



What's New with z/OS Network Performance Monitoring with OMEGAMON?

OMEGAMON XE for Mainframe Networks v5.1

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Increasing visibility with mainframe monitoring can improve availability across entire Enterprise

Key Takeaways



- IBM has provided leadership and best practices with System z Service Management **Visibility, Control and Automation** capability for years
- **Enterprise-wide Monitoring and Management** provides much better availability and performance results than individual separate products
- IBM's System z **OMEGAMON family** addresses key requirements, including reducing risk and decreasing costs, with improved productivity

OMEGAMON for Mainframe Networks V5.1 fits into Integrated Service Management Ecosystem



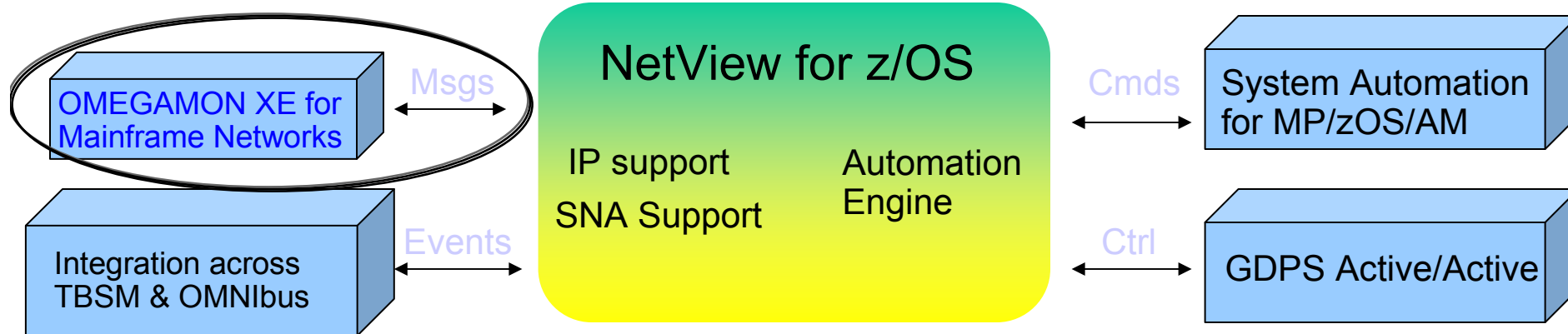
Visibility

Problem Determination,
Management and Resolution



Automation

Application, network and system
command and message automation



Control

Commands, Management
and Environmental Control

NetView and OMEGAMON for MfN working together create single view of enterprise networks

NetView for z/OS

Network Availability

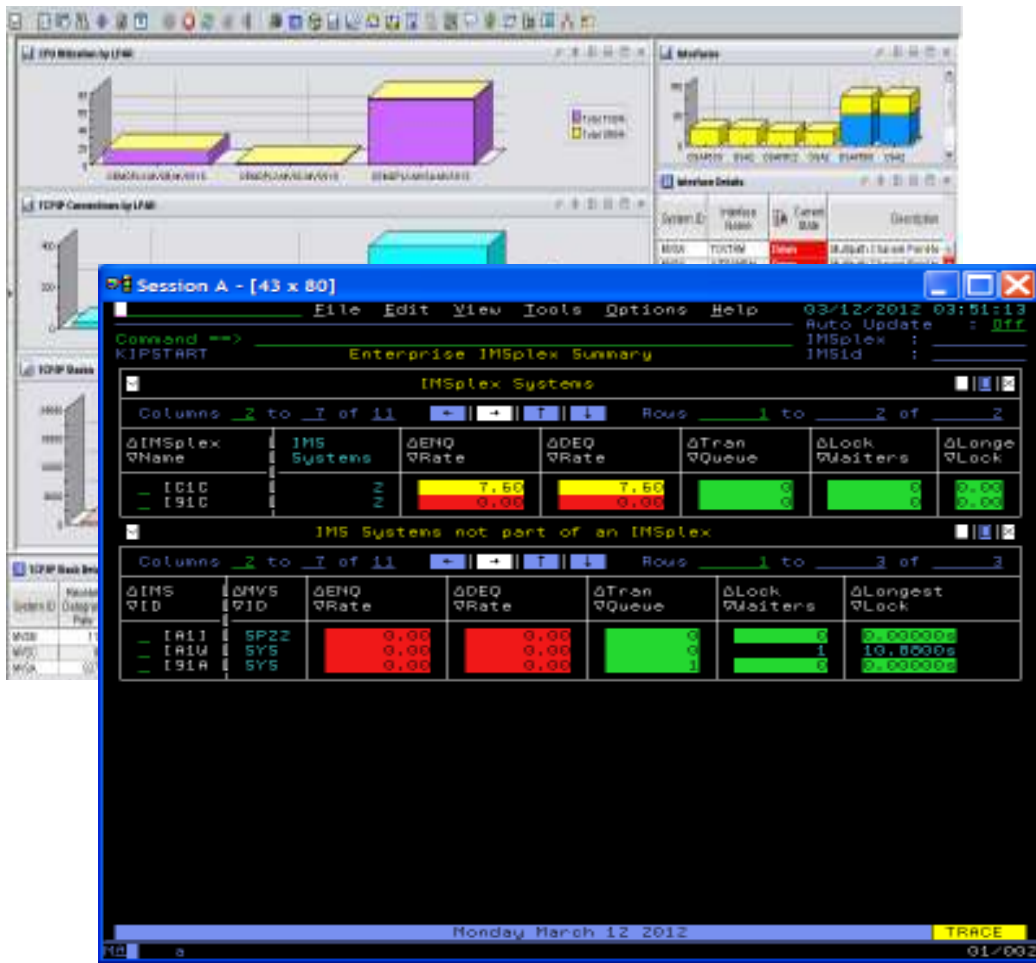
OMEGAMON XE for
Mainframe Networks

Network Performance

- Common user interface integrates TCP/IP data from both NetView for z/OS and OMEGAMON XE for Mainframe Networks.
- Integration function provides customers with a consolidated TCP/IP workbench
 - Allowing management of both TCP/IP availability and performance from the same user interface.
- Smart IP tracing to immediately learn where poor or unstable TCP/IP connections hamper application performance



OMEGAMON V5.1 now has a complete family across System z sub-systems



- OMEGAMON XE z/OS v 5.1
- OMEGAMON XE CICS v 5.1
- OMEGAMON XE DB2 v 5.1.1
- OMEGAMON XE IMS v 5.1
- OMEGAMON XE Storage v 5.1
- OMEGAMON XE Messaging v 7.1
- OMEGAMON XE
Mainframe Networks v 5.1**
- OMEGAMON for z/OS
Management Suite V5.1

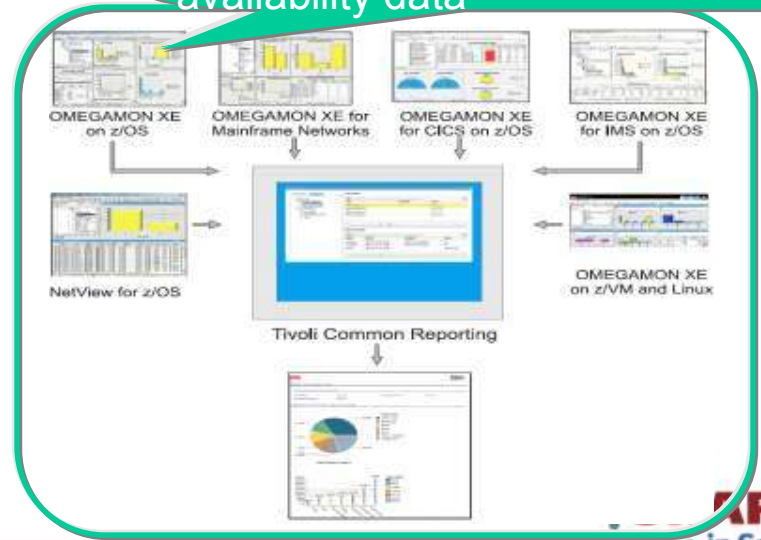
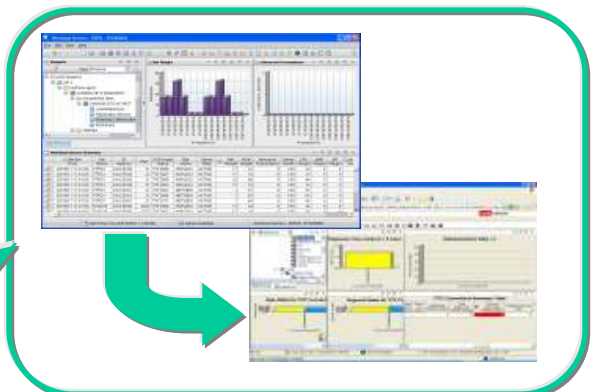
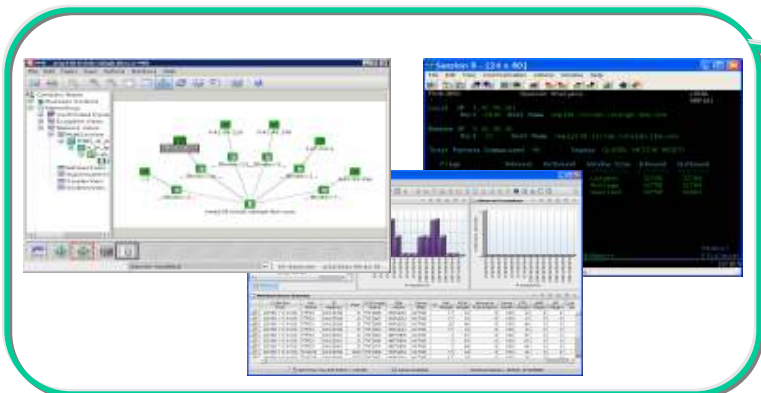
All the components work together to keep applications and services available

Role appropriate views of right data at right time

Rapid problem diagnostics via common UI and drill down between

Consistent historical views of resource performance and availability data

Alert me when thresholds breached and enable to automate corrective actions



Business Agility with improved IT visibility now available with OMEGAMON V5.1 family

Modernized and strengthened OMEGAMON product line for reduced resource usage and faster problem resolution

Increased System Availability with faster problem resolution

- Enhanced 3270 User Interface for SMEs
- Built-in Problem Solving Scenarios

Improved Productivity with simplified information

- Faster Install/Configuration/Maintenance
- zEnterprise monitoring across z196/114 and zBX

Reduced Costs with decreased resource usage

- Usage of zIIP specialty servers
- Simplified OMEGAMON architecture



Individual products include additional capability

Enhanced 3270 user interface creates Enterprise wide view of information for improved availability



- Understand transactions across your enterprise
- Color coding to provide ability to find and resolve problems quickly
- Eliminates need to move between multiple screens and monitors

“GUI on a green screen”

File Edit View Tools Options Help 09/15/2012 08:43:52
 Command ==> Auto Update : Off
 KOBSTART Plex ID :
 Enterprise Summary Sys ID :

All Active Sysplexes

ΔSysplex Name	ΔAverage CPU Percent	Highest LPAR Name	ΔHighest LPAR CPU%	ΔPercent LPAR MVSU Capacity	+LPAR Group Name
_ LPAR400J	7	CANSYSG	17	8.1	N/A

All Active CICSplexes

ΔCICSplex Name	ΔNumber of Regions	ΔTransaction Rate	ΔCPU Utilization	Any SOS Regions	SOS Region
_ OMEGPlex	2	0/m	0.0%	No	

All Active DB2 Subsystems

ΔDB2 ID	Waiting On Tape Mount	DDF Inactive	Global Trace Active	DDF Receive Rate	DDF Send Rate
_ D91J	False	False	False	0	0
_ DB1D	False	False	False	0	0

Monitored IMS Subsystems

ΔIMS VID	ΔIMSplex Name	ΔMVS VID	ΔSysplex Name	Monitor Status	ΔDS VGroup	ΔSQ VGroup
_ IC1C	IC1C	SYS	LPAR400J	Online	IRLMCC	DFSICCG

At a glance, view key information for each OMEGAMON product

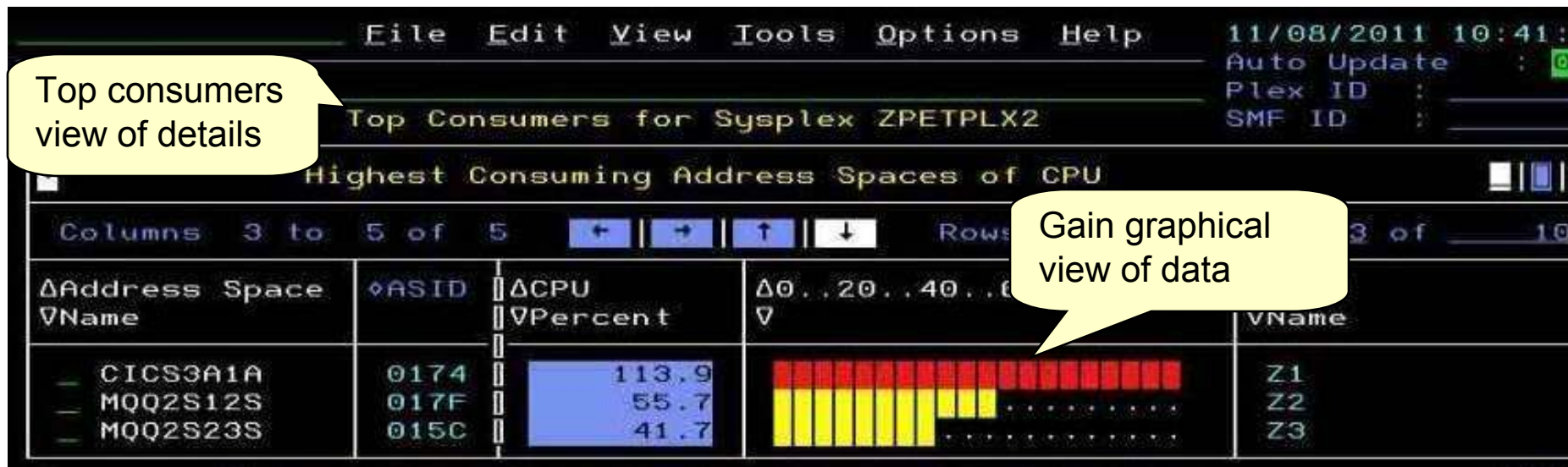
Navigate quickly through the data to identify the source of a problem



Customer prioritized Problem Solving scenarios built into enhanced 3270 user interface

Easy to see and find critical system and sub-system information for improved performance and availability across System z

- Customized screens focused on customer defined problems
- Screen content based on high priority problems
- Includes Healthcheck and Bottleneck analysis



File Edit View Tools Options Help 11/08/2011 10:41:00
 Auto Update : ON
 Plex ID :
 SMF ID :

Top Consumers for Sysplex ZPETPLX2

Highest Consuming Address Spaces of CPU

ΔAddress Space ▽VName	ASID	ΔCPU ▽Percent	Δ0..20..40..60..80..100 ▽	VName
CICS3A1A	0174	113.9	[Bar chart]	Z1
MQQ2S12S	017F	55.7	[Bar chart]	Z2
MQQ2S23S	015C	41.7	[Bar chart]	Z3

Columns 3 to 5 of 5 Rows 3 of 10

Example of quickly finding and fixing z/OS Problem

New E3270UI highlights problems and simplifies resolving them quickly

Screen 1 Exceptions

Columns 3 to 5 of 6 Rows 1 to 8 of 8

◊Sysplex Name	◊LPAR Name	ΔException	Value	Waiting Tasks
- LPAR400J	CANSYSG	Performance_Index	7.50	-
- LPAR400J	CANSYSG	Enqueue	SYSDSN	1
- LPAR400J	CANSYSG	GTF_Active	TRUE	-
- LPAR400J	CANSYSG	CPU_Loop_Index	100.0	-
- LPAR400J	CANSP22	Performance_Index	1.76	-
- LPAR400J	CANSYSL	Performance_Index	4.28	-
- LPAR400J	CANSP12	Performance_Index	1.42	-
- LPAR400J				

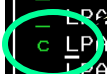
Possible Looping Job

Screen 2 Exceptions

Columns 3 to 5 of 6 Rows 1 to 7 of 7

◊Sysplex Name	◊LPAR Name	ΔException	Value	Waiting Tasks
- LPAR400J	CANSYSG	Performance_Index	6.66	-
- LPAR400J	CANSYSG	Active_Storage_Alert	WARNING	-
- LPAR400J	CANSYSL	Performance_Index	2.50	-
- LPAR400J	CANSP11	Performance_Index	1.42	-
- LPAR400J	CANSP22	Performance_Index	1.30	-
- LPAR400J	CANSP22	CPU_Loop_Index	99.6	-
- LPAR400J	CANSYSG	Performance_Index	4.28	-

Enter 'c' to cancel job



Screen 3 Cancel Address Space

Command ==> KMSPLX0

KMSACTC2

Press ENTER to continue

Address Space Name	: MGRABZ
ASID	: 0044
Address Space Type	: BATCH
SMF ID	: SP22

Job Cancelled

In prior releases this would have taken from 5 to 15 screen interactions

Exceptions

Columns 3 to 5 of 6 Rows 1 to 4 of 4

◊Sysplex Name	◊LPAR Name	ΔException	Value	Waiting Tasks
- LPAR400J	CANSP13	Performance_Index	2.85	-
- LPAR400J	CANSP13	Active_Storage_Alert	WARNING	-
- LPAR400J	CANSP22	CPU_Loop_Index	99.6	-
- LPAR400J	CANSYSG	Performance_Index	4.10	-

OMEGAMON V5.1 enhanced configuration and maintenance capability with Self-Describing Agents

Faster, easier, less error-prone for improved reliability and productivity

- Eliminate monitoring outages caused by ITM Server recycles
 - Product upgrades/maintenance requires agent or RTEMS recycles only
- Eliminate maintenance upgrade errors:
 - Applies to new installs, staged upgrades, and maintenance
 - Crosschecks/validates version with installed data and framework
 - Avoids inconsistent application data in ITM framework layers
- Self-describing framework extensible to new capabilities
- Eliminates application data DVDs and CDs:
 - No extra distributed installs or upgrades for mainframe-centric customers



- Moving from 40 hours a week to 4 hours a week maintenance
- 80% improvement in time for installation and maintenance
- 30% improvement in time to configure post installation

Customer Driven improvements simplify Installation and Configuration using PARMGEN

Replaces ICAT as primary way to install and configure

*Before: 145 ICAT **product-centric** jobs to configure 38 components for 1 LPAR RTE
Today: 8 Parmgen **function-centric** jobs to configure components for 1 LPAR RTE
Customers experiencing over 35% improvement in install and configuration time*

- Easy to walkthrough steps to complete configuration and customize profile
- Automatically updates hundreds of configuration artifacts, including auto-discovery of system values
- Validate parameter settings for tolerance and type
- Imports settings from an existing ICAT environment
- Re-run to change values, add or delete products

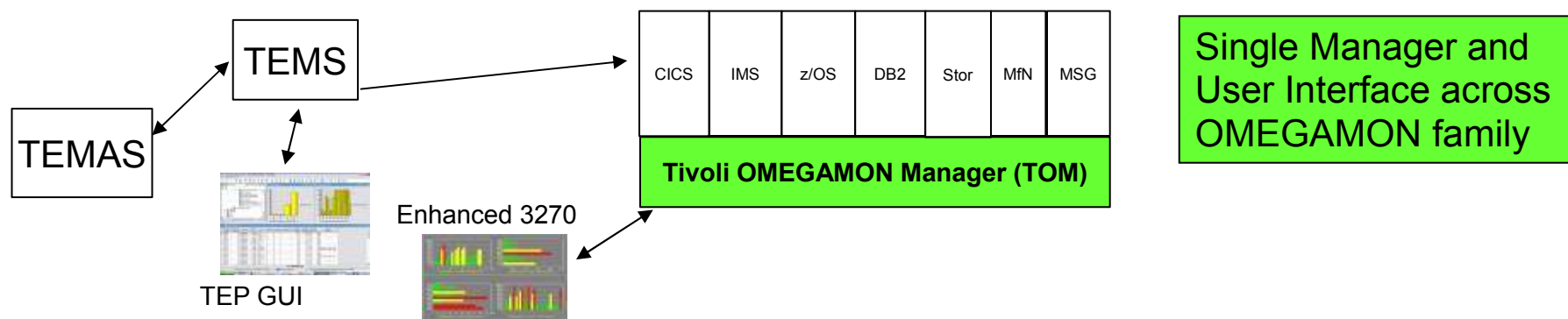
“I like using the PARMGEN approach better than ICAT. I find it much easier to make things repeatable... I like the fact that PARMGEN does not overwrite my running members”

Typical quotes from early adopters program

The overall process has been simple and quick. Total time for 3-4 products (z/OS, CICS, DB2, TOM plain vanilla) has been about 2 hours Field Engineer

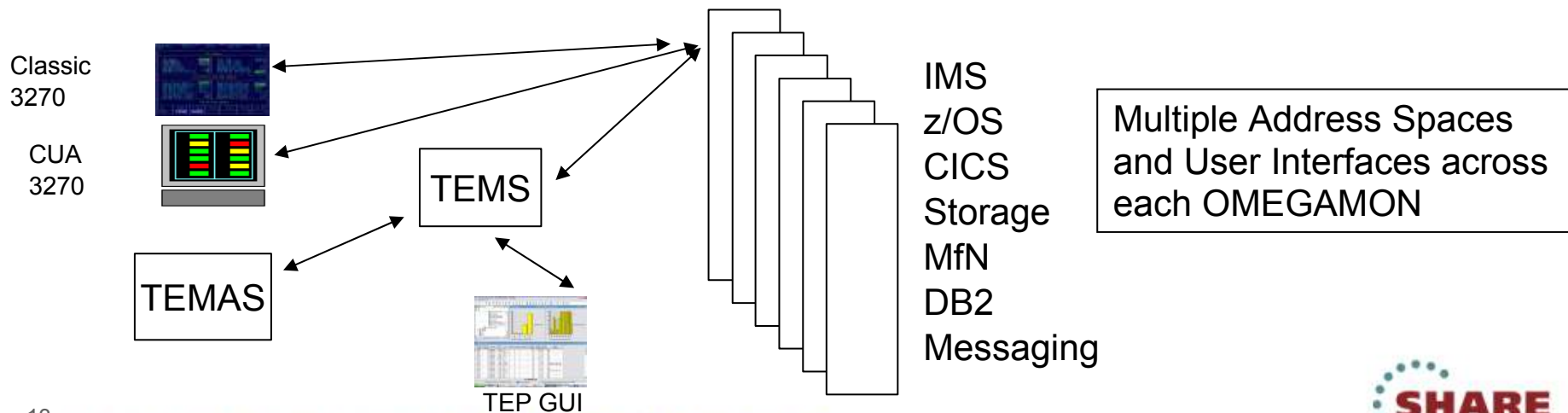
Moving to simplified architecture driving decreased resource utilization without loss of current function

Enhanced OMEGAMON Architecture



Single Manager and User Interface across OMEGAMON family

Current OMEGAMON Architecture



Multiple Address Spaces and User Interfaces across each OMEGAMON

OMEGAMON for Mainframe Networks V5.1 improves network diagnostics and management



In addition to OMEGAMON V5.1 family capability:

- Increased system availability with faster problem resolution through built-in problem solving scenarios
- Improved diagnostics and decreased CPU utilization
- Support for zEnterprise mainframe server improves application availability
- Improved resource usage with more control over data collection
- Greater synergy with IBM Tivoli NetView for z/OS
- Improved management through additional Take Action commands
- Improved troubleshooting of data collection problems

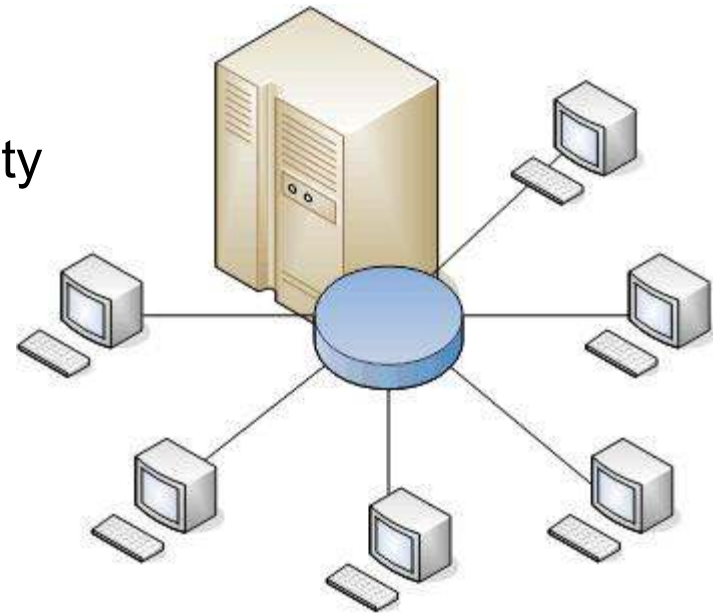


Increased System Availability with faster problem resolution



OMEGAMON XE for Mainframe Networks V5.1 delivers problem solving scenarios for your network

- Monitor application and TCP listener activity
- Monitor OSA and interface activity
- Monitor TN3270 server activity
- Monitor TCP/IP stacks activity



Scenario A: Scheduled logons and “silent” failures

The setting:

A mainframe network systems programmer was building a baseline for network performance of his LPARs and applications. A very high number of rejected connections were being reported by OMEGAMON XE for Mainframe Networks just after 10 pm each evening. At first, the systems programmer thought he had found a problem with the monitoring software.

Scheduled logons and “silent” failures

1. Johann, the network systems programmer, enabled a situation that e-mails him when backlog connections are rejected.

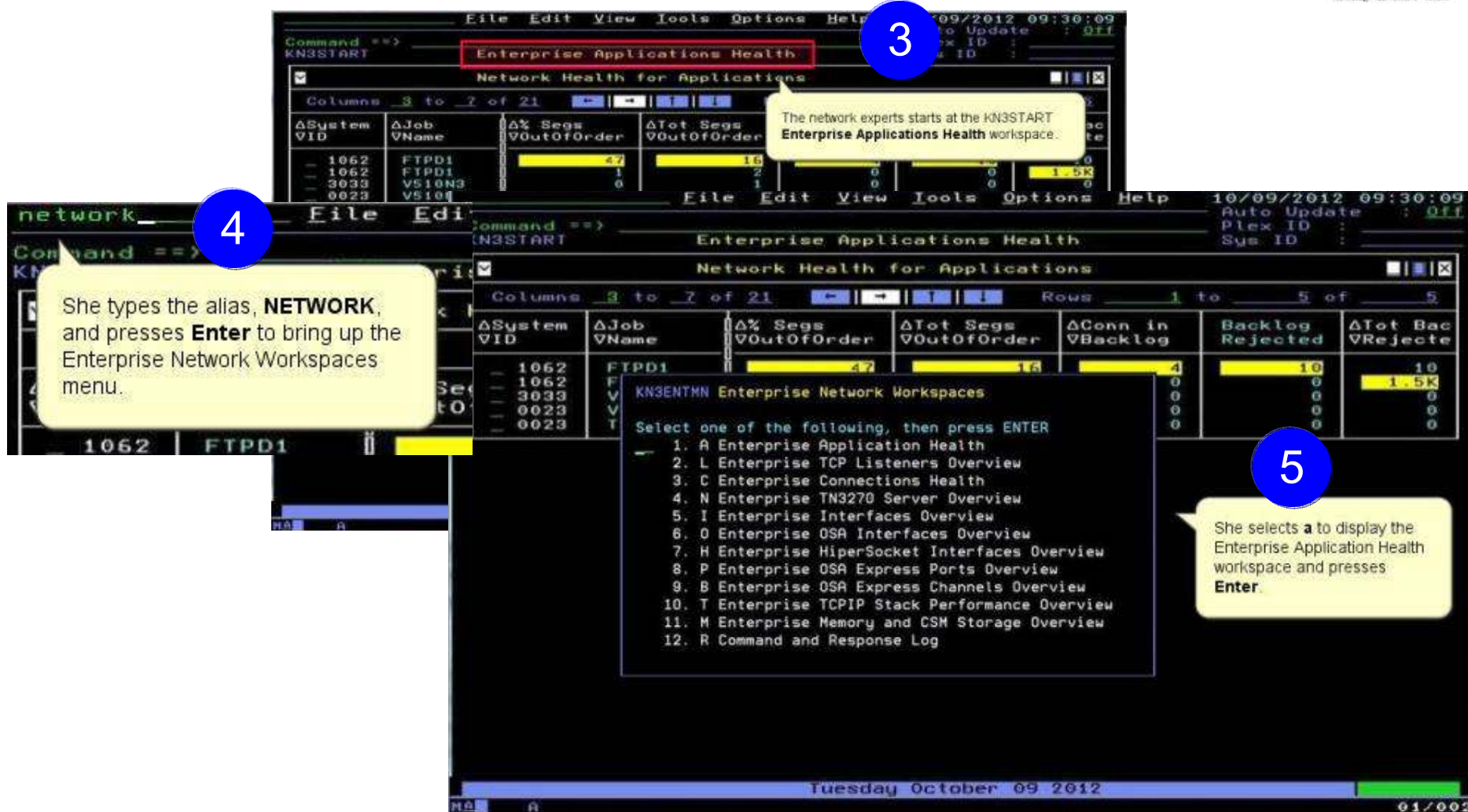
	System ID	Application Name	Local Port	Connections in Backlog	Backlog Limit	Backlog Connections Rejected	Total Backlog Connections Rejected	Backlog Connections Rejected Time Stamp
	MVSB	PORTMAP1	111	0	2	0	6	08/18/11 14:54:40
	MVSB	DB2SDIST	5446	5	10	0	0	
	MVSC	PORTMAP1	111	0	2	0	6	08/18/11 14:11:03
	MVSA	CXEGDSST	1920	0	10	0	7	08/20/11 10:05:35
	MVSA	PORTMAP1	111	0	2	0	6	08/18/11 14:35:27
	MVSA	PORTMAP1	5446	0	2	0	22	08/18/11 14:57:13

2. The e-mails confirmed that thousands of connection requests were being rejected before the FTP server was able to accept.

BacklogConnsRejected - The number of rejected backlog connections for FTPD1 on SYSXX is **6,842**: 11/16/09 22:07EST.

BacklogConnsRejected - The number of rejected backlog connections for FTPD1 on SYSXX is **8,045**: 11/17/09 22:06EST.

Scheduled logons and “silent” failures ...



3

The network experts starts at the KN3START Enterprise Applications Health workspace.

4

She types the alias, **NETWORK**, and presses **Enter** to bring up the Enterprise Network Workspaces menu.

ΔSystem VID	ΔJob VName	Δ% Segs VOutOfOrder	ΔTot Segs VOutOfOrder	ΔConn in VBacklog	Backlog Rejected	ΔTot Bac VRejecte
1062	FTPD1	47	16	4	10	10
1062	FTPD1	1	0	0	0	1.5K
3033	V510N3	0	0	0	0	0
0023	V510Q	0	0	0	0	0

5

She selects **a** to display the Enterprise Application Health workspace and presses **Enter**.

```

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 Server Overview
5. I Enterprise Interfaces Overview
6. O Enterprise OSA Interfaces Overview
7. H Enterprise HiperSocket Interfaces Overview
8. P Enterprise OSA Express Ports Overview
9. B Enterprise OSA Express Channels Overview
10. T Enterprise TCPIP Stack Performance Overview
11. M Enterprise Memory and CSM Storage Overview
12. R Command and Response Log
    
```

Scheduled logons and “silent” failures ...

File Edit View Tools Options Help 10/09/2012 09:21:30
 Command ==> Enterprise Applications Health
 Auto Update : Off
 TCP STC : *
 SMF ID : *

Applications Summary

System ID	Job Name	Idle Time	Conn Count	Active Conns	Highest Conns	Conn in Backlog
4083	V510DSST	0.02	29	16	17	0
5096	V510N3	329.38	16	3	3	0
4083	V510N3	0.09	16	3	3	0
4084	V510N3	329.40	16	3	3	0
0238	N3510PCM	0.07	16	3	4	0

Percent Out of Order Segments OR Total Out of Order Segments

System ID	Job Name	% Segs Out of Order	Tot Segs Out of Order	Tot S Recei
4083	V510DSST	0	616	0
4083	TN3270	0	49	788.4K / 389.3K

Connections in Backlog OR Total Backlog Connections Rejected

System ID	Job Name	Conn in Backlog	Tot Backlog Rejected	Backlog Rejected	Backlog Rejected Time Stamp
1062	FTPD1	0	1.5K	0	12/10/05 22:26:01

Percent Segments Retransmit OR Total Segments Retransmit

System ID	Job Name	% Segs Retrans	Tot Segs Retrans	Segs Retrans	Retrans	Conn
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6

She locates the FTP application in the Connections in Backlog OR Total Backlog Connections Rejected subpanel.

Scheduled logons and “silent” failures ...

7

She navigates to the **Application Details for Application_Name** workspace and verifies that the server has been up since the last IPL and is accepting connections, and that the connections are doing work.

```

Session A - [43 x 80]
File Edit View Communicat...
Host: tivvm4.raleigh.ibm.co...
Command -->
KN3TAPPD
Application Details for FTPD1
10/09/2012 09:34:03
Auto Update : OFF
TCP STC : ICPIFB
SMF ID : 1067

Connection Statistics
Conn Count..... 11      Active Conns..... 10
Conn Rate..... 1      Highest Conns..... 58
Accepted Conns... 12      Date for Highest Conns... 12/07/03
Conn in Backlog.. 0      Time for Highest Conn... 12:26:01
Backlog Rejected 0      Tot Backlog Rejected... 1.53
Idle Time..... 0.05    Backlog Rejected Date... 12/10/05
Time Since Last Activity.. 0.010s  Backlog Rejected Time... 22:26:01
Server Up Time... 164.72  Susplex Name..... PIFX1
Application Type... Unknown

Throughput Rates and Percents
Retrans Rate..... 5      Byte Rate..... 56
Receive Byte Rate.. 34     Transmit Byte Rate..... 53
Receive Segment Rate... 6      Transmit Segment Rate... 4
Segment Rate..... 23    % Segs OutOfOrder..... 47
% Segs Retrans... 0

Throughput Statistics
Total Bytes Received... 34     Total Bytes Sent..... 23
Total Bytes..... 67     Bytes Sent or Received... 34
Bytes Received... 64     Bytes Sent..... 74
Tot Segs Received... 32     Tot Segs Sent..... 11
Total Segments..... 12    Segments Sent or Received.. 21
Segments Received... 7      Segments Sent..... 29
Segments OutOfOrder... 23    Tot Segs OutOfOrder... 16
Segs Retrans..... 0     Tot Segs Retrans..... 0

Datagram Statistics
Receive Datagram Rate... 0      Transmit Datagram Rate... 0
Datagram Rate..... 0     Total Datagrams..... 0
Total Datagrams Received... 0    Total Datagrams Sent..... 0

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MORE 7
  
```

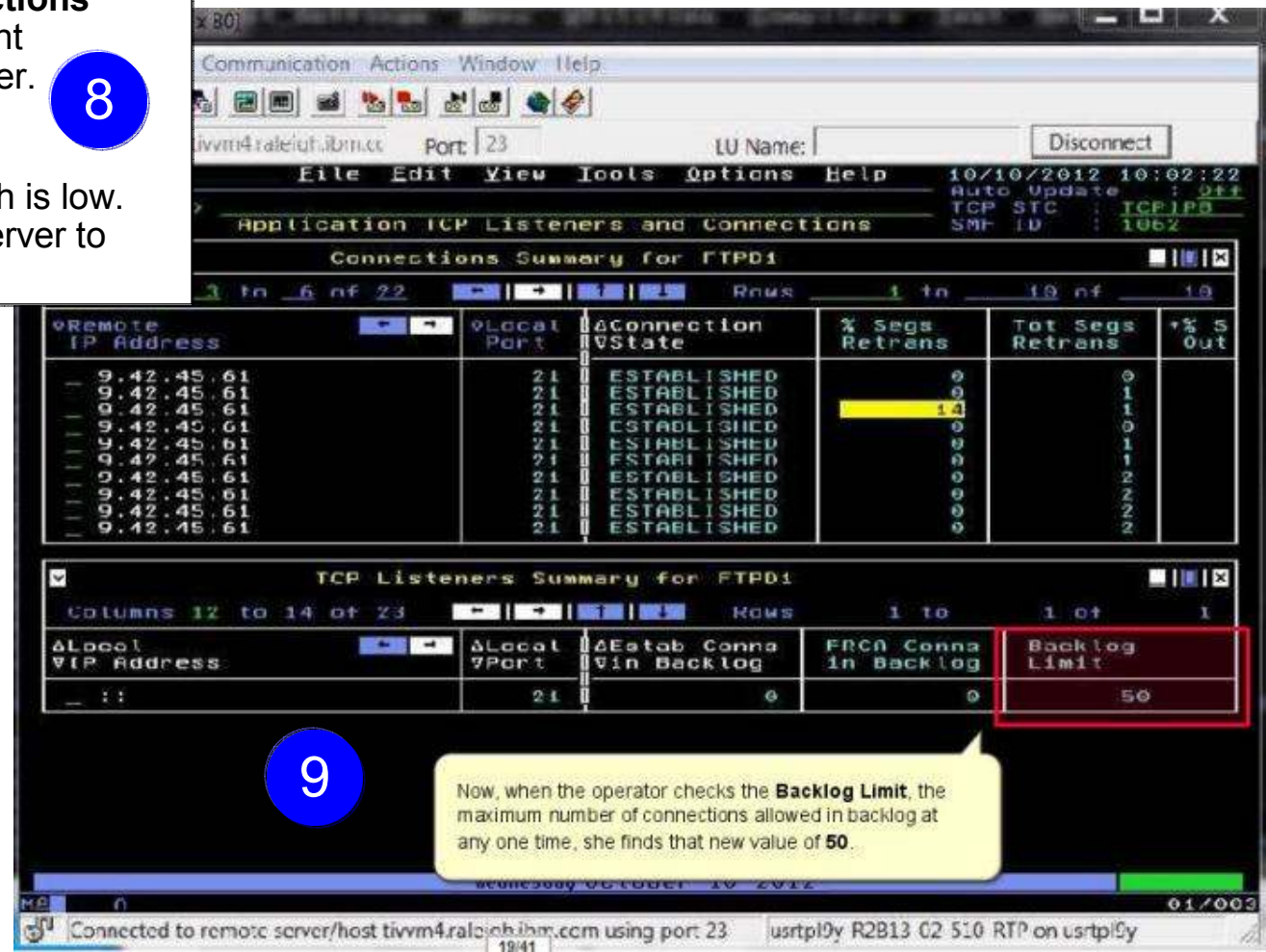
Connected to remote server/nost tivv 17/41 igh.ibm.com using port 23 usrtpl9y-R2B13-02-510-RTP on usrtpl9y

Scheduled logons and “silent” failures ...

She then navigates to the **Application TCP Listeners and Connections** workspace to view the current connections to the FTP server.

8

The backlog limit is 10, which is low. She reconfigures the FTP server to have a backlog limit of 50.



The screenshot shows the 'Application TCP Listeners and Connections' workspace. The top section displays 'Connections Summary for FTPD1' with a table of active connections. The bottom section displays 'TCP Listeners Summary for FTPD1' with a table of listener configurations. A red box highlights the 'Backlog Limit' field in the listener summary table, which is set to 50. A yellow callout box points to this field with the text: 'Now, when the operator checks the Backlog Limit, the maximum number of connections allowed in backlog at any one time, she finds that new value of 50.'

Remote IP Address	Local Port	Connection State	% Segs Retrans	Tot Segs Retrans	% S Out
9.42.45.61	21	ESTABLISHED	0	0	1
9.42.45.61	21	ESTABLISHED	0	1	1
9.42.45.61	21	ESTABLISHED	14	0	0
9.42.45.61	21	ESTABLISHED	0	1	1
9.42.45.61	21	ESTABLISHED	0	2	2
9.42.45.61	21	ESTABLISHED	0	2	2
9.42.45.61	21	ESTABLISHED	0	2	2
9.42.45.61	21	ESTABLISHED	0	2	2

Local IP Address	Local Port	Estab Conns	FRCA Conns in Backlog	Backlog Limit
::	21	0	0	50

9

Scheduled logons and “silent” failures ...

That evening starting at 10 pm, the FTP server was accepting connections as usual, but the backlog limit is quickly exceeded and subsequent connections are rejected.



- 10 The OMEGAMON operator again verifies that the FTP application is accepting connections, and the connections in backlog returns to zero by 10:30 pm. She calls the network expert to update her on the problem.
- 11 When she investigates further, the network expert finds that 10,000+ workstations all “wake up” at the same time and attempt to FTP files at 10pm every night.
- 12 She increases the backlog limit for the FTP sever temporarily to 2000 to provide relief until desktop support can roll out a change to the automated nightly timer, staggering the FTP connection requests over a couple of hours.

Scenario B: Spotting trends in abnormal connection count

The setting:

In this use case, a network systems programmer needs to identify the reasons behind slow, steady growth in the number of connections in one IMS region.

The network systems programmer navigates to the **Enterprise Applications Health** (KN3TAPO) workspace to view the IMS applications.

Spotting trends in an abnormal connection count ...

File Edit View Tools Options Help 10/18/2012 13:55:21
Auto Update : Off

Command ==> KN3TAP0

Filter(s)

- 1. Job Name..... n/a
- 2. Idle Time..... n/a
- 3. Conn Count..... n/a
- 4. Highest Conns..... n/a
- 5. Tot Segs Retrans..... n/a
- 6.
- 7.
- 8.

Filter Detail

Column	Job Name
Compare	=
Value	IMS*
UCTRAN	Yes

Columns: 301

nn in Stc : *
ID : *

1

She brings up the **Filter(s)** menu and selects 1 to specify a **Job Name** filter.

2

She types = as the operator and **IMS*** as the value. This action will enable the Application Summary subpanel to filter on IMS and show all the IMS regions in the Applications Summary subpanel. She presses **Enter**.

The workspace shows only IMS regions.

Applications Summary

Columns 7 of 21 Rows 1 to 5 of 21

System ID	Job Name	Idle Time	ΔConn Count	Active Conns	ΔHighest Conns	Conn in Backlog
SYS	IMS9CCON	101.5	6	0	0	0
SP12	IMS9YCON	100	3	0	0	0
SP12	IMSAAO		3	0	0	0
SP12	IMSASO		3	0	1	0
SP13	IMSBYO		3	0	4	0

3

He observes the values of **Connection Count** and **Active Connections High Water Mark**

Spotting trends in an abnormal connection count ...

4

```
Options Help 10/18/2012 13:56:15
Auto Update : Off
TCP STC : *
SMF ID : *
```

Health

To focus on the IMS regions on System SP13, she types **SP13** into the **SMF ID** field and presses **Enter**.

5

IMSBYCON has a higher connection count than the other IMS regions.

System ID	Job Name	Idle Time	Conn Count	Active Conns	Highest Conns	Conn in Backlog
SP13	IMSCACON	1.85	30	6	24	0
SP13	IMSBYCON	0.50	117	91	91	0
SP13	IMSCWCON	24.73	3	0	0	0
SP13	IMSAGCON	0.03	35	19	2	0
SP13	IMSCZCON	0.00	34	12	2	0

6

7

6 He contacts an IMS systems programmer who verifies that all the IMS regions, including **IMSBYCON**, are performing work and no one has reported any connectivity issues.

7 There are no connections in backlog and the Idle Time shows that the IMS region is accepting connections

Spotting trends in an abnormal connection count ...

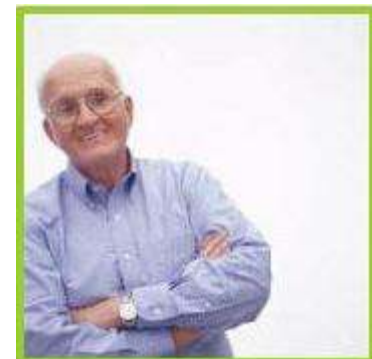
8 He observes the IMS regions over time, watching the **Connection Count** increase while the **Idle Time** and **Connections in Backlog** remain in a normal range.

Friday:	IMSBYCON	0.50	227	140	140	0
Monday:	IMSBYCON	0.50	1228	1000	1000	0

9 He again contacts the IMS systems programmer.

By now, 1000+ connections are open, but not performing any work.

They determine that connections are being opened that are not being closed. The recycle IMS server to relieve the problem and the IMS programmer further investigates the IMS region.



Scenario C: Congested OSA Interface

The setting:

A systems programmer needs to quickly identify whether one OSA is processing a significantly higher volume of traffic than the other OSA on LPAR SP12. Traffic should be evenly distributed between the two OSA ports.

Congested OSA interface ...

1

File Edit View Tools Options Help 10/29/2012 16:01:58
 Command ==> KN3IFS03 Enterprise OSA Interfaces Overview Auto Update : Off
 TCP STC : *
 SMF ID : *

OSA Interface Statistics

System ID	Interface Name	ΔBandwidth Util	Bytes Recv or Xmitd	Δ% Packets in Error	% In Pkts in Error
SP22	TCPIPLINK	0	1.6M	0	0
		0	1.2M	0	0
		0	783.9K	0	0
		0	70.8K	0	0
		0	382.3K	0	0
_SYS	TCPIPLINK	0	23.2M	0	0

He views the OSA Interface Status subpanel to ensure that the **Interface Status** is Active.

OSA Interface Status

ΔSystem ID	Interface Name	ΔInterface Status	ΔActual MTU	Device or Datapath	+Duplicate Addr Coun
SP22	TCPIPLINK	Active	8992	Active	0
SP12	TCPIPLINK	Active	8992	Active	0
SP13	TCPIPLINK	Active	8992	Active	0
SYSL	TCPIPLINK	Active	8992	Active	0
SP12	TCPIPLINK	Active	8992	Active	0
SYS	TCPIPLINK	Active	8992	Active	0

OSA Interface Write Queue Statistics

ΔSystem ID	Interface Name	ΔQueue Priority	ΔMax Staging Queue Depth	ΔUsed VSBALs	ΔMax Active VSBALs
SP22	TCPIPLINK2	4	0	6	1
SP22	TCPIPLINK2	3	0	0	0

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Congested OSA interface ...

File Edit View Tools Option

Command ==>
KN3IFS03

Enterprise OSA Interfaces Overview

OSA Interface Statistics

Columns 3 to 6 of 26

System ID	Interface Name	ΔBandwidth Util	Bytes Recvd or Xmitd	Δ% Packets in Error	% In Pkts in Error
— SP22	TCPIPLINK	0	1.6M	0	0
— SP13	TCPIPLINK	0	1.2M	0	0
— SP12	TCPIPLINK	0	783.9K	0	0
— SP12	TCPIPLINK	0	70.8K	0	0
— SYSL	TCPIPLINK	0	382.3K	0	0
— SYS	TCPIPLINK	0	23.2M	0	0

He reviews the values in the OSA Interface Statistics subpanel for the **Bytes Recvd or Xmitd** and determines that one OSA is transmitting and receiving significantly more traffic than the other OSA.

3 He issues a D TCPIP OMP RTTABLE command to display the main OMPROUTE table and determines that a first hop switch is congested for the non-productive OSA.

He contacts the enterprise networking team to resolve.

Scenario D: TN3270 connectivity problems

The setting:

A user has reported a problem accessing a 3270 application using a TN3270 session. Since the enterprise has more than 10,000 TN3270 connections, systems programmers cannot chase down individual connection issues.

However, after more users call with a similar complaint, a systems programmer starts to investigate.

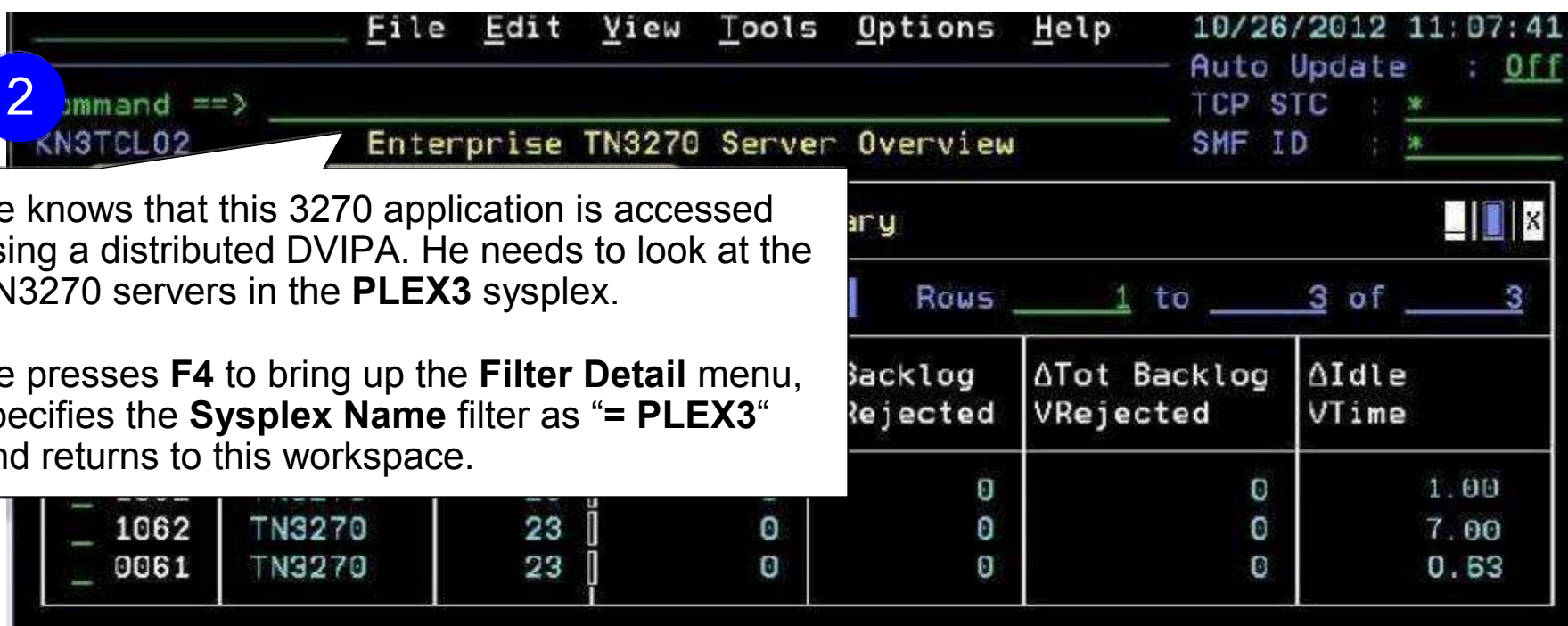
TN3270 connectivity problems ...

- 1 He navigates to the **Enterprise TN3270 Servers Overview** workspace

- 2

He knows that this 3270 application is accessed using a distributed DVIPA. He needs to look at the TN3270 servers in the **PLEX3** sysplex.

He presses **F4** to bring up the **Filter Detail** menu, specifies the **Sysplex Name** filter as "**= PLEX3**" and returns to this workspace.



The screenshot shows the 'Enterprise TN3270 Server Overview' workspace. At the top, there is a menu bar with 'File', 'Edit', 'View', 'Tools', 'Options', and 'Help'. The date and time are '10/26/2012 11:07:41'. Below the menu bar, there are status indicators: 'Auto Update : Off', 'TCP STC : *', and 'SMF ID : *'. The main area displays a table with columns for 'Backlog Rejected', 'ΔTot Backlog VRejected', and 'ΔIdle VTime'. The table has 3 rows, with the first two rows showing data for TN3270 servers.

Backlog Rejected	ΔTot Backlog VRejected	ΔIdle VTime
0	0	1.00
0	0	7.00
0	0	0.63

TN3270 connectivity problems ...

```

File Edit View Tools Options Help 10/26/2012 11:07:41
Auto Update : Off
TCP STC : *
SMF ID : *
Command ==>
KN3TCL02 Enterprise TN3270 Server Overview
  
```

TN3270 Server Summary						
ΔSystem VID	ΔJob VName	ΔLocal VPort	ΔConn in VBacklog	ΔBacklog VRejected	ΔTot Backlog VRejected	ΔIdle VTime
_ 0061	TN3270	23	0	0	0	0.63

Columns 4 to 7 of 20 Rows 1 to 3 of 3

3

He observes that the TN3270 server has no **Connections in Backlog** and no **Backlog Connections Rejected**.

4

ΔIdle VTime
0.63

The **Idle Time Since Last Accept** is less than 10 minutes, so the server has accepted new connections recently.

TN3270 connectivity problems ...

ΔSystem VID	ΔJob VName	ΔLocal VPort	ΔConn in VBacklog	ΔBacklog VRejected	ΔTot Backlog VRejected	ΔIdle VTime
_ 0061	TN3270	23	0	0	0	0.63

5

He positions the cursor on the action field to the left of the row and presses **Enter** to navigate to the default **Active TN3270 Connections for Port Port_Number** workspace.

6

No active sessions have remote IP addresses in the same subnet as the users reporting the problems.

```

File Edit View Tools Options Help 10/26/2012 11:12:17
Auto Update : Off
TCP STC : TCPIP
SMF ID : 0061
TN3270 Connections for Port 23
Server Session Connections Summary
  
```

7

He types an **A** in the action field to navigate to the **TN3270 Connections for Port Port_Number** workspace

ΔAvg Tot VResp Time	Avg IP Resp Time	Avg SNA Resp Time	Avg Trans Count
0.001s	0.001s	0.000s	0

TN3270 connectivity problems ...

```

File Edit View Tools Options Help 10/26/2012 15:45:44
Auto Update : Off
Command ==> TCP STC : TCPIP
KN3TNAS2 TN3270 Server Connections for Port 23 SMF ID : 0061
  
```

8

To view only closed sessions, he adds a filters on **Session Indicator** with a value of 2.

TN3270 Server Session Connections Summary		Columns 9 to 12 of 19	Rows
Remote IP Address	Session End	Total Rec	
9.42.9.247	12/10/26 15:05:05	598	5.5K
9.42.8.178	12/10/26 14:53:59	624	5.6K
9.42.8.191	12/10/26 14:29:45	528	4.9K
9.42.8.221	12/10/26 14:28:49	219	7.9K
9.42.8.221	12/10/26 14:28:37	308	1.8K
9.27.132.250	12/10/26 14:28:37	810	10.9K
9.27.132.250	12/10/26 13:43:15	754	6.9K
9.27.132.250	12/10/26 13:42:31	589	5.1K

TN3270 Server Sessionless Connections Summary

Friday October 26 2012 MOREV

MA B 01/002

TN3270 connectivity problems ...

9

He determines that some closed sessions have remote IP addresses in the reported subnet, but all of those connections ended more than an hour ago.

This is likely a router issue. He contacts network support.

File Edit View To

Command ==> KN3TNAS2 TN3270 Server Conn

TN3270 Server Session Co

Columns 9 to 12 of 19

Remote IP Address	Session End	Tot Bytes Received	Tot Bytes Sent	+Tota Byte
9.42.9.247	12/10/26 15:05:05	598	5.5K	
9.42.8.178	12/10/26 14:53:59	624	5.6K	
9.42.8.191	12/10/26 14:29:45	528	4.9K	
9.42.8.221	12/10/26 14:28:49	219	7.9K	
9.42.8.221	12/10/26 14:28:37	308	1.8K	
9.27.132.250	12/10/26 14:28:37	610	10.9K	

TN3270 Server Sessionless Connections Summary

Columns 9 to 12 of 18 Rows 1 to 3 of 3

Friday October 26 2012 MOREV

01/002

Scenario E: Determining stack health using throughput

The setting:

A network systems programmer needs to identify issues with the throughput of network traffic through the z/OS TCP/IP stacks in the enterprise.

She is notified of slow network performance on one or more systems. These problems do not appear to be associated with any particular application

Determining stack health using throughput



1 He starts at the **Enterprise Summary** workspace for all installed OMEGAMON agents.

ΔQMgr ▽Name	Host Name	ΔQMgr ▽Status	Initiator	Server
Q723	SP22	Running	Running	Running
Q722	SP22	Running	Running	Waiting
Q7G6	SYS	Running	Running	Waiting
Q7G5	SYS	Running	Running	Waiting
Q7G4	SYS	Running	Running	Waiting

2 He types **t** and presses **Enter** to navigate to the **Enterprise TCPIP Stack Performance Overview** workspace.

ΔSystem VID	ΔJob ▽Name	0	0	0	0	0	0	0	0
SP22	CVTZ5	0	0	0	0	0	0	0	0
SP22	TSS1C	0	0	0	0	0	0	0	0
SP22	M5GBH	0	0	0	0	0	0	0	0
SP22	Q1D0M	0	0	0	0	0	0	0	0
SP22	\$22SDSST	0	0	0	0	0	0	0	0
SP22	N3D0AG22	0	0	0	0	0	0	0	0
SP22	\$TN22	0	0	0	0	0	0	0	0
SP22	TSS0DSHA	0	4	0	0	0	0	0	0

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. I Enterprise Interfaces Overview
6. O Enterprise OSA Interfaces Overview
7. H Enterprise HiperSocket Interfaces Overview
8. P Enterprise OSA Express Ports Overview
9. B Enterprise OSA Express Channels Overview
10. T Enterprise TCPIP Stack Performance Overview
11. M Enterprise Memory and CSM Storage Overview
12. R Command and Response Log

Determining stack health using throughput



...

He reviews the **IP Layer Metrics**. There are no datagrams discarded.

10/24/2012 09:13:36
 Auto Update : Off
 TCP STC : *
 SMF ID : *

Enterprise TCPIP

IP Layer Metrics

Columns 3 to 7 of 16 Row 1 to 6 of 6

System ID	TCPIP STC Name	ΔInput Discard	% Input Discard	ΔOutput Discard	% Output Discard	Total No Route
SP22	TCPIP22	0	0	0	0	0
SP22	TCPIP22	0	0	0	0	0
SYSL	TCPIPL	0	0	0	0	0
SYSL	TCPIPL	0	0	0	0	0
SP13	TCPIP13	0	0	0	0	0
SP13	TCPIP13	0	0	0	0	0

4 The **TCP Layer Metrics** subpanel reveals that there have been segments retransmitted and out of order segments on LPAR SP13.

TCP Layer Metrics

Rows 1 to 3 of 3

ID	STC Name	ΔTot Segs OutOfOrder	Total Output Window Probes	ΔTot Segs Retrans	ΔTot Retrans
SP22	TCPIP22	0	0	3.9K	
SYSL	TCPIPL	0	0	1.1K	
SP13	TCPIP13	1	0	6.2K	

Determining stack health using throughput

...

5 Scrolling to the right, he notices that **Total Out of Order Segments** is growing.

System ID	TCPIP STC Name	ΔTot Drops ∇Retrans	ΔTot Segs ∇OutofOrder	ΔReceive ∇Seg Rate	ΔTransmit ∇Seg Rate	+Tot Recv Segments
SP22	TCPIP22	504	28	961	1013	3.4M
SYSL	TCPIPL	113	881	1.1K	985	1.8M
SP13	TCPIP13	3.9K	17	713	768	2.4M

6 He types / and presses **Enter** next to **SP13** to display the **Options Menu**.

He types I and presses **Enter** to navigate to the **TCPIP Stack IP Performance Details** workspace

7

```

Options Menu
Select an option and then press ENTER
1. E Enterprise Network Workspaces
2. I TCPIP Stack IP Performance Details
3. T TCPIP Stack TCP Performance Details
4. S Enterprise TCPIP Stack Memory and CSM Overview
    
```

Determining stack health using throughput

```
File Edit View Tools Options Help 10/24/2012 09:32:48
Command ==>
KN3GICD2 TCPIP Stack IP Performance Details Auto Update : Off
TCP STC : TCPIP3 SMF ID : SP13

IPv4 Layer Discards and Errors
Input Discard..... 0 Output Discard..... 0
% Input Discard..... 0 % Output Discard..... 0
Tot In Datagrams Discard.. 0 Tot Out Datagrams Discard.. 0
Tot Input Discard %..... 0 Tot Output Discard %..... 0
Tot No Route..... 0 Total Output No Routes... 0
Total Header Errors..... 0 Errors
Tot Unknown Protocol Err.. 0 ors... 0
Tot In Discard for Memory. Memory 0
Total Frame Unpack Errors. Asynch 0
Total Device Layer Calls.. Synch. 0

IPv4 Layer Reassemblies and Fragmentations
Tot Reassemblies Req'd.... 47.1K Tot Fragmentations Req'd... 0
Total Reassemblies..... 24.3K Total Fragmentations..... 0
Total Reassembly %..... 0 Total Fragmentation %..... 0
Total Reassembly Failures. 0 Tot Fragmentation Failures 0
Tot Reassembly Failure %.. 0 Tot Fragmentation Failure% 0
Total Reassembly Timeouts. 0 Tot Fragmentation Creates. 0

IPv4 Layer Performance
Datagram Recv Rate..... 1.3K
Tot Recv Datagrams..... 3.1M
Tot Delivered Datagrams... 3.3M Tot Out Fwd Datagrams... 0
Total Input zIIP Packets.. 0 Total Output zIIP Packets. 0
Fwd Datagrams..... 0

Discard..... 0
Tot Discard..... 0
Tot In Datagrams Discard.. 0 Tot Out Datagrams Discard.. 0
```

8

He views the IPv4 Layer Reassemblies and Fragmentations subpanel. There have been a number of reassemblies, but no failures.

9

There have been no fragmentations

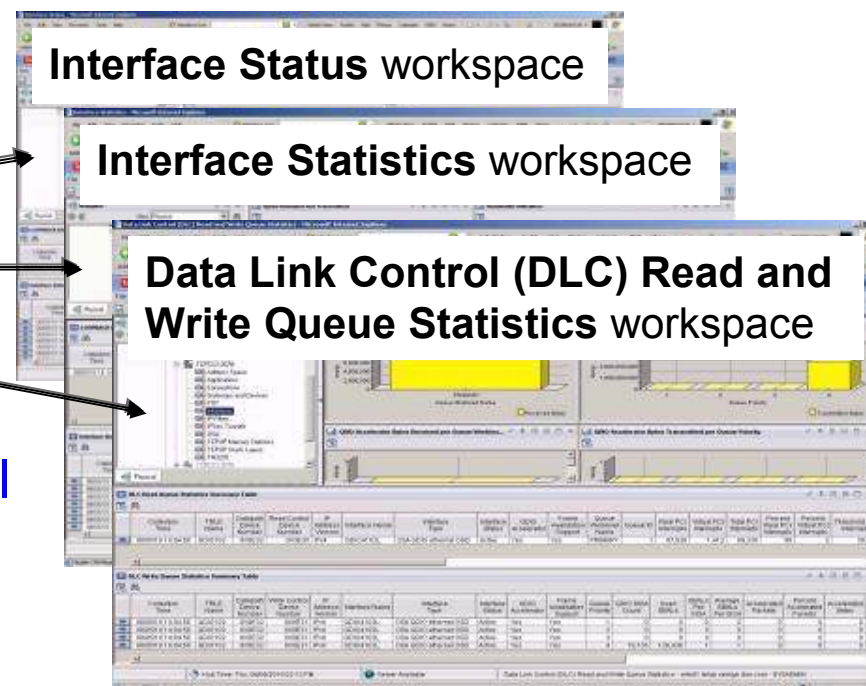
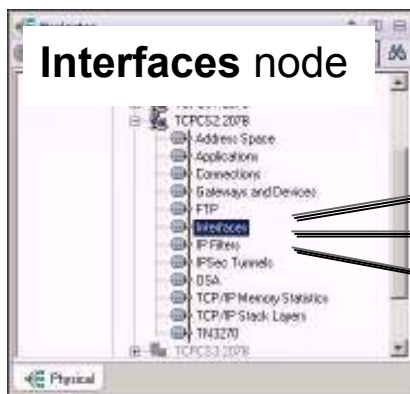
10

He determines that a configuration error on another system is causing the high number of reassemblies in the IPv4 layer. He corrects the error and confirms that the reassemblies stop.

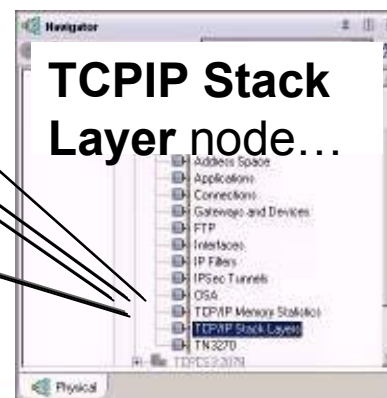
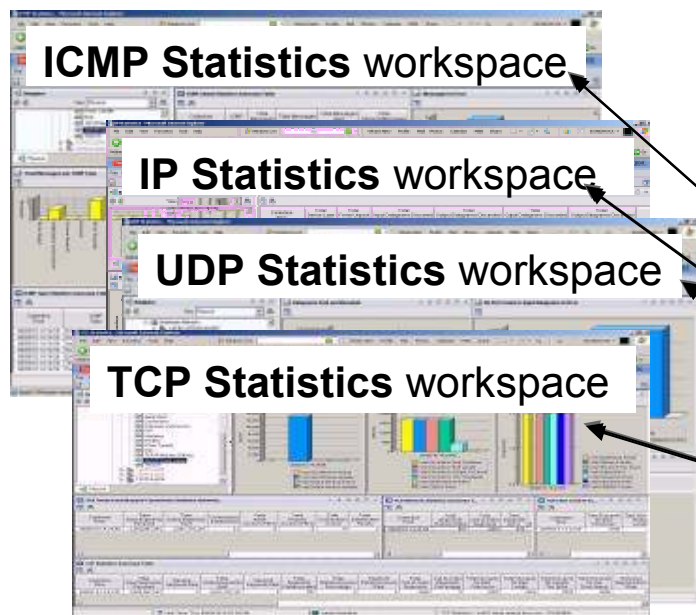
Improved Diagnostics and decreased CPU utilization

Source changed:

- Old: SNMP
- New: Callable NMI



Additional data collected



Complete your sessions evaluation online at SHARE.org/SanFranciscoEval

Improved Diagnostics and decreased CPU utilization

Gateways:

Gateways (Routing table) collected via IOCTL

- Lower CPU
- Reduce SNMP

Additional and improved routing information

Collection Time	Network Address	First Hop	Link or Interface Name	Subnet Mask	Subnet Value	Link or Interface Status	Route Status	Route Type	MTU Value	Dynamic Route	Network Route	IP Version
08/05/10 13:54:56	172.17.0.0	<direct>	LCS4102L	255.255.0.0	172.17.0.0	Ready	Active	ICMP	1500	Yes	Yes	IPv4
08/05/10 13:54:56	127.0.0.1	<direct>	LOOPBACK	HOST	127.0.0.1	Ready	Active	Static	65535	No	No	IPv4
08/05/10 13:54:56	10.62.0.0	<direct>	IUTIQDFEL	255.255.255.0	10.62.0.0	Ready	Active	Static	8192	No	Yes	IPv4
08/05/10 13:54:56	10.93.2.2	<direct>	HO...				Active	Static	576	No	No	IPv4
08/05/10 13:54:56	10.11.7.2	<direct>	MPC4172L				Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.12.1.2	<direct>	MPC4212L				Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.11.3.2	<direct>	MPC4132L				Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.11.1.2	<direct>	MPC4112L				Inactive	Static	0	No	No	IPv4
08/05/10 13:54:56	10.11.2.7	<direct>	MPC4172L				Inactive	Replaceable Static	4096	No	No	IPv4

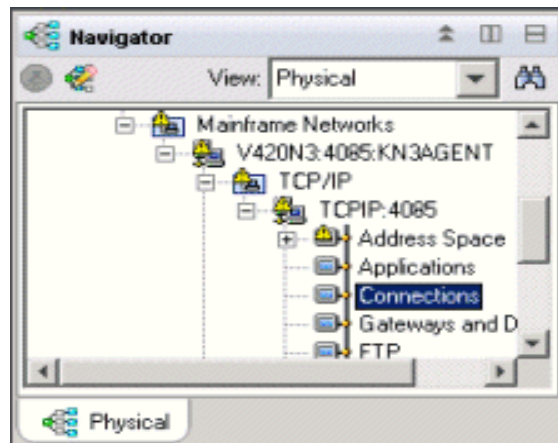
Dynamic Virtual IP Addresses (DVIPAs) reported in Gateways (formerly in Interfaces) table

OSA-Express:

- Speed diagnosis of OSA and interface problems by following links from OSA to Gateways or Interfaces workspaces
- Each instance of the monitoring agent does not need to collect OSA data for each instance of the monitoring agent in your environment
 - Collect OSA performance statistics from a single LPAR that is sharing the OSA adapter
 - OSA is the only data that is collected via SNMP. You may choose not to configure or run the SNMP daemon on systems where you do not collect OSA data

Improved Diagnostics and decreased CPU utilization

From **Connections** node...



- Connections
- UDP Endpoints
- TCP Listeners
- TCP Connections
- Application Connections
- Application UDP Endpoints
- Application TCP Listeners
- Application TCP Connections
- TCP Connections Link

Improve overall TCP/IP performance with additional visibility:

- Monitoring the sent and received data queued for TCP connections
- Monitoring Application Transport–Transport Layer Security (AT-TLS)
- Defining the Local Port attribute numerically (sorting)
- Displaying connection state for all connection types
- Enabling the remaining Connections node workspaces for product-specific Take Action commands

Support for zEnterprise mainframe server improves application availability

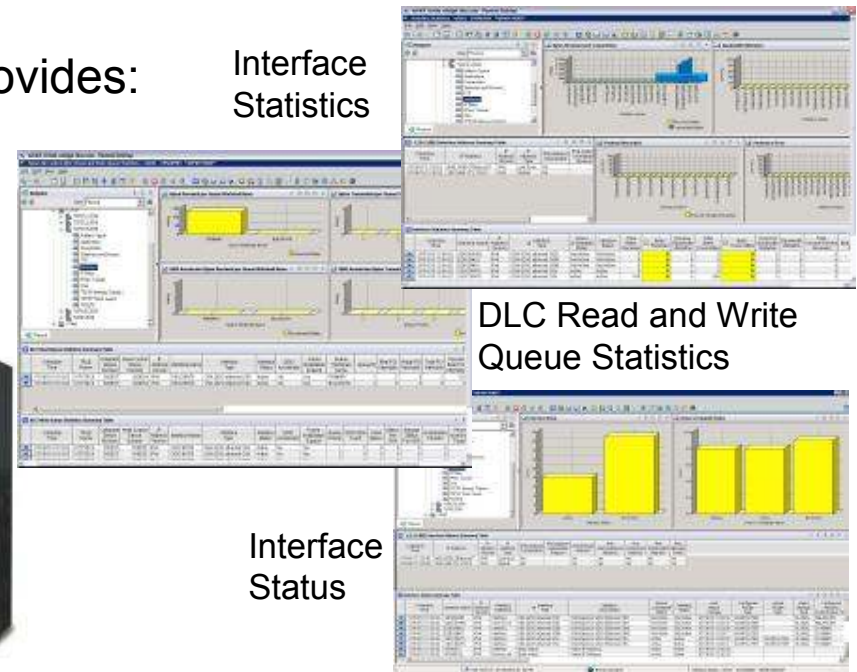


OMEGAMON XE for Mainframe Networks provides:

Interface Statistics

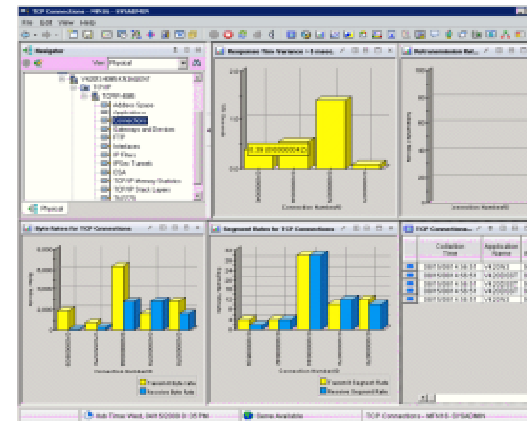
Visibility into the zEnterprise IntraNode Management Network (INMN) and zEnterprise IntraEnsemble Data Network (IEDN)

- Isolate and analyze traffic flowing over zEnterprise private networks



Visibility into z/OS applications and connections using the new zEnterprise Management Network with performance metrics that are useful in debugging problems

- Filter on Outbound Interface Name to show connections using the new INMN and IEDN interfaces



Complete your sessions evaluation online at SHARE.org/SanFranciscoEval



Improved resource usage with more control over data collection

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

Specify the following global information:

OSA Statistics Collection:          ==> Y (Y,N)
Interface Statistics Collection:    ==> Y (Y,N)
Interface Data Link Control Statistics Collection: ==> Y (Y,N)
TCP/IP Stack Layer Statistics Collection: ==> Y (Y,N)
```

Configuration Tool

The ability to turn data collection on and off is now available for the following types of data (at system and stack level):

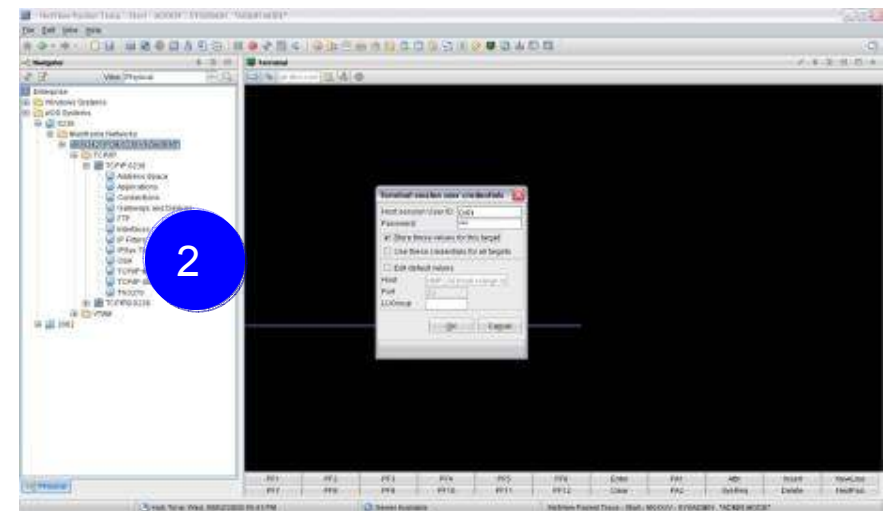
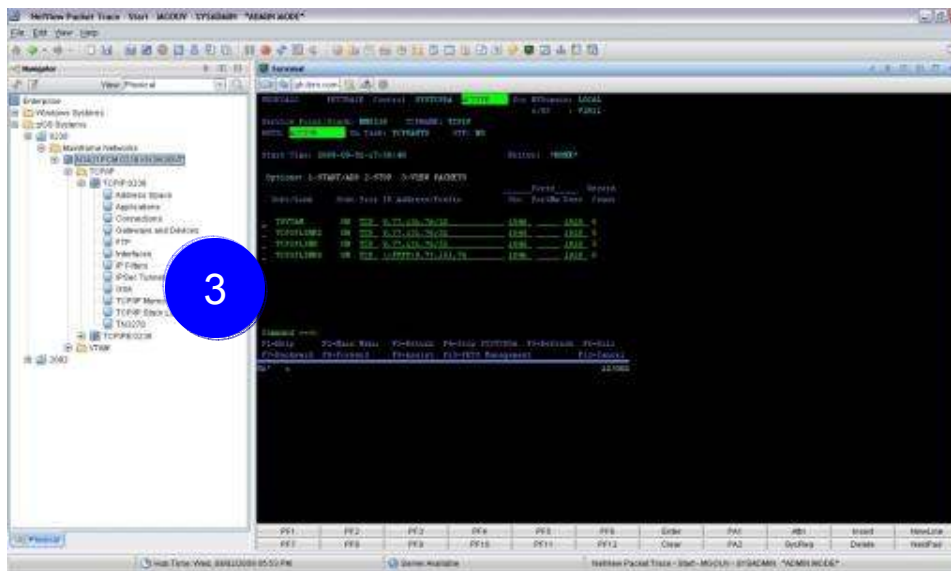
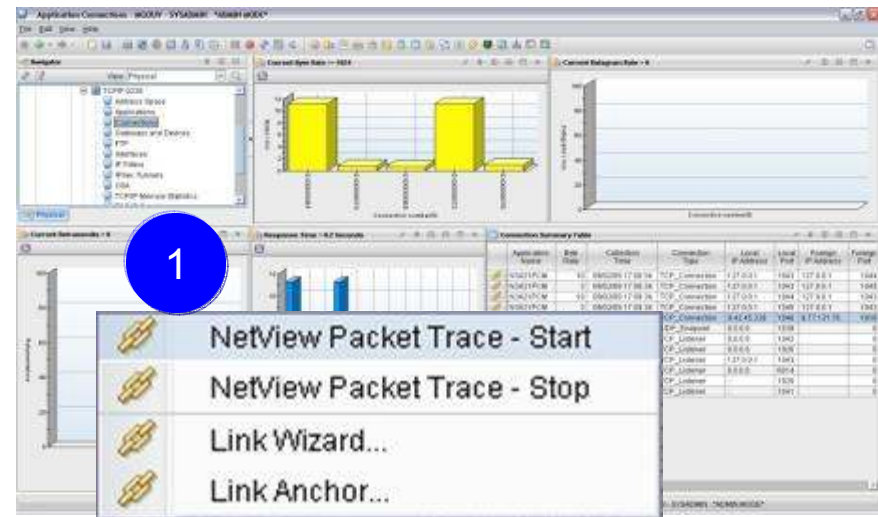
- OSA Statistics
- Interface Statistics
- Data Link Control (DLC) Read and Write Queue Statistics
- Stack Layer Statistics

- Four new attributes for the four new configurable data collection options:

TCP Collector Status										
Connections And Applications Collection	IP Security Collection	OSA Statistics Collection	Stack Layer Statistics Collection	Interface Statistics Collection	Data Link Control Statistics Collection	Routing Table Collection	Routing Table Collection Frequency	TN3270 Server Collection	TN3270 Data Display Interval	F- Colle
Yes	Yes	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes
Yes	No	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes
Yes	No	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	10	Yes	2	Yes

Greater synergy with IBM Tivoli NetView for z/OS

- Launch in context to start or stop a NetView packet trace
 1. Select TCP connection to trace
 2. Logon to NetView
 3. View packet trace definitions after link script completed

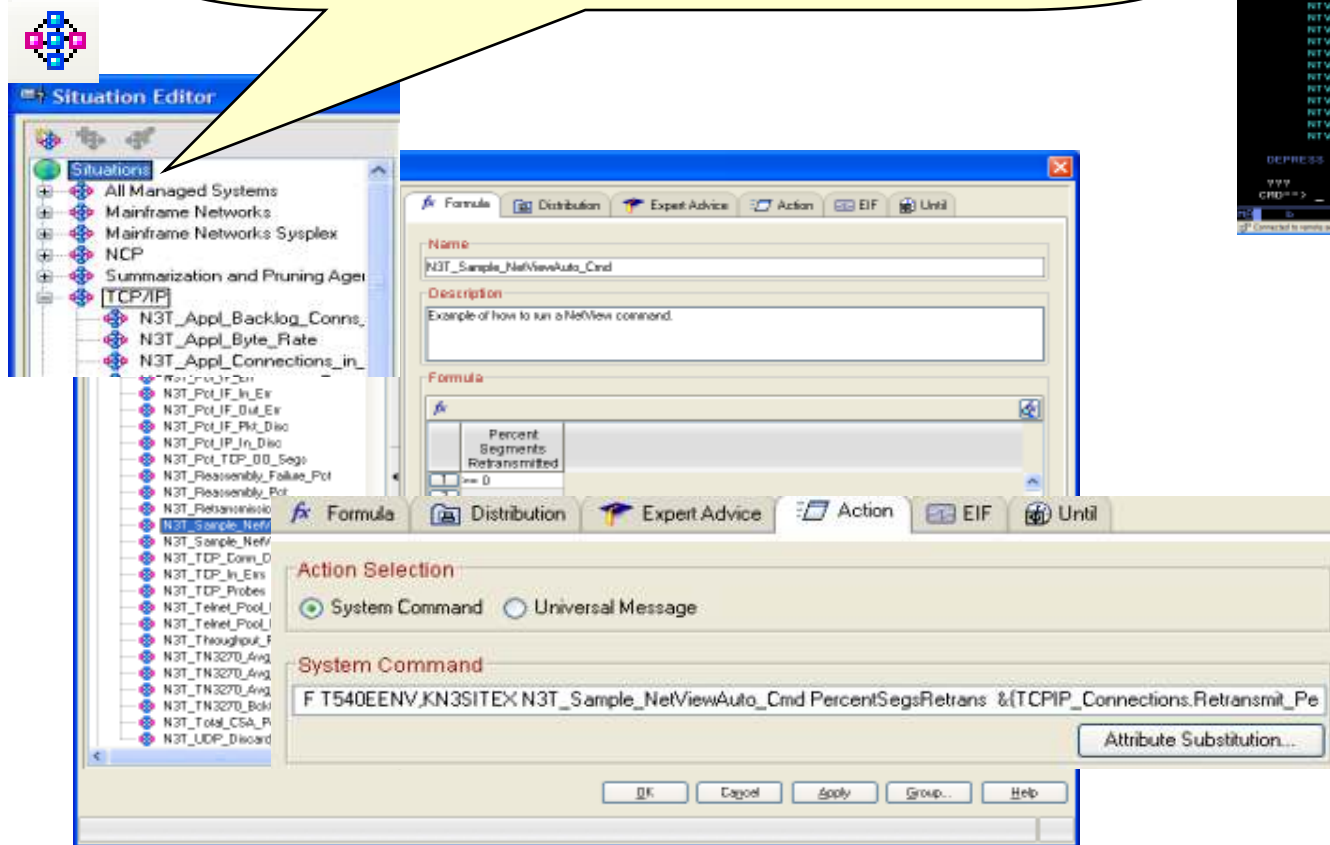
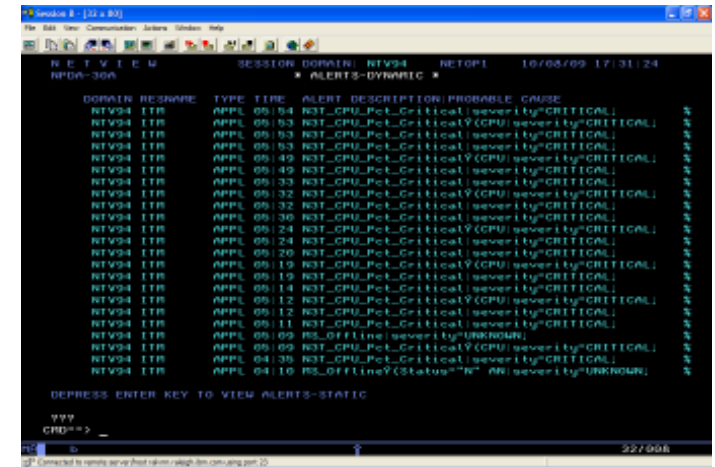


Complete your sessions evaluation online at SHARE.org/SanFranciscoEval

Greater synergy with IBM Tivoli NetView for z/OS

Sample situations trigger NetView for z/OS automation

- Execute command in NetView address space
- Send situation information in message

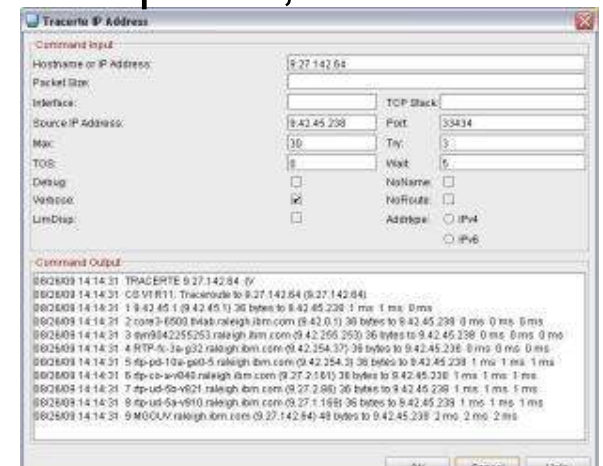
- Sample NetView for z/OS automation
- Recognize messages
 - Recognize situation events
 - Parse message text
 - Parse Situation event

Improved management through additional Take Action commands

- NSLookup and Tracerte added to Ping and Drop
- Available for Connections, TCP Connections, UDP Endpoints, TCP Listeners, and TN3270 Server Sessions

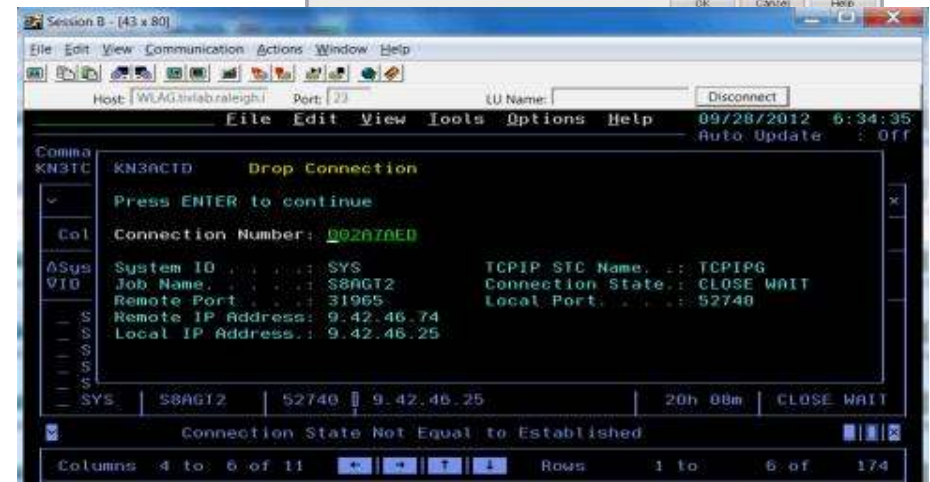
TEP Scenario:

- Situation alert created when connection experiences slow response time
- SME navigates to Connections workspace and sees high retransmission rate for a connection
- Is there high congestion in the network?
- Right clicks on the row for connection and choose Tracerte to display Tracerte dialog.
- Issues Tracerte to understand route between the two hosts and if router that is not working

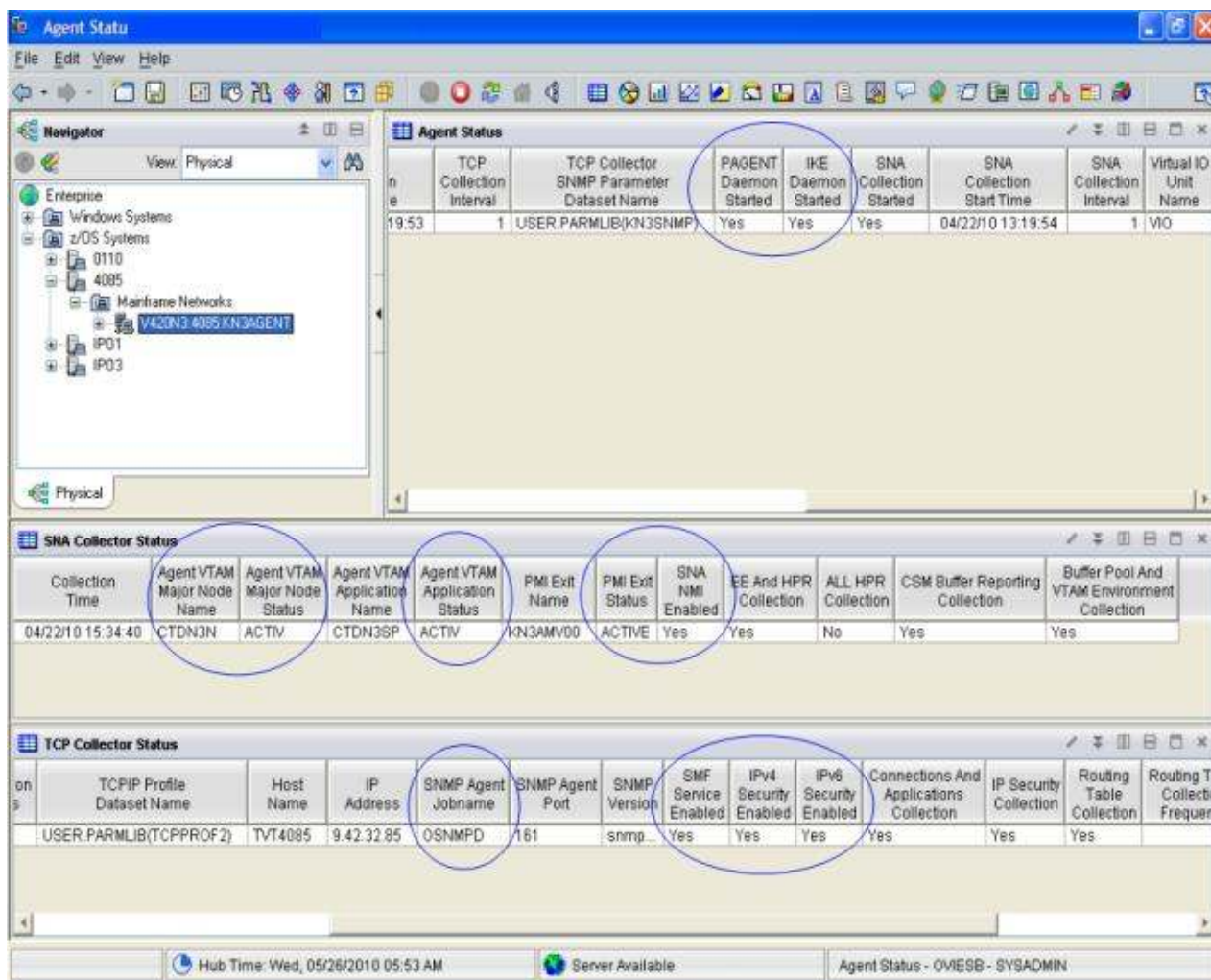


Enhanced 3270 Scenario:

- Situation alert created when connection experiencing slow response time
- SME navigates to Application TCP Listeners and Connections workspace and identifies connection
- SME types the "/" option to display a list of options
- Types "D" to display the Drop dialog
- Issues Drop and verifies connection dropped



Improved troubleshooting of data collection problems



The screenshot displays the 'Agent Status' workspace with the following data tables:

Agent Name	TCP Collection Interval	TCP Collector SNMP Parameter Dataset Name	PAGENT Daemon Started	IKE Daemon Started	SNA Collection Started	SNA Collection Start Time	SNA Collection Interval	Virtual IO Unit Name
19:53	1	USER.PARMLIB(KN3SNMP)	Yes	Yes	Yes	04/22/10 13:19:54		1 VIO

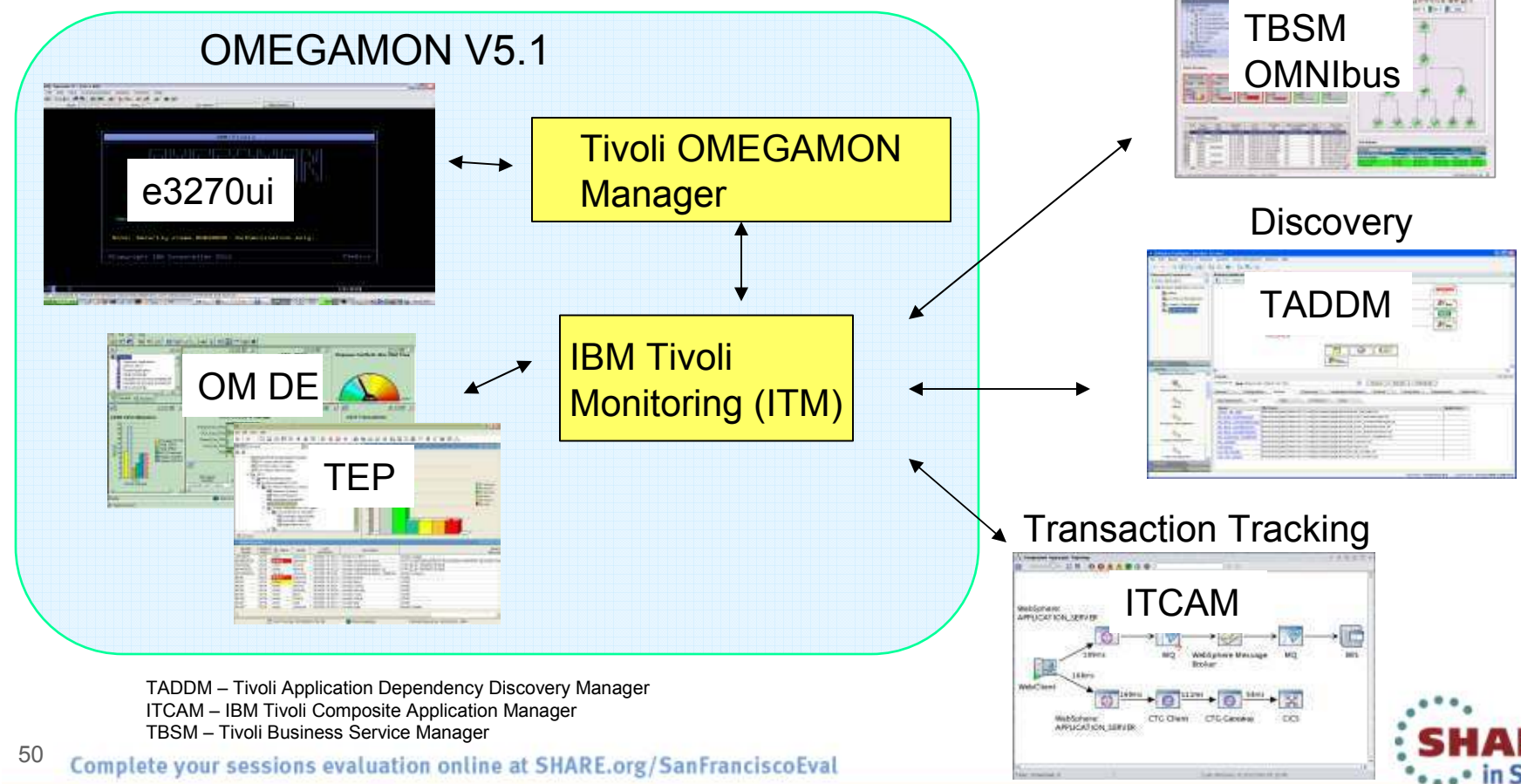
Collection Time	Agent VTAM Major Node Name	Agent VTAM Major Node Status	Agent VTAM Application Name	Agent VTAM Application Status	PMI Exit Name	PMI Exit Status	SNA NMI Enabled	EE And HPR Collection	ALL HPR Collection	CSM Buffer Reporting Collection	Buffer Pool And VTAM Environment Collection
04/22/10 15:34:40	CTDN3N	ACTIV	CTDN3SP	ACTIV	KN3AMV00	ACTIVE	Yes	Yes	No	Yes	Yes

TCPIP Profile Dataset Name	Host Name	IP Address	SNMP Agent Jobname	SNMP Agent Port	SNMP Version	SMF Service Enabled	IPv4 Security Enabled	IPv6 Security Enabled	Connections And Applications Collection	IP Security Collection	Routing Table Collection	Routing Table Collection Frequency
USER.PARMLIB(TCPPROF2)	TVT4085	9.42.32.85	OSNMPD	161	snmp	Yes	Yes	Yes	Yes	Yes	Yes	

- Agent Status workspace provides configuration and status information about the agent and its data collectors.
- Troubleshoot data collection problems resulting in missing or incomplete data
 - After an install or upgrade
 - After the agent has been running for some time
- New attributes display status of data collection interfaces

OMEGAMON integrates within a total System z Business Service Management solution

OMEGAMON Portfolio provides performance and availability visibility for System z events and data consumed by a set of Tivoli BSM products



TADDM – Tivoli Application Dependency Discovery Manager
 ITCAM – IBM Tivoli Composite Application Manager
 TBSM – Tivoli Business Service Manager

Business success is directly dependent on the health of underlying IT systems, applications, and networks



- Complexity of today's enterprise environments demands solutions that integrate across the enterprise
- IBM in unique position to deliver monitoring and management solutions across enterprise subsystems, including mainframe network
- IBM Tivoli OMEGAMON XE for Mainframe Networks V5.1 key to system and network availability and performance, providing Visibility, Control, and Automation

Tivoli System z Sessions at SHARE



Tuesday

- 9:30 12617: What's New with System z Monitoring with OMEGAMON
- 11:00 12789: OMEGAMON v5 Enhanced 3270 Hands-on Lab
- 1:30 12616: Speeding Performance Problem Solving by Breaking Down Silo Domain Views on Your z/OS Systems
- 4:30 12780: Understanding The Impact Of The Network On z/OS Performance

Wednesday

- 11:00 12880: Automated Performance Management Using IBM Tivoli: Techniques And Best Practices
- 1:30 12779: What's New for z/OS Network Performance Monitoring with OMEGAMON
- 4:30 12781: Using NetView for z/OS for Enterprise-Wide Event Management and Automation
Golden Gate 4

Thursday

- 8:00 12901: Managing the Mainframe From an End-to-End Perspective Golden Gate 6
- 9:30 12774: Get Up and Running With NetView IP Management Golden Gate 3
- 9:30 12791: Improve Service Levels with Enhanced Data Analysis Golden Gate 6
- 11:00 12790: Learn How to Leverage System z in Your Cloud Golden Gate 6

Session 12799

What's New for z/OS Network Performance Monitoring with OMEGAMON

Dean Butler
(butlerde@us.ibm.com)



Reference Materials

Product Documentation



- OMEGAMON XE information Center:
<http://pic.dhe.ibm.com/infocenter/tivihelp/v15r1/index.jsp>
- IBM Tivoli OMEGAMON XE for Mainframe Networks:
 - Planning and Configuration Guide, **SC27-4447**
 - New* Enhanced 3270 User Interface Guide, **SC27-4450**
 - Tivoli Enterprise Portal User's Guide, **SC27-4446**
 - Troubleshooting Guide, **SC27-4448**
 - Parameter Reference, **SC27-4449**
- IBM Tivoli OMEGAMON XE and Tivoli Management Services on z/OS:
Common Planning and Configuration Guide: **SC23-9734**
- New* IBM Tivoli OMEGAMON XE and Tivoli Management Services: Enhanced
3270 User Interface Guide: **SC22-5426**

Technotes



- OMEGAMON XE for Mainframe Network v5.1.0 GA technote:
 - <http://www.ibm.com/support/docview.wss?uid=swg21614258>
- High Availability z/OS Hub TEMS support Technote
 - <http://www-01.ibm.com/support/docview.wss?uid=swg21326770>
- Troubleshooting no data conditions on the OMEGAMON Enhanced 3270 User Interface
 - <http://www-01.ibm.com/support/docview.wss?uid=swg21610269>

Community, Forum, Wiki



- OMEGAMON XE for Mainframe Networks Community/Forum Support Site:
 - <http://www-01.ibm.com/software/sysmgmt/products/support/R118663G41228S30-community.html>
- Tivoli System z Monitoring and Application Management:
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