



How IBM Can Identify z/OS Networking Issues without tracing

Wed, August 12, 1:45-2:45

Session 17536

Speakers:

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Abstract

- Running traces has been an essential tool in resolving networking issues on z Systems.
- To reduce the need of running traces, z/OS Communication Server created the Network Management Interface (NMI) to give management tools **high-speed, low-overhead access to information** needed to isolate networking issues.
- This session will provide examples of how IBM's OMEGAMON XE for Mainframe Networks leverages the NMI to help networking experts reduce the need to run traces by as much as 90%.

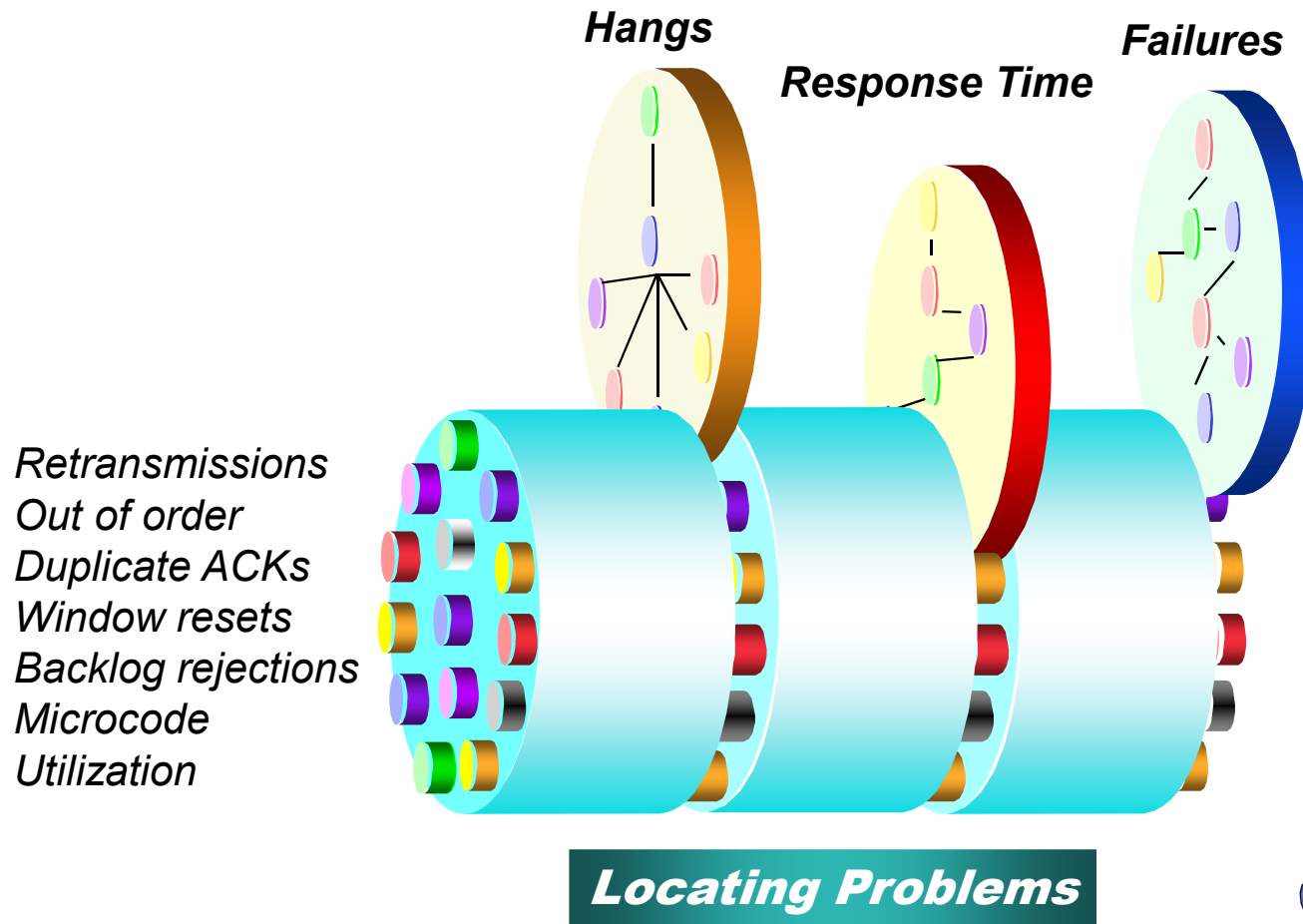


Agenda

- Overview of how OMEGAMON leverages NMI
- Historical baselines
- Finding a resource
- IPSEC
- Integration with IBM Operations Analytics for z Systems
- Demo of enhanced 3270 user interface
- Demo of Tivoli Enterprise Portal



Networking problem indicators



Key Points to Reducing the Need for Traces



1. Access to z/OS Communications Server data
 - ✓ High speed, low overhead access to networking data
 - ✓ Management tools have access through the **NMI¹** API

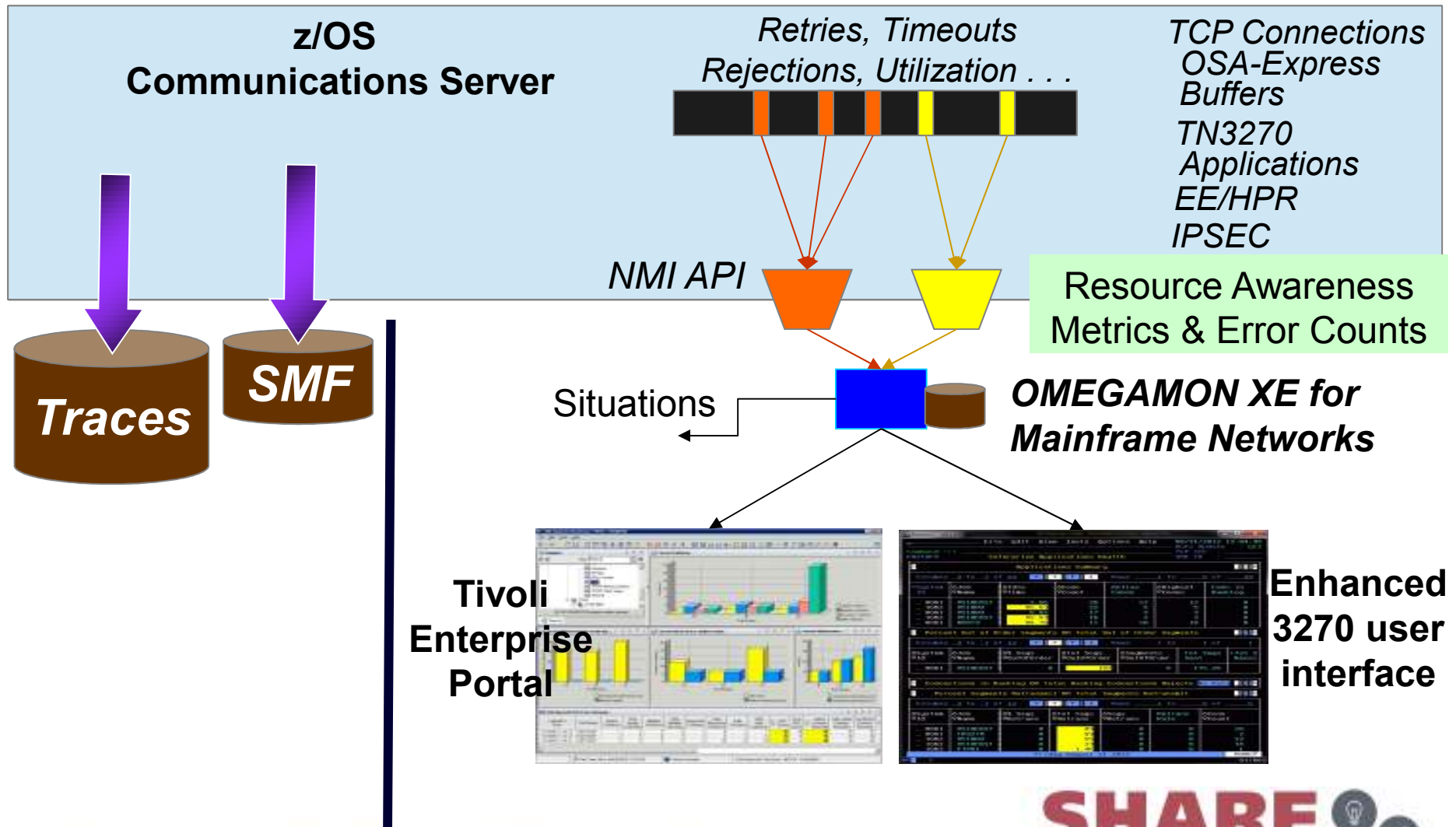
2. OMEGAMON for Mainframe Networks leverages **NMI¹**
 - ✓ Proactive with Alerting
 - ✓ Enterprise Network Health Views
 - ✓ Wildcard FIND connections, TN3270 and FTPs
 - ✓ History provides trending and eliminates recreates

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NMI¹ = *Network Management Interface*



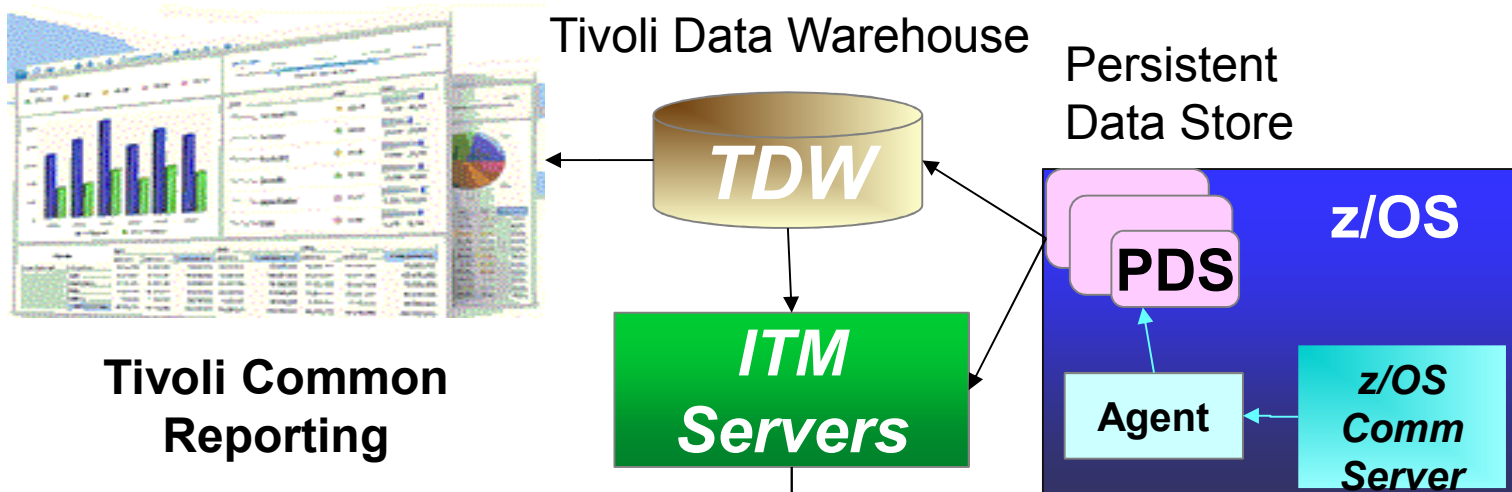
z/OS Communications Server Monitoring Overview



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OMEGAMON History Overview



Tivoli Enterprise Portal

- Short term (last 24 hours) from PDS
- Long term (> 24 hours) from TDW



Enhanced 3270 user interface

- Near-term history from PDS (all data available)



OMEGAMON XE for Mainframe Networks v5.3



Increased efficiency

- Understand information related to when the problem began with near-term history in the enhanced 3270 user interface

Easily see when an application has high percent out of order segments and select for details

File Edit View Tools Navigate Help 07/20/2015 16:14:50
 Command ==> KN3TAP1H Historical Summary
 Display : HISTORY
 TCP STC : TCPIPG
 SMF ID : SYS

Selected item SYS TCPIPG ZST10ALA

Columns 4 to 6 of 14 Rows 1 to 11 of 11

Recording Time	System ID	Job Name	% Segs OutOfOrder	Tot Segs OutOfOrder	Segments OutOfOrder
16:12:00	SYS	ZST10ALA	9%	54	6
16:07:00	SYS	ZST10ALA	10%	48	7
16:02:00	SYS	ZST10ALA	6%	41	4
15:57:00	SYS	ZST10ALA	5%	37	4
15:52:00	SYS	ZST10ALA	11%	33	8
15:47:00	SYS	ZST10ALA	6%	25	4
15:42:00	SYS	ZST10ALA	7%	21	5
15:37:00	SYS	ZST10ALA	8%	16	6
15:32:00	SYS	ZST10ALA	7%	10	5
15:27:00	SYS	ZST10ALA	7%	5	5
15:22:00	SYS	ZST10ALA	0%	0	0

File Edit View Tools Navigate Help
 Command ==> KN3TCLS Application TCP Listeners and Connections (f
 Connections Summary for ZST10ALf

Columns 3 to 5 of 22 Rows 1 to 7 of 7

Remote IP Address	Local Port	Connection State	% Segs Retrans	Tot Segs Retrans
9.37.224.66	19002	TIME WAIT	0%	0
9.37.224.66	18831	TIME WAIT	0%	0
9.37.224.66	18808	TIME WAIT	0%	0
9.37.224.66	18908	TIME WAIT	0%	0
9.37.224.66	18881	TIME WAIT	0%	0
9.37.224.66	18964	TIME WAIT	0%	0
9.37.224.66	19298	ESTABLISHED	0%	0

BACK 15:22 ← Display 15:27 → 15:32 HISTORY

Effortlessly explore data around when the out of order segments occurred



Historical Baselines – on Demand

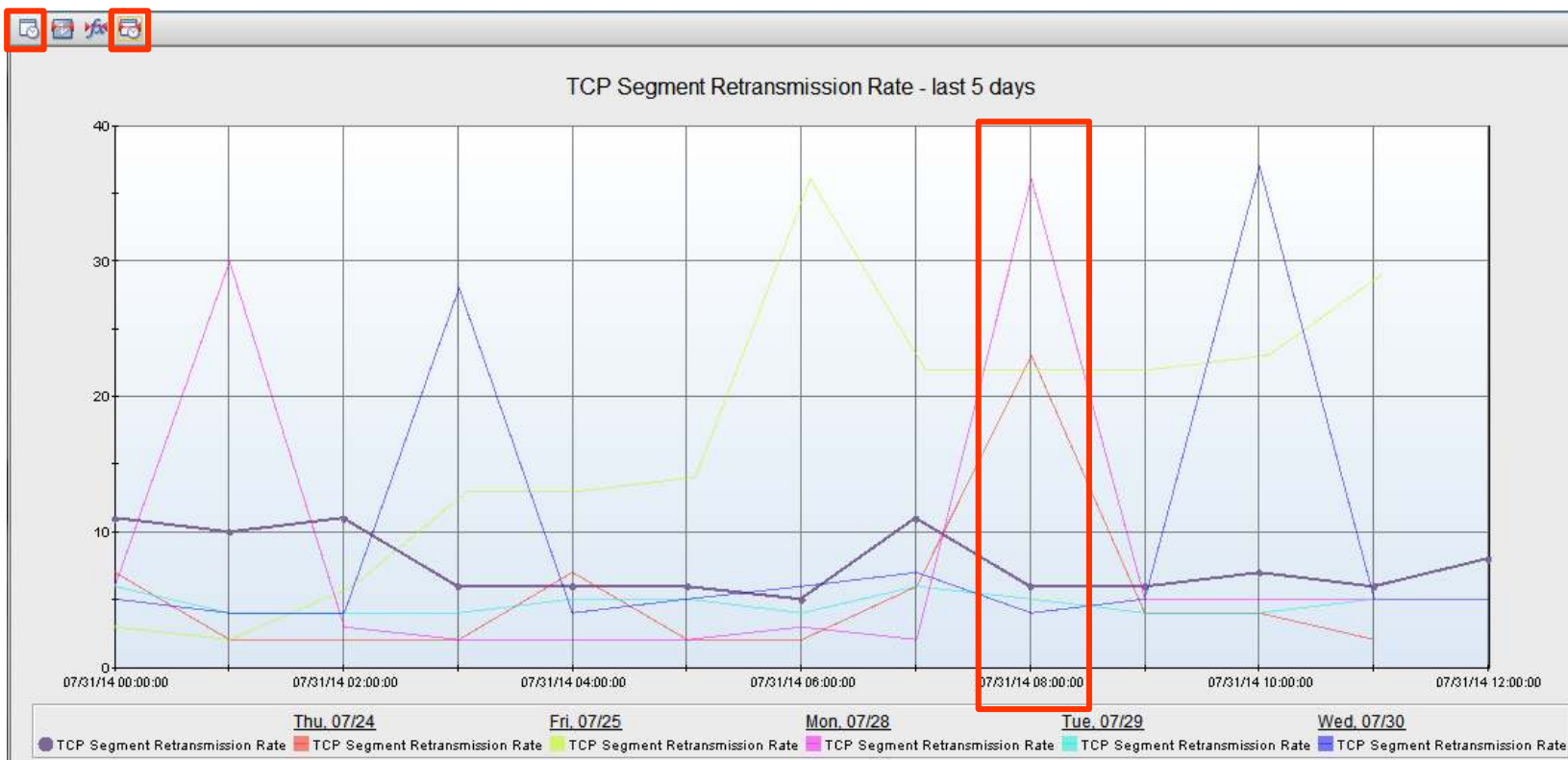
Show data for last

weekdays

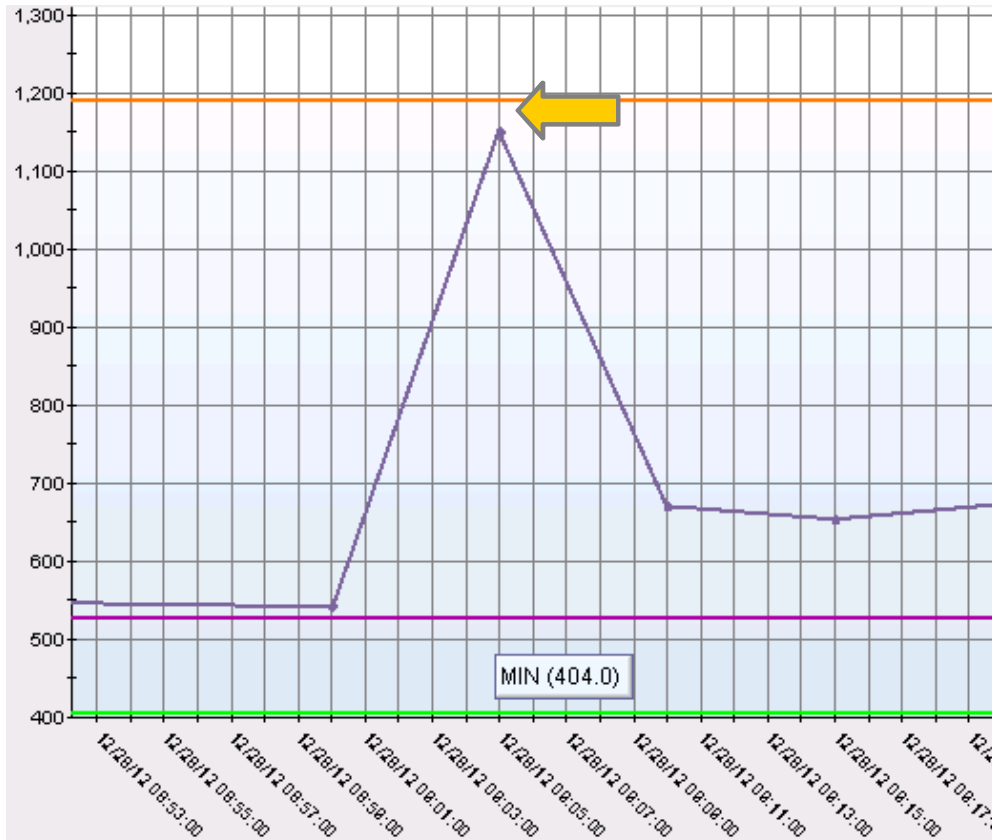
calendar days

- History Overlay for same time each day
- See weekly trends
- Create on-demand

Last



Backlog Connections Rejected History example



With History I can see more details



Recording Time	Local Port	Application Name	ASID	✓ Active Connections	✗ Backlog Connections Rejected
12/28/12 09:00:00	3006	DSNJDIST	0X007A	542	0
12/28/12 09:05:00	3006	DSNJDIST	0X007A	1151	294
12/28/12 09:10:00	3006	DSNJDIST	0X007A	670	0
12/28/12 09:15:00	3006	DSNJDIST	0X007A	653	0
12/28/12 09:20:00	3006	DSNJDIST	0X007A	672	0

OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- Quickly FIND network resources

Command ==> `find_`

or

Command ==> `find conn_`

- Locate TCP connections, FTP sessions, FTP transfers or TN3270 Sessions in your enterprise
- Then navigate in context or issue Take Action commands against a selected network resource

KN3FNDC Enterprise Connection Find

Press ENTER to continue

System ID : *
 TCPIP STC Name : *
 Remote IP Address: 9.42.57.221
 Local IP Address : *
 Local Port : *
 Application Name : *
 Connection State : *

KN3FNDCM Enterprise Find Workspaces

Select one of the following, then press

C _1. C Enterprise Find Connections
 2. S Enterprise Find FTP Sessions
 3. F Enterprise Find FTP Transfers
 4. N Enterprise Find TN3270 Sessions

File Edit View Tools Navigate Help 07/21/2015 07:14:12
 Auto Update : Off
 TCP STC : *
 SMF ID : *

Command ==> KN3TCPF Enterprise Connections Find

TCP Connections Summary					
Columns 4 to 6 of 22		Rows 1 to 9 of 9			
ΔSystem ∇ID	ΔJob ∇Name	ΔLocal ∇Port	ΔRemote ∇IP Address	ΔLast ∇Activity	ΔConnection ∇State
- SP22	\$TN22	23	9.42.57.221	35.780s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	5.030s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	4.830s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	18.760s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	29.590s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	5.040s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	55.940s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	5.850s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	55.830s	ESTABLISHE

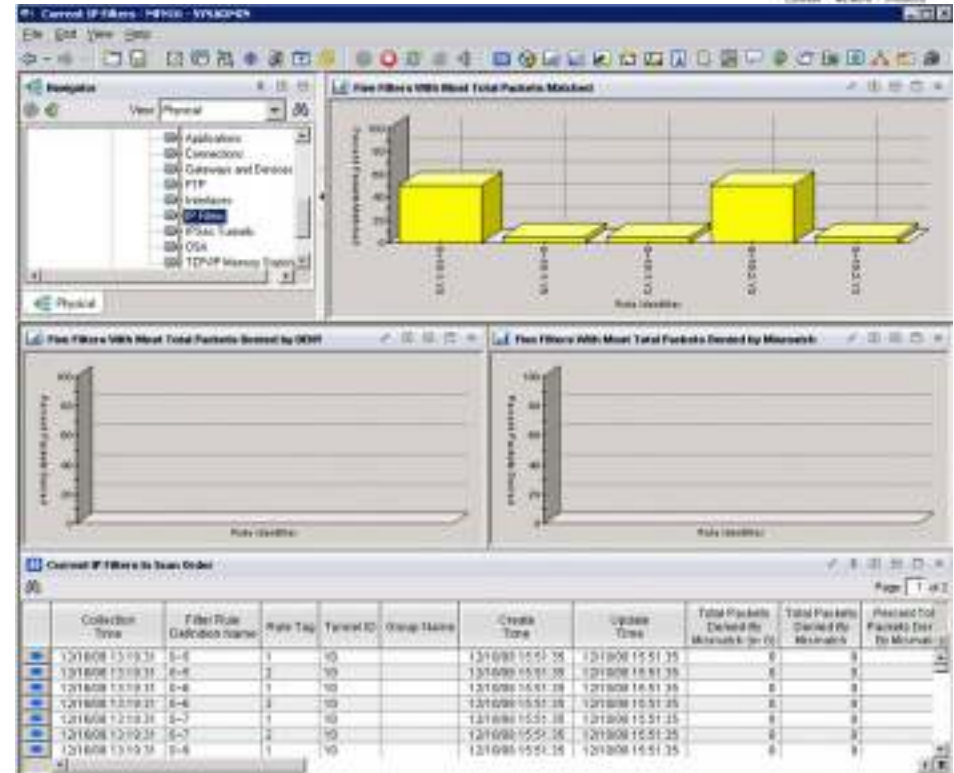
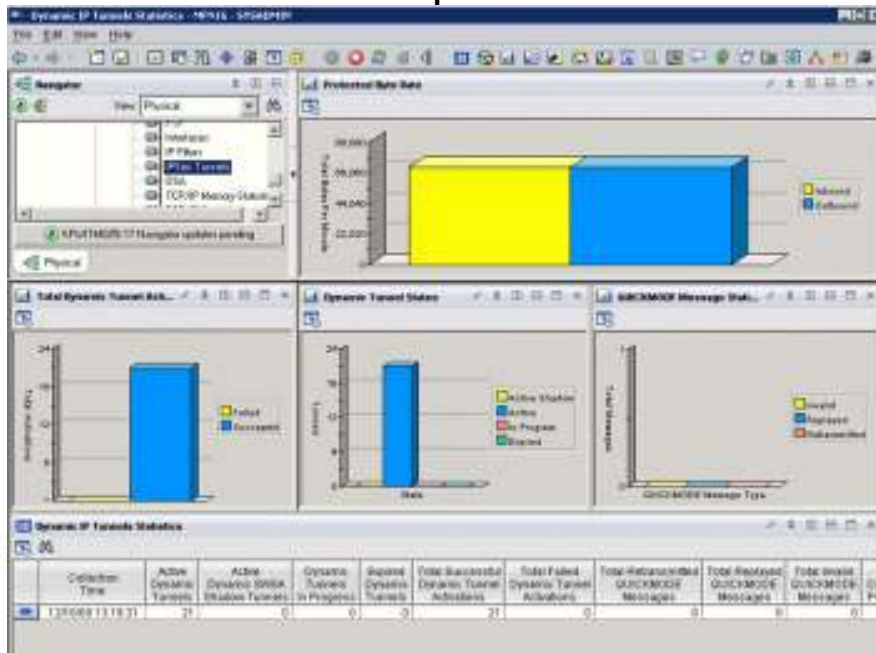
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IP Security (IPSec)

.Overview

- ✓ Network layer Security
 - ◆ Driven by filters
 - ◆ Difficult to debug
- ✓ IP Filter Statistics
 - ◆ HPR Maps to UDP
- ✓ Tunnel Details
 - ◆ High Retransmissions
 - ◆ Out of Sequence

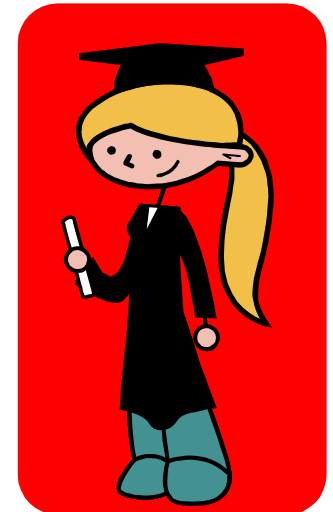


.Results

- Diagnose IPSEC tunnels and IP filters
- **Unique to OMEGAMON**

Summary

- ✓ z/OS Comm Server NMI provides alternative to tracing
 - ✓ High speed, low overhead access to networking data
- ✓ OMEGAMON exploits this interface
 - ✓ History eliminates recreates
 - ✓ Flexible ways to FIND resources, really fast
 - ✓ Enterprise views of networking resources
 - ✓ Applications, listeners, connections
 - ✓ FTP, TN3270
 - ✓ OSA and interfaces
 - ✓ TCP/IP, VTAM, buffers, and storage
 - ✓ IPsec and IP Filters
 - ✓ Integration with IBM Operations Analytics for z Systems



YouTube videos of problem solving scenarios



http://www.youtube.com/playlist?list=PLiD3_RDV00Jcpfl2GCf2mPqprba2KZCsP

- What's New with OMEGAMON XE for Mainframe Networks?
- Diagnosing Slow Response Times to a Business Partner's Applications
- Troubleshooting Applications with Poor FTP Performance
- Troubleshooting Backlogged Connections with TEP
- Diagnosing Connection Problems using a FIND Workspace
- Spotting Trends in an Abnormal Connection Count
- Backlog Connection Count Exceeds a Defined Threshold
- Balancing Workloads Between OSA Adapters
- Troubleshooting Problems with TN3270 Connectivity
- Determining Stack Health Using Throughput
- Running a NetView z/OS IP Packet Trace from OMEGAMON Mainframe Networks
- Understanding Spikes in CSM Storage Usage
- **More videos are under development...**

Complete your session evaluations online at www.SHARE.org/Orlando-Eval



How IBM Can Identify z/OS Networking Issues without tracing

Session 17536

Ernie Gilman, IBM (egilman@us.ibm.com)

Dean Butler, IBM (butlerde@us.ibm.com)



Questions...



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OMEGAMON XE for Mainframe Networks v5.3



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15:52:00	SYS	ZST10ALA	11%	33	8
15:47:00	SYS	ZST10ALA	6%	25	4
15:42:00	SYS	ZST10ALA	7%	21	5
15:37:00	SYS	ZST10ALA	8%	16	6
15:32:00	SYS	ZST10ALA	7%	10	5
15:27:00	SYS	ZST10ALA	7%	5	5
15:22:00	SYS	ZST10ALA	0%	0	0

File Edit View Tools Navigate Help
 Command ==> KN3TCLS Application TCP Listeners and Connections (f
 Connections Summary for ZST10ALf

Columns 3 to 5 of 22 Rows 1 to 7 of 7

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9.37.224.66	18831	TIME WAIT	0%	0
9.37.224.66	18808	TIME WAIT	0%	0
9.37.224.66	18908	TIME WAIT	0%	0
9.37.224.66	18881	TIME WAIT	0%	0
9.37.224.66	18964	TIME WAIT	0%	0
9.37.224.66	19298	ESTABLISHED	0%	0

BACK 15:22 ← Display 15:27 → 15:32 HISTORY

Effortlessly explore data around when the out of order segments occurred



OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- View TCP connections and z/OS address space details together to understand when network performance is impacted by z/OS resource constraints
- Zoom into OMEGAMON on z/OS workspaces to investigate further into bottlenecks, storage usage, and WLM service classes

```

File Edit View Tools Navigate Help 07/20/2015 16:34:04
Auto Update : Off
TCP STC : TCP/IP22
SMF ID : SP22
Command ==>
KN3TCLS2 TCP Listener Connections for OMD2HUB

Connections for Port 35605, Local IP 127.0.0.1
Columns 2 to 5 of 21 Rows 1 to 5 of 5
Remote IP Address Connection State % Segs Retrans Tot Segs Retrans % Segs OutOfOrde
- 127.0.0.1 ESTABLISHED 0% 0 0 0%
- 127.0.0.1 ESTABLISHED 0% 0 0 0%
- 127.0.0.1 ESTABLISHED 0% 0 0 0%
- 127.0.0.1 ESTABLISHED 0% 0 0 0%
- 127.0.0.1 ESTABLISHED 0% 0 0 0%

z/OS Address Space Details for OMD2HUB 0x0118
Type..... STC
JESJOBID..... STC31523
Step Name..... OMD2HUB
Proc Step..... OMD2HUB
CPU Percent..... 0.0
IFA Percent..... 0.0
SRB Percent..... 0.0
TCB Percent..... 0.0
zIIP Percent..... 0.0
CPU Percent Excluding Home SRB Time..... 0.0
IFA Percent With Enclave Home SRB Time..... 0.0
zIIP Percent With Enclave Home SRB Time..... 0.0
IFA on CP Percent..... 0.0
zIIP on CP Percent..... 0.0
Job CPU Percent..... 2.4

Job SRB Percent..... 0.3
Job TCB Percent..... 2.2
Job CPU Time..... 752.02
Job SRB Time..... 77.64
Job TCB Time..... 674.37

BACK HOME Monday July 20 2015 MOREV
    
```

```

KM5N3ASZ Navigation Options for Address Space OMD2HUB 0x01
Select an action and then press ENTER
- 1. ! Take Action on Address Space
  2. C - Cancel Address Space
  3. A Address Space Bottlenecks Summary
  4. B Bottleneck Analysis for Address Space
  5. D Storage Usage by Address Space
  6. M Storage Usage by all Address Spaces
  7. O Address Space Overview
  8. T TCB Storage and LSQA for Address Space
  9. W WLM Service Class Resources
    
```

OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- View TCP connections and TCP listeners for a queue manager's channel initiator address space to understand if network performance is impacting the processing of messages.
- Navigate to OMEGAMON XE for Mainframe Networks workspaces to investigate further into any potential network performance issues

File Edit View Tools Navigate Help 11/17/2014 20:06:46
 Auto Update : Off
 Command ==> KMQAPPND Channel Initiator Application Details HostName : SYS
 QmgrName : Q7G4

Application Q7G4CHIN

Columns 2 to 4 of 17 Rows 1 to 8 of 17

Conn ID Suffix (CONN)	Channel Name	Connection Name	+Asynch State
CE126D8700BF0001	TO_Q7G4	::ffff:9.42.46.17	None
CE127F9700760001			None
CE127E78E1ED0001			None
CE127A0030A50001			None
CE1216BC5ECD0001			None
CE1216BC5EC90001			None
CE1216BC5E770001			None
CE1216BC56E80001			None

Connections Summary for Q7G4CHIN on SYS

Columns 3 to 6 of 23 Rows 1 to 1 of 1

Remote IP Address	Local Port	ΔConnection VState	Δ% Segs VRetrans	Tot Segs Retrans	Δ% S VOut
9.42.46.17	4040	ESTABLISHED	0	21	

TCP Listeners Summary for Q7G4CHIN on SYS

Columns 3 to 6 of 24 Rows 1 to 2 of 2

ΔLocal VIP Address	ΔLocal VPort	ΔConn in VBacklog	ΔBacklog VRejected	ΔTot Backlog VRejected	ΔIdle VTime
::	21432	0	0	0	
::	4040	0	0	0	

Monday November 17 2014

OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- Quickly FIND network resources

Command ==> `find_`

or

Command ==> `find conn_`

- Locate TCP connections, FTP sessions, FTP transfers or TN3270 Sessions in your enterprise
- Then navigate in context or issue Take Action commands against a selected network resource

```

KN3FNDC      Enterprise Connection Find
Press ENTER to continue
System ID      : *
TCPIP STC Name : *
Remote IP Address: 9.42.57.221
Local IP Address : *
Local Port     : *
Application Name : *
Connection State : *

KN3FNDCM Enterprise Find Workspaces
Select one of the following, then press
c _ 1. C Enterprise Find Connections
    2. S Enterprise Find FTP Sessions
    3. F Enterprise Find FTP Transfers
    4. N Enterprise Find TN3270 Sessions
    
```

File Edit View Tools Navigate Help 07/21/2015 07:14:12
 Auto Update : Off
 TCP STC : *
 SMF ID : *

Command ==> `KN3TCPF` Enterprise Connections Find

TCP Connections Summary					
Columns 4 to 6 of 22				Rows 1 to 9 of 9	
ΔSystem ∇ID	ΔJob ∇Name	ΔLocal ∇Port	ΔRemote ∇IP Address	ΔLast ∇Activity	ΔConnection ∇State
- SP22	\$TN22	23	9.42.57.221	35.780s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	5.030s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	4.830s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	18.760s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	29.590s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	5.040s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	55.940s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	5.850s	ESTABLISHE
- SP22	\$TN22	23	9.42.57.221	55.830s	ESTABLISHE

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OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- Debug network problems faster
- Issue PING, NSLOOKUP and TRACERTE commands while viewing any workspace in the enhanced 3270 user interface

Command ==> ping_

```
KN3ACTP  Ping IP Address
Press ENTER to continue
Issue command from:
SMFID: SP22  TCP/IP STC: TCPIP22
Hostname/IP Address: 9.48.145.96
Source IP Address :
Interface:  TCP Stack:
Count: 10  Packet Size: 256  Timeout: 10
Addrtype  PMTU  Enter "/" to select o
- 1. IPv4  - 1. yes  - NoName
- 2. IPv6  - 2. ignore - Verbose
```

Command Log			
Command Timestamp	Command	Return Code	Response Message
07/21/15 12:11:17	ping 9.48.145.9	0	KN3A001I PROCESSING CO

Command Response	
Command Timestamp	+Command Output
07/21/15 12:11:18	CS V2R1: Pinging host 9.48.145.96
07/21/15 12:11:18	Ping #1 response took 0.038 seconds.
07/21/15 12:11:18	Ping #2 response took 0.038 seconds.
07/21/15 12:11:18	Ping #3 response took 0.039 seconds.
07/21/15 12:11:18	Ping #4 response took 0.040 seconds.
07/21/15 12:11:18	Ping #5 response took 0.038 seconds.
07/21/15 12:11:18	Ping #6 response took 0.038 seconds.
07/21/15 12:11:18	Ping #7 response took 0.038 seconds.
07/21/15 12:11:18	Ping #8 response took 0.039 seconds.
07/21/15 12:11:18	Ping #9 response took 0.039 seconds.
07/21/15 12:11:18	Ping #10 response took 0.042 seconds.

- The command is issued from the selected system and the output is displayed in the Command and Response Log workspace

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OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

Improved navigation:

- Enterprise Network Workspaces menu
 - Access using the E action or the NETWORK or NETMENU commands

```
KN3ENTMN Enterprise Network Workspaces
Select one of the following, then press ENTER
- 1. A Enterprise Application Health
  2. L Enterprise TCP Listeners Overview
  3. C Enterprise Connections Health
  4. N Enterprise TN3270 Servers Overview
  5. F Enterprise FTP Sessions Overview
  6. G Enterprise FTP Transfers Overview
  7. I Enterprise Interfaces Overview
  8. O Enterprise OSA Interfaces Overview
  9. K Enterprise HiperSockets Interfaces Overview
 10. P Enterprise OSA Express Ports Overview
 11. B Enterprise OSA Express Channels Overview
 12. T Enterprise TCPIP Stack Performance Overview
 13. M Enterprise Memory and CSM Storage Overview
 14. E Enterprise TCPIP and VTAM Overview
 15. Z More actions
```

```
KN3ENTM2 More Enterprise Network Workspaces
Select one of the following, then press ENTER
- 1. N Enterprise Mainframe Network Health
  2. R Command and Response Log
  3. A Enterprise Extender and HPR Health
  4. B Enterprise Extender Connections Overview
  5. C Enterprise HPR Connections Overview
```

- Investigate interfaces and OSA issues with the OSA command

```
KN3ENTOM Enterprise OSA & Interfaces Workspaces
Select one of the following, then press ENTER
- 1. I Enterprise Interfaces Overview
  2. O Enterprise OSA Interfaces Overview
  3. K Enterprise HiperSockets Interfaces Overview
  4. P Enterprise OSA Express Ports Overview
  5. B Enterprise OSA Express Channels Overview
```

- Investigate issues with TCP/IP resources with the TCPIP or TCPIPMENU commands

```
KN3ENTTM Enterprise TCP/IP Workspaces
Select one of the following, then press ENTER
- 1. A Enterprise Application Health
  2. L Enterprise TCP Listeners Overview
  3. C Enterprise Connections Health
  4. N Enterprise TN3270 Servers Overview
  5. F Enterprise FTP Sessions Overview
  6. G Enterprise FTP Transfers Overview
  7. I Enterprise Interfaces Overview
  8. O Enterprise OSA Interfaces Overview
  9. K Enterprise HiperSockets Interfaces Overview
 10. P Enterprise OSA Express Ports Overview
 11. B Enterprise OSA Express Channels Overview
 12. T Enterprise TCPIP Stack Performance Overview
 13. M Enterprise Memory and CSM Storage Overview
 14. E Enterprise TCPIP and VTAM Overview
 15. R Command and Response Log
```

- Investigate issues with VTAM resources with the VTAM or VTAMMENU commands

```
KN3ENTVT Enterprise VTAM Workspaces
Select one of the following, then press ENTER
- 1. E Enterprise TCPIP and VTAM Overview
  2. M Enterprise Memory and CSM Storage Overview
  3. A Enterprise Extender and HPR Health
  4. B Enterprise Extender Connections Overview
  5. C Enterprise HPR Connections Overview
  6. R Command and Response Log
```

Complete your session evaluations online at www.SHARE.org/Orlando-Eval



OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

Customize filters and queries by setting site or user profile variables

- When you navigate to a workspace or invoke a command, there are default values for query and workspace filters
- Set site or user profile variables in *rtename.UKOBDATF* dataset to override the defaults

```

EDIT MFNSVT.N3530BAS.N5304083.UKOBDATF(USER2) - 01.02
Command ==>
000101 /* OMEGAMON XE for Mainframe Networks definitions
000102 /*****
000103
000104 SET KN3EECO2_RETRANS=0
000105 SET KN3EECO2_RETRANS_OPER='>='
000106 SET KN3EECO2_UNACK=0
000107 SET KN3EECO2_UNACK_OPER='>='
000108 SET KN3EECO2_OUTOFSEQ=0
000109 SET KN3EECO2_OUTOFSEQ_OPER='>='
000110 SET KN3EECO2_SNALINKS=0
000111 SET KN3EECO2_SNALINKS_OPER='>='
000112
000113 SET KN3TCLO_TBKLOGREJ=0
000114 SET KN3TCLO_TBKLOGREJ_OPER='>='
000115
000116 SET KN3TCP_TBKLOGREJ=0
000117 SET KN3TCP_TBKLOGREJ_OPER='>='
000118
000119 SET KN3TCP_IDLETIME = '1000'
000120 SET KN3TCP_CONNSTATUS = ''
000121 SET KN3TCP_REXMITSTOT = ''
000122 SET KN3TCP_000SEGTOT = ''

```

File Edit View Tools Navigate Help 07/21/2015 17:16:36 Auto Update : Off

Command ==> KN3TCLO

Filter(s)

1. Job Name..... n/a
2. Local Port..... n/a
3. Conn in Backlog..... n/a
4. Tot Backlog Rejected..... >= 0
5. Idle Time..... n/a
6. Conn Rate..... n/a
7. Sysplex Name..... n/a

System ID	Job Name	Local Port	Conn in Backlog	Tot Backlog Rejected	Idle Time	Conn Rate	Sysplex Name
0181							
5096							
0181	BPX0INIT	10007	0	0			
4083	BPX0INIT	10007	0	0			
0181	BPX0INIT	10007	0	0			
0061	BPX0INIT	10007	0	0			
0181	V530N3	7756	0	0			
0181	V530N3	7756	0	0			
0061	V530N3	7314	0	0			

Complete your sess



OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- View UDP endpoints data in context of an Enterprise Extender connection
- The UDP endpoints data displays the byte rates, datagrams discarded, and queued bytes for all the EE connections on this LPAR
- View additional information by selecting one of the UDP endpoints and navigating to the UDP Connection Details workspace

File Edit View Tools Navigate Help 07/21/2015 17:41:32
 Auto Update : Off
 Command ==> VTAM : VTAM
 KN3EEDS* EE Connection Summary for EX000003 SMF ID : 0181

EE Connection Details

Columns 2 to 7 of 12 Rows 1 to 5 of 5

ΔLocal/Remote ▽Port	ΔType of ▽Service	ΔTransmit ▽Byte Rate	ΔReceive ▽Byte Rate	ΔBytes ▽Sent	ΔBytes ▽Received	ΔTra ▽Pkt
- 12000	Signal	18	18	18	18	6
- 12001	Network	0	0	0	0	0
- 12002	High	0	0	0	0	0
- 12003	Medium	0	0	0	0	0
- 12004	Low	0	0	0	0	0

HPR Connections Summary

Columns 2 to 6 of 17 Rows 1 to 4 of 4

ΔLocal RTP ▽PU Name	ARB Mode	Δ% Pkts ▽Retrans	ΔUnacknowledged ▽Buffers	ΔOutOfSequence ▽Buffers	ΔSmo ▽Rou
- CNR00004	Green	0%	0	0	42
- CNR00005	Green	0%	0	0	42
- CNR00006	Green	0%	0	0	45
- CNR00007	Green	0%	0	0	47

UDP Endpoints Summary

Columns 2 to 7 of 12 Rows 1 to 4 of 5

ΔPort ▽	ΔTransmit ▽Byte Rate	ΔReceive ▽Byte Rate	Δ% Datagrams ▽Discarded	ΔDatagrams ▽Discarded	ΔQueued ▽Bytes	ΔTot ▽Sent
- 12000	198	198	0	0	0	**K
- 12001	0	0	0	0	0	91K
- 12002	0	0	0	0	0	13M
- 12003	0	0	0	0	0	56

OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

- Identify overall TCP/IP and VTAM address space issues
 - Discards or retransmits
 - CPU percent
 - Paging rate
 - CSA and private storage usage
- Navigate to VTAM Buffer Pools summary and details workspaces

Command ==> VTAM : VTAM
KN3BPDS SMF ID : 0181

VTAM Buffer Pools Summary

Columns 2 to 7 of 15 Rows 1 to 14 of 14

ΔBuffer ▽Pool Name	ΔTotal ▽Buffers	ΔBuffers ▽In Use	ΔBuffers ▽Available	ΔStatic ▽Buffers Av	ΔPool ▽Thrashing	ΔTime ▽Expa
- AP00	56	0	56	56	No	0
- CRPL	75	3	72	72	No	0
- I000	80	0	80	56	No	3
- LF00	30	3	27	27	No	0
- LP00	18	2	16	10	No	1
- SF00	64	5	59	59	No	0
- SP00	21	0	21	21	No	0
- BS00	28	0	28	28	No	0
- XD00	10	4	6	1	No	1
- T100	480	256	224	104	No	2
- CRA4	50	1	49	49	No	0
- CRA8	18	2	16	10	No	1
- T100	48	0	48	16	No	1
- T200	40	0	40	8	No	1

File Edit View Tools Navigate Help 07/21/2015 17:46:34
Auto Update : Off
Command ==> Enterprise TCPIP and VTAM Overview
KN3TASO* TCP STC : *
SMF ID : *

TCPIP Summary

Columns 3 to 7 of 12 Rows 1 to 6 of 6

ΔSystem ▽ID	ΔTCPIP ▽STC Name	ΔInput ▽Discards	Δ% Input ▽Discards	ΔOutput ▽Discards	Δ% Output ▽Discards	Δ% TCP ▽Retrans
- 0181	TCPIP	6	0%	0	0%	0%
- 4083	TCPIP	6	0%	0	0%	0%
- 0061	TCPIP	6	0%	0	0%	0%
- 0181	TCPIPB	0	0%	0	0%	0%
- 0181	TCPIPC	0	0%	0	0%	0%
- 5096	TCPIP	0	0%	0	0%	0%

TCPIP Address Space

Columns 3 to 7 of 11 Rows 1 to 6 of 6

ΔSystem ▽ID	ΔTCPIP ▽STC Name	ΔCPU ▽%	ΔPaging ▽Rate	ΔCSA Usage ▽16MB	ΔCSA % ▽16MB	ΔTot % ▽CSA
- 0181	TCPIP	0%	0	136	0%	0%
- 4083	TCPIP	0%	0	136	0%	0%
- 0061	TCPIP	0%	0	136	0%	0%
- 0181	TCPIPB	0%	0	136	0%	0%
- 0181	TCPIPC	0%	0	136	0%	0%
- 5096	TCPIP	0%	0	136	0%	0%

VTAM Address Space

Columns 3 to 7 of 13 Rows 1 to 4 of 4

ΔSystem ▽ID	ΔVTAM ▽STC Name	ΔSIO ▽Util	ΔCPU ▽%	ΔPaging ▽Rate	ΔCSA Usage ▽16MB	ΔCSA % ▽16MB

BACK HOME Tuesday July 21 2015 MORE

OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

Identify gaps in monitoring and issues with your monitoring agents with the Enterprise Mainframe Networks Health workspace

- Invoke HEALTH command from any OMEGAMON XE for Mainframe Networks workspace
- Verify monitoring agents are online
- Verify that data collection is active and configured correctly
- SNA Collector and TCP Collector tabs provide additional information

Command ==> **health_**

The screenshot displays the 'Enterprise Mainframe Networks Health' workspace. At the top, it shows the date and time (07/21/2015 17:53:57) and system status (Auto Update: Off, Agent: *, SMF ID: *). Below this, there are tabs for 'Agent & Subnode' (selected), 'SNA Collector', and 'TCP Collector'. The main area is divided into two sections: 'Agent & Subnode Status' and 'Agent Status'.

Agent & Subnode Status Table:

ΔName	ΔStatus	ΔVersion	ΔReason	ΔHost Address
CANJN3:4085:KN3AGENT	*OFFLINE	04.20.03		ip.pipe:#9.42.32.8
N3D0N3Y:SP22:KN3AGEN	*OFFLINE	05.30.00		ip.pipe:#9.42.46.1
TCPCS5:0061	*OFFLINE	05.30.00		
TCPCS8:0061	*OFFLINE	05.30.00		
TCPIP:IP01	*OFFLINE	05.30.00		
TCPIP:LP03	*OFFLINE	05.10.02		
TCPIP:0016	*OFFLINE	05.10.02		
TCPIP:0023	*OFFLINE	05.10.00		
TCPIP:0110	*OFFLINE	04.01.00		
TCPIP:0128	*OFFLINE	05.10.01		
TCPIP:1062	*OFFLINE	05.10.01		
TCPIP:3033	*OFFLINE	05.10.02		
TCPIP:4084	*OFFLINE	05.30.00		
TCPIP:4085	*OFFLINE	04.20.03		

Agent Status Table:

ΔSystem ID	ΔTCP VCollect	ΔTCP VInterval	ΔSNA VCollect	ΔSNA VInterval	ΔAGENT VStarted	ΔIKE VStarted
0061	Yes	5	Yes	5	No	No
0181	Yes	1	Yes	5	Yes	Yes
4083	Yes	5	Yes	5	No	No
5096	Yes	5	Yes	5	No	No

The bottom of the screen shows the 'Agent Configuration' section with navigation buttons (BACK, HOME, MOREV) and the date 'Tuesday July 21 2015'.

OMEGAMON XE for Mainframe Networks v5.3



Decreased problem resolution time and effort

Monitor your OSA-Express5S adapters in the enhanced 3270 user interface

- Enterprise OSA-Express Ports Overview
- OSA-Express Ports for Channel
- OSA-Express Ports for Interface
- OSA-Express5S Ports Details

File Edit View Tools Navigate Help 07/21/2015 13:58:53
 Command ==> KN35SE0 Enterprise OSA-Express Ports Overview
 Auto Update : Off
 TCP STC : *
 SMF ID : *

OSA5S OSA3/4S OSA2 10G OSA/2

OSA-Express5S Ports Errors Summary

Columns 4 to 7 of 13 Rows 1 to 1 of 1

ΔSystem VID	ΔChan Num	ΔPort Name	ΔNo Free Buffer NIC	ΔTot No Free Buffer NIC	ΔNo Free Desc NIC	ΔTot No F Desc NIC
5096	D5	OSA2	0	0	0	0

OSA-Express5S Ports Statistics Summary

Columns 4 to 7 of 13 Rows 1 to 1 of 1

ΔSystem VID	ΔChan Num	ΔPort Name	ΔPackets Recvd	ΔPackets Xmitd	ΔPackets Recvd or Xmitd	ΔTot Pkts Recvd
5096	D5	OSA2	0	0	0	0

Command ==> KN3THES OSA-Express Ports for Channel D5
 SMF ID : 5096

OSA-Express5S Ports Errors Summary

Columns 2 to 6 of 10 Rows

Port Name	No Free Buffer NIC	Tot No Free Buffer NIC	No Free Desc NIC
OSA2	1	1	0

OSA-Express5S Ports Statistics Summary

Columns 2 to 6 of 10 Rows

Port Name	Packets Recvd	Packets Xmitd	Packets Recvd or Xmitd
OSA2	64.1K	64.2K	128.4K

Command ==> KN35STD OSA-Express5S Details for Port OSA2
 TCP STC : TCPIP
 SMF ID : 5096

CONFIG SUMMARY ERRORS STATS CONTROL

Configuration

Channel Number	D5	Port Name	OSA2
Port Number	0	Port Type	osaexp5S
Active MAC Address	6CAE8B48	Active Speed Mode	tenGigab
Burned In MAC Address	6CAE8B48	Configuration Speed Mode	tenGigab
Exclusive Usage ID		Exclusive Usage MAC	00000000
IPv4 Layer 3 VMAC	00000000	IPv6 Layer 3 VMAC	00000000
Configuration Name	IBM Defa	Interface Index	11

Enterprise Network Health

Command ==> KN3START

Enterprise Network Health

Network Health for Applications

Columns 3 to 11 of 21

ΔSystem ▽ID	ΔJob ▽Name	Δ% Segs ▽▽OutOfOrder	ΔTot Segs ▽OutOfOrder	ΔConn in ▽Backlog	Backlog Rejected	ΔTot Backlog ▽Rejected	Δ% Segs ▽Retrans	ΔTot Segs ▽Retrans
_ ADEV	V366338	0 5	19	0	0	0	0	0
_ BDEV	WSD3B05	0 0	8	0	0	0	0	522
_ BDEV	WSDBHT2	0 0	125	0	0	50.3K	0	377
_ BDEV	WSD3B05S	0 0	0	0	0	0	0	794

Applications that may be impacted by networking issues

- Out of order segments
- **Backlog connections rejected**
- Segments retransmitted
- Datagrams Discarded
- Number of connections and Idle Time

Backlog Connection Rejections

•Overview

- ✓ Connection Rejections
 - ◆ Exceeds Backlog Limit
- ✓ Need to retry logon
 - ◆ Excessive overhead
- ✓ Backlog limit too low
 - ◆ Application can override

Backlog Limit	Backlog Connections Rejected	Total Backlog Connections Rejected	Backlog Connections Rejected Time Stamp
2	0	6	08/18/11 14:54:40
10	0	0	
2	0	50.3K	08/18/11 14:11:03
10	0	7	08/20/11 10:05:35
2	0	6	08/18/11 14:35:27

Enhanced 3270 user interface or TEP:
Network Health for Applications

ΔTot Backlog ∇Rejected	Δ% Segs ∇Retrans	ΔTot Segs ∇Retrans	ΔIdle ∇Time
0	0	0	0.00
0	0	522	0.00
50.3K	0	377	0.00
0	0	794	585.16

•Results:

- ★ Most common unidentified issue
- ★ Applications are not be notified
- ★ No Message from z/OS Comm Server

Enterprise Connections Health

File Edit View Tools Options Help 12/30/2012 15:10:38

Command ==> Enterprise Connections Health

Auto Update : Off
TCP STC : *
SMF ID : *

Time Since Last Activity > 10 Minutes

Columns 4 to 8 of 16 Rows 1 to 8 of 33

ΔSystem ▽ID	ΔJob ▽Name	ΔLocal ▽Port	ΔRemote ▽IP Address	ΔLast ▽Activity	Connection State	Tot Segs Retrans	+Tot S OutOf
- MVSE	CICSAR10	3090	204.146.27.23	21d 05h	ESTABLISHED	0	0
- MVSE	IBMSMV32	9994	122.248.183.1	19d 13h	ESTABLISHED	10	0
- MVSE	IBMSMV32	9994	99.138.104.246	19d 00h	ESTABLISHED	0	0
- MVSE	IBMSMV32	9994	99.138.104.246	18d 17h	ESTABLISHED	0	0
- MVSE	IBMSMV32	9994	99.138.104.246	18d 12h	ESTABLISHED	0	0
- MVSE	CICSAOR2	8082	129.33.1.38	18d 02h	ESTABLISHED	0	0
- MVSE	CICSAOR2	8082	129.33.1.37	18d 02h	ESTABLISHED	0	0
- MVSE	CICSAOR2	8082	129.33.1.37	18d 02h	ESTABLISHED	0	0

Connection State Not Equal to Established

Columns 4 to 7 of 11 Rows 1 to 3 of 3

ΔSystem ▽ID	ΔJob ▽Name	ΔLocal ▽Port	ΔRemote ▽IP Address	ΔConnection ▽State	Connection Start Time	ΔConn ▽Duratio
- MVSE	RD4ZRSE9	57701	192.84.47.60	CLOSE WAIT	12/12/12 15:06:56	18d 0
- MVSE	RD4ZRSE2	60649	192.84.47.60	CLOSE WAIT	12/12/23 23:27:59	6d 1
- MVSE	RD4ZRSE9	41779	192.84.47.60	CLOSE WAIT	12/12/12 14:39:39	18d 0

Inbound or Outbound Bytes Buffered

Columns 4 to 7 of 11 Rows 1 to 3 of 3

ΔSystem ▽ID	ΔJob ▽Name	ΔLocal ▽Port	ΔRemote ▽IP Address	ΔIn Bytes ▽Buffered	ΔOut Bytes ▽Buffered	In Queued Data Time Stamp
- MVSE	RD4ZRSE9	57701	192.84.47.60	84	0	12/12/12 16:43:06
- MVSE	RD4ZRSE2	60649	192.84.47.60	84	0	12/12/24 00:43:07
- MVSE	RD4ZRSE9	41779	192.84.47.60	84	0	12/12/12 17:03:06

- We see three windows with potential connection issues
- Connections with no activity in longer than 10 minutes.
 - Connections not in Established state.
 - Connections with bytes being buffered in CSM storage.

Complete your session evaluations online at www.SHARE.org/Orlando-Eval

TCP/IP Bytes Backing Up

•Overview

- ✓ Backup in CSM storage
 - ◆ LPAR can run out of storage
- ✓ Outbound backup
 - ◆ Endpoint slow or Network issues
- ✓ Inbound backup
 - ◆ High Application CPU

•Results

- ★ **Can Prevent LPAR crash**
 - ◆ Situation to drop connection

Inbound Bytes Buffered	Percent Segments Retransmitted	Total Segments Retransmitted	Duplicate ACKs
209621	2	112	96
84	0	0	1
84	0	0	1

TEP: Inbound & Outbound Bytes Buffered

ΔJob ▽Name	ΔLocal ▽Port	ΔRemote ▽IP Address	ΔIn Bytes ▽Buffered	ΔOut Bytes ▽Buffered
CDCONN	1364	9.39.68.147	4.0K	0
RD4ZRSE2	4077	9.39.68.147	84	0
ADHCDSNB	56909	9.39.68.70	60	0
ADHCDSNB	10141	9.39.68.70	60	0
ADHCDSNB	10152	9.39.68.70	60	0
AUVSTAPV	33864	9.39.68.70	60	0
BBOS002S	53094	9.39.68.147	23	0
BBOS002S	51611	9.39.68.147	23	0

Enhanced 3270 user interface:
Enterprise Connections Health

Zombie Connections

.Overview

- ✓ Connections
 - ◆ Not in established State
- ✓ Can prevent new connections
 - ◆ Exceed maximum socket limit
- ✓ No activity for days

.Results

- ★ **Prevent Major outage**
 - ◆ Drop zombie connections

Enterprise Connections Health

Connection State Not Equal to Established

Local Port	ΔConn ▽Duration	Last Activity	Local IP Address
7701	18d 00h	17d 22h	192.84.47.60
0649	6d 15h	6d 14h	192.84.47.60
1779	18d 00h	17d 22h	192.84.47.60

Enhanced 3270 user interface or TEP:
Enterprise Connection Health

Connections in CLOSE WAIT for hours or days can eventually prevent new connections from starting. This can be caused by applications failing to cleanup connections correctly. You can drop these “zombie” connections by issuing Drop command right from here.

FTP Monitoring

•Overview

- ✓ FTP Sessions
 - ◆ Session Errors
 - ◆ Drill down to TCP/IP
- ✓ FTP Transfers
 - ◆ Monitor performance
- ✓ Enterprise FINDS
 - ◆ IP Address,
 - ◆ USERID, DSN

	Remote IP Address	Login Failure Reason Description	Session Start	Session End	User ID on Server Extended	Client User ID	F T
	204.146.27.25	User_ID_is_unknown	11/04/13 06:25:47	11/04/13 06:25:47	FTP		Ser
	204.146.27.25	User_ID_is_unknown	11/04/13 06:25:47	11/04/13 06:25:47	FTP		Ser
	204.146.27.25	User_ID_is_unknown	11/04/13 06:10:34	11/04/13 06:10:34	ANONYMOU		Ser
	204.146.27.25	User_ID_is_unknown	11/04/13 06:07:05	11/04/13 06:07:05	ANONYMOU		Ser

Item ID	TCPIP STC Name	Application Name	Remote IP Address	Session End Reason Description	Total Files Transferred	To Byt Trans
3E	TCPIP	MS519	24.161.86.175	Client_closed_control_connection_unexpectedly	2	48
3E	TCPIP	PLS	99.156.166.184	Socket_or_network_error	0	
3E	TCPIP	PLS	99.156.166.184	Socket_or_network_error	0	
3E	TCPIP	PLS	99.156.166.184	Socket_or_network_error	0	

•Results

- ★ Access History immediately
- ★ No need to wait for Report

Available in TEP and enhanced 3270 user interface

OSA-Express and Hypersockets

.Overview

- ✓ Utilization, Discards,
- ✓ Microcode, MTU Size
- ✓ **Outbound Queue Priorities**
- ✓ **View non-z/OS OSAs (snmp)**
- ✓ **Alert if OSA is down**



Command ==> KN3IFS02

Enterprise HiperSockets Interfaces Overview

HiperSockets Interface Statistics

ΔSystem VID	ΔInterface Name	ΔBandwidth VUtil	Bytes Recv or Xmitd	Δ% Packets Vin Error	% In Pkts In Error	% Out Pkts In Error	% Packets Discarded	In Pkts Discarded	Out Pkts Discarded	ΔTot In Pkts VDisc in Error	ΔTot Out P VDisc in E
0128	10D10	0%	0	0%	0%	0%	0%	0	0	0	0
0016	10D10	0%	0	0%	0%	0%	0%	0	0	0	0

HiperSockets Interface Status

ΔSystem VID	ΔInterface Name	ΔInterface VStatus	Device or Datapath	ΔActual VMU	Duplicate Addr Count	Actual Perf Type	Routing MTU Size	TCP Seg Offload	Checksum Offload	Configured Perf Type	+Interface ID
0128	10D10	Active	Active	8192	0		8192	No	No		
0016	10D10	Active	Active	8192	0		8192	No	No		

HiperSockets Interface Write Queue Statistics

ΔSystem VID	ΔInterface Name	ΔQueue VPriority	ΔMax Staging VQueue Depth	ΔUsed VSBA	ΔMax Active VSBA	ΔAvg Active VSBA	ΔSBA	ΔAvg SBA	QD10 SBA Count	I0D10 SBA Count	Avg Staging Queue Depth
0128	10D10	4	0	0	0	0	0	0	0	0	0
0128	10D10	3	0	0	0	0	0	0	0	0	0
0128	10D10	2	0	0	0	0	0	0	0	0	0
0128	10D10	1	0	0	0	0	0	0	0	0	0
0016	10D10	4	0	0	0	0	0	0	0	0	0
0016	10D10	3	0	0	0	0	0	0	0	0	0
0016	10D10	2	0	0	0	0	0	0	0	0	0
0016	10D10	1	0	0	0	0	0	0	0	0	0

HiperSockets Interface Read Queue Statistics

ΔSystem VID	ΔInterface Name	ΔQueue ID	ΔReads VExhausted	ΔRead VDeferrals	Tot Read Deferrals	ΔUsed VSBA	% Packets Accelerated	% Bytes Accelerated	% Real PCI Interrupts	% Virt PCI Interrupts	% Threshold PCI Interrupts
0128	10D10	1	0	0	0	0	0%	0%	0%	0%	0%
0016	10D10	1	0	0	0	0	0%	0%	0%	0%	0%

Available in TEP and enhanced 3270 user interface

Complete your session evaluations online at www.SHARE.org/Orlando-Eval