** represents the number of packets whose retransmission rates were greater than zero (0) over the most recent sampling interval.
- **EE Connections w/ Byte Rate > 0 Bar Chart**: Shows the number of EE Connections, by PU Name, that were sent and received, per minute, during the most recent interval. This information is presented in a bar graph where:
  - **Yellow** represents the number of bytes sent over the most recent sampling interval.
  - **Blue** represents the number of bytes received over the most recent sampling interval.
- **RTP Pipes > 10 or Sessions > 1000 Bar Chart**: Displays the number of RTP pipes that are flowing over this EE Connection and the number of LU-to-LU sessions that are flowing over this EE Connection. This information is presented in a bar graph where:
  - **Yellow** represents the number of RTP Pipes over the most recent sampling interval.
  - **Blue** represents the number of LU-to-LU sessions over the most recent sampling interval.
- **EE Connections w/Packet Rates > 0 Bar Chart**: Shows the number of HPR network-layer packets that were sent over this EE connection, per minute, during the most recent sampling interval. This information is presented in a bar graph where:
  - **Yellow** represents the number of packets sent over the most recent sampling interval.
  - **Blue** represents the number of packets received over the most recent sampling interval.

- “EE Connections Summary Table”: Displays summary information about a particular EE or HPR PU.

EE Connections Summary Table: The following attributes are displayed in the EE Connections summary table:

- Collection Time
- PU Name
- Local IP Address
- Remote IP Address
- RTP Pipes
- Sessions
- Packets Retransmitted
- Percent of Packets Retransmitted
- Packet Retransmission Rate
- Transmit Byte Rate
- Receive Byte Rate
- Transmit Packet Rate
- Receive Packet Rate
- Bytes Sent (in GB)
- Bytes Sent
- Bytes Received (in GB)
- Bytes Received
- Packets Sent
- Packets Received

For more information about these attributes, refer to the help for the EE Connections attribute group.

Updated EE Connection Details workspace

The EE Connection Details workspace provides information about performance data for the Enterprise Extender (EE) links defined by the system name and the **PU Name** attribute in the EE Connections workspace.

To display the EE Connection Details workspaces, do the following:

1. Click on the EE navigator item for a specific VTAM instance.
2. Right-click on the **Link** icon by a row in the EE Connections Summary Table and select EE Connection Details.

Links To Other Workspaces:
None.

Data Source:
z/OS Communications Server Network Management Interface

Default Filter:
EE Connection ID

Figure 13 on page 140 shows the EE Connection Details workspace.

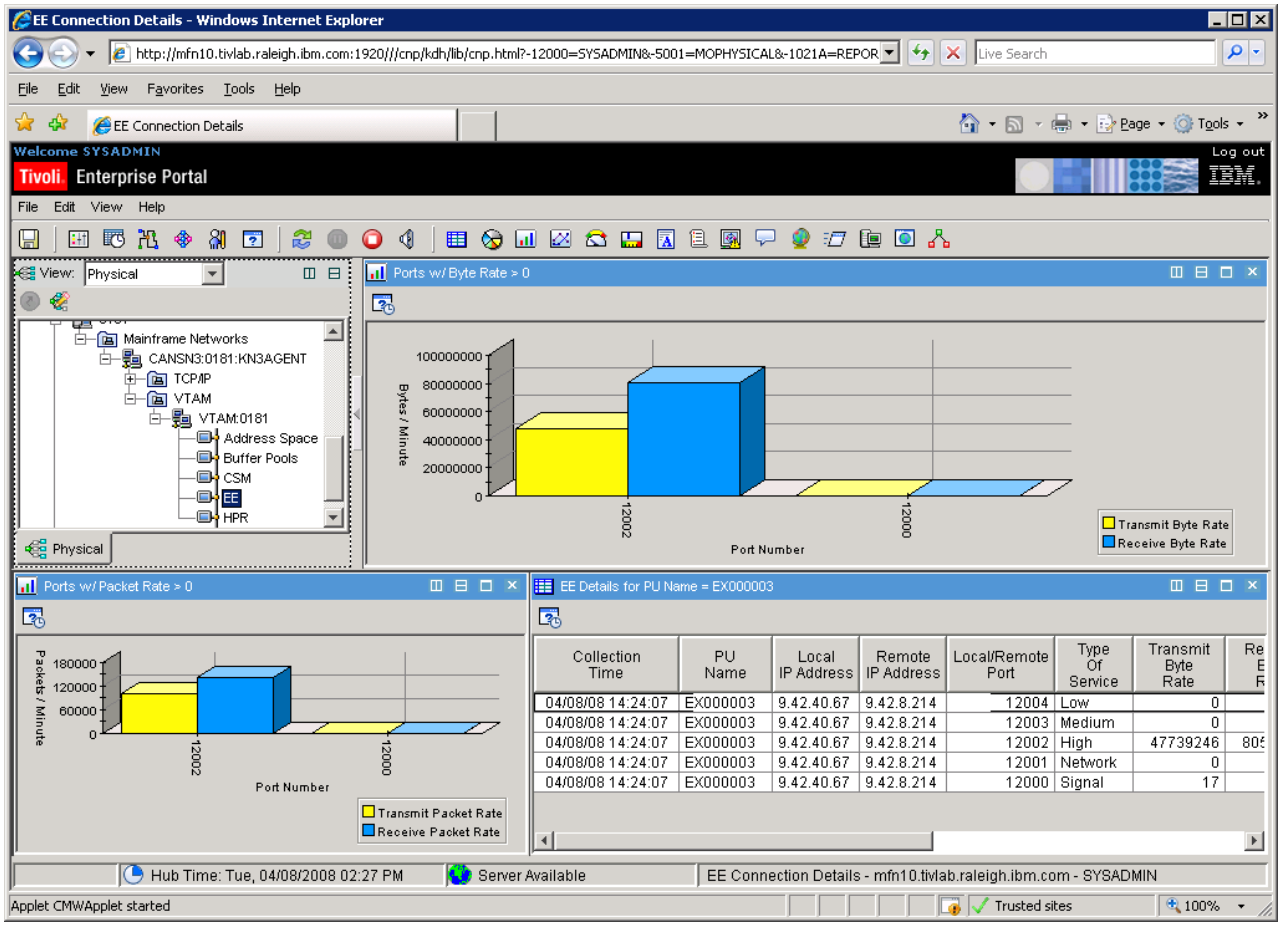


Figure 13. The Tivoli OMEGAMON XE for Mainframe Networks EE Connection Details workspace

The EE Connections Details workspace contains the following views:

- **Ports w/ Byte Rate > 0**: For specific ports (by port number), displays the number of bytes that were sent, per minute, during the most recent interval. This information is presented in a bar graph where:
  - **Yellow** represents the number of bytes sent over the most recent sampling interval.
  - **Blue** represents the number of bytes received over the most recent sampling interval.

  The transmit and receive bytes rates are available to be displayed when these rates are greater than zero (0).
- **Ports w/ Packet Rate > 0**: For specific ports (by port number), displays the number of HPR network-layer packets that were sent, per minute, during the most recent interval. This information is presented in a bar graph where:
  - **Yellow** represents the number of packets sent over the most recent sampling interval.
  - **Blue** represents the number of packets received over the most recent sampling interval.

  The transmit and receive packet rates are available to be displayed when these rates are greater than zero (0).
- **"EE Connections Details summary table"**: Provides detailed information about the EE connection selected from the EE Connections Workspace.

EE Connections Details summary table: The following attributes are displayed in the EE Connections Details summary table:

- Collection Time
- PU Name

- Local IP Address
- Remote IP Address
- Local/Remote port
- Type of Service
- Transmit Byte Rate
- Receive Byte Rate
- Transmit Packet Rate
- Receive Packet Rate
- Bytes Sent (in GB)
- Bytes Sent
- Bytes Received (in GB)
- Bytes Received
- Packets Sent
- Packets Received

For more information about these attributes, refer to the help for the EE Connections Details attribute group.

New and updated in Fix Pack 1

The workspaces in Table 22 have been added and updated in Fix Pack 1:

Table 22. New and updated workspaces in Fix Pack 1

Workspace Name	Attribute Group	New or Updated?
“IPSec Status workspace” on page 142, as a new type of workspace that applies to all TCP/IP stacks	KN3ISS	New
“IP Filters Statistics workspace” on page 145	KN3ISS	New
“Current IP Filters workspace” on page 147	KN3IFC	New
“Current IP Filters by Destination Address workspace” on page 151	KN3IFC	New
“Current IP Filters by Filter Rule Definition Name workspace” on page 153	KN3IFC	New
“Current IP Filters in Scan Order workspace” on page 155	KN3IFC	New
“Dynamic IP Tunnels Statistics workspace” on page 157	KN3ISS	New
“Dynamic IP Tunnels workspace” on page 159	KN3ITD	New
“Dynamic IP Tunnels by Destination Address workspace” on page 163	KN3ITD	New
“Dynamic IP Tunnels by Filter Rule Definition Name workspace” on page 165	KN3ITD	New
“Dynamic IP Tunnels by Tunnel ID workspace” on page 167	KN3ITD	New
“Dynamic IP Tunnels with Byte Rate < 2048 workspace” on page 169	KN3ITD	New
“Manual IP Tunnels workspace” on page 182	KN3ITM	New
“Manual IP Tunnels by Tunnel ID workspace” on page 184	KN3ITM	New
“IKE Tunnels Statistics workspace” on page 171	KN3ISS	New
“IKE Tunnels workspace” on page 173	KN3ITI	New
“IKE Tunnels by Security Endpoint Workspace” on page 175	KN3ITI	New

Table 22. New and updated workspaces in Fix Pack 1 (continued)

Workspace Name	Attribute Group	New or Updated?
"IKE Tunnels by Tunnel ID Workspace" on page 178	KN3ITI	New
"IKE Tunnels with Byte Rate < 1024 Workspace" on page 180	KN3ITI	New
Applications Connections Workspace	KN3TCN	Updated
Connections Workspace	KN3TCN	Updated
"Updates to the Interfaces and Interfaces History workspaces" on page 186	KN3TIF	Updated
TCP Connections Workspace	KN3TCP	Updated
"TCP/IP Gateways attributes" on page 186	KN3TGA	Updated

New TCP/IP Navigator item workspace

This fix pack introduces a workspace that displays a row of data for each TCP/IP stack, the **"IPSec Status workspace"**. This workspace displays statistics for IKE and dynamic IP tunnels and for IP filters for all monitored stacks on a z/OS system.

The **"IPSec Status workspace"** is displayed when you select the **TCP/IP** navigator item.

IPSec Status workspace

The IPSec Status workspace displays IP security configuration and IP security performance statistics for all active TCP/IP stacks on a z/OS image. There is one row of data for each active stack on the monitored system. This workspace provides a high level view of IP security information that may be used to quickly assess the status of IKE and dynamic IP tunnels and the effect of filter rules on IP traffic. There is one row of data for each active stack on the monitored system.

The IPSec Status workspace is displayed when you select the **TCP/IP** navigator item.

Links to Other Workspaces:

Right-click the **Link** icon in the IPSec Status table to display a list of other workspaces. Left-click the **Link** icon to select the default link and navigate to its target workspace.

- **Dynamic IP Tunnels Statistics** (default): Displays cumulative availability and performance statistics for the dynamic IP tunnels known to a TCP/IP stack.
- **IKE Tunnels Statistics**: Displays cumulative availability and performance statistics for all of the IKE tunnels known by the IKE daemon for a TCP/IP stack.
- **IP Filters Statistics**: Displays cumulative statistics for the IP filters in use by a TCP/IP stack.

Data Source:

z/OS Communication Server Network Management Interface.

Default Filter:

None.

Figure 14 on page 143 shows the IPSec Status workspace.

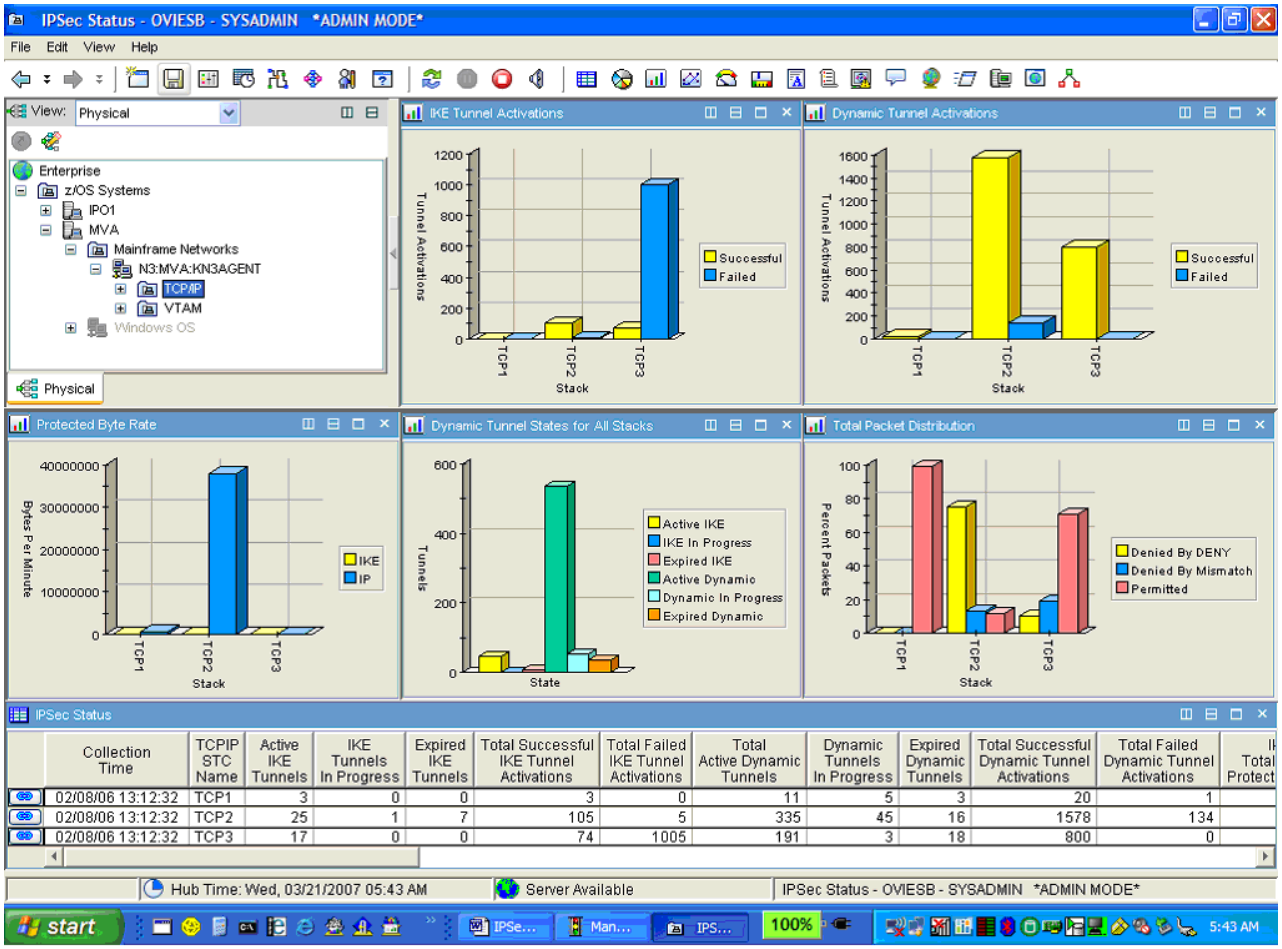


Figure 14. The Tivoli OMEGAMON XE for Mainframe Networks IPSec Status workspace

The IPSec Status workspace displays the following views:

IKE Tunnel Activations

Provides a snapshot of the cumulative number of successful and failed IKE tunnel activations for each TCP/IP stack. This bar chart shows the number of tunnel activations by TCPIP STC name with two bars for each stack as follows:

- Yellow represents successful IKE tunnel activations.
- Blue represents failed IKE tunnel activations.

Dynamic Tunnel Activations

Provides a snapshot of the cumulative number of successful and failed dynamic tunnel activations for each TCP/IP stack. This bar chart shows the number of tunnel activations by TCPIP STC name with two bars for each stack as follows:

- Yellow represents successful dynamic tunnel activations.
- Blue represents failed dynamic tunnel activations.

Protected Byte Rate

Shows the number of bytes per minute being protected by IKE and dynamic IP tunnels for each TCP/IP stack. The bar chart shows the number of bytes per minute by TCP/IP stack name with two bars for each stack as follows:

- Yellow represents IKE tunnels.
- Blue represents IP tunnels.

Dynamic Tunnel States for All Stacks

Provides a snapshot of the cumulative number of tunnels currently in different states across all the known TCP/IP stacks. The bar chart shows the number of tunnels in each of the states as follows:

- Yellow represents current number of active IKE tunnels.
- Blue represents the current number of active dynamic tunnels (including active dynamic SWSA shadow tunnels).
- Pink represents the current number of IKE tunnels in progress (either pending or in negotiation).
- Green represents the current number of dynamic tunnels in progress.
- Turquoise represents the current number of expired IKE tunnels.
- Orange represents the current number of expired dynamic tunnels.

Total Packet Distribution

Shows how packets are being distributed between permit and deny actions by the filters for each of the TCP/IP stacks. The bar charts shows the percentage of packets being permitted or denied (either by deny or mismatch action) by TCP/IP stack name.

- Yellow represents actions denied by deny.
- Blue represents actions denied by mismatch.
- Pink represents permitted actions.

IPSec Status summary table

Displays IP security performance and configuration information for all active TCP/IP stacks for a given z/OS image. Each row represents one of the active stacks running in the z/OS image.

IPSec Status attributes: The following attributes are displayed in the IPSec Status summary table:

- Collection Time
- TCPIP STC Name
- Active IKE Tunnels
- IKE Tunnels in Progress
- Expired IKE Tunnels
- Total Successful IKE Tunnel Activations
- Total Failed IKE Tunnel Activations
- Total Active Dynamic Tunnels
- Dynamic Tunnels In Progress
- Expired Dynamic Tunnels
- Total Successful Dynamic Tunnel Activations
- Total Failed Dynamic Tunnel Activations
- IKE Total Bytes Protected (in G)
- IKE Total Bytes Protected
- IKE Bytes Protected
- IKE Protected Byte Rate
- IP Total Bytes Protected (in G)
- IP Total Bytes Protected
- IP Bytes Protected
- IP Protected Byte Rate
- Total Packets Denied by DENY (in G)
- Total Packets Denied by DENY
- Percent Total Packets Denied by DENY
- Total Packets Denied by Mismatch (in G)
- Total Packets Denied by Mismatch

- Percent Total Packets Denied by Mismatch
- Total Packets Permitted (in G)
- Total Packets Permitted
- Percent Total Packets Permitted
- Total Packets Matched (in G)
- Total Packets Matched
- Total Packets Filtered (in G)
- Total Packets Filtered
- IP Security
- IPv6 Security
- Sysplex-Wide Security Associations (SWSA)
- Filter Logging
- Pre-Decapsulation Filtering
- Filter Set In Use
- Number of Configured Filters
- NAT Keep Alive Interval

For more information about these attributes, refer to the “IPSec Status Attributes” on page 99.

New TCP/IP Workspaces

IP Filters Statistics workspace

The IP Filters Statistics workspace displays cumulative statistics for the IP filters in use by a TCP/IP stack.

To display the IP Filters Statistics workspace, click the **IP Filters** Navigator item.

Additional Workspaces:

Right-click the TCP/IP Navigator item to display the following additional workspaces:

- **IP Filters Statistics** (Default): Displays cumulative statistics for the IP filters in use by a TCP/IP stack.
- **Current IP Filters**: Displays the currently active IP filters in use by a monitored TCP/IP stack on a z/OS system image.

Links To Other Workspaces:

Right-click the **Link** icon in the **IP Filters Statistics** summary table to display the following additional workspaces. Left-click the **Link** icon to select the default link and navigate to its target workspace.

- **Current IP Filters**: Displays the currently active IP filters in use by a monitored TCP/IP stack on a z/OS system image.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

None.

Figure 15 on page 146 shows the IP Filters Statistics workspace.

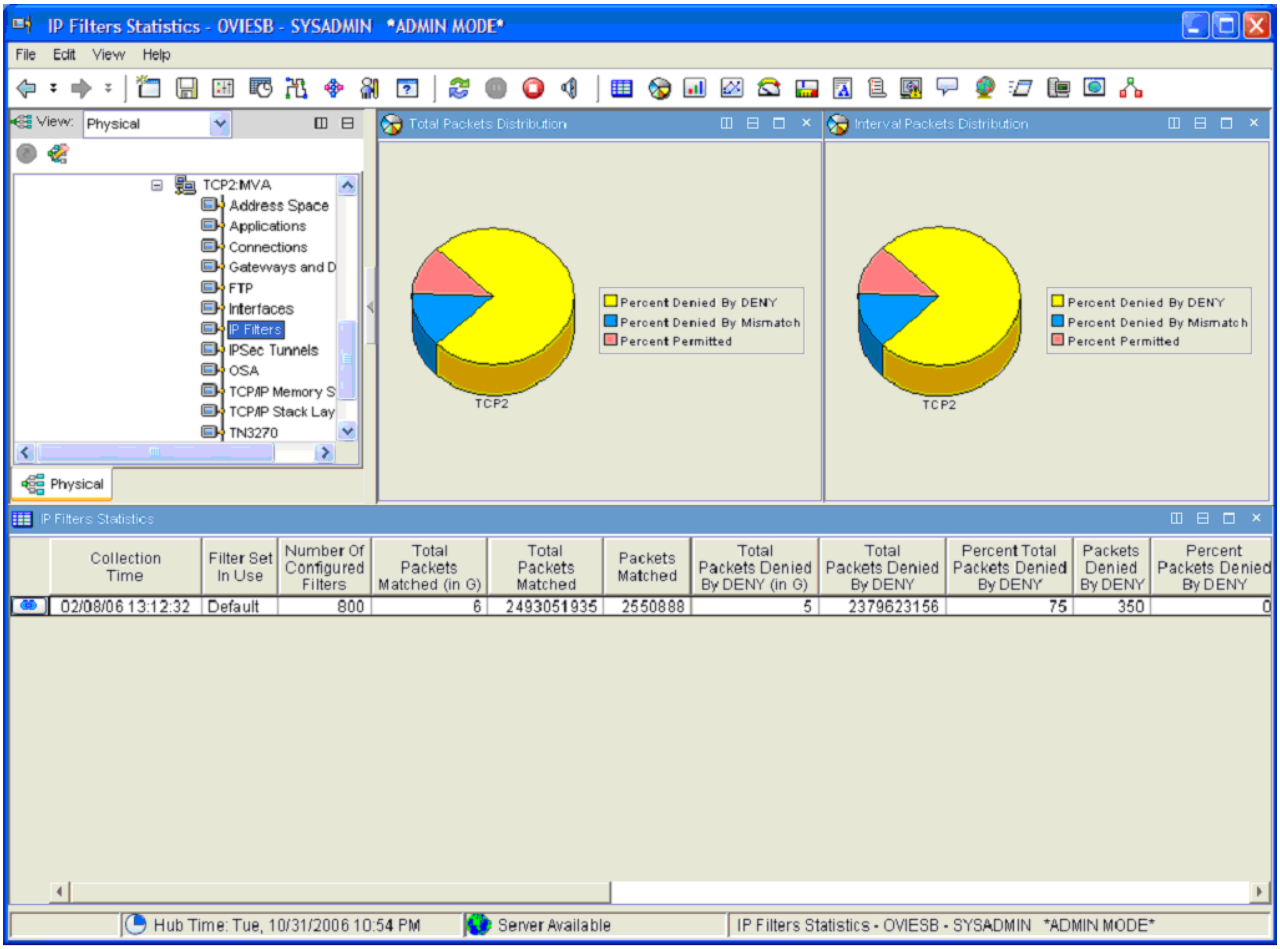


Figure 15. The Tivoli OMEGAMON XE for Mainframe Networks IP Filters Statistics workspace

The IP Filters Statistics workspace displays the following views:

Total Packets Distribution
Shows how all the packets filtered by the stack are distributed between deny and permit actions. This pie chart includes the following data:

- Yellow represents the percentage of packets denied by a DENY action.
- Blue represents the percentage of packets denied by a MISMATCH action.
- Pink represents the percentage of packets permitted.

Interval Packets Distribution
Shows how the packets filtered during the most recent interval are distributed between deny and permit actions. This pie chart includes the following data:

- Yellow represents the percentage of packets during the most recent interval denied by a DENY action.
- Blue represents the percentage of packets during the most recent interval denied by a MISMATCH action.
- Pink represents the percentage of packets permitted during the most recent interval.

IP Filters Statistics summary table
Provides cumulative statistics aggregated across all the filter rules known to the TCP/IP stack.

IP Filter Statistics attributes: The following attributes are displayed in the IP Filters Statistics summary table:

- Collection Time
- Filter Set In Use
- Number of Configured Filters
- Total Packets Matched (in G)
- Total Packets Matched
- Packets Matched
- Total Packets Denied By DENY (in G)
- Total Packets Denied by DENY
- Percent Total Packets Denied By DENY
- Packets Denied By DENY
- Percent Packets Denied By DENY
- Total Packets Denied By Mismatch (in G)
- Total Packets Denied By Mismatch
- Percent Total Packets Denied By Mismatch
- Packets Denied By Mismatch
- Percent Packets Denied By Mismatch
- Total Packets Permitted (in G)
- Total Packets Permitted
- Percent Total Packets Permitted
- Packets Permitted
- Percent Packets Permitted
- Total Packets Filtered (in G)
- Total Packets Filtered
- Packets Filtered

For more information about these attributes, refer to the “IPSec Status Attributes” on page 99.

Current IP Filters workspace: The Current IP Filters Workspace displays the currently active IP filters for a TCP/IP stack.

To display the Current IP Filters workspace, right-click the **IP Filters** navigator item for a specific TCP/IP stack, select **Workspaces** and select the **Current IP Filters** workspace.

Links to Other Workspaces:

Right-click the **Link** icon in the Current IP Filters in Scan Order table to display a list of links to other workspaces. Left-click the **Link** icon to select the default link and navigate to the link’s target workspace.

- **Dynamic IP Tunnels By Filter Rule Definition Name**. (default). This link navigates to the Dynamic IP Tunnels workspace and shows tunnels that have a filter rule definition name that matches the name of the selected filter. This is a conditional link and is displayed in the list of available links only if the filter **Type** is DYNAMIC (4), NATTDYN (6), or NRF (7).
- **Dynamic IP Tunnels By Tunnel ID**: This is a conditional link and is only displayed in the list of available links if the filter type is DYNAMIC (4) or NATTDYN (6) or NRF (7). This link navigates to the Dynamic IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.
- **Manual IP Tunnels by Tunnel ID**: This is a conditional link and is only displayed in the list of available links if the filter type is MANUAL (2). This link navigates to the Manual IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.

- **Current IP Filters In Scan Order By Previous Page:** This is a conditional link and will only be displayed in the list of available links if the page number for the selected link is greater than 0. This link navigates to the Current IP Filters In Scan Order workspace and shows the IP filters that have a page number that is 1 less than the page number for the selected filter.
- **Current IP Filters In Scan Order By Next Page:** This is a conditional link and will only be displayed in the list of available links if the page number for the selected link is less than the value in the Last Page column of the selected row. This link navigates to the Current IP Filters In Scan Order workspace and shows the IP filters that have a page number that is 1 more than the page number for the selected filter.
- **Current IP Filters by Destination Address**: This link causes a dialog box to be displayed that prompts you for a destination IP address that is compared to the currently active filters for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected filter, but you can change this value to be another IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected filter. If you specify an IPv6 address and the selected filter has an IPv4 address, then the linked-to workspace will not find any filters to display. With this address as input, this link navigates to the Current IP Filters By Destination Address Workspace showing the IP filters that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

There can be tens of thousands of IP Filters. The query filter implemented for this workspace retrieves up to 500 IP Filters at a time.

The Tivoli Enterprise Portal displays 100 rows of IPSec Filters at a time. Use the Tivoli Enterprise Portal scrolling controls or change the page number at the top right of the table view to see the remaining IP Filters from the current set of up to 500 IP Filters.

If more than 500 IP Filters exist, a link named **Current IP Filters In Scan Order By Next Page** will be provided in the right-click menu of the link icons for each row in the Current IP Filters in Scan Order table view. Use this link to display each successive group of 500 IP Filters. When no more IP Filters are available for display, the link will not appear in the right click menu. If you have already used the **Current IP Filters In Scan Order By Next Page** link to display additional IP Filters, another link named **Current IP Filters In Scan Order By Previous Page** can be used to return to the previous set of 500 IP Filters.

Figure 16 on page 149 shows the Current IP Filters workspace.

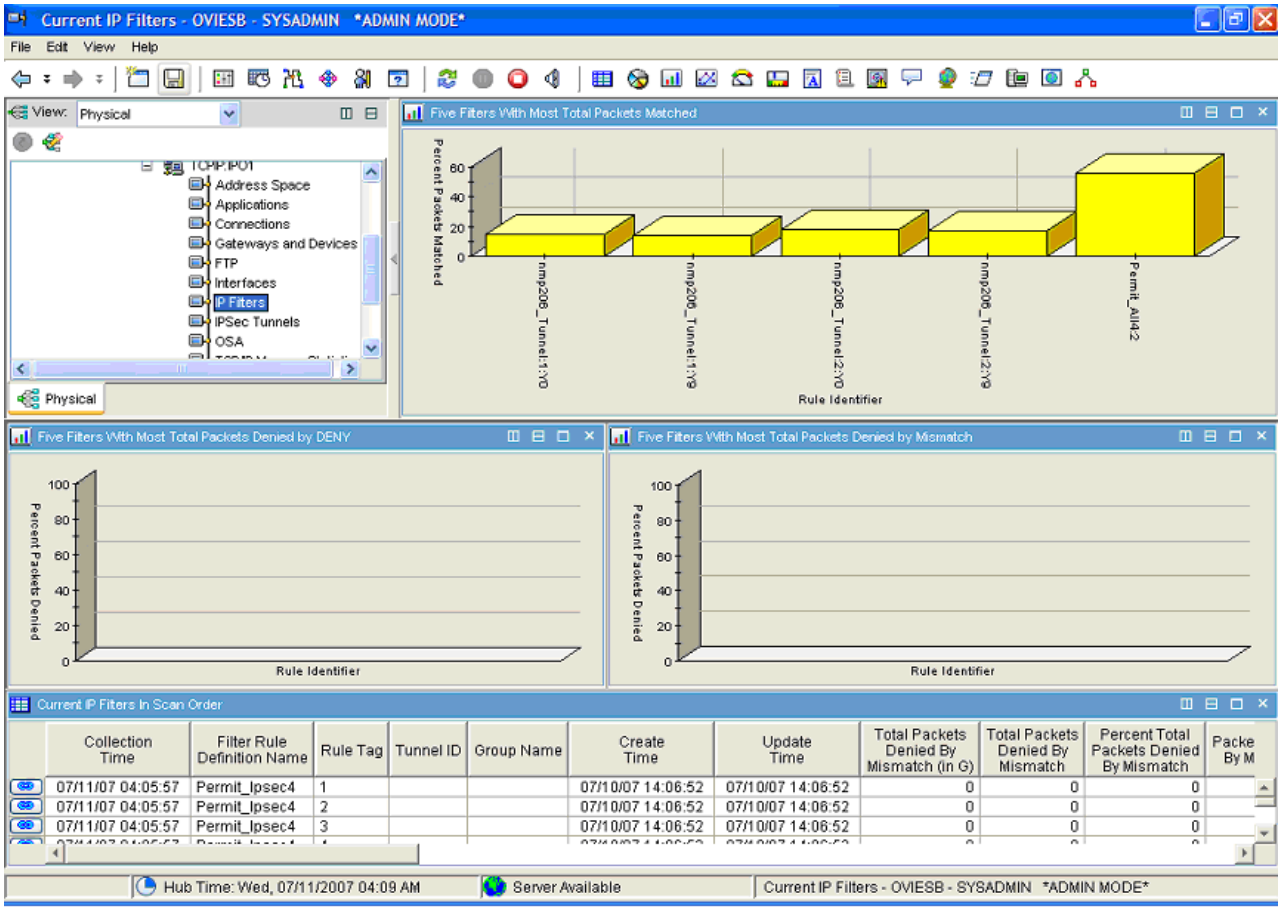


Figure 16. The Tivoli OMEGAMON XE for Mainframe Networks Current IP Filters workspace

The Current IP Filters workspace displays the following views:

Five Filters With Most Total Packets Matched
Displays the five filters that have the highest number of total packets that matched the filter's condition and action in the Current IP Filters table.

Five Filters With Most Total Packets Denied By DENY
Displays the five filters that have the highest number of total packets that matched the filter's condition and for which the action was DENY.

Five Filters With Most Total Packets Denied By Mismatch
Displays the five filters that have the highest number of total packets that matched the filter's condition but did not match the filter's action (for example, if a packet was sent "in the clear" but the action was coded as IPSec). This view can provide an indication of a configuration problem such as packets flowing in the clear when they should be encrypted.

Current IP Filters in Scan Order summary table
This summary table provides performance and configuration data about the currently active IP filters.

Each row in the table represents a single IP filter. The filters are displayed in the order that they would be scanned by the TCP/IP stack when it compares them to packets. The first 500 filters are displayed. Additional filters may be displayed by using the **Current IP Filters In Scan Order By Next Page** link defined for each row.

The rows in the Current IP Filters table have a page column and a last page column associated with them. The page column is initialized by the agent so that rows may be retrieved 500 row at a

time. The last “page” may have fewer than 500 rows. When you navigate to this workspace, the default filter displays the first page of rows or the first 500 filters. The filters are ordered in the table view in the order that the TCP/IP stack scans them to compare them to packets.

Current IP Filters attributes: The following attributes are displayed in the Current IP Filters in Scan Order summary table:

- Collection Time
- Filter Rule Definition Name
- Rule Tag
- Tunnel ID
- Group Name
- Create Time
- Update Time
- Total Packets Denied By Mismatch (in G)
- Total Packets Denied By Mismatch
- Percent Total Packets Denied By Mismatch
- Packets Denied By Mismatch
- Total Packets Matched (in G)
- Total Packets Matched
- Packets Matched
- Percent Total Packets Matched
- Filter Set
- Local Start Action Name
- VPN Action Name
- Type
- State
- Action
- Scope
- Direction
- Security Class
- Protocol Number
- ICMP Type Code
- ICMP Code
- OSPF Type
- On Demand Indicator
- TCP Connect
- SWSA Shadow Indicator
- Source Address
- Upper Source Address
- Lower Source Port
- Upper Source Port
- Destination Address
- Upper Destination Address
- Lower Destination Port
- Upper Destination Port
- NATT Client ID Type

- NATT Client ID
- Upper NATT Client ID
- NATT Peer UDP Port
- NRF Original Port
- NAT Indicator
- NAPT Indicator
- NAT Traversal Gateway
- Log Indicator

For more information about these attributes, refer to the “Current IP Filters Attributes” on page 75.

Current IP Filters by Destination Address workspace: The Current IP Filters By Destination Address workspace displays all the IP filters that match a destination IP address you specify.

One of the ways to display the Current IP Filters by Destination Address workspace is to do the following:

1. Right-click the **IP Filters** navigator item for a specific TCP/IP stack.
2. Select **Workspaces**, and select the **Current IP Filters** workspace.
3. Click the **Link** icon in the **Current IP Filters** summary table and select **Current IP Filters by Destination Address**.
4. Provide a destination IP address for one of the filters in the current stack in the resulting dialog box. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected filter, but you can change this value to be another IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected connection. If you specify an IPv6 address and the selected connection has an IPv4 Destination Address, then the linked to workspace will not find any filters to display. With this address as input, this link navigates to the Current IP Filters By Destination Address Workspace showing the IP filters that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Links to Other Workspaces:

Right-click the **Link** icon in the Current IP Filters by Destination Address table to display a list of links to other workspaces. Left-click the **Link** icon to select the default link and navigate to the link’s target workspace.

- **Dynamic IP Tunnels By Filter Rule Definition Name** (default). This link navigates to the Dynamic IP Tunnels workspace and shows tunnels that have a filter rule definition name that matches the name of the selected filter. This is a conditional link and is displayed in the list of available links only if the filter **Type** is DYNAMIC (4), NATTDYN (6), or NRF (7).
- **Dynamic IP Tunnels By Tunnel ID**: This is a conditional link and is only displayed in the list of available links if the filter type is DYNAMIC (4), NATTDYN (6), or NRF (7). This link navigates to the Dynamic IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.
- **Manual IP Tunnels by Tunnel ID**: This is a conditional link and is only displayed in the list of available links if the filter type is MANUAL (2). This link navigates to the Manual IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.
- **Current IP Filters In Scan Order By Same Page:** This is a conditional link and will only be displayed in the list of available links if the page number for the selected link is greater than 0. This link navigates to the Current IP Filters In Scan Order workspace and shows the IP filters that have a page number that is 1 less than the page number for the selected filter. If the active filters have changed significantly between collection intervals (for example, if the filter set in use was switched or a large number of filters became inactive), link might display a workspace with no filters.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the destination IP address you provided.

Figure 17 shows the Current IP Filters by Destination Address workspace.

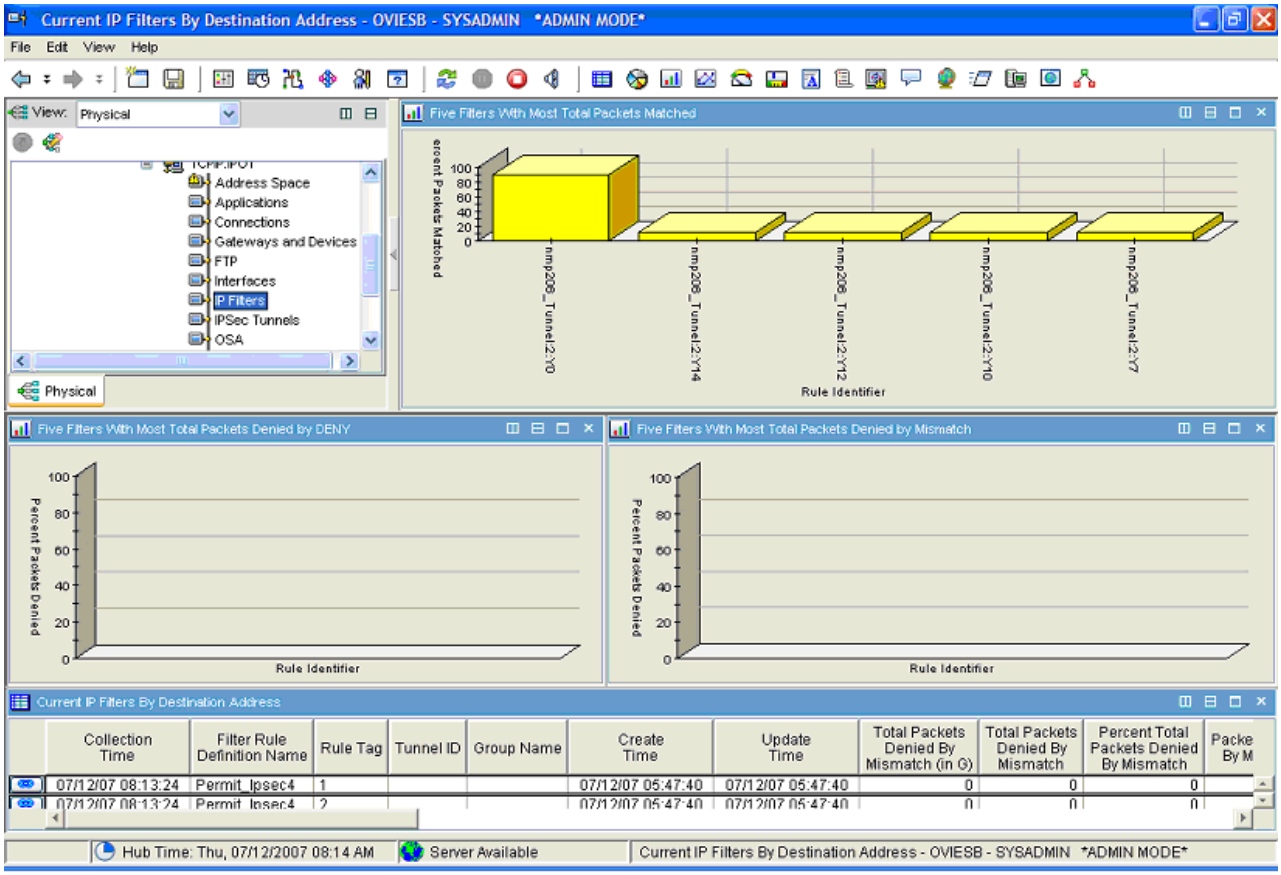


Figure 17. The Tivoli OMEGAMON XE for Mainframe Networks Current IP Filters by Destination Address workspace

The Current IP Filters by Destination Address workspace displays the following views:

Five Filters With Most Total Packets Matched

Displays the five filters that have the highest number of total packets that matched the filter's condition and action in the Current IP Filters table.

Five Filters With Most Total Packets Denied By DENY

Displays the five filters that have the highest number of total packets that matched the filter's condition and for which the action was DENY.

Five Filters With Most Total Packets Denied By Mismatch

Displays the five filters that have the highest number of total packets that matched the filter's condition but did not match the filter's action (for example, if a packet was sent "in the clear" but the action was coded as IPSec). This view can provide an indication of a configuration problem such as packets flowing in the clear when they should be encrypted.

Current IP Filters by Destination Address summary table

This summary table provides performance and configuration data about currently active IP filters. Each row in the table represents a single IP filter. The first 500 filters are displayed. Additional filters may be displayed by following one of the links.

Current IP Filters by Destination Address attributes: For more information about the attributes available from this workspace, refer to the “Current IP Filters attributes” on page 150.

Current IP Filters by Filter Rule Definition Name workspace: The Current IP Filters By Filter Rule Definition Name workspace displays the IP filters whose filter rule definition name matches the name passed in the link.

One of the ways to display the Current IP Filters by Filter Rule Definition Name workspace is to do the following:

1. Right-click the **IPSec Tunnels** navigator items for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Dynamic IP Tunnels** workspace.
3. From the **Dynamic IP Tunnels With Byte Rate = 0** summary table or the **Dynamic IP Tunnels With Byte Rate >= 2048** summary table, right-click a **Link** icon and select **Current IP Filters By Filter Rule Definition Name**. Rows of data are displayed that match the rule name.

Links to Other Workspaces:

Right-click the **Link** icon in the Current IP Filters by Filter Rule Definition Name table to display a list of links to other workspaces. Left-click the **Link** icon to select the default link and navigate to the link’s target workspace.

- **Dynamic IP Tunnels by Tunnel ID** (default): This is a conditional link displayed in the list of available links only if the filter type is DYNAMIC (4), NATTDYN (6), or NRF (7). This link navigates to the Dynamic IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.
- **Current IP Filters in Scan Order By Same Page Workspace**: This link navigates to the Current IP Filters in Scan Order workspace and shows the IP filters that have a page number that is the same as the page for the selected filter. If the active filters have changed significantly between collection intervals (for example, if the filter set in use was switched or a large number of filters became inactive), this link might display a workspace with no filters
- **Current IP Filters by Destination Address**: This link causes a dialog box to be displayed that prompts you for a destination IP address that is compared to the currently active filters for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected filter, but you can change this value to be another IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected filter. If you specify an IPv6 address and the selected filter has an IPv4 address, then the linked-to workspace will not find any filters to display. With this address as input, this link navigates to the Current IP Filters By Destination Address Workspace showing the IP filters that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

The table in this workspace is filtering based on the Filter Rule Definition Name attribute.

Figure 16 on page 149 shows the Current IP Filters by Filter Rule Definition Name workspace.

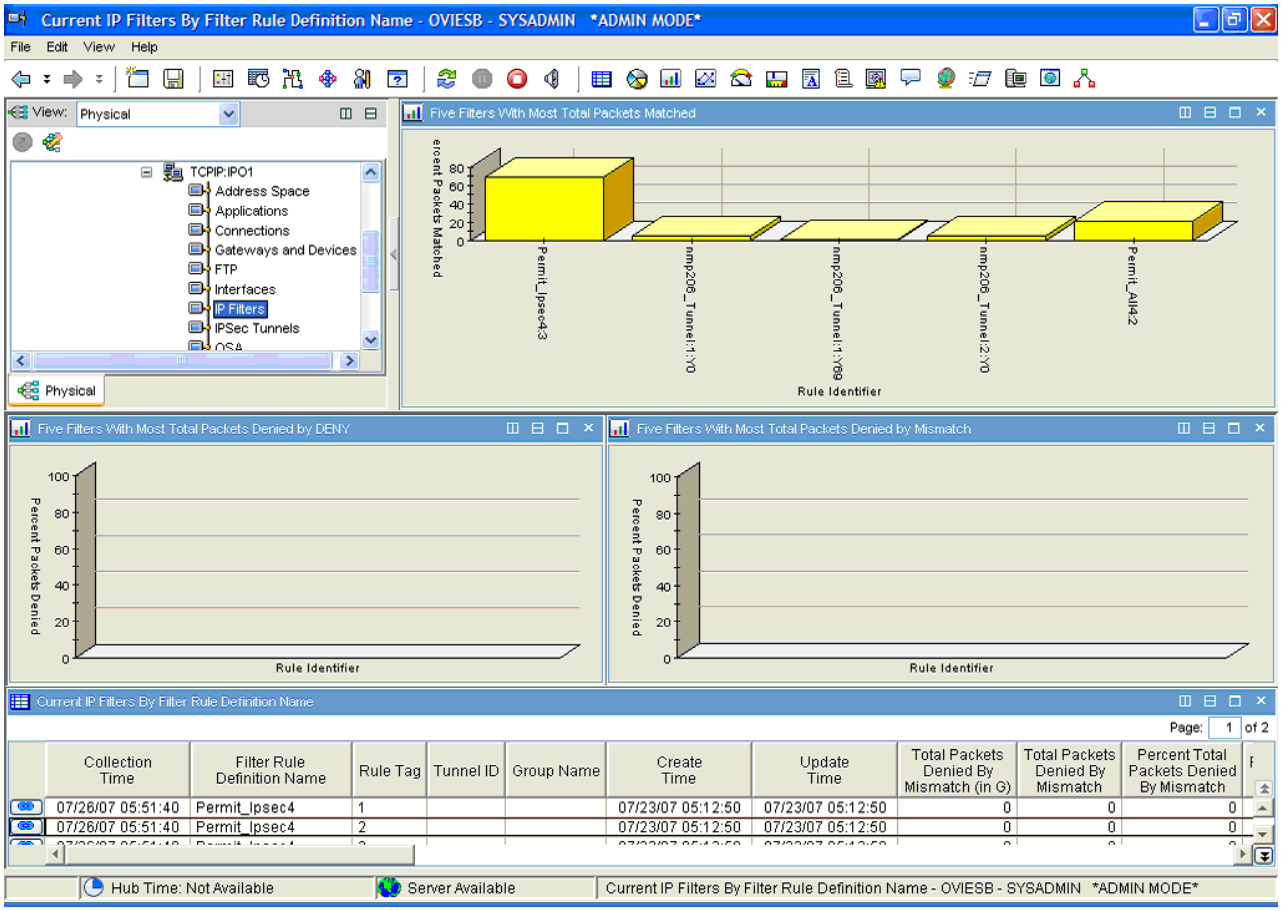


Figure 18. The Tivoli OMEGAMON XE for Mainframe Networks Current IP Filters by Filter Rule Definition Name workspace

The Current IP Filters by Filter Rule Definition Name workspace displays the following views:

Five Filters With Most Total Packets Matched
Displays the five filters that have the highest number of total packets that matched the filter's condition and action in the Current IP Filters table.

Five Filters With Most Total Packets Denied By DENY
Displays the five filters that have the highest number of total packets that matched the filter's condition and for which the action was DENY.

Five Filters With Most Total Packets Denied By Mismatch
Displays the five filters that have the highest number of total packets that matched the filter's condition but did not match the filter's action (for example, if a packet was sent "in the clear" but the action was coded as IPSec). This view can provide an indication of a configuration problem such as packets flowing in the clear when they should be encrypted.

Current IP Filters by Filter Rule Definition Name summary table
Provides performance and configuration data about currently active IP filters specified by the filter rule definition name. Each row in the table represents a single IP filter. The filters are displayed in the order that they would be scanned by the TCP/IP stack when it compares them to packets.

Current IP Filters by Filter Rule Definition Name attributes: For more information about the attributes available from this workspace, refer to the "Current IP Filters attributes" on page 150.

Current IP Filters in Scan Order workspace: The Current IP Filters in Scan Order workspace is used to display IP filters beyond the first 500 IP Filters shown in the Current IP Filters Workspace. The filters are displayed in the order that the stack would scan them to match them to packets.

One of the ways to display the Current IP Filters in Scan Order workspace is to do the following:

1. Right-click the **IP Filters** navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Current IP Filters** workspace.
3. Click the **Link** icon in the **Current IP Filters** summary table and select the **Current IP Filters in Scan Order by Next Page** link. Rows of data are displayed that match the scan order.

Links to Other Workspaces:

Right-click the **Link** icon in the Current IP Filters in Scan Order table to display a list of links to other workspaces. Left-click the **Link** icon to select the default link and navigate to the link's target workspace.

- **Dynamic IP Tunnels By Filter Rule Definition Name** (default). This link navigates to the Dynamic IP Tunnels by Filter Rule Definition Name workspace and shows tunnels that have a **Filter Rule Definition Name** that matches the name of the selected filter. This is a conditional link and is displayed in the list of available links only if the filter **Type** is DYNAMIC (4), NATTDYN (6), or NRF (7).
- **Dynamic IP Tunnels By Tunnel ID**: This is a conditional link and is only displayed in the list of available links if the filter type is DYNAMIC (4), NATTDYN (6), or NRF (7). This link navigates to the Dynamic IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.
- **Manual IP Tunnels by Tunnel ID**: This is a conditional link and is only displayed in the list of available links if the filter type is MANUAL (2). This link navigates to the Manual IP Tunnels workspace and shows tunnels that have a tunnel ID that matches the tunnel ID associated with the selected filter.
- **Current IP Filters In Scan Order By Previous Page:** This is a conditional link and will only be displayed in the list of available links if the page number for the selected link is greater than 0. This link navigates to the Current IP Filters In Scan Order workspace and shows the IP filters that have a page number that is 1 less than the page number for the selected filter. If the active filters have changed significantly between collection intervals (for example, if the filter set in use was switched or a large number of filters became inactive), this link will display a workspace with no filters.
- **Current IP Filters In Scan Order By Next Page:** This is a conditional link and will only be displayed in the list of available links if the page number for the selected link is greater than 0. This link navigates to the Current IP Filters In Scan Order workspace and shows the IP filters that have a page number that is 1 less than the page number for the selected filter. If the active filters have changed significantly between collection intervals (for example, if the filter set in use was switched or a large number of filters became inactive), this link will display a workspace with no filters.
- **Current IP Filters by Destination Address**: This link causes a dialog box to be displayed that prompts you for a destination IP address that is compared to the currently active filters for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected filter, but you can change this value to be another IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected filter. If you specify an IPv6 address and the selected filter has an IPv4 address, then the linked-to workspace will not find any filters to display. With this address as input, this link navigates to the Current IP Filters By Destination Address Workspace showing the IP filters that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

There can be tens of thousands of IP Filters. The query filter implemented for this workspace retrieves up to 500 IP Filters at a time.

The Tivoli Enterprise Portal displays 100 rows of IPSec Filters at a time. Use the Tivoli Enterprise Portal scrolling controls or change the page number at the top right of the table view to see the remaining IP Filters from the current set of up to 500 IP Filters.

If more IP Filters exist beyond the set of 500 currently displayed, a link named **Current IP Filters In Scan Order By Next Page** will be provided in the right-click menu of the link icons for each row in the Current IP Filters in Scan Order table view. Use this link to display each successive group of 500 IP Filters. When no more IP Filters are available for display, the link will not appear in the right click menu. If you have already used the **Current IP Filters In Scan Order By Next Page** link to display additional IP Filters, another link named **Current IP Filters In Scan Order By Previous Page** can be used to return to the previous set of 500 IP Filters.

Figure 16 on page 149 shows the Current IP Filters in Scan Order workspace.

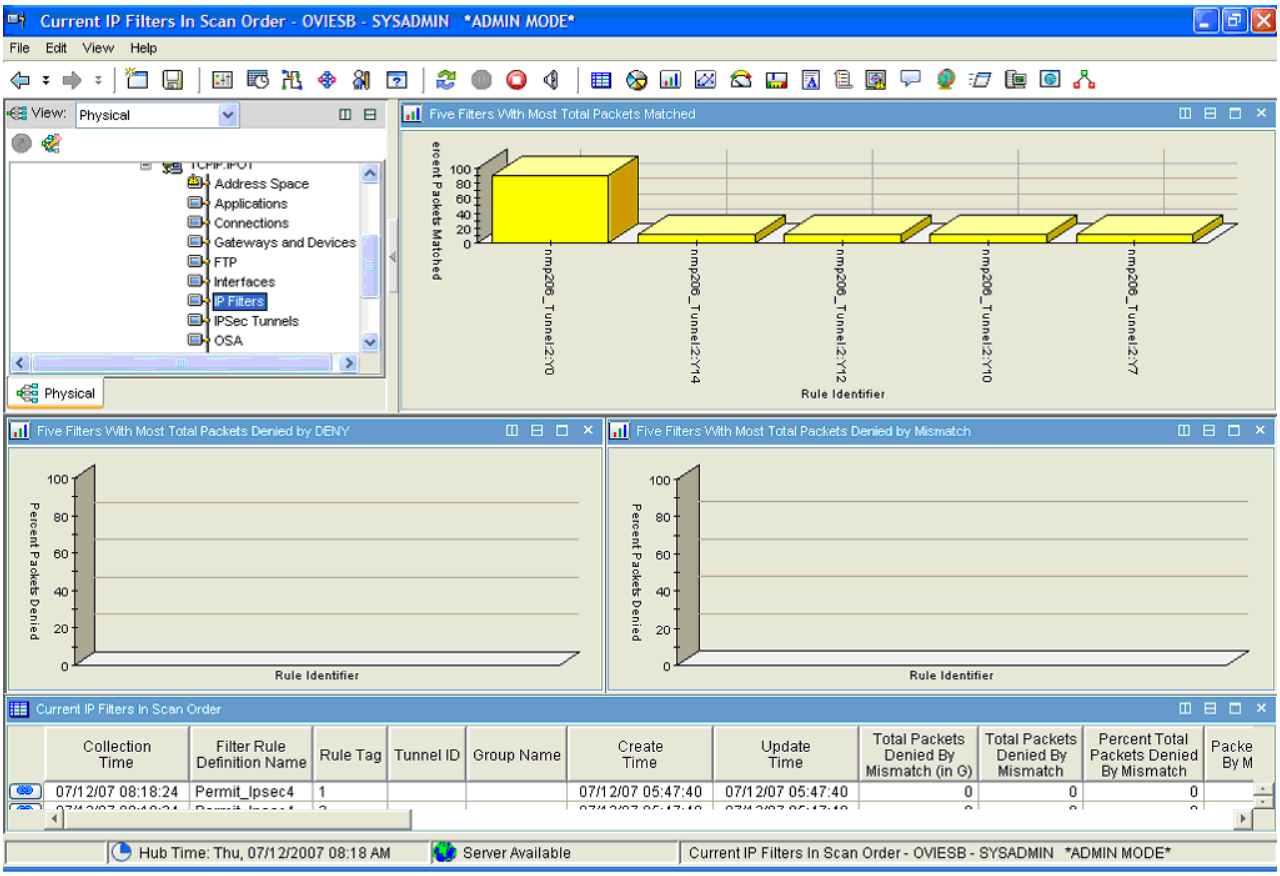


Figure 19. The Tivoli OMEGAMON XE for Mainframe Networks Current IP Filters in Scan Order workspace

The Current IP Filters in Scan Order workspace displays the following views:

Five Filters With Most Total Packets Matched

Displays the five filters that have the highest number of total packets that matched the filter's condition and action in the Current IP Filters table.

Five Filters With Most Total Packets Denied By DENY
Displays the five filters that have the highest number of total packets that matched the filter's condition and for which the action was DENY.

Five Filters With Most Total Packets Denied By Mismatch
Displays the five filters that have the highest number of total packets that matched the filter's condition but did not match the filter's action (for example, if a packet was sent "in the clear" but the action was coded as IPSec). This view can provide an indication of a configuration problem such as packets flowing in the clear when they should be encrypted.

Current IP Filters in Scan Order summary table
This summary table provides performance and configuration data about the IP filters that are grouped on the same logical page. The filters are displayed in the order that they would be scanned by the TCP/IP stack when it compares them to packets.

Current IP Filters in Scan Order attributes: For more information about the attributes available from this workspace, refer to the "Current IP Filters attributes" on page 150.

Dynamic IP Tunnels Statistics workspace

The Dynamic IP Tunnels Statistics workspace displays cumulative availability and performance statistics for the dynamic IP tunnels known to a TCP/IP stack.

The Dynamic IP Tunnels Statistics workspace can be displayed by clicking the **IPSec Tunnels** Navigator item of each monitored TCP/IP stack.

Additional Workspaces:
Right-click the **IPSec Tunnels** Navigator item to display the following additional workspaces:

- **Dynamic IP Tunnels Statistics** (default): Displays cumulative availability and performance statistics for the dynamic IP tunnels known to a TCP/IP stack.
- **Dynamic IP Tunnels**: Displays availability and performance statistics for dynamic IP tunnels known to the IKE daemon and the TCP/IP stack. Because of the large number of possible dynamic tunnels, this workspace has a predefined default filter when initially opened. The table view displays only those tunnels with a byte rate >= 2048
- **Manual IP Tunnels**: Displays availability and performance statistics for manual IP tunnels known to a specific TCP/IP stack.
- **IKE Tunnels Statistics**: Displays cumulative availability and performance statistics for all of the IKE tunnels known by the IKE daemon for a TCP/IP stack.
- **IKE Tunnels**: Displays availability and performance statistics for the IKE tunnels known to a specific TCP/IP stack.
- **Dynamic IP Tunnels with Byte Rate < 2048**: Displays availability and performance statistics for dynamic IP tunnels with a byte rate of less than 2048 bytes known to the IKE daemon and the TCP/IP stack.
- **IKE Tunnel with Byte Rate < 1024**: Displays availability and performance statistics for the IKE tunnels with a byte rate less than 1024 known to a specific TCP/IP stack.

Links to Other Workspaces:
Right-click the **Link** icon in the Dynamic IP Tunnels Statistics summary table to display a list of links to other workspaces. Left-click the **Link** icon to select the default link and navigate to its target workspace.

- **Dynamic IP Tunnels**: (default) Displays cumulative availability and performance statistics for the dynamic IP tunnels known to a TCP/IP stack.
- **Dynamic IP Tunnels With Byte Rate < 2048**: Displays availability and performance statistics for dynamic IP tunnels with a byte rate of less than 2048 bytes known to the IKE daemon and the TCP/IP stack.
- **Manual IP Tunnels**: Displays availability and performance statistics for manual IP tunnels know to a specific TCP/IP stack.

Data Source:

z/OS Communication Server Network Management Interface.

Default Filter:

None.

Figure 21 on page 161 shows the Dynamic IP Tunnels Statistics workspace.

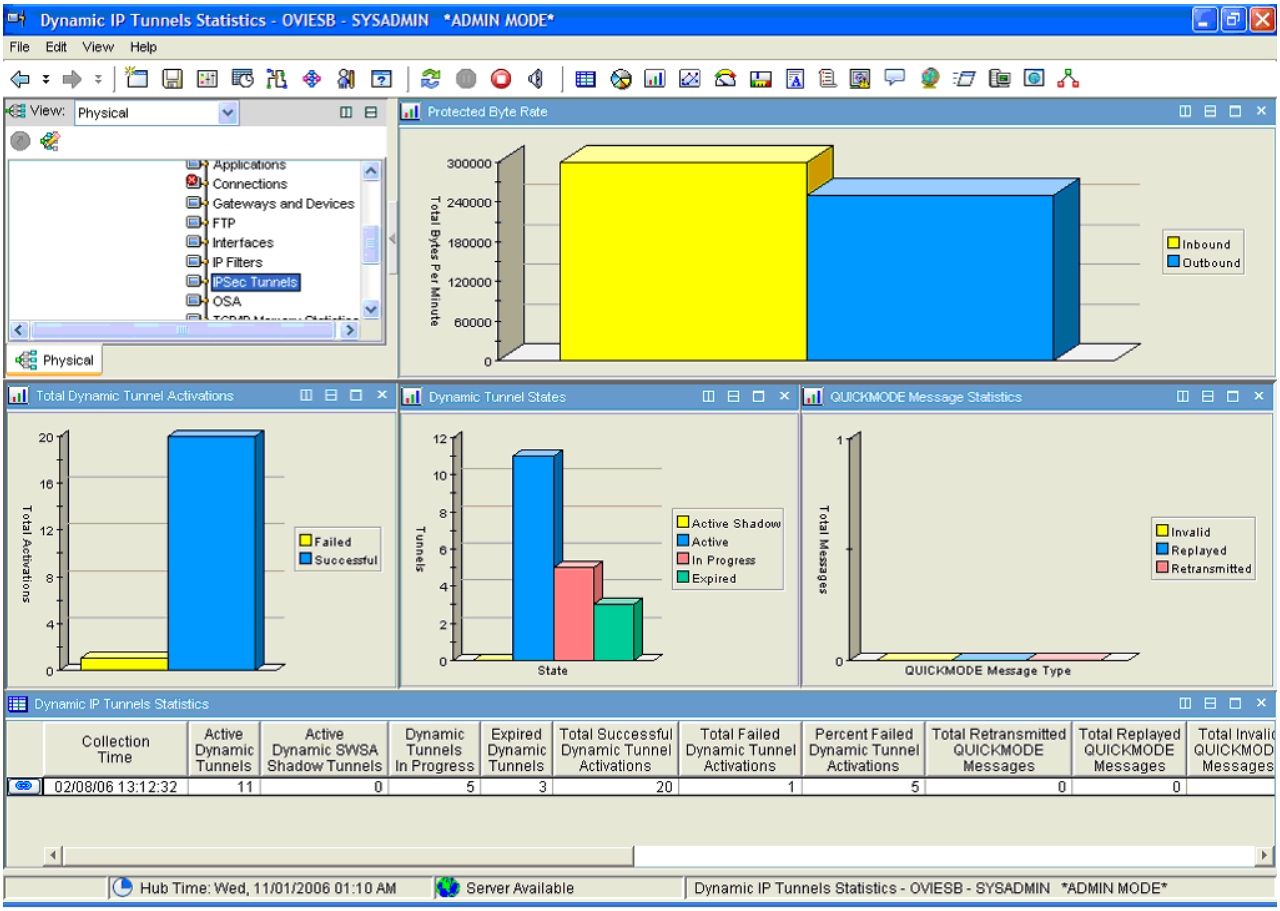


Figure 20. The Tivoli OMEGAMON XE for Mainframe Networks Dynamic IP Tunnels Statistics workspace

The Dynamic IP Tunnels Statistics workspace displays the following views:

Protected Byte Rate

Shows the rate at which data is flowing through all of the dynamic IPSec tunnels on the stack. This view can be used to see which tunnels are being used the most. The graph is a bar chart where:

- Yellow represents the inbound byte rate expressed as number of bytes per minute.
- Blue represents the outbound byte rate expressed as number of bytes per minute.

Total Dynamic Tunnel Activations

Shows the cumulative number of successful and failed dynamic tunnel activations since the stack was started. The graph is a bar chart where:

- Yellow represents the number of dynamic tunnels that were successfully activated
- Blue represents the number of dynamic tunnels that failed to be activated.

Dynamic Tunnel States

Shows the dynamic IP tunnels known by the TCP/IP stack grouped by state. The graph is a bar chart where:

- Yellow represents the number of Active Shadow (SWSA) tunnels.
- Blue represents the number of Active tunnels.
- Pink represents the number of In Progress (either pending or in negotiation) tunnels.
- Green represents the number of Expired tunnels.

Quickmode Message Statistics

Provides cumulative statistics about QUICKMODE messages used to negotiate dynamic IPSec tunnels since the IKE daemon was started. High numbers of retransmits and replays may indicate a network problem between the security endpoints (IKEs). Non-zero values for invalid messages may indicate a possible attack. The graph is a bar chart where:

- Yellow represents the number Invalid QUICKMODE messages.
- Blue represents the number Replayed QUICKMODE messages.
- Pink represents the number of Retransmitted QUICKMODE messages.

Dynamic IP Tunnels Statistics summary table

Provides cumulative performance and availability data aggregated across all the dynamic IP tunnels known to the TCP/IP stack and the IKE daemon since the TCP/IP stack was started.

Dynamic IP Tunnels Statistics attributes: The following attributes are displayed in the Dynamic IP Tunnels Statistics summary table:

- Collection Time
- Active Dynamic Tunnels
- Active Dynamic SWSA Shadow Tunnels
- Dynamic Tunnels In Progress
- Expired Dynamic Tunnels
- Total Successful Dynamic Tunnel Activations
- Total Failed Dynamic Tunnel Activations
- Total Retransmitted QUICKMODE Messages
- Total Replayed QUICKMODE Messages
- Total Invalid QUICKMODE Messages
- IP Total Outbound Bytes Protected (in G)
- IP Total Outbound Bytes Protected
- IP Outbound Bytes Protected
- IP Outbound Protected Byte Rate
- IP Total Inbound Bytes Protected (in G)
- IP Total Inbound Bytes Protected
- IP Inbound Bytes Protected
- IP Inbound Protected Byte Rate

For more information about these attributes, refer to the “IPSec Status Attributes” on page 99.

Dynamic IP Tunnels workspace: The Dynamic IP tunnels workspace displays availability and performance statistics for dynamic IP tunnels known to the IKE daemon and the TCP/IP stack. Because of the large number of possible dynamic tunnels, this workspace has a predefined default filter when initially opened. These table views displays only those tunnels with a byte rate >= 2048 or = 0.

One of the ways to display the Dynamic IP Tunnels workspace is to right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack, select **Workspaces** and select the **Dynamic IP Tunnels** workspace.

Links to Other Workspaces:

The following additional workspaces can be accessed by clicking the **Link** icon in the Dynamic IP Tunnels With Byte Rate >= 2048 or the Dynamic IP Tunnels with Byte Rate = 0 summary tables:

- **IKE Tunnels by Tunnel ID** (default): Navigates to the IKE Tunnels By Tunnel ID workspace and displays the IKE tunnel used to activate the selected tunnel.
- **Current IP Filters by Filter Rule Defintion Name**: Navigates to the Current IP Filters By Filter Rule Definition Name workspace and displays the IP filter used to activate the selected tunnel.
- **Dynamic IP Tunnels by Destination Address**: Navigates to the Current IP Tunnels By Destination Address workspace and displays tunnels that match the destination IP address you specified in the **Destination Address** dialog box. This dialog box prompts you for a destination IP address that is compared to the currently active tunnels for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the Destination Address column for the selected tunnel, but you can change this value to be any IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected connection. If you specify an IPv6 address and the selected connection has an IPv4 address, then the linked-to workspace will not find any tunnels to display. With this address as input, this link navigates to the Dynamic IP Tunnels By Destination Address workspace showing the IP tunnels that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communications Server Network Management Interfaces

Default Filter:

There could be thousands of dynamic IP tunnels. This workspace must have a predefined default filter when initially opened. These table views display only tunnels with a byte rate >= 2048 or tunnels where the byte rate = 0.

Figure 21 on page 161 shows the Dynamic IP Tunnels workspace.

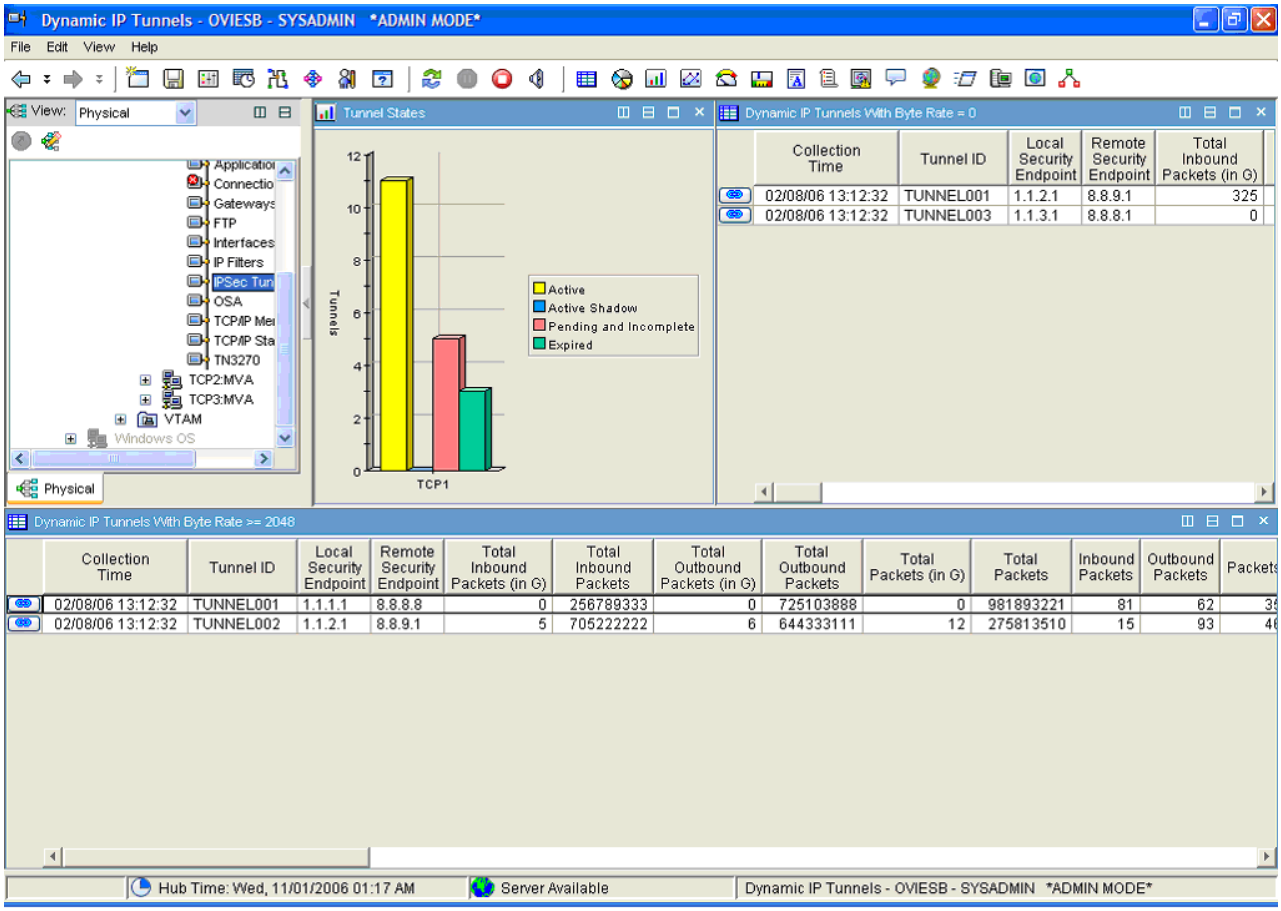


Figure 21. The Tivoli OMEGAMON XE for Mainframe Networks Dynamic IP Tunnels workspace

The Dynamic IP Tunnels workspace displays the following views:

Tunnel States
Shows the current number of dynamic IP tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec status table instead of the Dynamic IP tunnels table. The graph is a bar chart where:

- Yellow represents the number of Active tunnels.
- Blue represents the number of Active Shadow (SWSA) tunnels.
- Pink represents the number of Pending or Incomplete tunnels.
- Green represents the number of Expired tunnels.

Dynamic IP Tunnels with Byte Rate = 0 summary table
Provides performance and configuration information for dynamic IP tunnels that are active and had a byte rate of 0 in the most recent interval. A byte rate of 0 could be indicative of a problem with the tunnel. Each row in the table represents a single dynamic IP tunnel.

Dynamic IP Tunnels with Byte Rate >= 2048 summary table
Provides performance and configuration data about dynamic IP tunnels that had a byte rate >= 2048 in the most recent interval. Each row in the table represents a single dynamic IP tunnel.

Dynamic IP Tunnels attributes: The following attributes are displayed in the **Dynamic IP Tunnels with Byte Rate = 0** and **Dynamic IP Tunnels with Byte Rate >= 2048** summary tables.

- Collection Time
- Tunnel ID

- Local Security Endpoint
- Remote Security Endpoint
- Total Inbound Packets (in G)
- Total Inbound Packets
- Total Outbound Packets (in G)
- Total Outbound Packets
- Total Packets (in G)
- Total Packets
- Inbound Packets
- Outbound Packets
- Packets
- Packet Rate
- Total Inbound Bytes (in G)
- Total Inbound Bytes
- Total Outbound Bytes (in G)
- Total Outbound Bytes
- Total Bytes (in G)
- Total Bytes
- Inbound Bytes
- Outbound Bytes
- Bytes
- Byte Rate
- State
- Extended State
- SWSA Shadow Indicator
- Pending New Indicator
- Source Address
- Upper Source Address
- Source Port
- Destination Address
- Upper Destination Address
- Destination Port
- Protocol
- Filter Rule Definition Name
- VPN Action Name
- Local Dynamic VPN Rule Name
- Encapsulation Mode
- Authentication Protocol
- Authentication Algorithm
- Encryption Algorithm
- Parent IKE Tunnel ID
- Current Life Size
- Life Size
- Refresh Life Size
- Life Expiration Time

- Life Refresh Time
- VPN Life Expiration Time
- Activation Method
- Diffie-Hellman Group
- Remote IKE UDP Port
- Local NAT Indicator
- Remote NAT Indicator
- Remote NAPT Indicator
- Remote NAT Traversal Gateway Indicator
- Remote zOS Indicator
- Initiation Indicator

For more information about these attributes, refer to the “Dynamic IP Tunnels Attributes” on page 84.

Dynamic IP Tunnels by Destination Address workspace: The Dynamic IP Tunnels by Destination Address workspace displays availability and performance statistics for dynamic IP tunnels known to the IKE daemon and the TCP/IP stack.

Summary information is displayed in the **Dynamic IP Tunnels With Byte Rate = 0** summary table and the **Dynamic IP Tunnels by Destination Address** summary table.

One of the ways to display the Dynamic IP Tunnels by Destination Address workspace is to do the following:

1. Right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Dynamic IP Tunnels** workspace.
3. Click the **Link** icon by one of the rows of the **Dynamic IP Tunnels With Byte Rate >= 2048** summary table.
4. Select the **Dynamic IP Tunnels by Destination Address** link.

Links to Other Workspaces:

The following additional workspaces can be accessed by clicking the **Link** icon in the Dynamic IP Tunnels by Destination Address summary table:

- **IKE Tunnel by Tunnel ID** (default): Navigates to the IKE Tunnels By Tunnel ID workspace and displays the IKE tunnel used to activate the selected tunnel.
- **Current IP Filters by Filter Rule Definition Name**: Navigates to the Current IP Filters By Filter Rule Definition Name workspace and displays the IP filter used to activate the selected tunnel.
- **Dynamic IP Tunnels by Destination Address** (this workspace)

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the following attributes:

- Byte Rate = 0
- Destination Address

Figure 22 on page 164 shows the Dynamic IP Tunnels by Destination Address workspace.

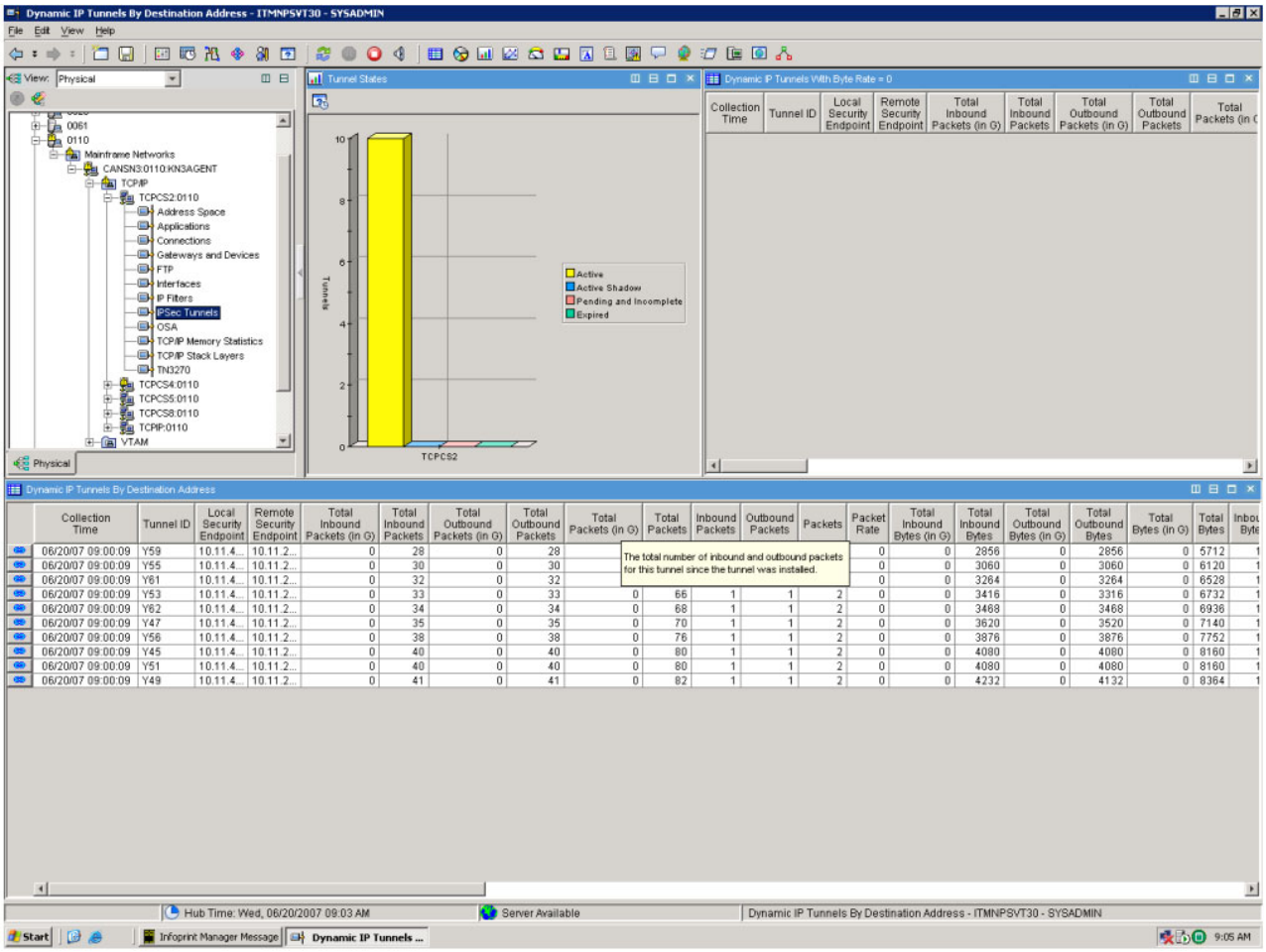


Figure 22. The Tivoli OMEGAMON XE for Mainframe Networks Dynamic IP Tunnels by Destination Address workspace

The Dynamic IP Tunnels by Destination Address Workspace contains the following views:

- **Tunnel States**: Shows the current number of dynamic IP tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec status table instead of the Dynamic IP tunnels table. The graph is a bar chart where:
  - Yellow represents the number of Active tunnels.
  - Blue represents the number of Active Shadow (SWSA) tunnels.
  - Pink represents the number of Pending or Incomplete tunnels.
  - Green represents the number of Expired tunnels.
- **Dynamic IP Tunnels with Byte Rate = 0** summary table: Provides performance and configuration information for dynamic IP tunnels to any destination address that are active and had a byte rate of 0 in the most recent interval. A byte rate of 0 could be indicative of a problem with the tunnel. Each row in the table represents a single dynamic IP tunnel.
- **Dynamic IP Tunnels by Destination Address** summary table: Provides performance and configuration data about dynamic IP tunnels that match the destination IP address you specified in the destination address dialog box. Each row in the table represents a single dynamic IP tunnel.

Dynamic IP Tunnels by Destination Address attributes: For a complete list of the attributes displayed in the **Dynamic IP Tunnels with Byte Rate = 0** and **Dynamic IP Tunnels by Destination Address** summary tables, see the “Dynamic IP Tunnels attributes” on page 161.

Dynamic IP Tunnels by Filter Rule Definition Name workspace: The Dynamic IP Tunnels by Filter Rule Definition Name workspace displays availability and performance statistics for dynamic IP tunnels that match a filter name passed in via a link.

One way to display the Dynamic IP Tunnels by Filter Rule Definition Name workspace is to do the following:

1. Right-click the **IP Filters** Navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Current IP Filters** workspace.
3. Click the **Link** icon by one of the rows in the **Current IP Filters in Scan Order** summary table.
4. If you have selected a filter that is associated with a dynamic IP tunnel, the **Dynamic IP Tunnels by Filter Rule Definition Name** conditional link is displayed. This link is available only for filters with a **Type** value of DYNAMIC, NATTDYN or NRF.

Links to Other Workspaces:

The following additional workspaces can be accessed by right-clicking the **Link** icon in the Dynamic IP Tunnels by Filter Rule Definition Name summary table:

- **IKE Tunnels by Tunnel ID** (default): Navigates to the IKE Tunnels By Tunnel ID workspace and displays the IKE tunnel used to activate the selected tunnel.
- **Current IP Filters by Filter Rule Definition Name**: Navigates to the Current IP Filters By Filter Rule Definition Name workspace and displays the IP filter used to activate the selected tunnel.
- **Dynamic IP Tunnels by Destination Address**: Navigates to the Current IP Tunnels By Destination Address workspace and displays tunnels that match the destination IP address you specified in the Destination Address dialog box. This dialog box prompts you for a destination IP address that is compared to the currently active tunnels for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected tunnel, but you can change this value to be any IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected connection. If you specify an IPv6 address and the selected connection has an IPv4 address, then the linked-to workspace will not find any tunnels to display. With this address as input, this link navigates to the Dynamic IP Tunnels By Destination Address workspace showing the IP tunnels that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the following attributes:

- Filter Name
- Byte Rate = 0

Figure 23 on page 166 shows the Dynamic IP Tunnels by Filter Rule Definition Name workspace.

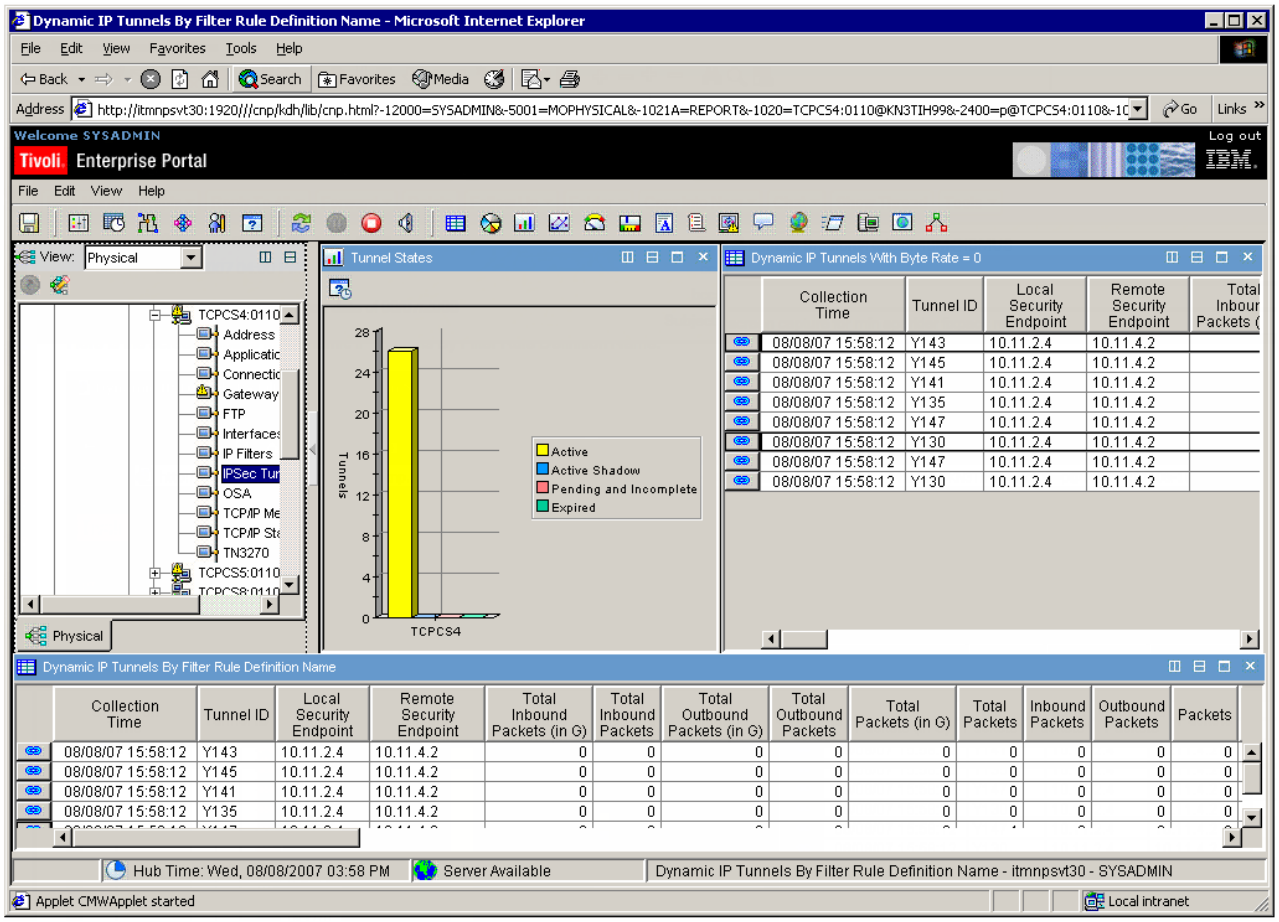


Figure 23. The Tivoli OMEGAMON XE for Mainframe Networks Dynamic IP Tunnels by Filter Rule Definition Name workspace

The Dynamic IP Tunnels by Filter Rule Definition Name Workspace contains the following views:

- **Tunnel States**: Shows the current number of dynamic IP tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec status table instead of the Dynamic IP tunnels table. The graph is a bar chart where:
  - Yellow represents the number of Active tunnels.
  - Blue represents the number of Active Shadow (SWSA) tunnels.
  - Pink represents the number of Pending or Incomplete tunnels.
  - Green represents the number of Expired tunnels.
- **Dynamic IP Tunnels with Byte Rate = 0** summary table: Provides performance and configuration information for dynamic IP tunnels to any destination address that are active and had a byte rate of 0 in the most recent interval. A byte rate of 0 could be indicative of a problem with the tunnel. Each row in the table represents a single dynamic IP tunnel.
- **Dynamic IP Tunnels by Filter Rule Definition Name** summary table: Provides performance and configuration data about dynamic IP tunnels that matched the filter rule definition name query in the most recent interval. Each row in the table represents a single dynamic IP tunnel.

Dynamic IP Tunnels by Filter Rule Definition Name attributes: For a complete list of the attributes displayed in the **Dynamic IP Tunnels with Byte Rate = 0** and **Dynamic IP Tunnels by Filter Rule Definition Name** summary tables, see the “Dynamic IP Tunnels attributes” on page 161.

Dynamic IP Tunnels by Tunnel ID workspace: The Dynamic IP Tunnels by Tunnel ID workspace displays availability and performance statistics for dynamic IP tunnels that match the value specified for the Tunnel ID attribute.

Summary information is displayed in the **Dynamic IP Tunnels with Byte Rate = 0** summary table and the **Dynamic IP Tunnels by Tunnel ID** summary table.

One way to display the Dynamic IP Tunnels by Tunnel ID workspace is to do the following:

1. Right-click the **IP Filters** Navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Current IP Filters** workspace.
3. Right-click the **Link** icon by one of the rows of the **Current IP Filters in Scan Order** summary table.
4. If you have selected a filter that is associated with a dynamic IP tunnel, the **Dynamic IP Tunnels by Tunnel ID** conditional link is displayed. This link is available only for filters with a **Type** value of **DYNAMIC**, **NATTDYN** or **NRF**.

Links to Other Workspaces:

The following additional workspaces can be accessed by clicking the **Link** icon in the Dynamic IP Tunnels With Byte Rate = 0 or the Dynamic IP Tunnels by Tunnel ID summary tables:

- **IKE Tunnels by Tunnel ID** (default): Navigates to the IKE Tunnels By Tunnel ID workspace and displays the IKE tunnel used to activate the selected tunnel.
- **Current IP Filters by Filter Rule Definition Name**: Navigates to the Current IP Filters By Filter Rule Definition Name workspace and displays the IP filter used to activate the selected tunnel.
- **Dynamic IP Tunnels by Destination Address**: Navigates to the Current IP Tunnels By Destination Address workspace and displays tunnels that match the destination IP address you specified in the Destination Address dialog box. This dialog box prompts you for a destination IP address that is compared to the currently active tunnels for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected tunnel, but you can change this value to be any IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected connection. If you specify an IPv6 address and the selected connection has an IPv4 address, then the linked-to workspace will not find any tunnels to display. With this address as input, this link navigates to the Dynamic IP Tunnels By Destination Address workspace showing the IP tunnels that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the following filters:

- Tunnel ID
- Byte Rate = 0

Figure 24 on page 168 shows the Dynamic IP Tunnels by Tunnel ID workspace.

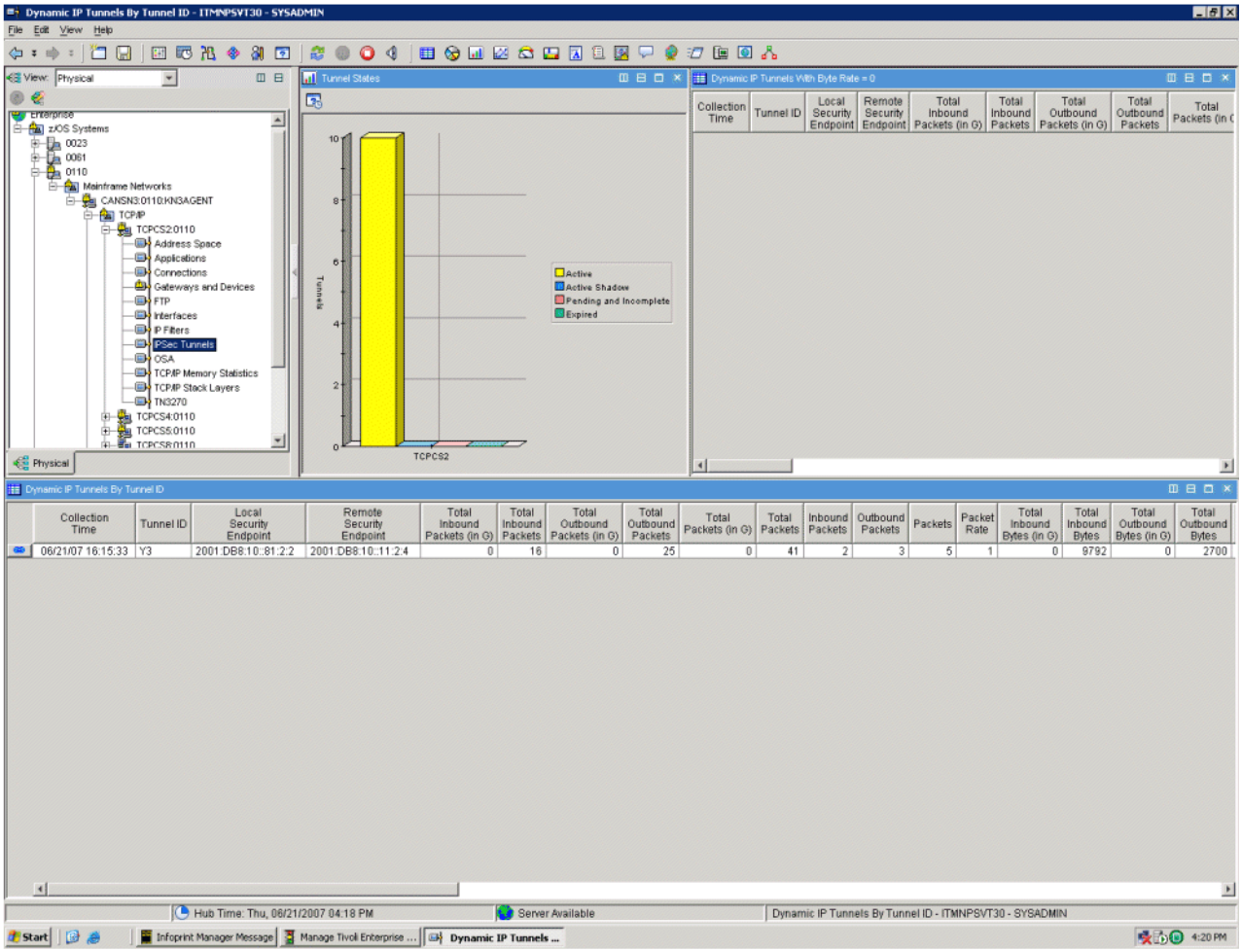


Figure 24. The Tivoli OMEGAMON XE for Mainframe Networks Dynamic IP Tunnels by Tunnel ID workspace

The Dynamic IP Tunnels by Tunnel ID Workspace contains the following views:

- **Tunnel States**: Shows the current number of dynamic IP tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec status table instead of the Dynamic IP tunnels table. The graph is a bar chart where:
  - Yellow represents the number of Active tunnels.
  - Blue represents the number of Active Shadow (SWSA) tunnels.
  - Pink represents the number of Pending or Incomplete tunnels.
  - Green represents the number of Expired tunnels.
- **Dynamic IP Tunnels with Byte Rate = 0** summary table: Provides performance and configuration information for dynamic IP tunnels that are active and had a byte rate of 0 in the most recent interval. A byte rate of 0 could be indicative of a problem with the tunnel. Each row in the table represents a single dynamic IP tunnel.
- **Dynamic IP Tunnels by Tunnel ID** summary table: Provides performance and configuration data about dynamic IP tunnels that match the tunnel ID passed using the link.

Dynamic IP Tunnels by Tunnel ID attributes: For a complete list of the attributes displayed in the **Dynamic IP Tunnels with Byte Rate = 0** and **Dynamic IP Tunnels by Tunnel ID** summary tables, see the “Dynamic IP Tunnels attributes” on page 161.

Dynamic IP Tunnels with Byte Rate < 2048 workspace: The Dynamic IP Tunnels with Byte Rate < 2048 workspace displays availability and performance statistics for dynamic IP tunnels with a byte rate of less than 2048 bytes.

One way to display the Dynamic IP Tunnels by Destination Address workspace is to do the following:

1. Click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack to access the **Dynamic IP Tunnels Statistics** workspace.
2. Click the **Link** icon by one of the rows of the **Dynamic IP Tunnels Statistics** summary table.
3. Select the **Dynamic IP Tunnels with Byte Rate < 2048** link.

Links to Other Workspaces:

The following additional workspaces can be accessed by clicking the **Link** icon in the Dynamic IP Tunnels With Byte Rate = 0 and the Dynamic IP Tunnels by Filter Rule Definition Name summary tables:

- **IKE Tunnels by Tunnel ID** (default): Navigates to the IKE Tunnels By Tunnel ID workspace and displays the IKE tunnel used to activate the selected tunnel.
- **Current IP Filters by Filter Rule Definition Name**: Navigates to the Current IP Filters By Filter Rule Definition Name workspace and displays the IP filter used to activate the selected tunnel.
- **Dynamic IP Tunnels by Destination Address**: Navigates to the Current IP Tunnels By Destination Address workspace and displays tunnels that match the destination IP address you specified in the Destination Address dialog box. This dialog box prompts you for a destination IP address that is compared to the currently active tunnels for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected tunnel, but you can change this value to be any IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected connection. If you specify an IPv6 address and the selected connection has an IPv4 address, then the linked-to workspace will not find any tunnels to display. With this address as input, this link navigates to the Dynamic IP Tunnels By Destination Address workspace showing the IP tunnels that match the destination IP address that you provided. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

Data Source:

z/OS Communications Server Network Management Interfaces

Default Filter:

The table in this workspace is filtering using the following attributes:

- Tunnel ID
- Byte Rate < 2048

Figure 25 on page 170 shows the Dynamic IP Tunnels with Byte Rate < 2048 workspace.

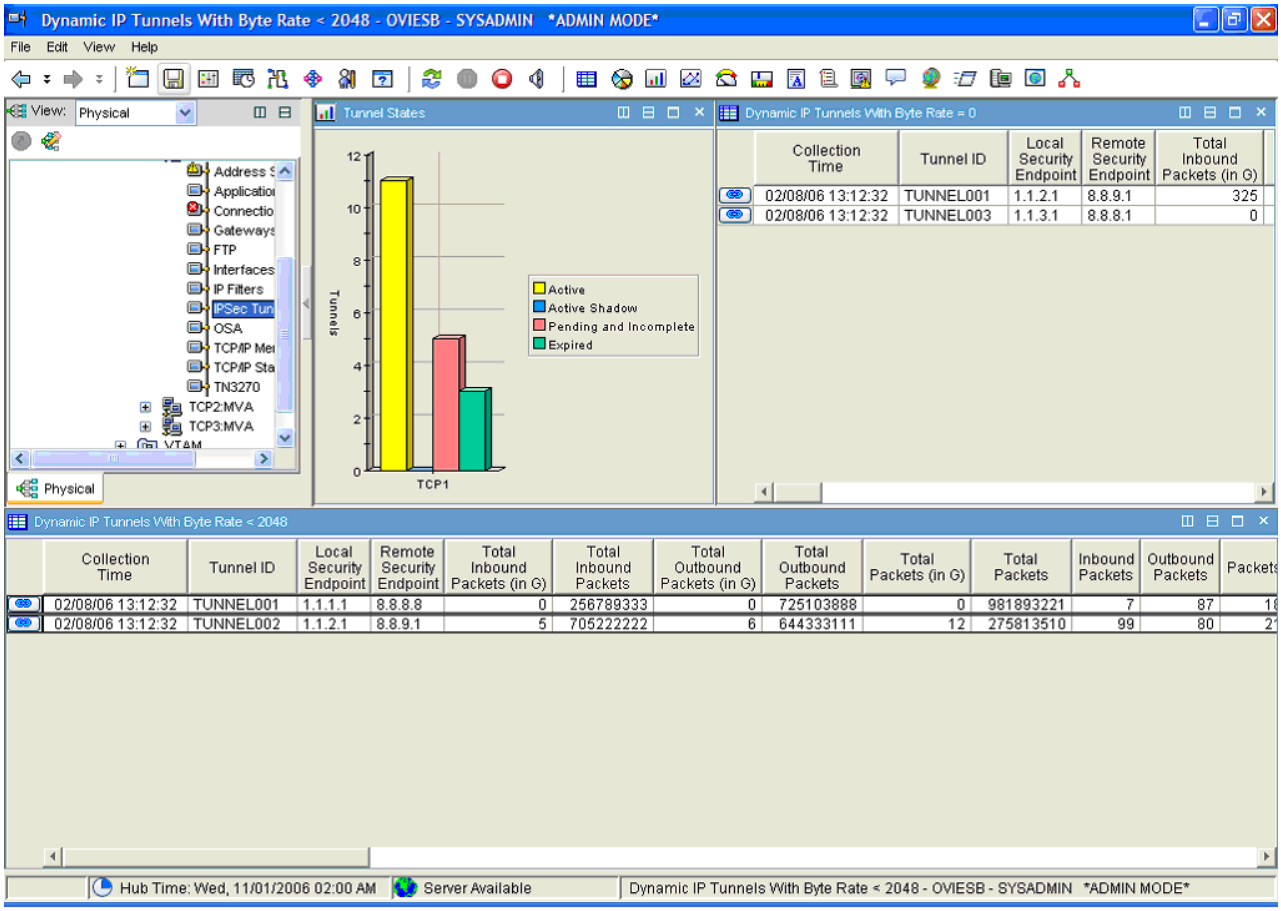


Figure 25. The Tivoli OMEGAMON XE for Mainframe Networks Dynamic IP Tunnels with Byte Rate < 2048 workspace

The Dynamic IP Tunnels with Byte Rate < 2048 workspace displays the following views:

Tunnel States
Shows the current number of dynamic IP tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec status table instead of the Dynamic IP tunnels table. The graph is a bar chart where:

- Yellow represents the number of Active tunnels.
- Blue represents the number of Active Shadow (SWSA) tunnels.
- Pink represents the number of Pending or Incomplete tunnels.
- Green represents the number of Expired tunnels.

Dynamic IP Tunnels with Byte Rate = 0 summary table
Provides performance and configuration information for dynamic IP tunnels that are active and had a byte rate of 0 in the most recent interval. A byte rate of 0 could be indicative of a problem with the tunnel. Each row in the table represents a single dynamic IP tunnel.

Dynamic IP Tunnels with Byte Rate < 2048 summary table
Provides performance and configuration data about dynamic IP tunnels that had a byte rate of less than 2048 bytes in the most recent interval. Each row in the table represents a single dynamic IP tunnel.

Dynamic IP Tunnels with Byte Rate < 2048 attributes: For a complete list of the attributes displayed in the **Dynamic IP Tunnels With Byte Rate = 0** and **Dynamic IP Tunnels with Byte Rate < 2048** summary tables, see the “Dynamic IP Tunnels attributes” on page 161.

IKE Tunnels Statistics workspace

The IKE Tunnels Statistics workspace displays cumulative availability and performance statistics for all of the IKE tunnels known by the IKE daemon for a TCP/IP stack.

To display the IKE Tunnels Statistic workspace is to right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack, select **Workspaces**, and select the **IKE Tunnels Statistics** workspace.

Links to Other Workspaces:

Right-click the IPSec Tunnels navigator item to display the following additional workspaces:

- **IKE Tunnels** (default): Displays availability and performance statistics for IKE tunnels known to the IKE daemon for a specific stack.
- **IKE Tunnels with Byte Rate < 1024:** Displays availability and performance statistics for IKE tunnels with a byte rate of less than 1024 bytes known to the IKE daemon for a specific stack.

Data Source:

z/OS Communications Server Network Management Interface

Default Filter:

None.

Figure 26 shows the IKE Tunnels Statistics workspace.

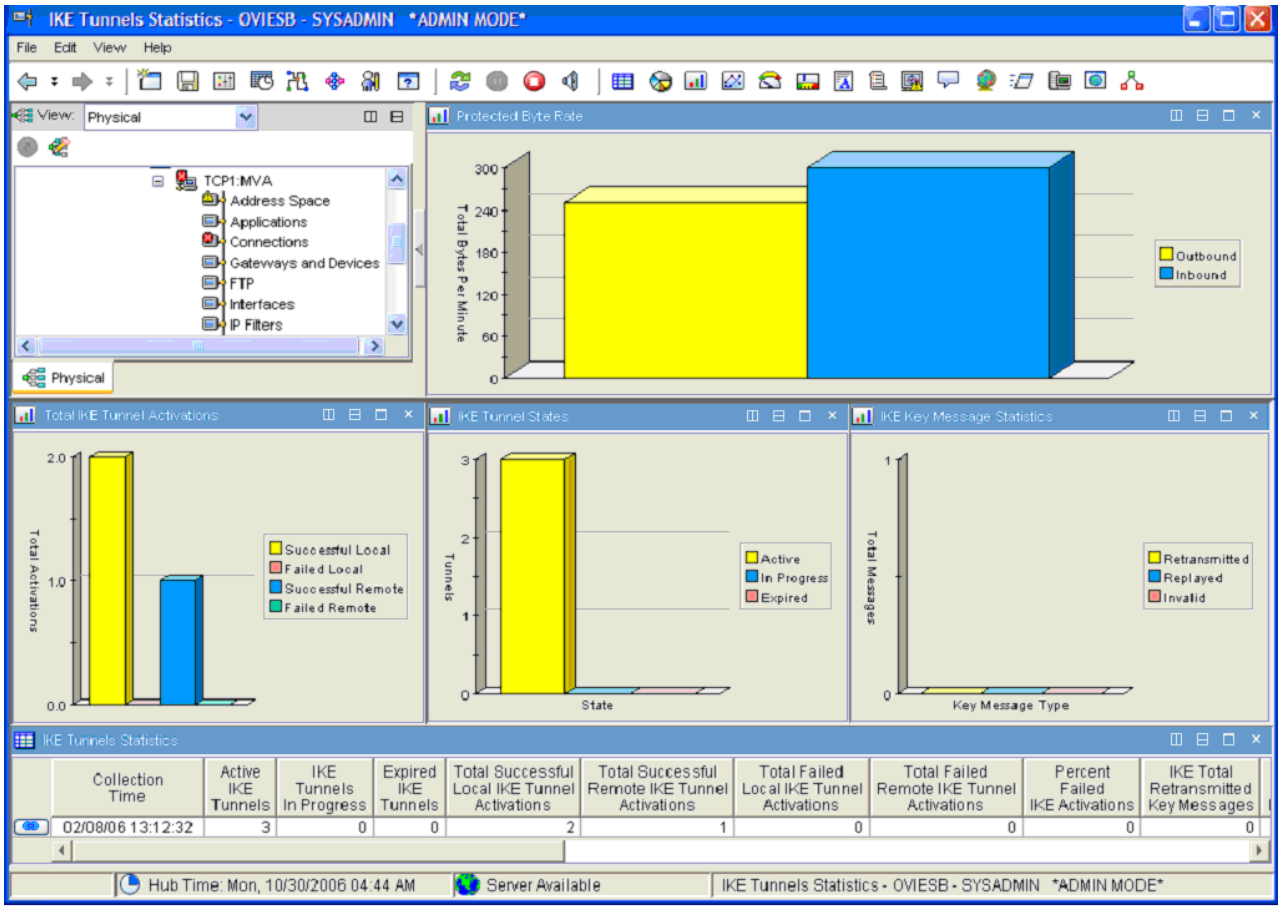


Figure 26. The Tivoli OMEGAMON XE for Mainframe Networks IKE Tunnels Statistics workspace

The IKE Tunnels Statistics workspace displays the following views:

Protected Byte Rate

Shows the rate at which data is flowing through all of the IKE tunnels on the stack. Use this view to determine which tunnels are being used the most. The graph is a bar chart where:

- Yellow represents the number of bytes per minute flowing through outbound IKE tunnels.
- Blue represents the number of bytes per minute flowing through inbound IKE tunnels.

Total IKE Tunnel Activation

Provides a snapshot of the cumulative number of successful and failed IKE tunnel activations since the IKE daemon was started. The bars on the graph differentiate between IKE tunnels that were initiated locally and IKE tunnels that were initiated remotely. The graph is a bar chart where:

- Yellow represents the number of Successful Local tunnel activations.
- Pink represents the number of Failed Local tunnel activations.
- Blue represents the number of Successful Remote tunnel activations.
- Green represents the number of Failed Remote tunnel activations.

IKE Tunnel States

Provides a snapshot of the state of the all the IKE tunnels known by the IKE daemon. The graph is a bar chart where:

- Yellow represents the number of tunnels that are Active.
- Blue represents the number of tunnels that are In Progress (either pending or in negotiation).
- Pink represents the number of tunnels that are Expired.

IKE Key Message Statistics

Provides statistics about key exchange messages that are used to activate IKE tunnels between security endpoints. High number of key exchange messages could indicate that a problem exists. The graph is a bar chart where:

- Yellow represents the number of key exchange messages that were Retransmitted.
- Blue represents the number of key exchange messages that were Replayed.
- Pink represents the number of key exchange messages that were Invalid.

A high number of retransmitted or replayed messages over several collection intervals may indicate a problem in the network between the two security endpoints. Invalid messages may indicate an attack or an incompatibility between the security endpoints.

IKE Tunnels Statistics summary table

Provides performance and configuration data about all IKE tunnels known by the IKE daemon for a TCP/IP stack.

IKE Tunnels Statistics attributes: The following attributes are displayed in the IKE Tunnels Statistics summary table:

- Collection Time
- Active IKE Tunnels
- IKE Tunnels in Progress
- Expired IKE Tunnels
- Total Successful Local IKE Tunnel Activations
- Total Successful Remote IKE Tunnel Activations
- Total Failed Local IKE Tunnel Activations
- Total Failed Remote IKE Tunnel Activations
- IKE Total Retransmitted Key Messages
- IKE Total Replayed Key Messages
- IKE Total Invalid Key Messages
- IKE Total Key Message Authentication Failures

- IKE Total Outbound Bytes Protected (in G)
- IKE Total Outbound Bytes Protected
- IKE Outbound Bytes Protected
- IKE Outbound Protected Byte Rate
- IKE Total Inbound Bytes Protected (in G)
- IKE Total Inbound Bytes Protected
- IKE Inbound Bytes Protected
- IKE Inbound Protected Byte Rate

For more information about these attribute, refer to the “IPSec Status Attributes” on page 99.

IKE Tunnels workspace: The Internet Key Exchange (IKE) Tunnels workspace displays availability and performance statistics for IKE tunnels known to the IKE daemon for a specific stack. IKE tunnels are used by a security endpoint (IKE daemon) to negotiate dynamic IP tunnels. Since there could be thousands of IKE tunnels this workspace has a predefined default filter when initially opened. The query used to initially open the workspace will request IKE tunnels with a byte rate >= 1024.

One way to display the IKE Tunnels workspace, right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack is to select **Workspaces** and select the **IKE Tunnels** workspace.

Summary information is displayed in the IKE Tunnels summary tables.

Links to Other Workspaces:

The following can be accessed by clicking the **Link** icon in the **IKE Tunnels with Byte Rate >= 1024** summary table:

- **IKE Tunnels by Security Endpoint Workspace** (default): Navigates to the IKE Tunnels By Security Endpoint workspace and displays the IKE tunnels matching the remote security endpoint of the IKE tunnels you would like displayed. When you select the link to the IKE Tunnels By Security Endpoint workspace, a dialog box prompts you to identify the remote security endpoint of the tunnels you would like displayed. This value is requested: .
  - Remote Security Endpoint: The IP address of the remote security endpoint. This may be an IPv4 address in dotted decimal notation or an IPv6 address in colon hexadecimal notation

  Entries in the stored table are compared to the values provided in the dialog box. All entries in the table that match are displayed in the table view requested.

Data Source:

z/OS Communications Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the Byte Rate >= 1024 attribute.

Figure 27 on page 174 shows the IKE Tunnels workspace.

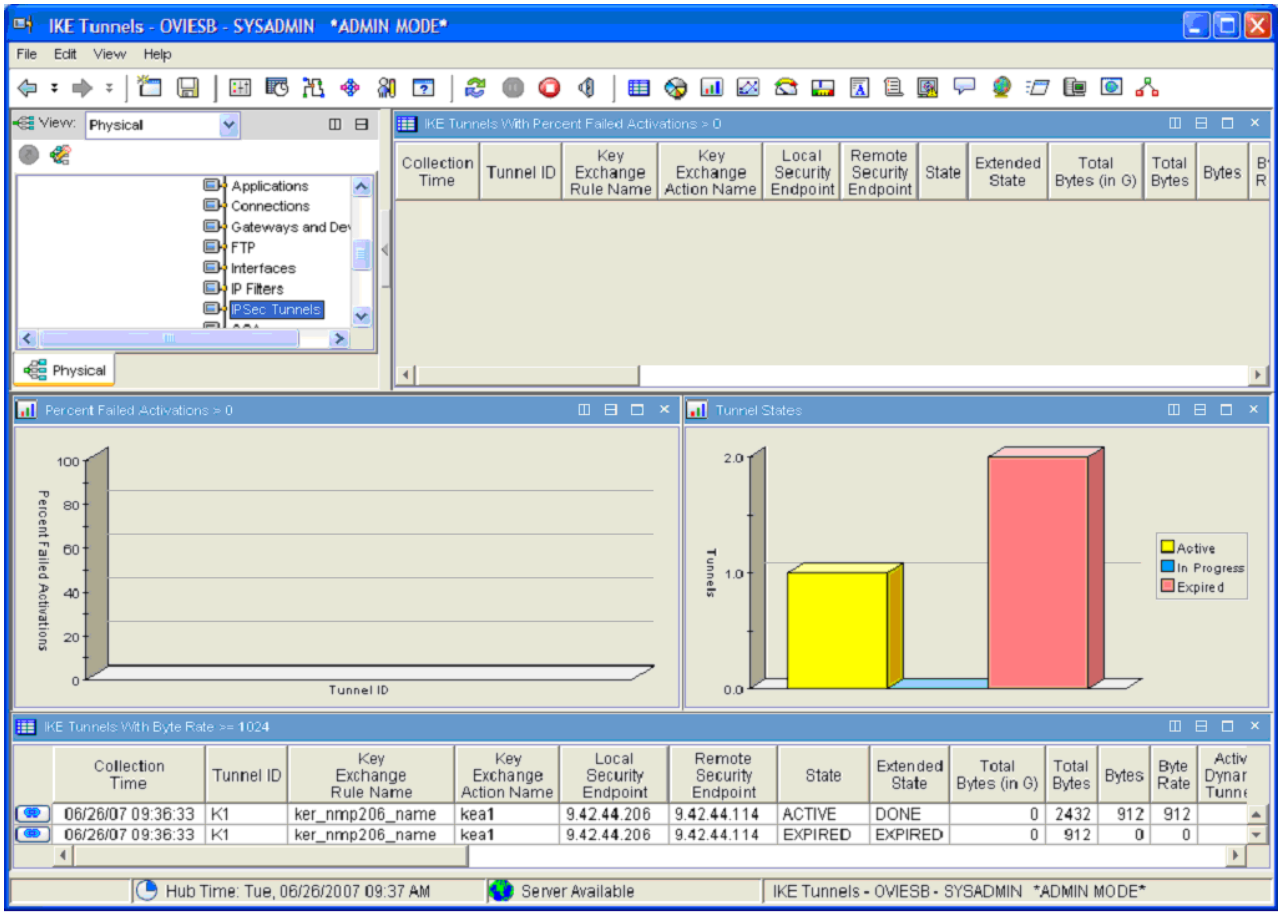


Figure 27. The Tivoli OMEGAMON XE for Mainframe Networks IKE Tunnels workspace

The IKE Tunnels workspace displays the following views:

IKE Tunnels with Percent Failed Activations > 0 summary table
Displays performance and configuration information for IKE tunnels that are experiencing failures when activating dynamic IP tunnels. No links are available from this view.

Percent Failed Activations > 0
Shows IKE tunnels that have experienced dynamic tunnel activation failures. This bar chart shows the percentage of dynamic tunnel activations that have failed by Tunnel ID.

Tunnel States
Shows the current number of IKE tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec statistics table instead of the IKE Tunnels table. The graph is a bar chart where:

- Yellow represents the number of tunnels in an Active state.
- Blue represents the number of tunnels in an In Progress state.
- Pink represents the number of tunnels in an Expired state.

IKE Tunnels with Byte Rate >= 1024 summary table
Displays performance and configuration data about the IKE tunnels with a byte rate greater than or equal to 1024. Each row in the table represents a single IKE tunnel. The data in this table can be filtered based on criteria that you provide.

IKE Tunnels attributes: The following attributes are displayed in the **IKE Tunnels with Percent Failed Activations > 0** and **IKE Tunnels with Byte Rate >= 1024** summary tables:

- Collection Time
- Tunnel ID
- Key Exchange Rule Name
- Key Exchange Action Name
- Local Security Endpoint
- Remote Security Endpoint
- State
- Extended State
- Total Bytes (in G)
- Total Bytes
- Bytes
- Byte Rate
- Active Dynamic Tunnels
- In Progress Dynamic Tunnels
- Percent In Progress Dynamic Tunnels
- Percent Failed Activations
- Total Successful Local Activations
- Total Successful Remote Activations
- Total Failed Local Activations
- Total Failed Remote Activations
- Exchange Mode
- Role
- Authentication Algorithm
- Encryption Algorithm
- Diffie Hellman Group
- Peer Authentication Method
- Life Size
- Life Time
- Life Refresh Time
- Life Expiration Time
- Remote IKE UDP Port
- NAT Traversal Indicator
- NAT Traversal Support Level
- Local NAT Indicator
- Remote NAT Indicator
- Remote NAPT Indicator
- Initiation Indicator

For more information about these attribute, refer to the “Internet Key Exchange (IKE) Tunnels Attributes” on page 93.

IKE Tunnels by Security Endpoint Workspace: The Internet Key Exchange (IKE) Tunnels by Security Endpoint workspace displays availability and performance statistics for IKE tunnels known to the IKE daemon for the specified remote security endpoint. IKE tunnels are used by a security endpoint (IKE daemon) to negotiate dynamic IP tunnels.

One way to display the IKE Tunnels by Security Endpoint workspace is to do the following:

1. Right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **IKE Tunnels** workspace.
3. Click the **Link** icon by one of the rows of the **IKE Tunnels With Byte Rate >= 1024** summary table.
4. Select the **IKE Tunnels by Security Endpoint** link.

Summary information is displayed in the IKE Tunnels summary tables.

Links to Other Workspaces:

The following additional workspace can be accessed by right-clicking the **Link** icon in the IKE Tunnels by Security Endpoint summary table:

- **IKE Tunnels by Security Endpoint Workspace** (default): Navigates to the IKE Tunnels By Security Endpoint workspace and displays the IKE tunnels matching the remote security endpoint of the IKE tunnels you would like displayed. When you select the link to the IKE Tunnels By Security Endpoint workspace, a dialog box prompts you to identify the remote security endpoint of the tunnels you would like displayed. This value is requested: .
  - Remote Security Endpoint: The IP address of the remote security endpoint. This may be an IPv4 address in dotted decimal notation or an IPv6 address in colon hexadecimal notation

  Entries in the stored table are compared to the values provided in the dialog box. All entries in the table that match are displayed in the table view requested.

Data Source:

z/OS Communications Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the specified local or remote security endpoint.

Figure 28 on page 177 shows the IKE Tunnels by Security Endpoint workspace.

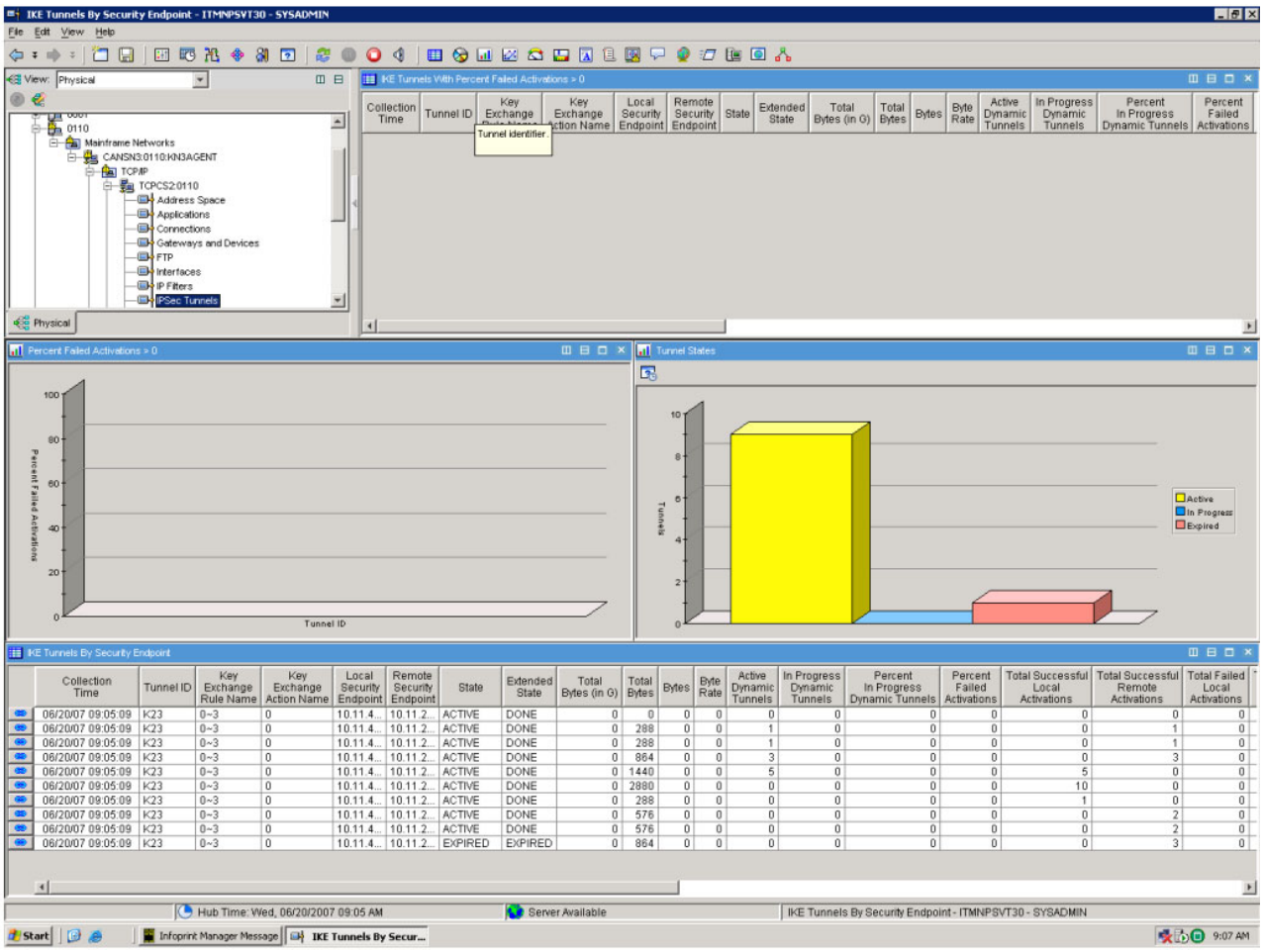


Figure 28. The Tivoli OMEGAMON XE for Mainframe Networks IKE Tunnels by Security Endpoint workspace

The IKE Tunnels IKE Tunnels by Security Endpoint workspace displays the following views:

IKE Tunnels with Percent Failed Activations > 0 summary table
Displays performance and configuration information for IKE tunnels that are experiencing failures when activating dynamic IP tunnels.

Percent Failed Activations > 0
Shows tunnels that have experienced dynamic tunnel activation failures. This bar chart shows the percentage of dynamic tunnel activations that have failed by Tunnel ID.

Tunnel States
Shows the current number of IKE tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec statistics table instead of the IKE Tunnels table. The graph is a bar chart where:

- Yellow represents the number of tunnels in an Active state.
- Blue represents the number of tunnels in an In Progress state.
- Pink represents the number of tunnels in an Expired state.

IKE Tunnels By Security Endpoint summary table
Provides performance and configuration data about the IKE tunnels known to the IKE daemon for the specified security endpoints.

IKE Tunnels by Security Endpoint attributes: For a complete list of the attributes displayed in the **IKE Tunnels with Percent Failed Activations > 0** and **IKE Tunnels By Security Endpoint** summary tables, see the “IKE Tunnels attributes” on page 174.

IKE Tunnels by Tunnel ID Workspace: The IKE Tunnels by Tunnel ID workspace displays availability and performance statistics for IKE tunnels with a tunnel ID that matches the one passed by the link. IKE tunnels are used by a security endpoint (IKE daemon) to negotiate dynamic IP tunnels.

To display the IKE Tunnels by Tunnel ID workspace, do the following:

1. Right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Dynamic IP Tunnels** workspace.
3. Click the **Link** icon by one of the rows of the **Dynamic IP Tunnels With Byte Rate >= 2048** or **Dynamic IP Tunnels With Byte Rate = 0** summary tables.
4. Select the **IKE Tunnels by Tunnel ID** link.

Summary information is displayed in the IKE Tunnels summary tables.

Links to Other Workspaces:

The following additional workspace can be accessed by clicking the **Link** icon in the IKE Tunnels by Tunnel ID summary table:

- **IKE Tunnels by Security Endpoint Workspace** (default): Navigates to the IKE Tunnels By Security Endpoint workspace and displays the IKE tunnels matching the remote security endpoint of the IKE tunnels you would like displayed. When you select the link to the IKE Tunnels By Security Endpoint workspace, a dialog box prompts you to identify the remote security endpoint of the tunnels you would like displayed. This value is requested:
  - Remote Security Endpoint: The IP address of the remote security endpoint. This may be an IPv4 address in dotted decimal notation or an IPv6 address in colon hexadecimal notation

  Entries in the stored table are compared to the values provided in the dialog box. All entries in the table that match are displayed in the table view requested.

Data Source:

z/OS Communications Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the Tunnel ID attribute.

Figure 29 on page 179 shows the IKE Tunnels by Tunnel ID workspace.

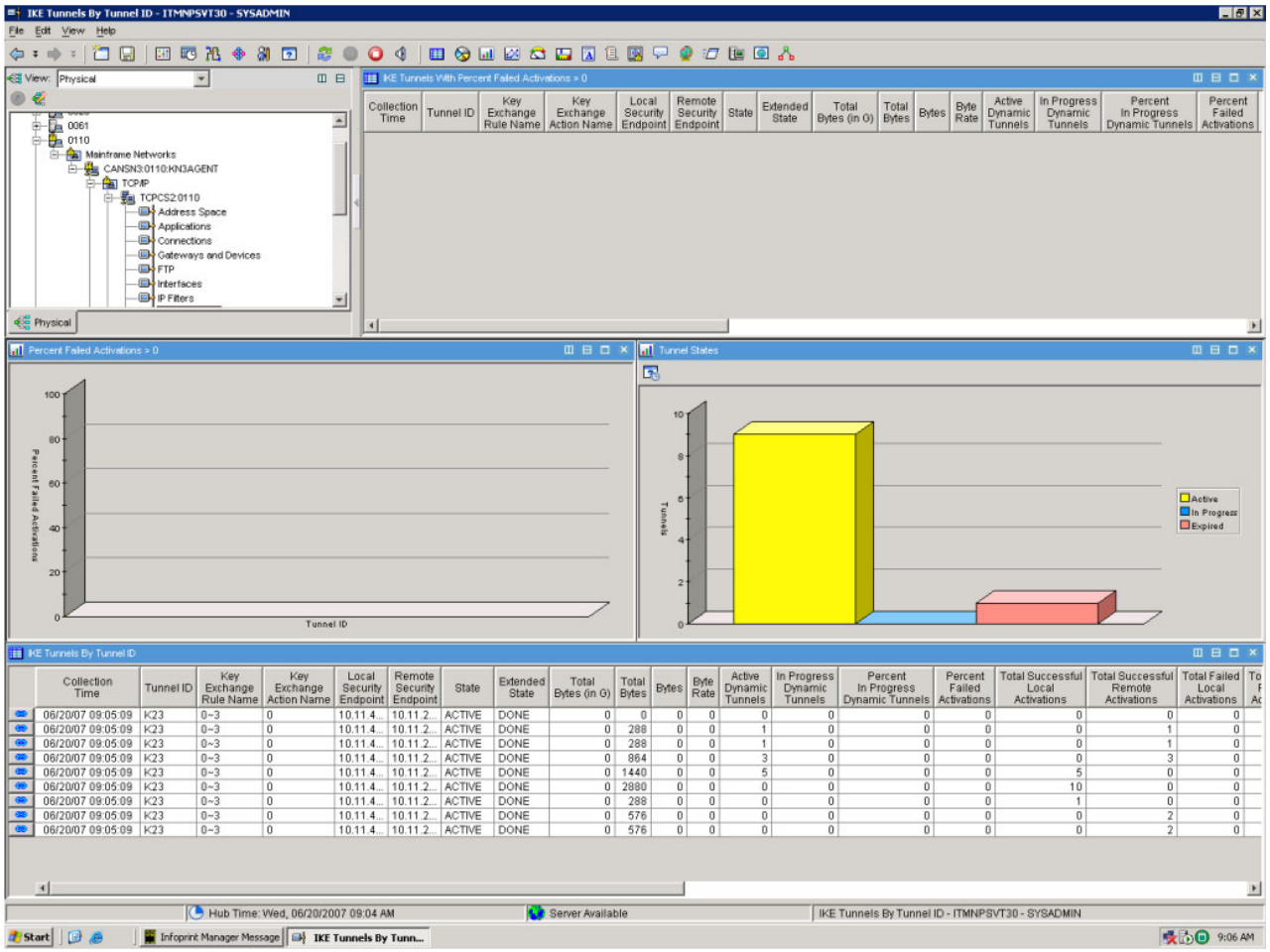


Figure 29. The Tivoli OMEGAMON XE for Mainframe Networks IKE Tunnels by Tunnel ID workspace

The IKE Tunnels IKE Tunnels by Tunnel ID workspace displays the following views:

IKE Tunnels with Percent Failed Activations > 0 summary table
Displays performance and configuration information for IKE tunnels that are experiencing failures when activating dynamic IP tunnels.

Percent Failed Activations > 0
Shows tunnels that have experienced dynamic tunnel activation failures. This bar chart shows the percentage of dynamic tunnel activations that have failed by Tunnel ID.

Tunnel States
Shows the current number of IKE tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec statistics table instead of the IKE Tunnels table. The graph is a bar chart where:

- Yellow represents the number of tunnels in an Active state.
- Blue represents the number of tunnels in an In Progress state.
- Pink represents the number of tunnels in an Expired state.

IKE Tunnels by Tunnel ID summary table
Displays availability and performance statistics for IKE tunnels with a tunnel ID that matches the one passed by the link. IKE tunnels are used by a security endpoint (IKE daemon) to negotiate dynamic IP tunnels.

IKE Tunnels by Tunnel ID attributes: For a complete list of the attributes displayed in the **IKE Tunnels with Percent Failed Activations > 0** and **IKE Tunnels by Tunnel ID** summary tables, see the "IKE Tunnels attributes" on page 174.

IKE Tunnels with Byte Rate < 1024 Workspace: The IKE Tunnels with Byte Rate < 1024 workspace displays availability and performance statistics for IKE tunnels with a byte rate of less than 1024 bytes known to the IKE daemon for a specific stack. IKE tunnels are used by a security endpoint (IKE daemon) to negotiate dynamic IP tunnels. A low byte rate could be indicative of a problem and this workspace allows users to examine information about IKE tunnels with lower byte rates. This view may be used to see if there is a large number of expired IKE tunnels using up system resources.

One way to display the IKE Tunnels workspace is to right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack, select **Workspaces** and select the **IKE Tunnels with Byte Rate < 1024** workspace.

Links to Other Workspaces:

The following additional workspace can be accessed by clicking the **Link** icon in the IKE Tunnels With Percent Failed Activations > 0 summary table:

- **IKE Tunnels by Security Endpoint Workspace** (default): Navigates to the IKE Tunnels By Security Endpoint workspace and displays the IKE tunnels matching the remote security endpoint of the IKE tunnels you would like displayed. When you select the link to the IKE Tunnels By Security Endpoint workspace, a dialog box prompts you to identify the remote security endpoint of the tunnels you would like displayed. This value is requested: .
  - Remote Security Endpoint: The IP address of the remote security endpoint. This may be an IPv4 address in dotted decimal notation or an IPv6 address in colon hexadecimal notation

  Entries in the stored table are compared to the values provided in the dialog box. All entries in the table that match are displayed in the table view requested.

Data Source:

z/OS Communications Server Network Management Interface

Default Filter:

The table in this workspace is filtering using the Byte Rate < 1024 attribute.

Figure 30 on page 181 shows the IKE Tunnels with Byte Rate < 1024 workspace.

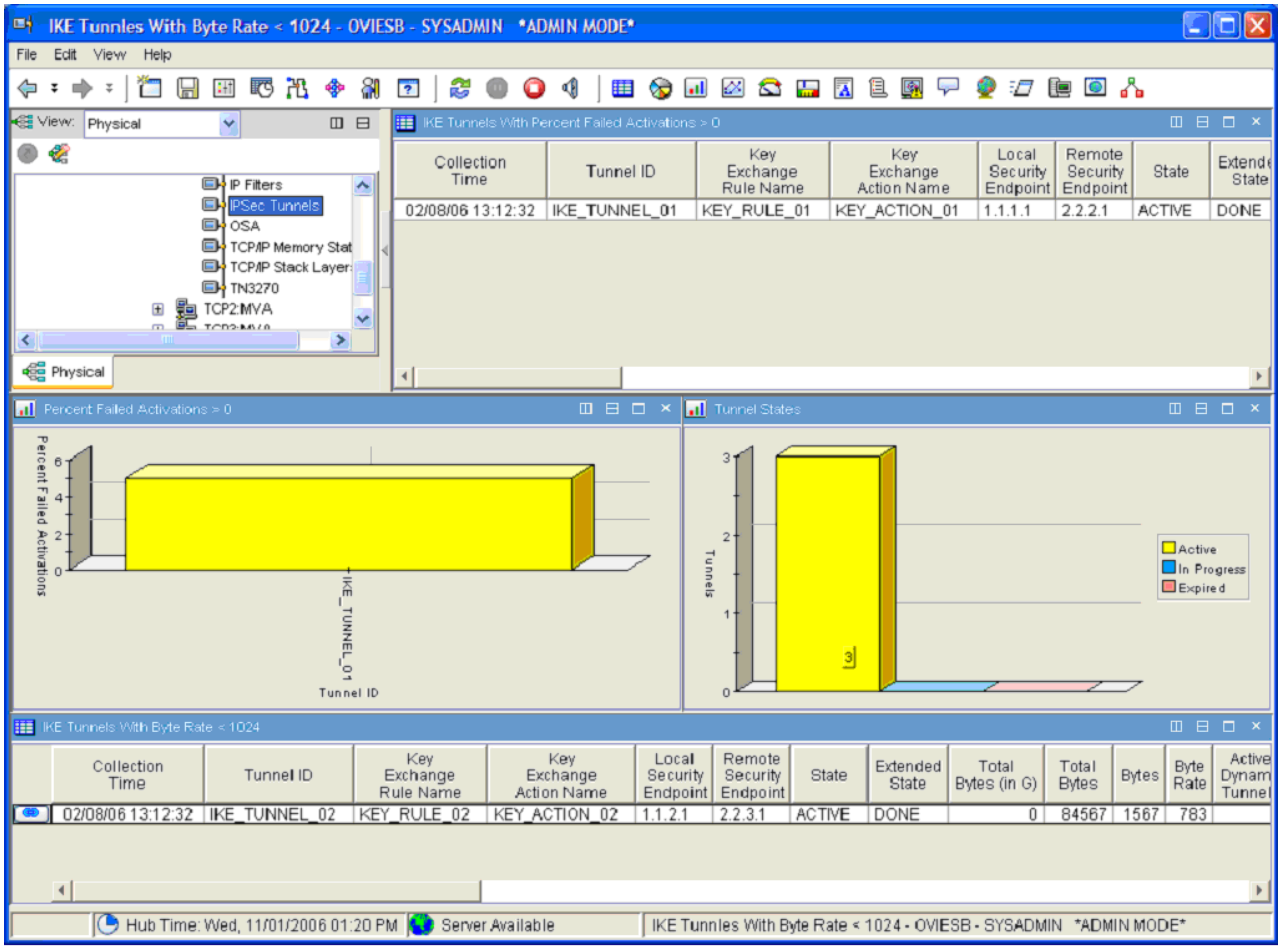


Figure 30. The Tivoli OMEGAMON XE for Mainframe Networks IKE Tunnels with Byte Rate < 1024 workspace

The IKE Tunnels with Byte Rate < 1024 workspace displays the following views:

IKE Tunnels with Percent Failed Activations > 0 summary table
Displays performance and configuration information for IKE tunnels that are experiencing failures when activating dynamic IP tunnels.

Percent Failed Activations > 0
Shows IKE tunnels that have experienced dynamic tunnel activation failures. This bar chart shows the percentage of dynamic tunnel activations that have failed by Tunnel ID.

Tunnel States
Shows the current number of IKE tunnels in different states for the given TCP/IP stack. The query for this view uses the IPSec statistics table instead of the IKE Tunnels table. The graph is a bar chart where:

- Yellow represents the number of tunnels in an Active state.
- Blue represents the number of tunnels in an In Progress state.
- Pink represents the number of tunnels in an Expired state.

IKE Tunnels with Byte Rate < 1024 summary table
Displays performance and configuration data about the IKE tunnels with byte rates less than 1024 bytes. Each row in the table represents a single IKE tunnel. The data in this table can be filtered based on criteria that you provide.

IKE Tunnels with Byte Rate < 1024 attributes: For a complete list of the attributes available in the **IKE Tunnels with Percent Failed Activations > 0** and **IKE Tunnels with Byte Rate < 1024** summary table summary tables, see the “IKE Tunnels attributes” on page 174.

Manual IP Tunnels workspace

The Manual IP Tunnels workspace displays availability and performance statistics for manual IP tunnels known to a specific TCP/IP stack.

One way to display the Manual IP Tunnels workspace is to right-click the **IPSec Tunnels** Navigator item for a specific TCP/IP stack, select **Workspaces** and select the **Manual IP Tunnels** link.

Links to Other Workspaces:

None.

Data Source:

z/OS Communication Server Network Management Interface

Default Filter:

None.

Figure 31 shows the Manual IP Tunnels workspace.

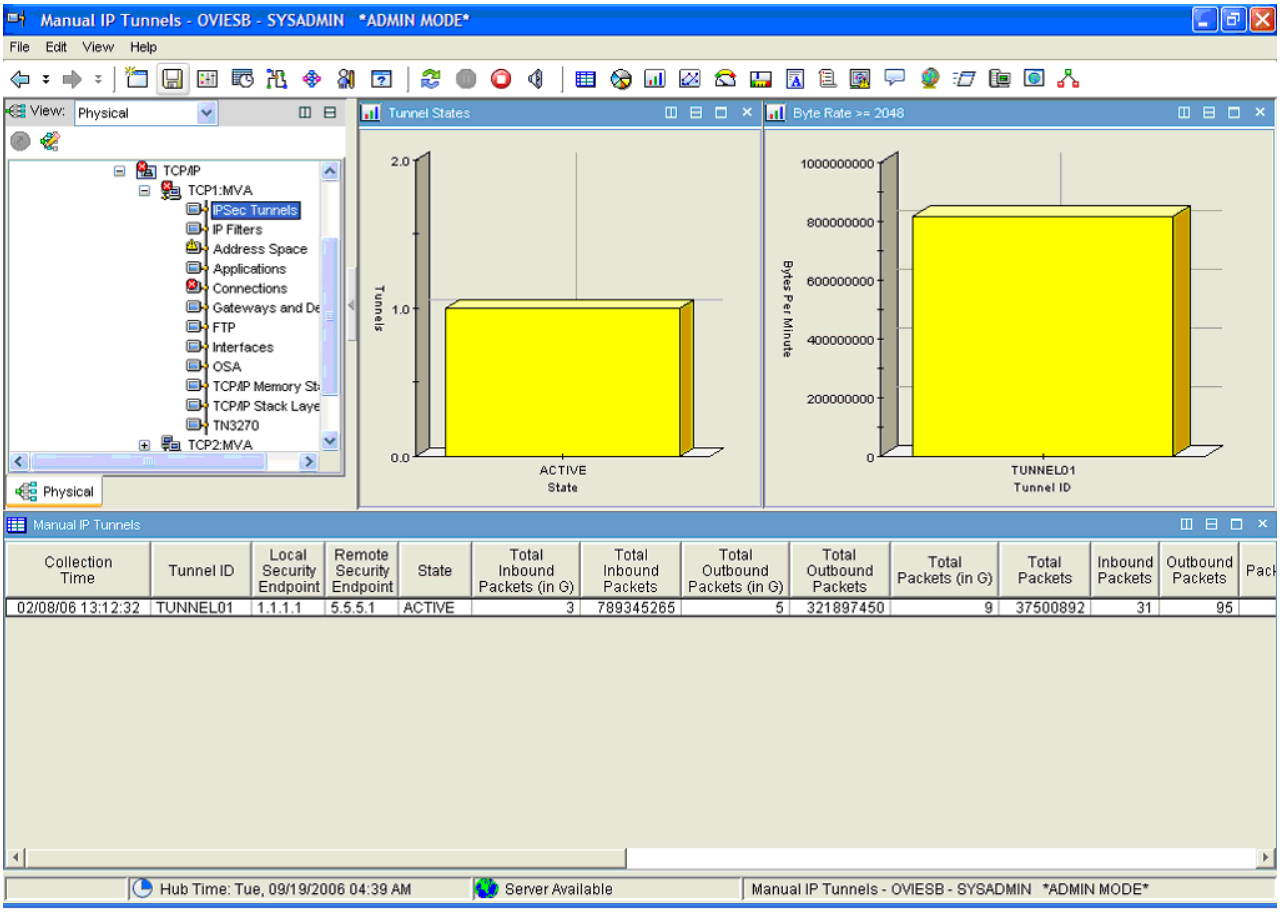


Figure 31. The Tivoli OMEGAMON XE for Mainframe Networks Manual IP Tunnels workspace

The Manual IP Tunnels workspace displays the following views:

Tunnel States

Provides a snapshot of the current number of manual tunnels in different states for the given TCP/IP stack. Each bar in the graph represents the number of tunnels in a particular state. The graph is a bar chart where:

- Yellow represents the number of Active tunnels.
- Blue represents the number of Inactive tunnels.

Byte Rate >= 2048

Shows tunnels that have an inbound or outbound byte rate of 2048 or greater during the most recent collection interval. The bar chart displays number of bytes per minute for each tunnel ID.

Manual IP Tunnels summary table

Provides performance and configuration data about the manual IP tunnels. Each row in the table represents a single manual IP tunnel.

Manual IP Tunnels attributes: The following attributes are displayed in the Manual IP Tunnels summary table:

- Collection Time
- Tunnel ID
- Local Security Endpoint
- Remote Security Endpoint
- State
- Total Inbound Packets (in G)
- Total Inbound Packets
- Total Outbound Packets (in G)
- Total Outbound Packets
- Total Packets (in G)
- Total Packets
- Inbound Packets
- Outbound Packets
- Packets
- Packet Rate
- Total Inbound Bytes (in G)
- Total Inbound Bytes
- Total Outbound Bytes (in G)
- Total Outbound Bytes
- Total Bytes (in G)
- Total Bytes
- Inbound Bytes
- Outbound Bytes
- Bytes
- Byte Rate
- VPN Action Name
- Encapsulation Mode
- Authentication Protocol
- Authentication Algorithm
- Encryption Algorithm

For more information about these attribute, refer to the “Manual IP Tunnels attributes” on page 106.

Manual IP Tunnels by Tunnel ID workspace: The Manual IP Tunnels by Tunnel ID workspace displays availability and performance statistics for manual IP tunnels known to a specific TCP/IP stack sorted by Tunnel ID.

One way to display the Manual IP Tunnels by Tunnel ID workspace is to do the following:

1. Right-click the **IP Filters** Navigator item for a specific TCP/IP stack.
2. Select **Workspaces** and select the **Current IP Filters** link.
3. Click the **Link** icon in the **Current IP Filters in Scan Order** summary table and select the **Manual IP Tunnels by Tunnel ID** link. This link is available only for filters with a **Type** value of **MANUAL**.

Links to Other Workspaces:
None.

Data Source:
z/OS Communication Server Network Management Interface

Default Filter:
None.

Figure 32 shows the Manual IP Tunnels by Tunnel ID workspace.

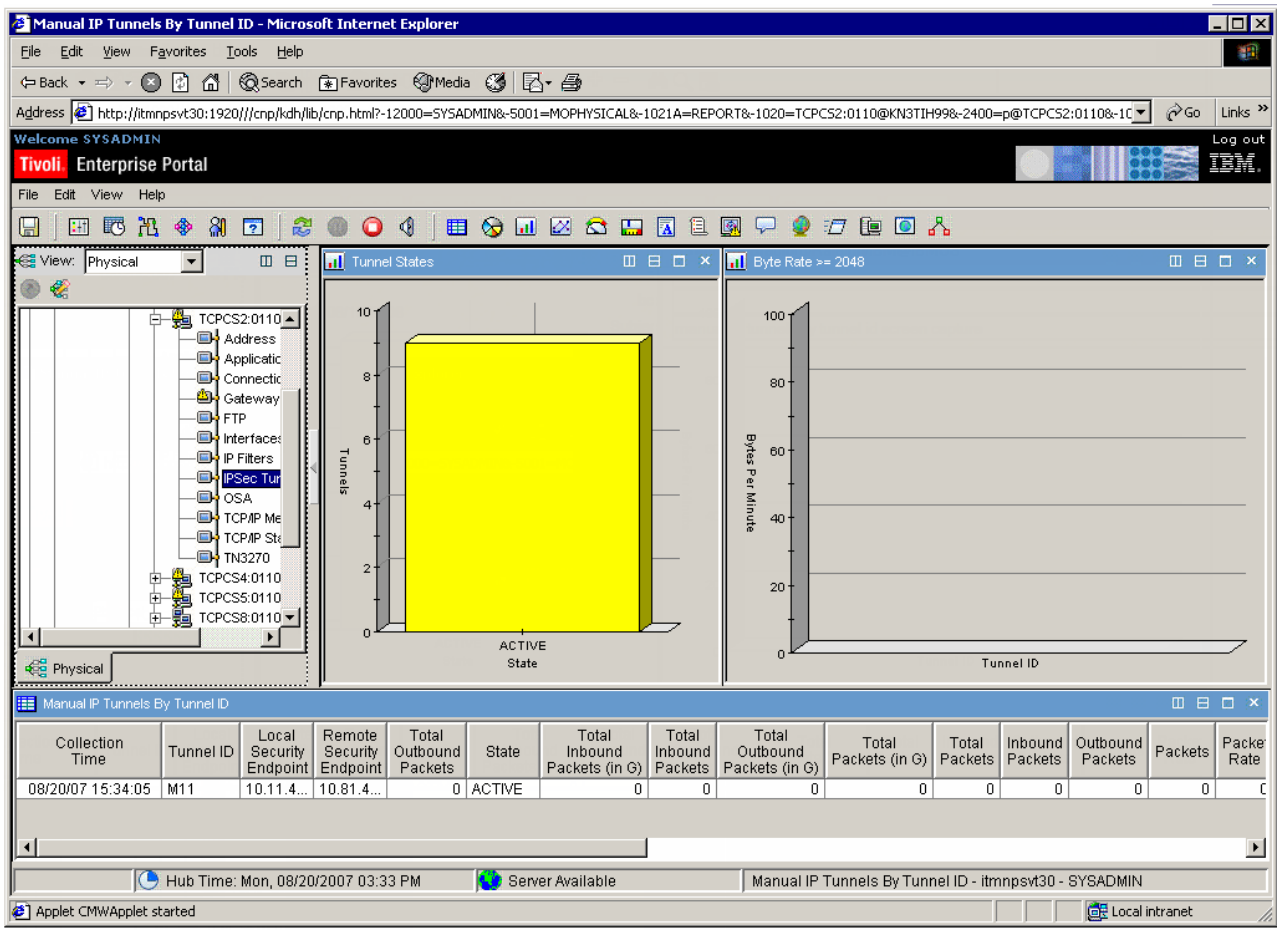


Figure 32. The Tivoli OMEGAMON XE for Mainframe Networks Manual IP Tunnels by Tunnel ID workspace

The Manual IP Tunnels by Tunnel ID workspace displays the following views:

Tunnel States
Provides a snapshot of the current number of manual tunnels in different states for the given TCP/IP stack. Each bar in the graph represents the number of tunnels in a particular state. The graph is a bar chart where:

- Yellow represents the number of Active tunnels.
- Blue represents the number of Inactive tunnels.

Byte Rate >= 2048
Shows tunnels that have an inbound or outbound byte rate of 2048 or greater during the most recent collection interval. The bar chart displays number of bytes per minute for each tunnel ID.

Manual IP Tunnels by Tunnel ID summary table
Provides performance and configuration data about the manual IP tunnel selected.

Manual IP Tunnels by Tunnel ID attributes: For a complete list of the attributes available in the Manual IP Tunnels by Tunnel ID summary table, see the “Manual IP Tunnels attributes” on page 183.

Updates to the Connections, Applications Connections, and TCP Connections workspaces

The Connections, Applications Connections, and TCP Connections workspaces have been updated to add a new conditional link to the **Current IP Filters by Destination Address** workspace shown when the Connection Type is TCP. There is also a new conditional link to the IBM Tivoli NetView for z/OS **DVIPA Definition and Status Workspace**. This link is displayed when the value for the DVIPA attribute in the Current IP Filters by Destination Address workspace is **Yes (1)**.

The following attributes were added to the TCPIP Connections Summary table displayed in all three workspaces:

Local IP Address
The local IP address for this connection. For UDP end points, a value of 0.0.0.0 (or ::) in this field indicates that the UDP end point will accept datagrams from any local IP address. For TCP listeners, this IP address will be 0.0.0.0 (or ::) when the application will accept connections to any local IP address. The format is a string up to 45 characters in length.

Note: This attribute was changed for the Connections Workspace only.

Application Name and Port
The Application Name and Local Port are combined in this attribute, separated by a colon. The format is a string up to 15 characters in length.

DVIPA Identifies when the Local IP Address is a DVIPA address. This value is stored as an integer and displayed as a string. The following are valid values:

- 0 = [blank] - Not available.
- 1 = Yes
- 2 = No

These new links to other workspaces are available for these three workspaces:

Links to Other Workspaces:
These following additional workspaces can be accessed by left-clicking the **Link** icon for a row in the Connections summary table:

- **Current IP Filters by Destination Address**: If the **Connection Type** is TCP, this link causes a dialog box to be displayed that prompts you for a destination IP address that is compared to the currently active filters for a TCP/IP stack. The IP address input field in the dialog box is filled in by default with the value from the **Destination Address** column for the selected filter, but you can change this value to be another IPv4 or IPv6 address found on this TCP/IP stack. Specify an IP address that has the same IP address version as the selected connection. If you specify

an IPv6 address and the selected connection has an IPv4 address, then the linked-to workspace will not find any filters to display. Note that if the **Destination Address** column in the summary table is blank, the IP address input field in the dialog box is filled with an IP address that has a value of zero (0) for all subnets in the address.

- IBM Tivoli NetView for z/OS **DVIPA Definition and Status Workspace**: This link uses the IP address specified by the **Local IP Address** attribute to link to the NetView DVIPA Definition and Status Workspace. This conditional link is available only if the DVIPA attribute in these workspaces has the value of **Yes (1)**.

For a full list of all the attributes available from these workspaces, refer to the online help or the user's guide.

Updates to the Interfaces and Interfaces History workspaces

In APAR OA21641, a user discovered that the Physical Address attribute in the Interfaces and Interfaces History workspaces was not returning the intended data. In Fix Pack 1, this problem has been corrected.

Interfaces attributes

The old Physical Address definition has been deprecated, and a new definition has been added.

Old Value:

Physical Address
(deprecated) The address of the interface at the protocol sub-layer. The format is a string up to four characters in length.

New Value:

Physical Address
The address of the interface at the protocol sub-layer or blank. The format is a string up to 12 characters in length. This field will be blank when the interface is not active or is not one of the following types:

- ATM
- HYPERchannel
- LCS Ethernet
- MPCIPA OSA Express QDIO

Updates to the Gateways and Devices workspace

In Fix Pack 1, the method by which the TCP/IP Gateways summary table in the Gateways and Devices workspaces retrieves gateway information has changed for monitoring agents running on z/OS 1.5 and higher. For these monitoring agents, the TCP/IP stack creates an “implicit route” for every IP address defined to the stack. These “implicit routes” are not reflected in the inetCidrRouteTable, As a result, the inetCidrRouteIfIndex does not return as many gateways as ipForwardIfIndex.

TCP/IP Gateways attributes

Changes were made to the to the TCP/IP Gateways attributes group to accommodate IPv6 addresses. The following attributes are involved in this change:

- First Hop
- Network Address
- Subnet Mask
- Subnet Value

The existing attributes are deprecated. New attributes with the same name but a longer length have been added to accommodate the longer IPv6 addresses. The Packet Size attribute is no longer displayed.

The new definitions for these attributes follow:

First Hop
The first router in the path to the remote network. The format is an alphanumeric string no longer than 45 characters. This special value may be displayed:

```
<direct> – First Hop is a host IP address
```

Network Address
The network address of this gateway. The format is an alphanumeric string no longer than 45 characters. Special values may be displayed as follows:

- *Defaultnet* – the Network Address is a host IP address
- *Default* – the Network Address is 0

Link-local IPv6 addresses will be displayed in the following format:

```
FE80::<interface ID>%<interface name>
```

Subnet Mask
The 32-bit (for IPv4 addresses) or 128-bit (for IPv6 addresses) mask for the subnetwork address in the IP address host portion. The format is an alphanumeric string no longer than 45 characters. These special values might be displayed:

- <none> – Subnet Mask contains zeros.
- HOST – Subnet Mask is a host IP address.

Subnet Value
The subnet identifier. A subnet composes a group of nodes within the same network ID. The format is an alphanumeric string no longer than 45 characters.

Chapter 7. New situations

IBM Tivoli OMEGAMON XE for Mainframe Networks offers a set of situations that help you to identify some of the most common mainframe network problems. You can use these situations to begin monitoring immediately, or modify them to meet the needs of your enterprise.

This chapter describes the new situations delivered in the two updates delivered since version 4.1.0 of OMEGAMON XE for Mainframe Networks became available. This chapter includes the following:

Situations added for Fix Pack 2

The situations in Table 23 were added to exploit new OSA-Express2 10 Gigabit and OSA-Express3 functionality.

Table 23. Summary of situations provided by OMEGAMON XE for Mainframe Networks to support OSA-Express2 10 Gigabit and OSA-Express3

Navigator Item	Attribute table name	Situation name	Description	State	Run at startup?
OSA	KN3TTE	N3T_OSA2_Not_Stored_Frames	The number of not stored frames over the current collection interval is great than 0 (zero) for four consecutive 15–minute collection intervals	Warning	No
		N3T_OSA2_Missed_Packets	The number of missed packets over the current collection interval is great than 0 (zero) for four consecutive 15–minute collection intervals	Warning	No
	KN3THE	N3T_OSA3_Not_Stored_Frames	The number of not stored frames over the current collection interval is great than 0 (zero) for four consecutive 15–minute collection intervals	Warning	No
		N3T_OSA3_Missed_Packets	The number of missed packets over the current collection interval is great than 0 (zero) for four consecutive 15–minute collection intervals	Warning	No

New OSA situation details

N3T_OSA2_Missed_Packets

The number of missed packets was greater than zero (0) for four consecutive 15-minute collection intervals.

Missed packets over consecutive collection intervals is an indication that too little buffer space is available on the OSA card. Recommended remediation is to add an additional OSA-Express2 10 Gigabit port.

This warning situation is based on the Missed Packets attribute. By default, this situation is run every 15 minutes and is not set to run automatically at startup.

N3T_OSA2_Not_Stored_Frames

The number of not-stored frames has been greater than zero (0) for four consecutive 15-minute collection intervals.

Failing to have descriptor buffers available to store frames over consecutive collection intervals is an indication that the LAN is running near or at 100% utilization. Recommended remediation is to add an additional OSA-Express2 10 Gigabit port.

This warning situation is based on the Not Stored Frames Received attribute. By default, this situation is run every 15 minutes and is not set to run automatically at startup.

N3T_OSA3_Missed_Packets

The number of missed packets was greater than zero (0) for four consecutive 15-minute collection intervals.

Missed packets over consecutive collection intervals is an indication that too little buffer space is available on the OSA card. Recommended remediation is to add an additional OSA-Express3 port of the same subtype. If you are running an OSA-Express3 Gigabit adapter, consider upgrading to OSA-Express3 10 Gigabit.

This warning situation is based on the Missed Packets attribute. By default, this situation is run every 15 minutes and is not set to run automatically at startup.

N3T_OSA3_Not_Stored_Frames

The number of not-stored frames has been greater than zero (0) for four consecutive 15-minute collection intervals.

Failing to have descriptor buffers available to store frames over consecutive collection intervals is an indication that the LAN is running near or at 100% utilization. Recommended remediation is to add an additional OSA-Express3 port of the same subtype. If you are running an OSA-Express3 Gigabit adapter, consider upgrading to OSA-Express3 10 Gigabit.

This warning situation is based on the Not Stored Frames Received attribute. By default, this situation is run every 15 minutes and is not set to run automatically at startup.

Situations added for Fix Pack 1

The situations in Table 24 on page 191 were added to exploit IPSec functionality.

Table 24. Summary of situations provided by OMEGAMON XE for Mainframe Networks to support IPSec

Navigator Item	Attribute table name	Situation name	Description	State	Run at startup?
IPSec Tunnels	KN3ITI	N3T_IPSec_Dyn_Act_Fail_IKE_Tnl	The number of failed local activations since the situation was last evaluated is > 0.	Warning	No
		N3T_IPSec_Dyn_Act_Fail_IKE_TnR	The number of failed remote activations since the situation was last evaluated is > 0.	Warning	No
	KN3ISS	N3T_IPSec_Dyn_Act_Fail	The number of failed dynamic tunnel activations since the situation was last evaluated is > 0.	Warning	No
		N3T_IPSec_IKE_Act_Fail	The number of failed IKE tunnel activations since the situation was last evaluated is > 0.	Warning	No
		N3T_IPSec_Key_Msgs_Auth_Fail	IKE key message authentication failures since the situation was last evaluated is > 0. **Note:** This is most likely due to a configuration error.	Warning	No
		N3T_IPSec_Key_Msgs_Invalid	IKE invalid key messages received during the last interval is > 0. **Note:** This is an ISAKMP protocol error.	Warning	No
		N3T_IPSec_Key_Msgs_Replayed	The total number of replayed key messages since the situation was last evaluated is > 5 for 3 consecutive intervals.	Warning	No
		N3T_IPSec_Key_Msgs_Rtrnsmttd	The total number of retransmitted key messages since the situation was last evaluated is > 5 for 3 consecutive intervals.	Warning	No
		N3T_IPSec_QUICKMODE_Invalid	The number of invalid QUICKMODE messages received since the situation was last evaluated is > 0.	Warning	No
		N3T_IPSec_QUICKMODE_Replayed	The total number of replayed QUICKMODE messages since the situation was last evaluated is > 5 for 3 consecutive intervals.	Warning	No
		N3T_IPSec_QUICKMODE_Rtrnsmttd	The total number of retransmitted QUICKMODE messages since the situation was last evaluated is > 5 for 3 consecutive intervals.	Warning	No

Table 24. Summary of situations provided by OMEGAMON XE for Mainframe Networks to support IPSec (continued)

Navigator Item	Attribute table name	Situation name	Description	State	Run at startup?
IPSec Filters	KN3ISS	N3T_IPSec_Pkts_Denied_DENY	The percentage of packets denied by DENY is > 5.	Warning	No
	KN3IFC	N3T_IPSec_Pkts_Denied_Mismatch	Packets denied by mismatch is > 0.	Warning	No

New IPSec situation details

N3T_IPSec_Dyn_Act_Fail

Dynamic IP tunnel activations have failed.

Evaluate the IKE daemon logs to understand the nature of the failures. Failures could be due to either a configuration mismatch where one of the peers is rejecting the other peer's proposals or a network problem such as retransmissions.

Refer to the *z/OS Communication Server: IP Diagnosis* manual for additional information.

This warning situation uses the CHANGE function and the Total Failed Dynamic Tunnel Activations attribute to determine if any dynamic IP tunnel activations have failed since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Dyn_Act_Fail_IKE_TnI

Locally initiated dynamic IP tunnel activations using a particular IKE tunnel have failed.

Evaluate the IKE daemon logs to understand the nature of the failures. Failures could be due to either a configuration mismatch where one of the peers is rejecting the other peer's proposals or a network problem such as retransmissions.

Refer to the *z/OS Communication Server: IP Diagnosis* manual for additional information.

This warning situation uses the CHANGE function and the Total Failed Local Activations attribute to determine if any dynamic IP tunnel local activations using a specific IKE tunnel have failed since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Dyn_Act_Fail_IKE_TnR

Remotely initiated dynamic IP tunnel activations using a particular IKE tunnel have failed.

Evaluate the IKE daemon logs to understand the nature of the failures. Failures could be due to either a configuration mismatch where one of the peers is rejecting the other peer's proposals or a network problem such as retransmissions.

Refer to the *z/OS Communication Server: IP Diagnosis* manual for additional information.

This warning situation uses the CHANGE function and the Total Failed Remote Activations attribute to determine if any dynamic IP tunnel remote activations using a specific IKE tunnel have failed since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_IKE_Act_Fail

Internet Key Exchange (IKE) tunnel activations have failed.

Evaluate the IKE daemon logs to understand the nature of the failures. Failures could be due to either a configuration mismatch where one of the peers is rejecting the other peer's proposals or a network problem such as retransmissions.

Refer to the *z/OS Communication Server: IP Diagnosis* manual for additional information.

This warning situation uses the CHANGE function and the Total Failed IKE Tunnel Activations attribute to determine if any IKE tunnel activations have failed since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Key_Msgs_Auth_Fail

Authentication failures have occurred during the negotiation of Internet Key Exchange (IKE) tunnels.

This condition can occur when using shared keys if the shared keys on the peers do not match. Otherwise, this problem is likely an indication of network data corruption.

This warning situation uses the CHANGE function and the IKE Total Key Message Authentication Failures attribute to determine if the total number of IKE key message authentication failures has increased since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Key_Msgs_Invalid

Invalid key exchange messages have been received from the remote security endpoint.

This condition can occur either because of an Internet Security Association and Key Management Protocol (ISAKMP) error (check the service levels on both peers) or, when using shared keys, if the shared keys on the peers do not match.

This warning situation uses the CHANGE function and the IKE Total Invalid Key Messages attribute to determine if the total number of invalid key messages has increased since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Key_Msgs_Replayed

Key exchange messages used to negotiate Internet Key Exchange (IKE) tunnels have been replayed by the remote security endpoint.

This situation is an indication of a networking problem or a configuration mismatch problem. Evaluate the UNIX syslog and identify the reason for IKE daemon dropping messages.

This warning situation uses the CHANGE function and the IKE Total Replayed Key Messages attribute to determine if the total number of replayed key messages was more than five for three consecutive evaluations for the situation. During IKE tunnel negotiation the IKE daemon replays 10 messages before declaring a failed activation attempt. Key messages will be replayed periodically for an activation attempt. The five replayed messages may or may not be for the same activation attempt. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Key_Msgs_Rtrnsmttd

Key exchange messages used to negotiate Internet Key Exchange (IKE) tunnels have been retransmitted by the local security endpoint.

This situation is an indication of a networking problem or a configuration mismatch problem. Evaluate the UNIX syslog and identify the reason for the IKE daemon dropping messages.

This warning situation uses the CHANGE function and the IKE Total Retransmitted Key Messages attribute to determine if the total number of retransmitted key messages was more than five for three consecutive evaluations for the situation. During IKE tunnel negotiation the IKE daemon retransmits 10 messages before declaring a failed activation attempt. Key messages will be retransmitted periodically for an activation attempt. The five retransmitted messages may or may not be for the same activation attempt. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Pkts_Denied_DENY

The number of packets being denied by the DENY action associated with one or more filters may be high.

This situation could indicate attempted suspicious activity. Enable logging for the filters with DENY actions and monitor the traffic using the UNIX syslog.

This warning situation is based on the Percent Packets Denied By DENY attribute. By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_Pkts_Denied_Mismatch

The number of packets being denied due to a mismatch with the filter's action may be high.

First identify which filters are causing the mismatch alert. This problem could indicate a policy mismatch between the peer and this TCP/IP stack. Another possibility is attempted suspicious activity. Enable logging for the associated filter rule and monitor the traffic using the UNIX syslog.

This warning situation is based on the Packets Denied By Mismatch attribute. By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_QUICKMODE_Invalid

Invalid QUICKMODE messages have been received from the remote security endpoint.

This situation indicates an Internet Security Association and Key Management Protocol (ISAKMP) error. Check the service levels on both peers.

This warning situation uses the CHANGE function and the Total Invalid QUICKMODE Messages attribute to determine if the total number of invalid QUICKMODE messages received (from the remote security endpoint) has increased since the situation was last evaluated. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_QUICKMODE_Replayed

QUICKMODE messages used to negotiate dynamic IP tunnels have been replayed by the remote security endpoint.

This situation indicates a networking problem or a configuration mismatch problem. Evaluate the UNIX syslog and identify the reason for the Internet Key Exchange (IKE) daemon dropping messages.

This warning situation uses the CHANGE function and the Total Replayed QUICKMODE Messages attribute to determine if the total number of replayed QUICKMODE messages was more than five for three consecutive evaluations for the situation. During dynamic tunnel negotiation the IKE daemon replays 10 messages before declaring a failed activation attempt. QUICKMODE messages will be replayed periodically for an activation attempt. The five replayed messages may or may not be for the same activation attempt. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

N3T_IPSec_QUICKMODE_Rtrnsmttd

QUICKMODE messages used to negotiate dynamic IP tunnels have been retransmitted by the local security endpoint.

This situation indicates a networking problem or a configuration mismatch problem. Evaluate the UNIX syslog and identify the reason for the IKE daemon dropping messages.

This warning situation uses the CHANGE function and the Total Retransmitted QUICKMODE Messages attribute to determine if the total number of retransmitted QUICKMODE messages was more than five for three consecutive evaluations for the situation. During dynamic tunnel negotiation the IKE daemon retransmits 10 messages before declaring a failed activation attempt. QUICKMODE messages will be retransmitted periodically for an activation attempt. The five retransmitted messages may or may not be for the same activation attempt. An attribute is not highlighted when the CHANGE function is used, and the Current Situation Value Table may not display data.

By default, this situation is evaluated every 15 minutes and is not run at startup.

Chapter 8. New and changed KN3FCCMD commands

This chapter is an addendum to the "KN3FCCMD Command Reference" appendix in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide*.

KN3FCCMD z/OS `MODIFY` commands support the IBM Tivoli OMEGAMON XE for Mainframe Networks monitoring agent. This monitoring agent is made up of components that map to data types. By default, each of the components is enabled except IPSec. The default collection interval is 5 minutes.

You can enable or disable data collection by component, providing more granular control over which types of data are collected. These actions can be specified at the time you configure the IBM Tivoli OMEGAMON XE for Mainframe Networks monitoring agent (the preferred method) or through the z/OS MODIFY command. The z/OS `MODIFY` command is issued when the IBM Tivoli OMEGAMON XE for Mainframe Networks monitoring agent is running. You can use the z/OS `MODIFY` command to initialize, start, stop, and display the status of components.

The command appendix in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* has been updated to add the following:

- New commands to support IPSec security extensions to the Internet Protocol. You can start or stop collection of IPSec data. To collect IPSec data, the OMEGAMON XE for Mainframe Networks monitoring agent must be at version 4.1.0 with Fix Pack 1 or higher and must be running on a z/OS version 1.8 system or higher.
- Updated commands to support granular tracing.

  In Version 4.1.0 Fix Pack 1 and earlier, the debug facility supported all-on or all-off tracing within a component. The changes in the Fix Pack 2 enable OMEGAMON XE for Mainframe Networks to support three levels of tracing (MIN, MID, and MAX) for both TCPC and SNAC components. These changes also support subdividing the TCPC component into subcomponents to allow tracing to target specific TCP/IP data collection problems.

  Note: These specialized trace parameters should be enabled only when requested by IBM Software support.

KN3FCCMD HELP

Format

Purpose

Displays the actions and options provided on the KN3FCCMD commands.

Usage

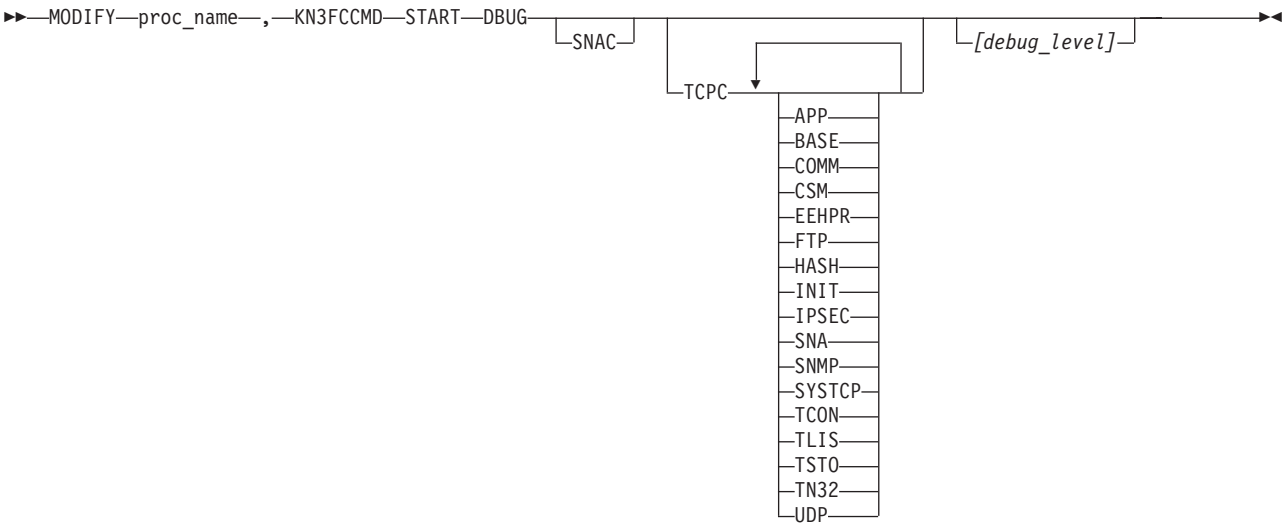
Sample output of this command is provided below:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD HELP'
KN3FC005 --------+-------------------------------------------------------------+
KN3FC005 COMMAND | DESCRIPTION                                                 |
KN3FC005 --------+-------------------------------------------------------------+
KN3FC005 STATUS  | DISPLAY STATUS INFORMATION ABOUT INSTALLED COMPONENTS       |
KN3FC005 HELP    | HELP INFORMATION FOR KN3FCCMD                               |
KN3FC005 INSTALL | INSTALL COMPONENT(S) FOR PRODUCT ENVIRONMENT                |
KN3FC005 START   | START INSTALLED COMPONENTS                                  |
KN3FC005 STOP    | STOP INSTALLED COMPONENTS                                   |
KN3FC005 SEND    | SEND COMMAND MESSAGES                                       |
KN3FC005 --------+-----------------------------------+-----------------------+
KN3FC005 OPTION  | DESCRIPTION                       | COMMANDS              |
KN3FC005 --------+-----------------------------------+-----------------------+
KN3FC005 CONN    | NMI TCP CONN/APPL DATA COLLECTION | START,STOP            |
KN3FC005 CSM     | NMI CSM DATA COLLECTION           | START,STOP            |
KN3FC005 DBUG    | EXTENDED DIAGNOSTICS MODE         | START,STOP,STATUS     |
KN3FC005 EEHPR   | NMI EE/HPR DATA COLLECTION        | START,STOP            |
KN3FC005 FPON    | OMEGAMON PRODUCT FEATURES         | INSTALL,STATUS        |
KN3FC005 FPCT    | CMS DATA SERVER FEATURES          | INSTALL,STATUS        |
KN3FC005 FTP     | NMI FTP DATA COLLECTION           | START,STOP            |
KN3FC005 IPSEC   | NMI IPSEC DATA COLLECTION         | START,STOP            |
KN3FC005 ROUTE   | SNMP ROUTE DATA COLLECTION        | START,STOP            |
KN3FC005 SEVT    | VTAM ENVIRONMENT FEATURES         | INSTALL,STATUS        |
KN3FC005 SEMV    | MVS ENVIRONMENT FEATURES          | INSTALL,STATUS        |
KN3FC005 SNAC    | SNA STATISTICS COLLECTOR          | START,STATUS          |
KN3FC005 TCPC    | TCP/IP STATISTICS COLLECTOR       | INSTALL,START,        |
KN3FC005         |                                   | STOP,STATUS           |
KN3FC005 TN3270  | NMI TN3270 DATA COLLECTION        | START,STOP            |
KN3FC005 TRACE   | DIAGNOSTICS TRACE FACILITY        | START,STOP,STATUS     |
KN3FC005 TRAP    | DIAGNOSTICS TRAP FACILITY         | START,STOP,STATUS     |
KN3FC005 --------+-----------------------------------+-----------------------+
KN3FC005 PARM    | DESCRIPTION                       | OPTION                |
KN3FC005 --------+-----------------------------------+-----------------------+
KN3FC005 ALLHPR  | Y=ALL HPR CONNECTIONS             | EEHPR                 |
KN3FC005         | N=HPR FLOWING OVER EE CONNECTIONS |                       |
KN3FC005 APP     | DIAGNOSTICS FOR APPLICATIONS      | DBUG                  |
KN3FC005 BASE    | DIAGNOSTICS FOR BASE COLLECTOR    | DBUG                  |
KN3FC005 COMM    | DIAGNOSTICS FOR COMMON FUNCTIONS  | DBUG                  |
KN3FC005 CSM     | DIAGNOSTICS FOR CSM               | DBUG                  |
KN3FC005 DSPINTV | NMI DATA DISPLAY INTERVAL SUBCMD  | FTP, TN3270           |
KN3FC005 EEHPR   | DIAGNOSTICS FOR EE AND HPR        | DBUG                  |
KN3FC005 FREQ    | ROUTE COLLECTION FREQUENCY SUBCMD | ROUTE                 |
KN3FC005 FTP     | DIAGNOSTICS FOR FTP               | DBUG                  |
KN3FC005 HASH    | DIAGNOSTICS FOR HASH FUNCTIONS    | DBUG                  |
KN3FC005 INIT    | DIAGNOSTICS FOR INITIALIZATION    | DBUG                  |
KN3FC005 IPSEC   | DIAGNOSTICS FOR IPSEC             | DBUG                  |
KN3FC005 SNA     | DIAGNOSTICS FOR SNA MANAGEMENT    | DBUG                  |
KN3FC005 MAX     | MAXIMUM DIAGNOSTICS LEVEL         | DBUG                  |
KN3FC005 MID     | MEDIUM  DIAGNOSTICS LEVEL         | DBUG                  |
KN3FC005 MIN     | MINIMUM DIAGNOSTICS LEVEL         | DBUG                  |
```

```
KN3FC005 SNAC     | DIAGNOSTICS FOR SNAC               | DBUG                   |
KN3FC005 SNMP     | DIAGNOSTICS FOR SNMP               | DBUG                   |
KN3FC005 SYSTCP   | DIAGNOSTICS FOR REAL-TIME TCP/IP   | DBUG                   |
KN3FC005          | NETWORK MONITORING NMI             | DBUG                   |
KN3FC005 SNACINTV | SNA COLLECTOR INTERVAL             | SNAC                   |
KN3FC005 TCON     | DIAGNOSTICS FOR TCP CONNECTIONS    | DBUG                   |
KN3FC005 TCPC     | DIAGNOSTICS FOR TCPC               | DBUG                   |
KN3FC005 TCPCINTV | TCP/IP COLLECTOR INTERVAL          | TCPC                   |
KN3FC005 TCPCTCPC | TCP/IP COLLECTOR NAME/PROFILE/COM  | TCPC                   |
KN3FC005 TCPCVIOU | TCP/IP COLLECTOR DYNALLOC VIOUNIT  | TCPC                   |
KN3FC005 TCPNAME  | TCP/IP STACK SUBCMD                | TCPC                   |
KN3FC005 TLIS     | DIAGNOSTICS FOR TCP LISTENERS      | DBUG                   |
KN3FC005 TSTO     | DIAGNOSTICS FOR TCP STORAGE        | DBUG                   |
KN3FC005 TN32     | DIAGNOSTICS FOR TN3270             | DBUG                   |
KN3FC005 UDP      | DIAGNOSTICS FOR UDP CONNECTIONS    | DBUG                   |
KN3FC005 --------+-----------------------------------+------------------------+
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

KN3FCCMD START DBUG

Format



Where:

SNAC Means write trace records for SNA Statistics collection.

TCPC Means write trace records for TCP/IP Statistics collections. Turning on all of the TCPC component may result in large amounts of trace data being written to the monitoring agent's job logs. To focus on the problem that you are experiencing, IBM Software Support may ask you to specify additional parameters to only write a subset of the trace records for TCP/IP Statistics collection. The following table describes those additional parameters:

Component	Description
APP	TCP/IP Application table
BASE	Base data collection in the KN3ACTC4 task
COMM	Common functions
CSM	CSM Storage table
EEHPR	Enterprise Extender and High Performance Routing tables
FTP	FTP sessions and transfers tables
HASH	Hash functions
INIT	Initialization and control
IPSEC	IP filters and IP security tables
SNA	VTAM Summary Statistics table
SNMP	SNMP data collection
SYSTCP	Functions that access the real-time TCP/IP Network Management Interface and pass the retrieved data to the FTP and TN3270 data collection routines. For more information about the real-time interface, refer to the *IBM z/OS Communications Server: IP Programmer's Guide and Reference*.
TCON	TCPIP Details table and TCP Connections data stored in the TCPIP Connections table
TLIS	TCP Listener table and TCP Listener data stored in the TCPIP Connections table
TSTO	TCPIP Memory Statistics table

Component	Description
TN32	TN3270 Server Sessions Avail and TN3270 Response Time Buckets tables
UDP	UDP Connections table and UDP Connections data stored in the TCPIP Connections table

debug_level
Is one of the following:

Debug level identifier	Meaning
MIN	Trace data is captured only when an error is detected.
MID	“Medium-detail” debugging messages are captured. These messages are used by IBM Software Support to diagnose software problems.
MAX	All trace data is captured. These messages are used by IBM Software Support to diagnose software problems.

Purpose

Starts the writing of trace messages for the TCP/IP and VTAM statistics collector to the log files. Additional trace messages will be written to sysout or spool data sets to facilitate investigation of a problem. IBM Software Support might request that you issue this command and then provide a copy of the log files. When the STOP command is issued, the component and subcomponents will capture trace information only when there is an error (MIN level).

Attention: Issuing the KN3FCCMD START DBUG command with the debug level set at MAX may result in the rapid filling of all spool volumes. When all spool volumes fill, system failure may occur.

Usage

These usages notes apply:

- You must specify a component before specifying a subcomponent. If you specify a subcomponent without a component, Message KN3FC004 is issued.
- When no subcomponent is specified when component is specified, the specified *debug_level* is applied to all subcomponents of the selected component.
- When all TCPC subcomponents are enabled at the MAX debug level (either as part of one command or cumulative), warning message KN3C143W is issued indicating that a significant amount of trace data may be written to the job log.
- When multiple subcomponent identifiers are specified, they are separated by spaces.
- All components/subcomponents are started at the MIN debug level by default when the agent is started.
- Multiple subcomponents may be specified on one command with different levels for trace defined for each component. Each START DBUG command has a cumulative effect.

Examples illustrating these usage points follow. These examples assume the default MIN level debug setting.

1. This command:

   ```
   MODIFY procname,KN3FCCMD START DBUG TCPC BASE TN32 MAX
   ```

   Results in the trace levels for the BASE and TN32 subcomponents of TCPC being set at MAX debug level. All other subcomponents of TCPC are still at the MIN debug level, and the SNAC component is at MIN debug level.

   Here is sample output for this command:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START DBUG TCPC BASE TN32 MAX'
KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3AHFD3 (TCPC, BASE) KN3AHFD3 EXIT
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C200I FOR TCPC COMPONENT, MAXIMUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I TN32 BASE
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

2. This command:

```
MODIFY procname,KN3FCCMD START DBUG TCPC TN32 MID
```

Results in the trace levels for the TN32 subcomponent being set to MID, but the trace level for the BASE subcomponent is still at MAX. All other TCPC subcomponents and the SNAC component are set at MIN by default.

Here is sample output for this command:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START DBUG TCPC TN32 MID'
KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C200I FOR TCPC COMPONENT, MAXIMUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I BASE
KN3C200I FOR TCPC COMPONENT, MEDIUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I TN32
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

3. This command:

```
MODIFY procname,KN3FCCMD START DBUG TCPC MAX
```

Results in the trace levels for all TCPC subcomponents being set to MAX. The trace level for the SNAC component is still set at MIN.

Here is sample output for this command:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START DBUG TCPC MAX'
KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
KN3C143W MAX DEBUG LEVEL SET FOR COMPONENT TCPC
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C202I MAXIMUM TRACING FOR COMPONENT TCPC IS ENABLED
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

KN3FCCMD START IPSEC

Format

Where:

TCPNAME
Identifies which TCP/IP address spaces this command applies to.

***** Indicates that this applies to all TCP/IP address spaces.

tcpip_proc_name
Is the name of a TCP/IP address space in your environment.

Purpose

Starts collection of IPSec data.

Usage

Sample output of this command using the default value of all TCP/IP address spaces is provided in the following section:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START IPSEC'
KN3C110I START FOR COMPONENT IPSEC ACCEPTED. TCPNAME: *
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

Sample output of this command using a specific TCP/IP address space is provided in the following section:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START IPSEC  TCPNAME(TCPIP)'
KN3C110I START FOR COMPONENT IPSEC ACCEPTED. TCPNAME: TCPIP
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

KN3FCCMD STATUS DBUG

Format

Purpose

Display the current settings of extended diagnostics.

Usage

Sample output of this command is provided in the following section:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C200I FOR TCPC COMPONENT, MAXIMUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I CSM
KN3C200I FOR TCPC COMPONENT, MEDIUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I SNMP
KN3C202I MAXIMUM TRACING FOR COMPONENT SNAC IS ENABLED
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

KN3FCCMD STATUS TCPC

Format

Purpose

Displays the status of TCP/IP and VTAM statistics components.

Usage

Sample output of this command is provided in the following section:

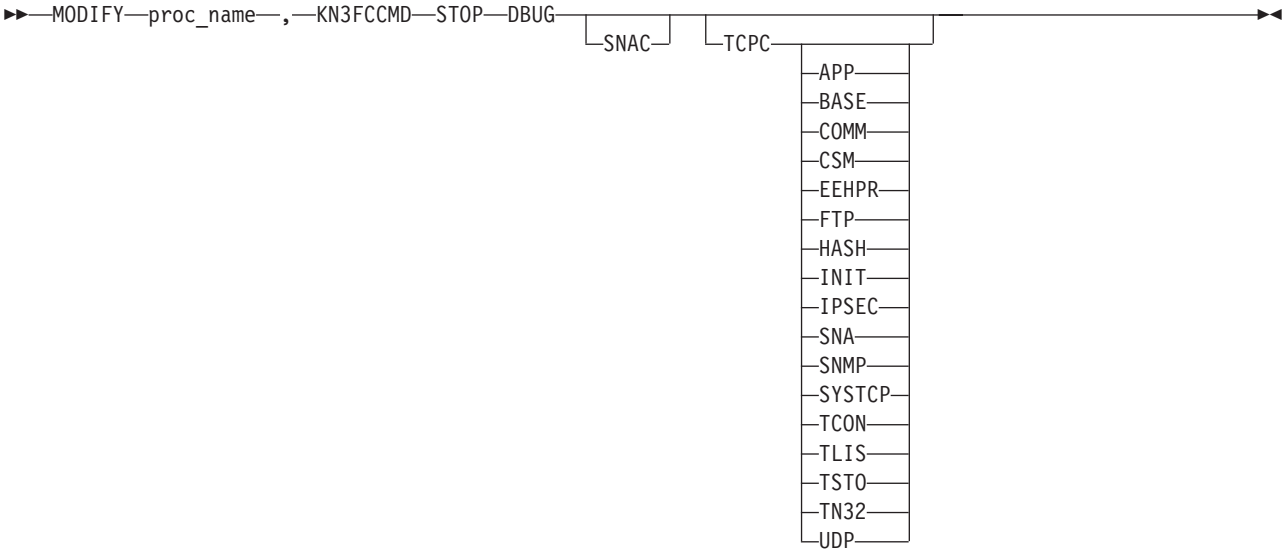
```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS TCPC'
KN3FC095 TCPC COLLECTOR STATUS IS ACTIVE
KN3FC095 KONAYTGA ADDRESS IS ED9F900, KONAYFCV ADDRESS IS ED93798
KN3FC095 SAMPLE INTERVAL IS 1 MINUTES
KN3FC095 NUMBER OF TIMES COLLECTOR HAS ABENDED IS 0
KN3FC095 TCPC COLLECTION IS ACTIVE FOR TCPC, CONN, FTP, TN3270, ROUTE
KN3FC095 FTP DISPLAY INTERVAL IS 2 HOURS
KN3FC095 TN3270 DISPLAY INTERVAL IS 2 HOURS
KN3FC095 ROUTE COLLECTION FREQUENCY IS ONCE EVERY 10 INTERVALS
KN3FC095 TCPC COLLECTION FROM TCPIP IS ACTIVE FOR TCPC, CONN, IPSEC, FTP, TN3270
KN3FC095 FTP DISPLAY INTERVAL FOR TCPIP IS 2 HOURS
KN3FC095 TN3270 DISPLAY INTERVAL FOR TCPIP IS 2 HOURS
KN3FC095 ROUTE COLLECTION FREQUENCY FOR TCPIP IS ONCE EVERY 10 INTERVALS
KN3FC095 VTAM COLLECTION IS ACTIVE FOR SNA, CSM, EEHPR
KN3FC095 EEHPR OPTIONS: ALLHPR(N)
KN3FC095 TCPC STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

Sample output for a system with three TCP/IP address spaces:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS TCPC'
KN3FC095 TCPC COLLECTOR STATUS IS ACTIVE
KN3FC095 KONAYTGA ADDRESS IS 116A59F0, KONAYFCV ADDRESS IS 116A4760
KN3FC095 SAMPLE INTERVAL IS 5 MINUTES
KN3FC095 NUMBER OF TIMES COLLECTOR HAS ABENDED IS 0
KN3FC095 TCPC COLLECTION IS ACTIVE FOR TCPC, CONN, IPSEC, FTP, TN3270, ROUTE
KN3FC095 FTP DISPLAY INTERVAL IS 2 HOURS
KN3FC095 TN3270 DISPLAY INTERVAL IS 2 HOURS
KN3FC095 ROUTE COLLECTION FREQUENCY IS ONCE EVERY 10 INTERVALS
KN3FC095 TCPC COLLECTION FROM TCPCS2 IS ACTIVE FOR TCPC, CONN, IPSEC, FTP, TN3270, ROUTE
KN3FC095 FTP DISPLAY INTERVAL FOR TCPCS2 IS 2 HOURS
KN3FC095 TN3270 DISPLAY INTERVAL FOR TCPCS2 IS 2 HOURS
KN3FC095 ROUTE COLLECTION FREQUENCY FOR TCPCS2 IS ONCE EVERY 10 INTERVALS
KN3FC095 TCPC COLLECTION FROM TCPCS4 IS ACTIVE FOR TCPC, CONN, IPSEC, FTP, TN3270, ROUTE
KN3FC095 FTP DISPLAY INTERVAL FOR TCPCS4 IS 2 HOURS
KN3FC095 TN3270 DISPLAY INTERVAL FOR TCPCS4 IS 2 HOURS
KN3FC095 ROUTE COLLECTION FREQUENCY FOR TCPCS4 IS ONCE EVERY 10 INTERVALS
KN3FC095 TCPC COLLECTION FROM TCPIP IS ACTIVE FOR TCPC, CONN, IPSEC, FTP, TN3270, ROUTE
KN3FC095 FTP DISPLAY INTERVAL FOR TCPIP IS 2 HOURS
KN3FC095 TN3270 DISPLAY INTERVAL FOR TCPIP IS 2 HOURS
KN3FC095 ROUTE COLLECTION FREQUENCY FOR TCPIP IS ONCE EVERY 10 INTERVALS
KN3FC095 VTAM COLLECTION IS ACTIVE FOR SNA, CSM, EEHPR
KN3FC095 EEHPR OPTIONS: ALLHPR(N)
KN3FC095 TCPC STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

KN3FCCMD STOP DBUG

Format



SNAC Means write trace records for SNA Statistics collection.

TCPC Means write trace records for TCP/IP Statistics collections. Turning on all of the TCPC component may result in large amounts of trace data being written to the monitoring agent's job logs. To focus on the problem that you are experiencing, IBM Software Support may ask you to specify additional parameters to only write a subset of the trace records for TCP/IP Statistics collection. The following table describes those additional parameters:

Component	Description
APP	TCP/IP Application table
BASE	Base data collection in the KN3ACTC4 task
COMM	Common functions
CSM	CSM Storage table
EEHPR	Enterprise Extender and High Performance Routing tables
FTP	FTP sessions and transfers tables
HASH	Hash functions
INIT	Initialization and control
IPSEC	IP filters and IP security tables
SNA	VTAM Summary Statistics table
SNMP	SNMP data collection
SYSTCP	Functions that access the real-time TCP/IP Network Management Interface and pass the retrieved data to the FTP and TN3270 data collection routines. For more information about the real-time interface, refer to the *IBM z/OS Communications Server: IP Programmer's Guide and Reference*.
TCON	TCPIP Details table and TCP Connections data stored in the TCPIP Connections table
TLIS	TCP Listener table and TCP Listener data stored in the TCPIP Connections table
TSTO	TCPIP Memory Statistics table

Component	Description
TN32	TN3270 Server Sessions Avail and TN3270 Response Time Buckets tables
UDP	UDP Connections table and UDP Connections data stored in the TCPIP Connections table

debug_level
Is one of the following:

Debug level identifier	Meaning
MIN	Trace data is captured only when an error is detected.
MID	"Medium-detail" debugging messages are captured. These messages are used by IBM Software Support to diagnose software problems.
MAX	All trace data is captured. These messages are used by IBM Software Support to diagnose software problems.

Purpose

Stops the writing of additional trace information for the TCP/IP and VTAM statistics collector. MIN-level tracing remain active.

Usage

These usages notes apply:

- You must specify a component before specifying a subcomponent. If you specify a subcomponent without a component, Message KN3FC004 is issued.
- When no subcomponent is specified when component is specified, the specified *debug_level* is applied to all subcomponents of the selected component.
- Multiple subcomponents may be specified on one command.

Examples illustrating these usage points follow.

1. This command:

   ```
   MODIFY procname,KN3FCCMD STOP DBUG TCPC
   ```

   In this example, prior to issuing the command to stop tracing of the TCPC component, tracing was started at the maximum level for the EEHPR and CSM TCPC subcomponents and at the medium level for the HASH TCPC subcomponent. Tracing of the SNAC component at the maximum trace level was also enabled. When no subcomponent is specified when a component is specified, the specified *debug_level* is applied to all subcomponents of the selected component.

   The following output shows that tracing has been stopped (MIN trace level) for the TCPC component and the SNAC component is at MAX debug level:

   ```
   KLVOP191 REPLY FROM *MASTER*:
   KLVOP191    'KN3FCCMD START DBUG SNAC TCPC EEHPR CSM'
   KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
   KN3FC000 KN3FCCMD PROCESSING COMPLETE
   KLVOP191 REPLY FROM *MASTER*:
   KLVOP191    'KN3FCCMD START DBUG TCPC HASH MID'
   KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
   KN3FC000 KN3FCCMD PROCESSING COMPLETE
   KLVOP191 REPLY FROM *MASTER*:
   KLVOP191    'KN3FCCMD STATUS DBUG'
   KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
   KN3C200I FOR TCPC COMPONENT, MAXIMUM TRACING IS ENABLED FOR SUBCOMPONENTS:
   KN3C201I CSM EEHPR
   KN3C200I FOR TCPC COMPONENT, MEDIUM TRACING IS ENABLED FOR SUBCOMPONENTS:
   ```

```
KN3C201I HASH
KN3C202I MAXIMUM TRACING FOR COMPONENT SNAC IS ENABLED
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE

KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STOP DBUG TCPC'
KN3C072I DBUG EXTENDED DIAGNOSTICS STILL ACTIVE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C202I MAXIMUM TRACING FOR COMPONENT SNAC IS ENABLED
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

2. This command:

```
MODIFY procname,KN3FCCMD STOP DBUG TCPC CSM
```

In this example, prior to issuing the command to stop tracing of the TCPC CSM subcomponent, tracing was started at the maximum level for the EEHPR and CSM TCPC subcomponents and at the medium level for the HASH TCPC subcomponent. Tracing of the SNAC component at the maximum trace level was also enabled.

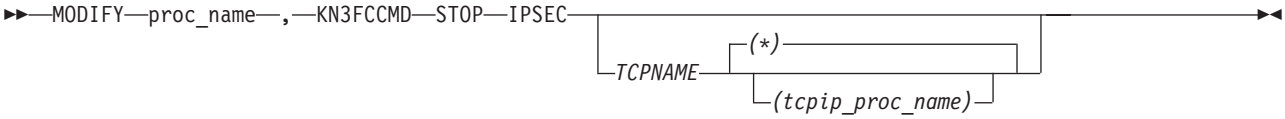
The following output shows that tracing has been stopped (MIN trace level) for the TCPC CSM subcomponent. The trace level for the EEHPR TCPC subcomponent remains at the maximum trace level, the HASH TCPC subcomponent remains at the medium trace level, and the SNAC component continues to be traced at the maximum trace level.

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START DBUG SNAC TCPC EEHPR CSM'
KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD START DBUG TCPC HASH MID'
KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C200I FOR TCPC COMPONENT, MAXIMUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I CSM EEHPR
KN3C200I FOR TCPC COMPONENT, MEDIUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I HASH
KN3C202I MAXIMUM TRACING FOR COMPONENT SNAC IS ENABLED
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE

KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STOP DBUG TCPC CSM'
KN3C072I DBUG EXTENDED DIAGNOSTICS STILL ACTIVE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STATUS DBUG'
KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS ACTIVE
KN3C200I FOR TCPC COMPONENT, MAXIMUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I EEHPR
KN3C200I FOR TCPC COMPONENT, MEDIUM TRACING IS ENABLED FOR SUBCOMPONENTS:
KN3C201I HASH
KN3C202I MAXIMUM TRACING FOR COMPONENT SNAC IS ENABLED
KN3C204I DBUG STATUS DISPLAY COMPLETE
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

KN3FCCMD STOP IPSEC

Format



Where:

TCPNAME
Identifies which TCP/IP address spaces this command applies to.

***** Indicates that this applies to all TCP/IP address spaces.

tcpip_proc_name
Is the name of a TCP/IP address space in your environment.

Purpose

Stops collection of IPSec data.

Usage

Sample output of this command using the default value of all TCP/IP address spaces is provided in the following section:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STOP IPSEC'
KN3C110I STOP FOR COMPONENT IPSEC ACCEPTED. TCPNAME: *
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

Sample output of this command using a specific TCP/IP address space is provided in the following section:

```
KLVOP191 REPLY FROM *MASTER*:
KLVOP191    'KN3FCCMD STOP IPSEC  TCPNAME(TCPIP)'
KN3C110I STOP FOR COMPONENT IPSEC ACCEPTED. TCPNAME: TCPIP
KN3FC000 KN3FCCMD PROCESSING COMPLETE
```

Chapter 9. New and changed messages and problem determination

This chapter describes the new messages and new problem determination scenarios in the two updates delivered since version 4.1.0 of OMEGAMON XE for Mainframe Networks became available.

New and updated messages for Fix Pack 2

The following messages are either new or updated because of additions made for Fix Pack 2 to support either OSA updates or granular tracing.

KN3FC004 KN3FCCMD INVALID OPTION(*option_name*) FOR COMMAND (*command_name*)

Explanation: An invalid command option was detected while processing the feature control command (KN3FCCMD) arguments.

This message might indicate that you specified one or more subcomponents on the `MODIFY proc_name,KN3FCCMD START DBUG` command without specifying the TCPC component. A component is now required; previously, when no component was specified, DEBUG was activated for ALL components.

System action: The command request fails.

Programmer response: Enter KN3FCCMD HELP to list supported command options. Reenter KN3FCCMD specifying valid command options. See the appendix in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* for more information about the KN3FCCMD command.

Message type: Error.

KN3CT055 OSA UNSUPPORTED OSA ADAPTOR DETECTED. SUBTYPE=*xxxxxxxx*

Explanation: An installed OSA Adapter has been detected whose channel subtype is not recognized by OMEGAMON XE for Mainframe Networks.

System action: Data for the unsupported OSA adapter will not be collected.

System Programmer Response: Log the information for problem diagnosis and contact IBM Software Support.

Message type: Error.

KN3CT056 TCP/IP COLLECTOR ERROR, ROUTINE=*xxxxxxxx*, TYPE=*yyyyyyyy*, ERROR=*zzzzzzzz*

Explanation: OMEGAMON XE for Mainframe Networks has encountered an error during data collection. The module, data collection type and error type are reported in the message.

System action: System action will vary depending on the error that is encountered.

System Programmer Response: Log the information for problem diagnosis and contact IBM Software Support.

Message type: Error.

KN3CT057 OSA SNMP DATA COLLECTION TYPE=*xxxxxxxx*, TCPIP=*yyyyyyyy*

Explanation: OMEGAMON XE for Mainframe Networks will determine and report the type of OSA data collection configured for the named TCP/IP stack.

System action: Action will depend on the reported type.

- If TYPE= Z/CS SNMP TCP/IP SUBAGENT then the z/CS MVSTCPIP MIB will be queried to retrieve OSA performance metrics.
- If TYPE=OSA-EXPRESS DIRECT SNMP then the OSA-Express Direct SNMP MIB will be queried to retrieve OSA performance metrics.
- If TYPE= UNAVAILABLE then no OSA performance metrics will be collected.

System Programmer Response: If TYPE=UNAVAILABLE follow the steps outlined in the OMEGAMON XE for Mainframe Networks Configuration Guide in section Starting the OSA adapter SNMP subagent.

Message type: Informational.

KN3CT058 PORT TABLES=*xxxxxxxx*

Explanation: OMEGAMON XE for Mainframe Networks will determine and report the type of OSA Port tables whose performance metrics will be collected for the TCP/IP stack identified in the prior KN3CT057 message.

System action: Action will depend on the reported type.

- If TABLES= OSAEXPETH and data collection is using the z/CS MVSTCPIP MIB, then OSA performance metrics from the osaexpEthPortTable will be reported.

- If TABLES= OSAEXPETH and data collection is using the OSA-Express Direct SNMP MIB, then OSA performance metrics from the ibmOSAExpEthPortTable will be reported.
- If TABLES= OSAEXP10GIG then OSA performance metrics from the ibmOSAExp10GigEthPortTable will be reported.
- If TABLES= OSAEXP3 then OSA performance metrics from the ibmOSAExp3PortTable will be reported.

System Programmer Response: None.

Message type: Informational.

KN3C070I DBUG EXTENDED DIAGNOSTICS MODE STARTED

Explanation: Extended diagnostics mode is active.

System action: None.

User response: None.

Message type: Informational.

KN3C071E DBUG EXTENDED DIAGNOSTICS MODE START FAILED ROUTINE=KN3AHFD1 REASON=*reason_code* **RETURN=***return_code*

Explanation: An error was detected while the feature control command (KN3FCCMD) was starting extended diagnostic mode (DBUG).

System action: The command request fails.

User response: Log the information and contact IBM Software Support.

Message type: Error.

KN3C072I DBUG EXTENDED DIAGNOSTICS MODE STOPPED

Explanation: Extended diagnostics mode is inactive.

System action: None.

User response: None.

Message type: Informational.

KN3C073E DBUG EXTENDED DIAGNOSTICS MODE STOP FAILED ROUTINE=KN3AHFD2 REASON=*reason_code* **RETURN=***return_code*

Explanation: An error was detected while the feature control command (KN3FCCMD) was stopping extended diagnostic mode (DBUG).

System action: The command request fails.

User response: Execute the command again. If you are not successful at stopping extended diagnostic mode, especially when MAX debug level is active, stop and restart the monitoring agent, log the information, and contact IBM Software Support.

Message type: Error.

KN3C074I DBUG EXTENDED DIAGNOSTICS MODE IS *<status>*

Explanation: This is a prefix for feature control command (KN3FCCMD) STATUS DBUG output. *<status>* can be active or inactive.

System action: None.

User response: None.

Message type: Informational.

KN3C075E DBUG EXTENDED DIAGNOSTICS MODE STATUS FAILED ROUTINE=KN3AHFD3 REASON=*reason_code* **RETURN=***return_code*

Explanation: An error was detected while the feature control command (KN3FCCMD) was displaying extended diagnostic mode (DBUG).

System action: The command request fails.

User response: Log the information and contact IBM Software Support.

Message type: Error.

KN3C143W MAX DEBUG LEVEL SET FOR COMPONENT *component*

Explanation: The debug level for component *component* is set to MAX. Debug levels can be set to MAX, MID, or MIN. Enabling the KN3FCCMD START DBUG command with the default *debug_level* of MAX may result in the filling of all spool volumes and cause system failure. Use a debug level of MAX for only as long as required to capture the trace data your need.

component is **TCPC** for TCP/IP traces.

System action: Over time, the spool volumes will fill, causing system failure.

Programmer response: Once the required traces have been gathered, stop the trace activity using the `KN3FCCMD STOP DBUG` command.

Message type: Warning.

KN3C200I FOR [*component***] COMPONENT, [***debug-level***] TRACING IS ENABLED FOR SUBCOMPONENTS:**

Explanation: Tracing was enabled for the named

components and subcomponents at the indicated debug level.

component is **TCPC** for TCP/IP traces.

debug-level is one of the following;

Debug level identifier	Meaning
MIN	Trace data is captured only when an error is detected.
MID	"Medium-detail" debugging messages are captured. These messages are used by IBM Software Support to diagnose software problems.
MAX	All trace data is captured. These messages are used by IBM Software Support to diagnose software problems.

The list of subcomponents is defined in Message KN3C201I

System action: None.

Programmer response: None.

Message type: Informational.

KN3C201I *subcomponents*

Explanation: The list of subcomponents for which tracing was enabled in Message KN3C200I.

subcomponent can include any of the following:

Component	Description
APP	TCP/IP Application table
BASE	Base data collection in the KN3ACTC4 task
COMM	Common functions
CSM	CSM Storage table
EEHPR	Enterprise Extender and High Performance Routing tables
FTP	FTP sessions and transfers tables
HASH	Hash functions
INIT	Initialization and control
IPSEC	IP filters and IP security tables
SNA	VTAM Summary Statistics table
SNMP	SNMP data collection
SYSTCP	Functions that access the real-time TCP/IP Network Management Interface and pass the retrieved data to the FTP and TN3270 data collection routines. For more information about the real-time interface, refer to the *IBM z/OS Communications Server: IP Programmer's Guide and Reference*.
TCON	TCPIP Details table and TCP Connections data stored in the TCPIP Connections table
TLIS	TCP Listener table and TCP Listener data stored in the TCPIP Connections table
TSTO	TCPIP Memory Statistics table
TN32	TN3270 Server Sessions Avail and TN3270 Response Time Buckets tables
UDP	UDP Connections table and UDP Connections data stored in the TCPIP Connections table

System action: None.

Programmer response: None.

Message type: Informational.

KN3C202I **[***debug-level***] TRACING FOR [***component***] COMPONENT IS ENABLED.**

Explanation: This is a prefix for feature control command (KN3FCCMD) HELP output. To see a listing of the text that can be displayed in the *<help text>* field, see Chapter 8, "New and changed KN3FCCMD commands," on page 197 in this book and the Command Reference appendix in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide*.

debug-level is one of the following:

Debug level identifier	Meaning
MIN	Trace data is captured only when an error is detected.
MID	"Medium-detail" debugging messages are captured. These messages are used by IBM Software Support to diagnose software problems.

Debug level identifier	Meaning
MAX	All trace data is captured. These messages are used by IBM Software Support to diagnose software problems.

System action: None.

Programmer response: None.

Message type: Informational.

KN3C203I DBUG ACTIVE FOR COMPONENTS [*subcomponents*]

Explanation: This information message displays a list of components for which some level of tracing other than the default MIN level is enabled

subcomponents can include any of the following:

Component	Description
APP	TCP/IP Application table
BASE	Base data collection in the KN3ACTC4 task
COMM	Common functions
CSM	CSM Storage table
EEHPR	Enterprise Extender and High Performance Routing tables
FTP	FTP sessions and transfers tables
HASH	Hash functions
INIT	Initialization and control
IPSEC	IP filters and IP security tables
SNA	VTAM Summary Statistics table
SNMP	SNMP data collection
SYSTCP	Functions that access the real-time TCP/IP Network Management Interface and pass the retrieved data to the FTP and TN3270 data collection routines. For more information about the real-time interface, refer to the *IBM z/OS Communications Server: IP Programmer's Guide and Reference*.
TCON	TCPIP Details table and TCP Connections data stored in the TCPIP Connections table
TLIS	TCP Listener table and TCP Listener data stored in the TCPIP Connections table
TSTO	TCPIP Memory Statistics table
TN32	TN3270 Server Sessions Avail and TN3270 Response Time Buckets tables
UDP	UDP Connections table and UDP Connections data stored in the TCPIP Connections table

System action: None.

Programmer response: None.

Message type: Informational.

New and updated messages and problem determination for the Fix Pack 1

New and updated messages

The following messages are either new or updated because of additions made in Fix Pack 1.

KN3FC095 <status text>

Explanation: This is a prefix for feature control command (KN3FCCMD) STATUS TCPC output. To see a listing of the text that can be displayed in the <*status text*> field, see Chapter 8, "New and changed KN3FCCMD commands," on page 197 in this book and the Command Reference appendix in *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide*. This message may now also include IPSec status.

System action: None.

Programmer response: None.

Message type: Informational.

KN3N024E THE *netmgmt_interface* INTERFACE IN THE *interface_path* PATH CANNOT BE INITIALIZED. ERRNO=*errno* AND ERRNOJR=0x*errnoJr*. LOCATION: *location_code*.

Explanation: An attempt to initialize the z/OS Communications Server network management interface was not successful for the identified reason.

The *location_code* identifies the location within the monitor code where this message is issued. It is used by IBM Software Support.

Operator response: Verify that the TCP/IP stack is active. Verify that the z/OS Communications Server

network management interface is active. Issue the `DISPLAY NET,VTAMOPTS,OPTION=SNAMGMT` command for the SNAMGMT interface. Issue the `DISPLAY TCPIP,`*`tcpip_procname`*`,NETSTAT,CONFIG` command for the network monitoring interfaces.

If you have enabled IPSec data collection on a z/OS version 1.8 or later system, confirm that the IKE daemon and Policy Agent daemon have been started by issuing this command: `D A,L`. If the daemons have not started, start them. Refer to the *z/OS Communications Server IP Configuration Guide* (SC31-8775) for more information about the IKE daemon and Policy Agent daemon.

Programmer response: Verify that the user ID running the monitor is authorized to access the z/OS Communications Server network management interface.

See *z/OS UNIX System Services Messages and Codes* for errno (displayed in decimal) and errnoJr codes.

KN3N031E AN UNEXPECTED MESSAGE TYPE WAS RECEIVED, *msgTypeReceived***. LOCATION:** *location_code***.**

Explanation: The data collection server received data that was not expected. Some IPSec data cannot be collected. The interface to the z/OS Communications Server network management data was closed, and resources were released. The data collection server attempts to establish this data collection again. The *location_code* identifies the location within the monitor code where this message is issued. It is used by IBM Software Support.

Operator Response: Notify the System Programmer if the problem persists.

Programmer response: Verify that the installed versions of Tivoli OMEGAMON XE for Mainframe Networks and z/OS Communications Server are compatible.

KN3N032E THE IPSEC INTERFACE CANNOT BE INITIALIZED. LOCATION: *location_code***.**

Explanation: The program attempted to initialize a z/OS Communications Server network management interface to prepare for collecting z/OS Communications Server IPSEC data. The initialization was not successful.

Operator Response: Confirm that the IKE daemon and Policy Agent daemon have been started by issuing this command:

```
D A,L
```

If the daemons have not started, start them. Refer to the *z/OS Communications Server IP Configuration Guide* (SC31-8775) for more information about the IKE daemon and Policy Agent daemon.

Programmer response: Verify that the installed versions of Tivoli OMEGAMON XE for Mainframe Networks and z/OS Communications Server are compatible. Verify that the user ID running the monitor is authorized to access the z/OS Communications Server network management interface.

KN3N033W KN3N033W THE Z/OS COMMUNICATIONS SERVER STOPPED THE IPSEC INTERFACE WITH ERRNO=*errno* **AND REASON_CODE=***reasonCode***. LOCATION:** *location_code*

Explanation: The monitor attempted to communicate using the z/OS Communications Server IPSec network management interface, but the z/OS Communications Server ended the connection. The monitor attempted to collect IPSEC data. The collection was not successful. The values for *errno* and *reasonCode* are Local IPSec NMI return and reason codes, documented in the network management interfaces (NMIs) chapter of the *z/OS V1R9.0 Communications Server, IP Programmer's Guide and Reference*, The *location_code* identifies the location within the monitor code where this message is issued. It is used by IBM Software Support.

Operator Response: Determine if the IKE daemon and Policy Agent daemon are running by issuing this command:

```
D A,L
```

If the daemons are not running, start them. Refer to the *z/OS Communications Server IP Configuration Guide* (SC31-8775) for more information about the IKE daemon and Policy Agent daemon. Notify the System Programmer if the problem persists.

Programmer response: Determine why the IKE daemon (IKED) and Policy Agent daemon (PAGENT) are not running. Correct the problem and start the daemons.

If IKED, PAGENT, and syslog daemons (syslogd) are running, error messages may have been written to the syslogd logs. These logs are usually found in the default `/tmp/syslogd` directory, but this location might be different for your environment. Check these logs for messages related to this error.

KN3N035W INVALID STATE FOR DYNAMIC TUNNEL IN GET_IPTUNDYNSTACK RESPONSE. LOCATION: *location_code*

Explanation: The data collection server received data that was not expected. A record for a dynamic tunnel in the pending or incomplete state was received among record from a TCP/IP stack. All dynamic tunnels known to a TCP/IP stack are expected to be in active state. This record is ignored. Data collection continues.

Operator Response: Notify the System Programmer if the problem persists.

Programmer response: Verify that the installed versions of Tivoli OMEGAMON XE for Mainframe Networks and z/OS Communications Server are compatible.

New problem determination

No data appears in the new workspaces added for IPSec

If no data appears in your IPsec workspaces, do the following:

1. Verify that IPSEC collection is configured and enabled:
   a. Examine the RKLVLOG for the Mainframe Networks agent. If IPSEC collection was started at agent initialization, there should be a message KN3FC095 message that lists IPSEC in the list of active collection types:

      ```
      KN3FC095 TCPC COLLECTION IS ACTIVE FOR TCPC, CONN, IPSEC, FTP, TN3270, ROUTE
      ```

   b. Follow the procedures in Chapter 3, “New configuration required for IPSec,” on page 25 to invoke the Configuration Tool and verify that IPSec is enabled in the panel shown in Figure 3 on page 26.
2. Examine the KN3ANMON log for the Mainframe Networks agent to determine if any of the following error messages appear:

   ```
   KN3N024E THE IPSEC INTERFACE IN THE interface_path PATH CANNOT BE INITIALIZED.
     ERRNO=errno AND ERRNOJR=0xerrnoJr. LOCATION: location_code

   OR

   KN3N031E AN UNEXPECTED MESSAGE TYPE WAS RECEIVED, msgTypeReceived.  LOCATION:  location_code.

   OR

   KN3N033W KN3N033W THE Z/OS COMMUNICATIONS SERVER STOPPED THE IPSEC INTERFACE WITH
     ERRNO=errno AND REASON_CODE=reasonCode

   OR

   KN3N035W INVALID STATE FOR DYNAMIC TUNNEL IN GET_IPTUNDYNSTACK RESPONSE.  LOCATION:  location code.
   ```

3. Verify that the IKE Daemon (IKED) and Policy Agent (PAGENT) tasks are active and initialized correctly. Examples of successful initialization messages follow:

   Policy agent example:

   ```
   EZZ8432I PAGENT INITIALIZATION COMPLETE
   EZZ8771I PAGENT CONFIG POLICY PROCESSING COMPLETE FOR TCPIP : IPSE
   ```

   IKE daemon example:

   ```
   EZD0911I IKE CONFIG PROCESSING COMPLETE USING FILE //'USER.PARMLIB(IKEDC)'
   EZD1061I IKE CONNECTING TO PAGENT
   EZD1059I IKE CONNECTED TO PAGENT
   EZD1058I IKE STATUS FOR STACK TCPIP IS UP
   EZD1068I IKE POLICY UPDATED FOR STACK TCPIP
   EZD1046I IKE INITIALIZATION COMPLETE
   ```

Appendix A. Known issues with information in the version 4.1.0 documentation

This appendix documents known issues with the OMEGAMON XE for Mainframe Networks documentation. The following links explain these issues:

Use of the configuration guide to complete the OMEGAMON XE agent configuration

Some steps required to complete the configuration of the OM XE agent are not found in the online help for the Configuration Tool. To ensure that you perform all the steps required and perform them in the correct order, use the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide* for product configuration, not the Configuration Tool online help.

Clarification that Tivoli Data Warehouse and warehouse proxy run on platforms other than Windows

In the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Planning Guide*, page 31 incorrectly states that the Tivoli Data Warehouse and warehouse proxy run only on Windows and that these two components must be on the same Windows system.

Replace this paragraph:

The Tivoli Data Warehouse and warehouse proxy run on Windows. The Tivoli Enterprise Portal Server retrieves data from the Tivoli Data Warehouse through an ODBC connection. The warehouse proxy communicates with the Tivoli Enterprise Portal Server and with the systems where the short-term history is stored (either the monitoring agents or the Tivoli Enterprise Monitoring Server). The Tivoli Data Warehouse and warehouse proxy must be on the same Windows system. The placement of the Tivoli Data Warehouse in your network should consider the location of both the Tivoli Enterprise Portal Server and the short-term history files.

With this paragraph:

The Tivoli Data Warehouse and warehouse proxy run on a number of platforms. For the most current list of platforms, refer to the fix pack document for the most current version of IBM Tivoli Monitoring. The Tivoli Enterprise Portal Server retrieves data from the Tivoli Data Warehouse through an ODBC connection. The

warehouse proxy communicates with the Tivoli Enterprise Portal Server and with the systems where the short-term history is stored (either the monitoring agents or the Tivoli Enterprise Monitoring Server). The placement of the Tivoli Data Warehouse in your network should consider the location of both the Tivoli Enterprise Portal Server and the short-term history files.

Likewise, in the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide*, page 89 incorrectly states the following:

Tivoli Enterprise Portal and Tivoli Enterprise Portal Server are installed on a Windows system.

This has been changed as follows:

Tivoli Enterprise Portal and Tivoli Enterprise Portal Server run on a number of platforms. For the most current list of platforms, refer to the documentation for the most current fix pack for IBM Tivoli Monitoring.

Clarification that the summarization and pruning agent runs on a distributed monitoring server, not on z/OS monitoring server

In the *IBM Tivoli OMEGAMON XE for Mainframe Networks: Configuration Guide*, page 98 incorrectly describes this process for enabling summarization and pruning is for the hub Tivoli Enterprise Monitoring Server on z/OS. This process is for distributed platforms only, not for z/OS. Thus, in this explanation on page 98:

Enabling summarization and pruning on a hub Tivoli Enterprise Monitoring Server on z/OS

If the hub Tivoli Enterprise Monitoring Server on z/OS does not reside on the same machine as the Tivoli Enterprise Portal Server, you must enable summarization and pruning manually. To enable the Summarization and Pruning Agent to run against OMEGAMON XE for Mainframe Networks tables in the Tivoli Data Warehouse, you must install the catalog and attribute data files on the hub Tivoli Enterprise Monitoring Server on z/OS. These files are not automatically installed on a hub Tivoli Enterprise Monitoring Server if that component does not reside on the same machine as the Tivoli Enterprise Portal Server.

The word ″If″ should be replaced with ″Since.″

Configuration Tool screens and help may be more up-to-date than the configuration guide screens

Be aware that the Configuration Tool is updated constantly because it is updated as new products are shipped and new requirements are introduced. Therefore, the screens in the Configuration Guide may not exactly match those in the Configuration Tool.

ITMS: Engine MINIMUM statement has additional parameters

On page 120 of the configuration guide, the following tuning information is found:

ITMS:Engine MINIMUM parameter

The MINIMUM parameter is used to specify the minimum amount (in KB) of extended storage that can be allocated. This value is specified with this syntax:

```
MINIMUM(8192,X | n,X)
```

Where *n* represents the minimum amount of extended storage (in KB) that can be allocated. For example, to specify a 16MB above-the-line region, code `MINIMUM(16384,X)`. When managing a large number of resources, a value of `MINIMUM (500000,X)` is recommended.

This section has been rewritten as follows:

ITMS:Engine MINIMUM parameter

The MINIMUM parameter is used to specify the minimum amount (in KB) of extended or below-the-line private storage that can be allocated. This value is specified with this syntax:

```
MINIMUM(n,P | X)
```

Where:

n Is the size of a block of storage in KB

P Represents the amount of below-the-line private storage (in KB) that can be allocated .

X Represents the minimum amount of extended storage (in KB) that can be allocated.

For example, to specify a 16MB above-the-line region, code `MINIMUM(16384,X)`. When managing a large number of resources, a value of `MINIMUM (500000,X)` is recommended.

To use extended storage, you must do both of the following:

- Code the MINIMUM parameter.
- Make sure that MINIMUM + RESERVE is less than or equal to MAXIMUM

Note the following about the default above-the-line region:

- Specified in the IEFUSI and IEALIMIT z/OS(R) modules.
- Distributed by IBM(R) as 32 megabytes.
- If smaller than the amount specified for the MINIMUM parameter, do one of the following:
  - Alter the default
  - Use the REGION parameter as follows:

    0K or 0M
    All primary and extended storage is available for GETMAIN.

    Up to 16M
    Primary region equals the specified value; extended region equals the default.

    Up to 32M
    All available region goes to primary storage; extended region equals the default.

    Over 32M
    All available region goes to primary storage; specified value goes to extended storage.

In general, for example, REGION=0M.

Note: The MINIMUM parameter can be set from the Configuration Tool using the ″Specify Advanced Agent Configuration Values″ panel.

FTP Data Display Interval defined incorrectly in the configuration guide

The Configuration Tool help for the FTP Data Display Interval that is part of the SPECIFY COMPONENT CONFIGURATION (PAGE 2) panel is misleading. This same misleading information is found on page 65 of the configuration guide. It currently says:

FTP Data Display Interval
Determines how long FTP data will be displayed on the Tivoli Enterprise Portal. A value of ″1″ means that FTP data is displayed for one hour. This value is expressed as a whole number in hours from 1 to 24. The default is 2 hours.

It should say:

FTP Data Display Interval

Determines the size of the sliding window that displays all FTP transfers that were completed or became active within the display interval. A value of ″1″ means the window displays all data from present until 1 hour ago. This value is expressed as a whole number in hours from 1 to 24. The default is 2 hours.

When the configuration guide says RC must be 0, there may be other valid returns found in the JCL job

In some instances, the configuration guides for monitoring agents on z/OS state that all return codes from the JCL job performed form the Configuration Tool must be zero. However, the comments inside the generated ICAT jobs sometimes state that other return codes are acceptable. Where there is a conflict between the JCL job comments and the configuration guide, accept the information in the JCL job since it may have been created later than the information in the book.

New problem determination issue: SNMP data collection fails with message KN3IR926

This problem description should be added to the *IBM OMEGAMON XE for Mainframe Networks: Problem Determination Guide*.

SNMP data collection fails with message KN3IR926 in your RKLVLOG: TCP MONITOR COLLECTION FAILED in v 4.1.0

This message most likely indicates a configuation issue with SNMP data collection. In OMEGAMON XE for Mainframe Networks version 4.1.0 the way you configure SNMP was changed from previous releases. In version 4.1.0, the Configuration Tool generates a sample SNMP configuration file during configuration. To collect SNMP-derived data, the SNMP configuration file must be customized to your environment. The sample started task procedures that are generated by the Configuration Tool for OMEGAMON XE and OMEGAMON II® for Mainframe networks contain DD statements that point to the SNMP configuration file that you identified during configuration. Refer to the SNMP appendix in the IBM Tivoli Monitoring: Configuration Guide for details about this file.

If the OMEGAMON XE or OMEGAMON II for Mainframe Networks SNMP configuration file is correct, then the problem could be caused by a more obscure SNMP agent configuration issue.

In OMEGAMON XE for Mainframe Networks version 3.1.0, the ″home″ IP address was used with the `sendto()` function when sending a PDU (datagram) to an SNMP agent associated with a TCP/IP stack whose data is being collected. This ″home″ interface is returned by an EZASMI TYPE=GETHOSTID request. As a result, the SNMP agent uses that ″home″ IP address as the source IP address for the datagram. A further com- plication is that this source IP address is also subjected to the IP address masking to determine if it is a source from which the SNMP agent will ″accept″ datagrams.

In OMEGAMON XE for Mainframe Networks version 4.1.0 with its new SNMP manager, the IP address used with `sendto()` is the loopback address. With this new solution, the loopback address is seen by the SNMP agent as the source IP address for the datagram. If the IP address-masking specified with the applicable COMMUNITY (or SNMP_COMMUNITY) definition in the SNMP agent configuration file (or perhaps in PW.SRC) is such that loopback is not allowed, that may explain an apparent change in the ability to communicate.

OMEGAMON II for Mainframe Networks version 560 is not affected by this change. This component continues to work as it did in version 550.

To address this issue, you must change the SNMP agent configuration to allow a request whose source IP address is loopback. Use one of the following three methods, based on your agent configuration.

1. Add a loopback statement in the PW.SRC file.
2. Add or change a COMMUNITY statement in the SNMP agent configuration file (for example, snmpd.conf).
3. Coordinate the SNMP_COMMUNITY and TARGET_ADDRESS statements in the SNMP agent configuration file (for example, snmpd.conf).

Information about how to make these changes is described in the *z/OS Communications Server: IP Configuration Reference*. All three alternatives could involve the addition to or a change in an IP address, an IP address mask, or both.

Telnet Pool Size and Data Source Level attributes summarized data is misleading

If you have configured both the Tivoli Data Warehouse and the Summarization and Pruning agent, you will find that summarized data for the Telnet Pool Size attribute is misleading. Therefore, summarized data for this attribute in the TCP/IP Summary and the TCP/IP Address Space workspaces is misleading.

To get around this issue, if you create or modify a view to show the summarized data, you could change the filter for that data. Right-click on the view, select **Properties**, click on the **Filter** tab, and select the LAT_ attribute (last value) instead of the TOT_ attribute (total value) for the summarized attribute.

Incorrect information configuration guide Appendix E: Disk space requirements for historical data table

The space requirement worksheets for some of the attribute tables in this appendix contain incorrect information. Refer to “Updates to historical data storage tables for new and changed attribute tables” on page 18 for specific changes in this appendix.

Undocumented OMEGAMON II for Mainframe Networks messages

These OMEGAMON II for Mainframe Networks messages were recently found to be undocumented.

KONAF162 (*module*) - TCP/IP COMMAND FAILED - COMMAND SERVICE TASK NOT ACTIVE

Explanation: The specified *module* needs the TCP/IP Collector Service Thread task to be active in order to issue a command but the task is not active.

System action: The request is terminated.

User response: Log the diagnostic information and contact IBM Software Support.

Message type: Error

KONAF163 (*module*) - EXTENDED MCS CONSOLE NOT ACTIVE

Explanation: The specified *module* expected to find an active EMCS console in order to issue a command. However, no EMCS console is active for this instance of OMEGAMON II for Mainframe Networks.

System action: The request is terminated.

User response: Log the diagnostic information and contact IBM Software Support.

Message type: Error

KONAF164 (*module*) - UNABLE TO LOCATE RESOURCE

Explanation: The specified *module* expected to find a resource associated with a chain of elements being processed. However, the resource was not found.

System action: The request to update the table is terminated.

User response: Log the diagnostic information and contact IBM Software Support.

Message type: Error

KONAF165 (*module*) - MIB BROWSER LINE LIMIT EXCEEDED

Explanation: The response to a MIB browser request

exceeded the maximum number of lines that could be displayed on the OMEGAMON II for Mainframe Networks console.

System action: The request for the MIB data is terminated.

User response: None.

Message type: Informational

KONAF166 (*module*) - MIB BROWSER IS NOT ACTIVE

Explanation: The specified *module* issued a request to the MIB browser task, but the MIB browser task was not active.

System action: The request for the MIB data is terminated.

User response: Log the diagnostic information and contact IBM Software Support.

Message type: Error

KONAF167 (*module*) - TCP/IP COMMAND FAILED - RC(*return_code*)

Explanation: The specified *module* issued a TCP/IP command and received a non-zero return code.

System action: The request is terminated.

User response: Log the diagnostic information and contact IBM Software Support.

Message type: Error

Appendix B. Support for problem solving

If you have a problem with your IBM software, you want to resolve it quickly. This section describes the following options for obtaining support for IBM software products:

Using IBM Support Assistant

The IBM Support Assistant is a free, stand-alone application that you can install on any workstation. You can then enhance the application by installing product-specific plug-in modules for the IBM products you use.

The IBM Support Assistant saves you the time it takes to search the product, support, and educational resources. The IBM Support Assistant helps you gather support information when you need to open a problem management record (PMR), which you can then use to track the problem.

The product-specific plug-in modules provide you with the following resources:

- Support links
- Education links
- Ability to submit problem management reports

For more information, and to download the IBM Support Assistant, see http://www.ibm.com/software/support/isa. After you download and install the IBM Support Assistant, follow these steps to install the plug-in for your Tivoli product:

1. Start the IBM Support Assistant application.
2. Select **Updater** on the Welcome page.
3. Select **New Properties and Tools** or select the **New Plug-ins** tab (depending on the version of IBM Support Assistant installed).
4. Under **Tivoli**, select your product, and then click **Install**. Be sure to read the license and description.

   If your product is not included on the list under **Tivoli**, no plug-in is available yet for the product.
5. Read the license and description, and click **I agree**.
6. Restart the IBM Support Assistant.

Obtaining fixes

A product fix might be available to resolve your problem. To determine which fixes are available for your Tivoli software product, follow these steps:

1. Go to the IBM Software Support Web site at http://www.ibm.com/software/support.
2. Under **Select a brand and/or product**, select **Tivoli**.

   If you click **Go**, the **Search within all of Tivoli support** section is displayed. If you don't click **Go**, you see the **Select a product** section.
3. Select your product and click **Go**.
4. Under **Download**, click the name of a fix to read its description and, optionally, to download it.

   If there is no **Download** heading for your product, supply a search term, error code, or APAR number in the field provided under **Search Support (this product)**, and click **Search**.

For more information about the types of fixes that are available, see the *IBM Software Support Handbook* at http://techsupport.services.ibm.com/guides/handbook.html.

Receiving weekly support updates

To receive weekly e-mail notifications about fixes and other software support news, follow these steps:

1. Go to the IBM Software Support Web site at http://www.ibm.com/software/support.
2. Click **My support** in the upper- right corner of the page.
3. If you have already registered for **My support**, sign in and skip to the next step.

   If you have not registered, click **register now**, and complete the registration form using your e-mail address as your IBM ID and click **Submit**.
4. Click **Edit profile**.
5. In the **Products** list, select **Software**. A second list is displayed.
6. In the second list, select a product segment, for example, **Systems management**. A third list is displayed.
7. In the third list, select **Application Performance & Availability**. A list of applicable products is displayed.
8. Select **IBM Tivoli Monitoring**, **IBM Tivoli OMEGAMON XE for Mainframe Networks**, and any other products for which you want to receive updates.
9. Click **Add products**.
10. After selecting all products that are of interest to you, click **Subscribe to email** on the **Edit profile** tab.
11. Select **Please send these documents by weekly email**.
12. Update your e-mail address as needed.
13. In the **Documents** list, select **Software**.
14. Select the types of documents that you want to receive information about.
15. Click **Update**.

If you experience problems with the **My support** feature, you can obtain help in one of the following ways:

- Online

  Send an e-mail message to erchelp@ca.ibm.com, describing your problem.
- By phone

  Call 1-800-IBM-4You (1-800-426-4968).

Contacting IBM Software Support

IBM Software Support provides assistance with product defects. The easiest way to obtain that assistance is to open a PMR or ETR directly from the IBM Support Assistant (see “Using IBM Support Assistant” on page 223).

Before contacting IBM Software Support, your company must have an active IBM software maintenance contract, and you must be authorized to submit problems to IBM. The type of software maintenance contract that you need depends on the type of product you have:

- For IBM distributed software products (including, but not limited to, Tivoli, Lotus®, and Rational® products, as well as DB2 and WebSphere® products that run on Windows or UNIX operating systems), enroll in Passport Advantage® in one of the following ways:

  Online

  Go to the Passport Advantage Web site at http://www-306.ibm.com/software/howtobuy/passportadvantage/pao_customers.htm .

By phone

For the phone number to call in your country, go to the IBM Software Support Web site at http://techsupport.services.ibm.com/guides/contacts.html and click the name of your geographic region.

- For customers with Subscription and Support (S & S) contracts, go to the Software Service Request Web site at https://techsupport.services.ibm.com/ssr/login.
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If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States. From other countries, go to the contacts page of the *IBM Software Support Handbook* on the Web at http://techsupport.services.ibm.com/guides/contacts.html and click the name of your geographic region for phone numbers of people who provide support for your location.

To contact IBM Software support, follow these steps:

1. "Determining the business impact"
2. "Describing problems and gathering information"
3. "Submitting problems" on page 226

Determining the business impact

When you report a problem to IBM, you are asked to supply a severity level. Use the following criteria to understand and assess the business impact of the problem that you are reporting:

Severity 1

The problem has a *critical* business impact. You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.

Severity 2

The problem has a *significant* business impact. The program is usable, but it is severely limited.

Severity 3

The problem has *some* business impact. The program is usable, but less significant features (not critical to operations) are unavailable.

Severity 4

The problem has *minimal* business impact. The problem causes little impact on operations, or a reasonable circumvention to the problem was implemented.

Describing problems and gathering information

When describing a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Software Support specialists can help you solve the problem efficiently. To save time, know the answers to these questions:

- Which software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
- Can you re-create the problem? If so, what steps were performed to re-create the problem?
- Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, and so on.

- Are you currently using a workaround for the problem? If so, be prepared to explain the workaround when you report the problem.

Submitting problems

You can submit your problem to IBM Software Support in one of two ways:

Online

Click **Submit and track problems** on the IBM Software Support site at http://www.ibm.com/software/support/probsub.html. Type your information into the appropriate problem submission form.

By phone

For the phone number to call in your country, go to the contacts page of the *IBM Software Support Handbook* at http://techsupport.services.ibm.com/guides/contacts.html and click the name of your geographic region.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Software Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the Software Support Web site daily, so that other users who experience the same problem can benefit from the same resolution.

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GI11-8116-01