

# Managing Your OS/390 or z/OS TCP/IP Stack and Environment

*Session 150*

*Laura Jeanne Knapp*

*IBM Technical Evangelist*

919-224-2205

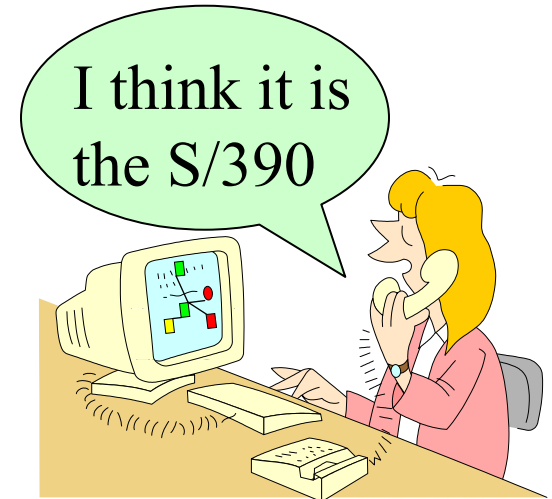
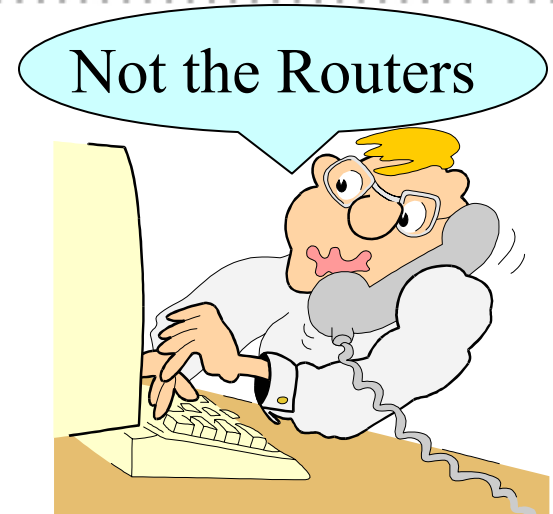
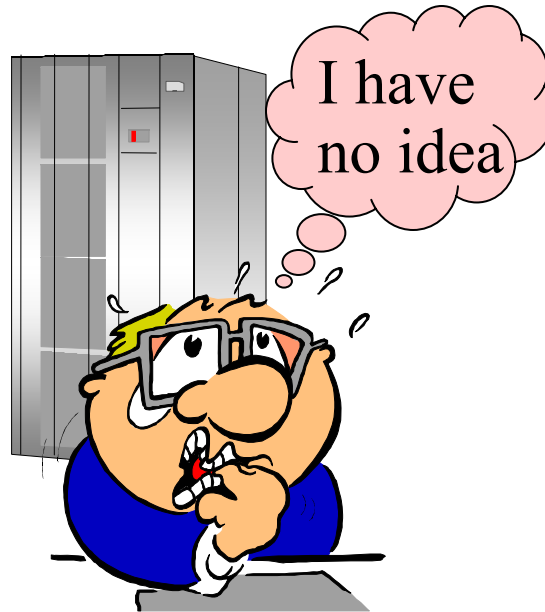
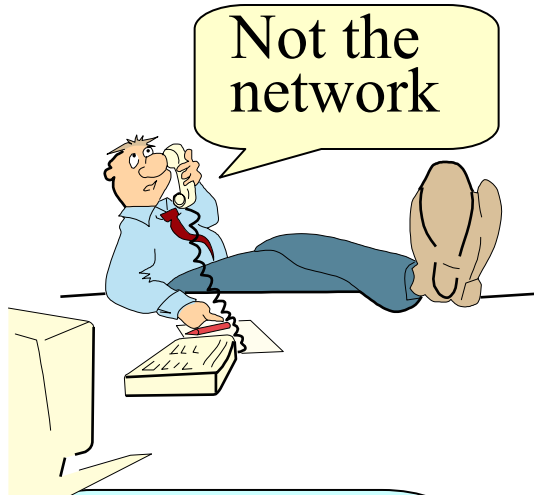
[ljknapp@us.ibm.com](mailto:ljknapp@us.ibm.com)

**Business Impact  
Management**

**Event Correlation and  
Automation**

**Monitor Systems and  
Applications**

# TCP/IP Problem Isolation – The Real Problem



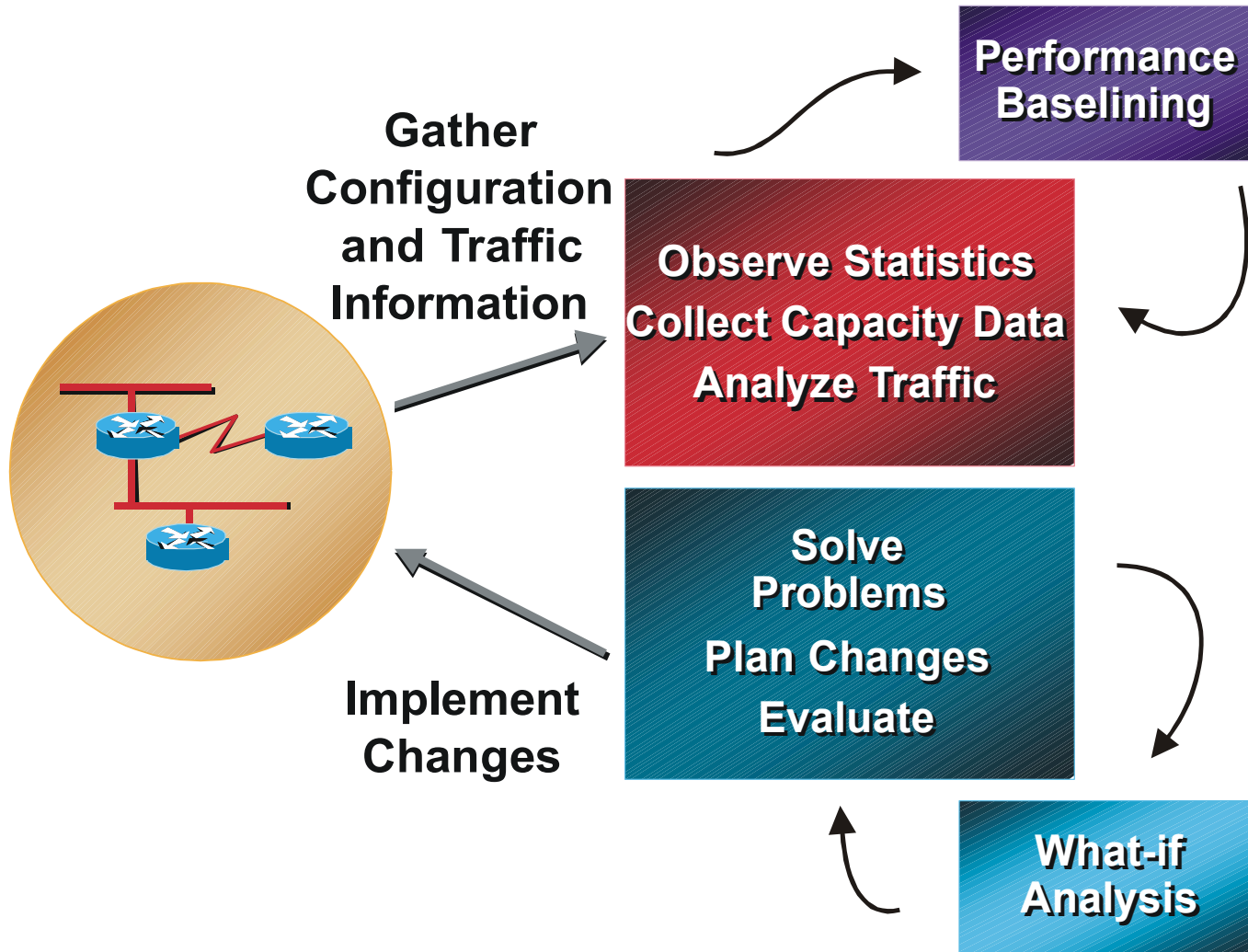
# Common S/390 TCP/IP Problems

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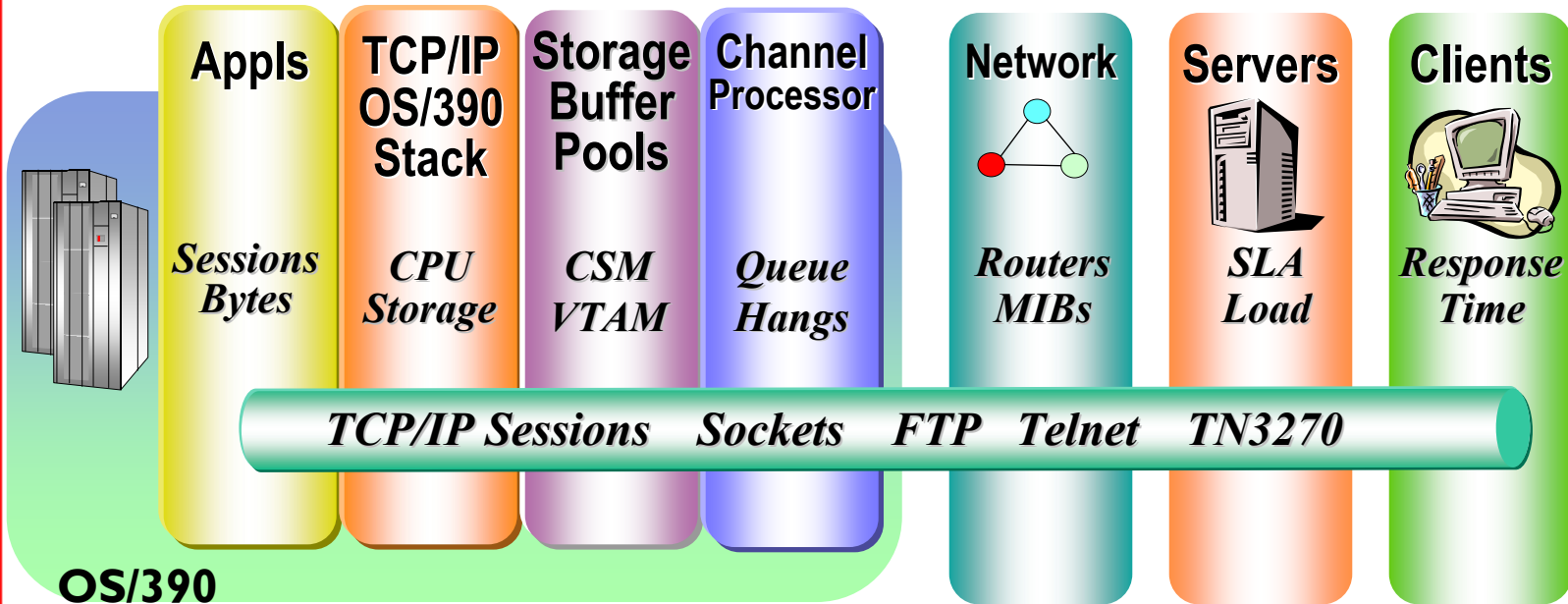
- IBM TCP/IP OS/390 (Communications Server)
- Cisco CIP attached boxes
- FTP problems, failures, timeouts
- OS/390 Performance problems
- Long problem resolution times for network problems
- Unauthorized users doing large FTPs
- Common OS/390 and Distributed problems
- Critical remote printers
- Network Service Levels
- Have no idea of the overall health of the network
- Channel problems



# Effective Performance Management

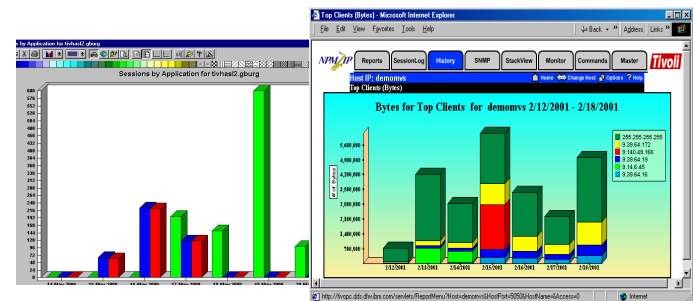


# Tivoli NPM/IP - End to End

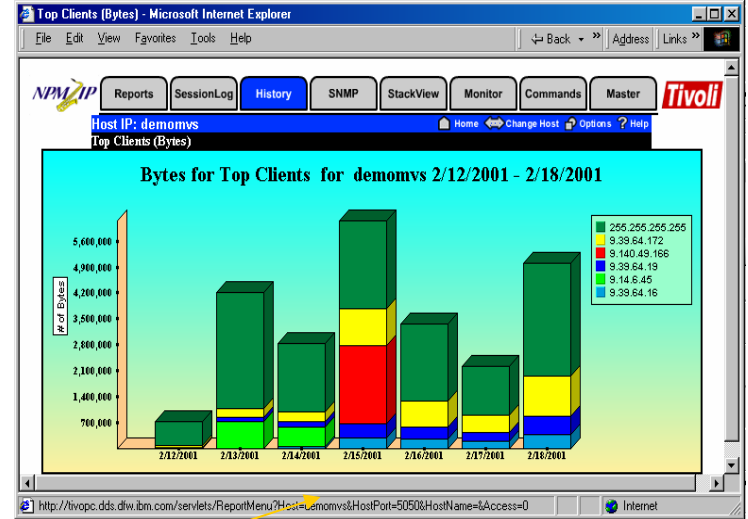
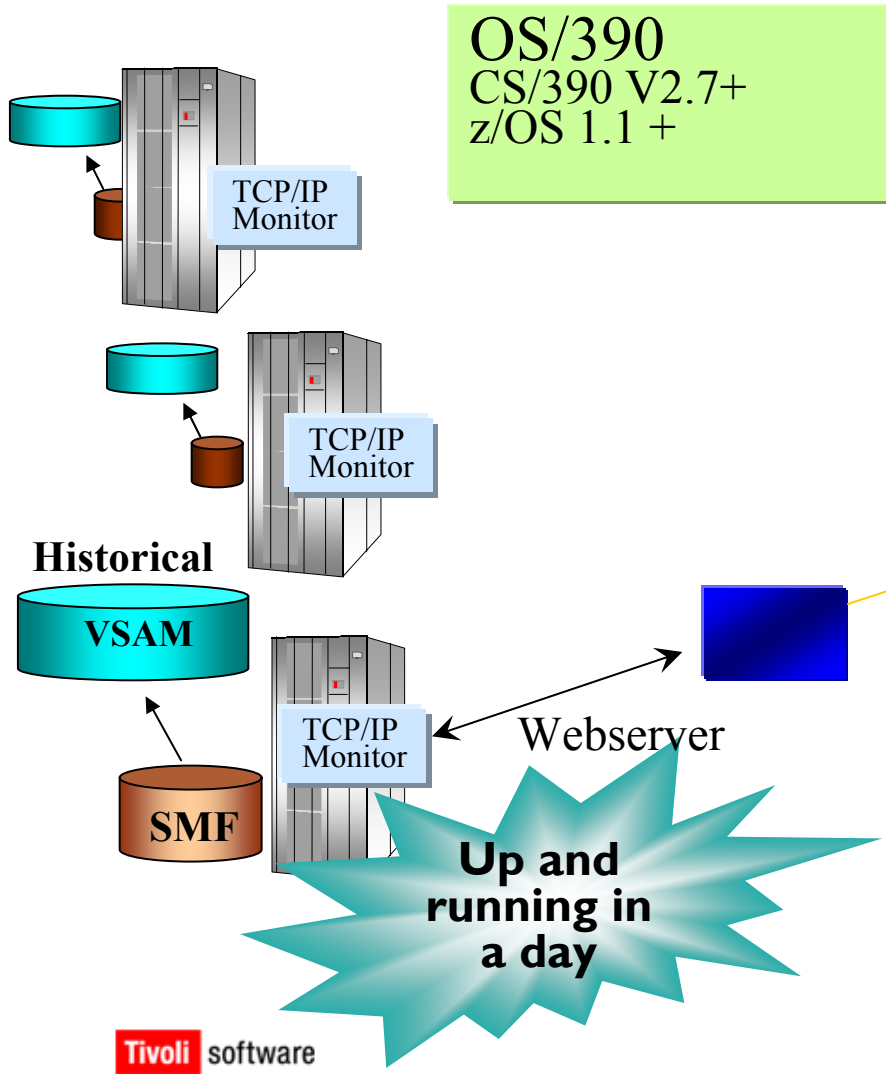


## • Intuitive

- Top 10 users, non-technical
- **OS/390 and Apples impact**
  - CPU, Memory, Sessions, Bytes
- **Validates SLA goals**
  - Availability, Response time



# NPM/IP Design



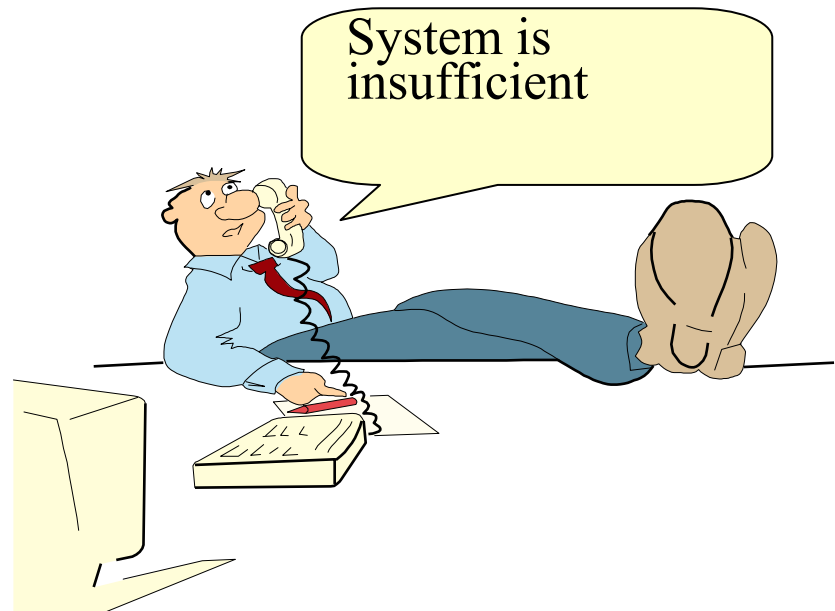
- Quick Install
- Low OS/390 or z/OS overhead
- Simple Interface
- Fast
  - Access over low speed lines



## ***Problem: zSeries Not Handling Projected Load***

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- **Customer ordered new system**
- **Should handle 600 TCP/IP users**
- **System on its knees after 300 users log in**
- **What's going on?**

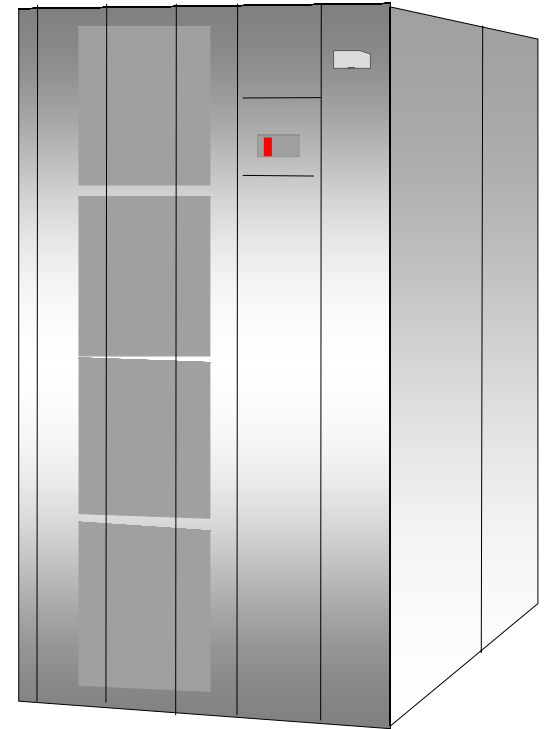




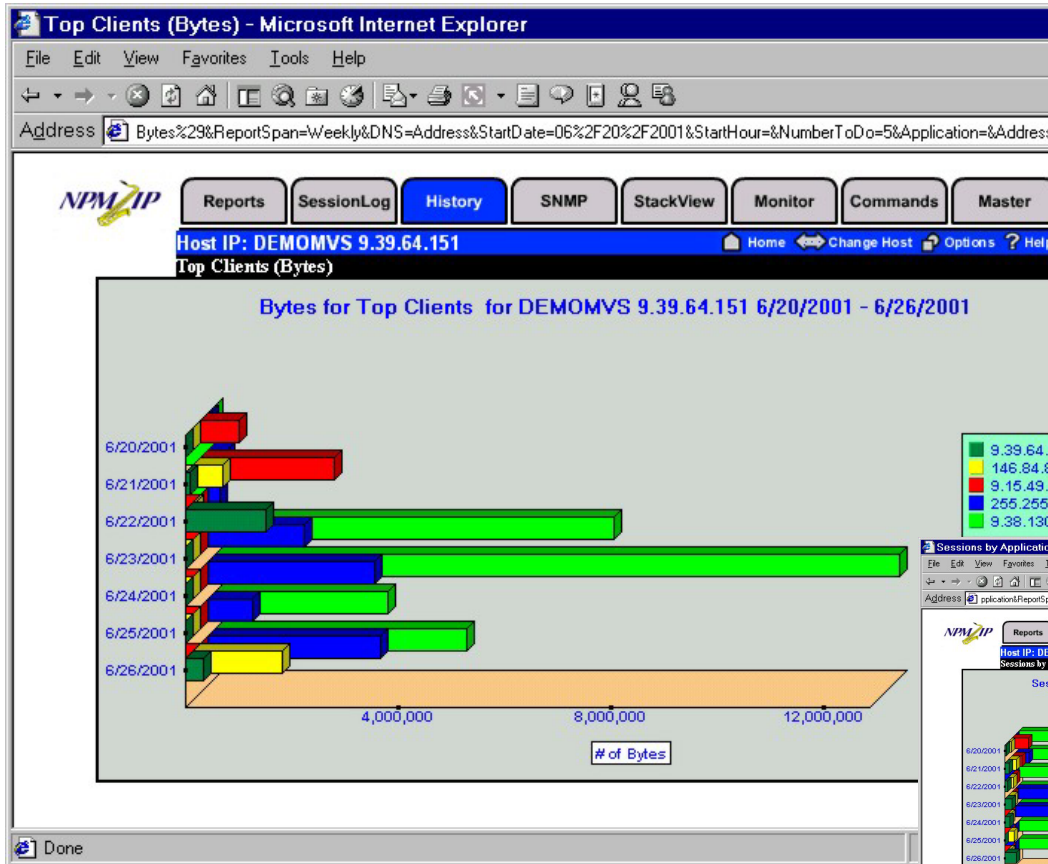
# Investigation Using NPM/IP

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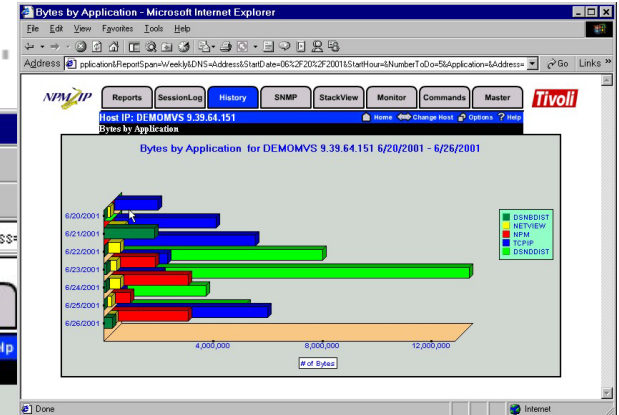
- Lots of investigation originally on zSeries using a multitude of tools
- Nothing stood out or viewed as potential culprit
- How can I get a quick view of application usage by session and bytes



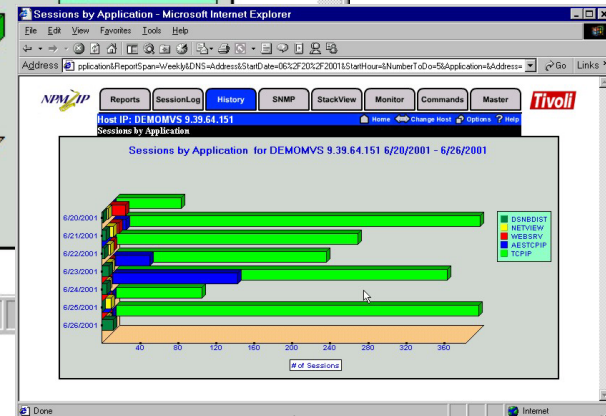
# Resolution using NPM/IP



Bytes per Top Clients



Bytes per application



Session per Application

# Discovered owners of Systems in Question

The screenshot shows the 'SNMP MIB Browser - Microsoft Internet Explorer' window. The address bar displays 'Address: 9.82.2.184' and the time is '7/23/2001 11:17:12'. The left sidebar contains the NPM/ZIP logo, an 'Address' field with '9.82.2.184', a 'Community Name' field with 'public', a 'MIB Type' dropdown set to 'System', and several checkboxes for 'View Changes', 'View Graphs', and 'Graphs on Top'. There is also an 'AutoRefresh' checkbox and a 'Refresh Interval' field set to '60'. A 'Get MIB' button is at the bottom of the sidebar. The main content area displays system information:

- Description:** Hardware: x86 Family 6 Model 5 Stepping 2 AT/AT  
COMPATIBLE - Software: Windows NT Version 4.0 (Build Number: 1381 Uniprocessor Free)
- OID:** 1.3.6.1.4.1.311.1.1.3.1.2
- Up Time:** 6days 3:47:31.53  
John Doe - 123-4567
- Contact:**
- Name:** TIVOLI4
- Location:**

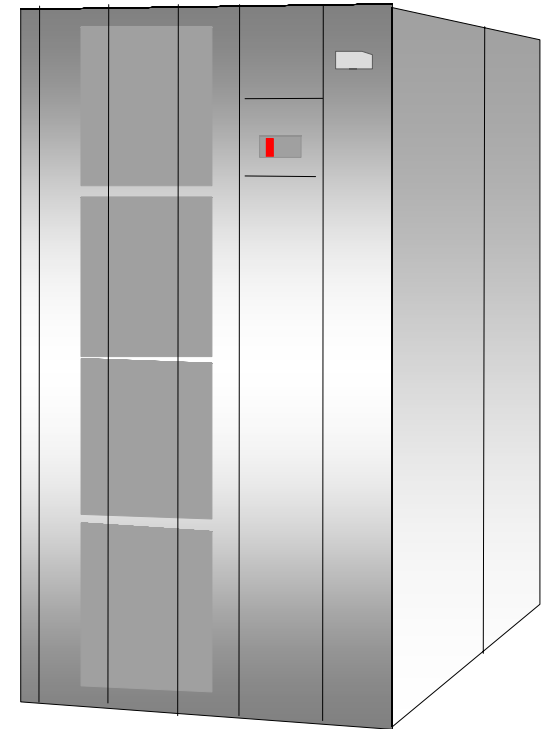
The status bar at the bottom shows 'Done' and 'Internet'.

**From this system descriptor MIB we found the owner of the system and his number**

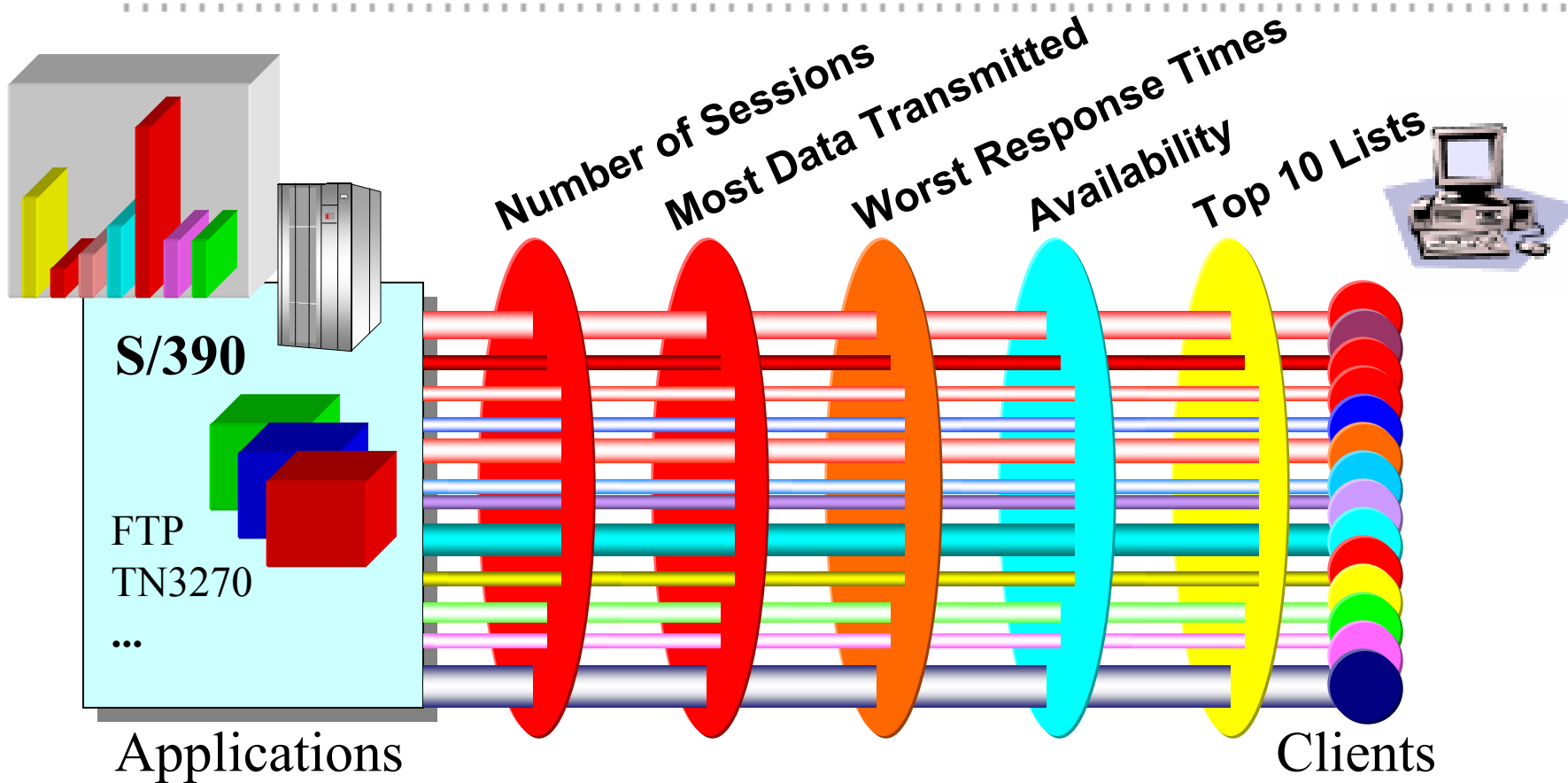
# Resolution to Problem

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- **Talked to system administrator**
  - He thought he was sending 20 Mbytes not the 100 gigabytes we were seeing
  - He thought he was doing a backup once a day not the continuous backup we were seeing
- **Asked them to verify backup process**
- **They changed to once a day backups during off hours and we were able to get in excess of our 600 users connected into the zSeries**



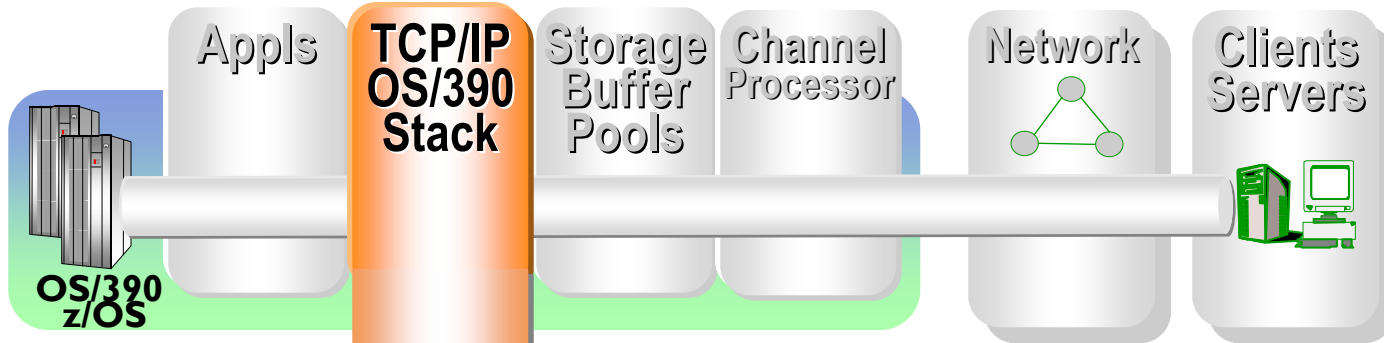
# TCP/IP Applications and Clients



## View TCP/IP Performance

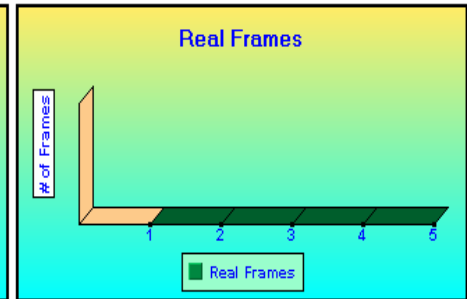
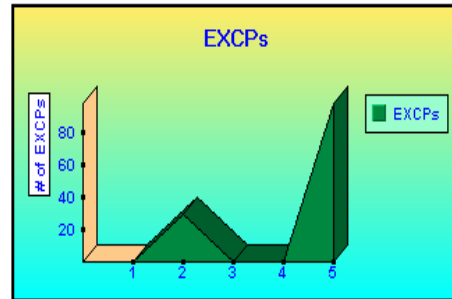
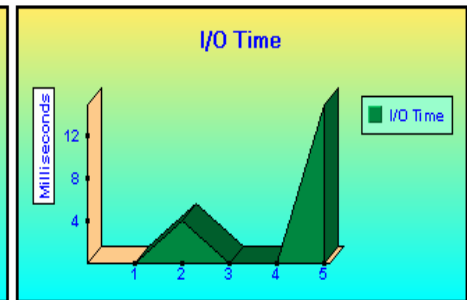
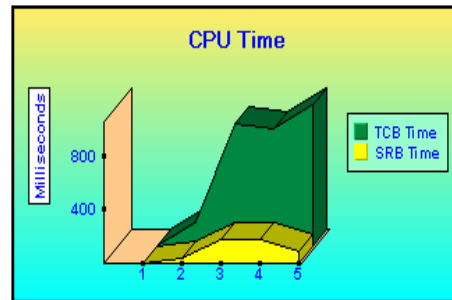
- Real time GUI
- Historical analysis
- Thresholds activated alerts

# OS/390 TCP/IP Stack



Why is my system running so slow?

**Workload**  
**Performance**  
**Real storage used**



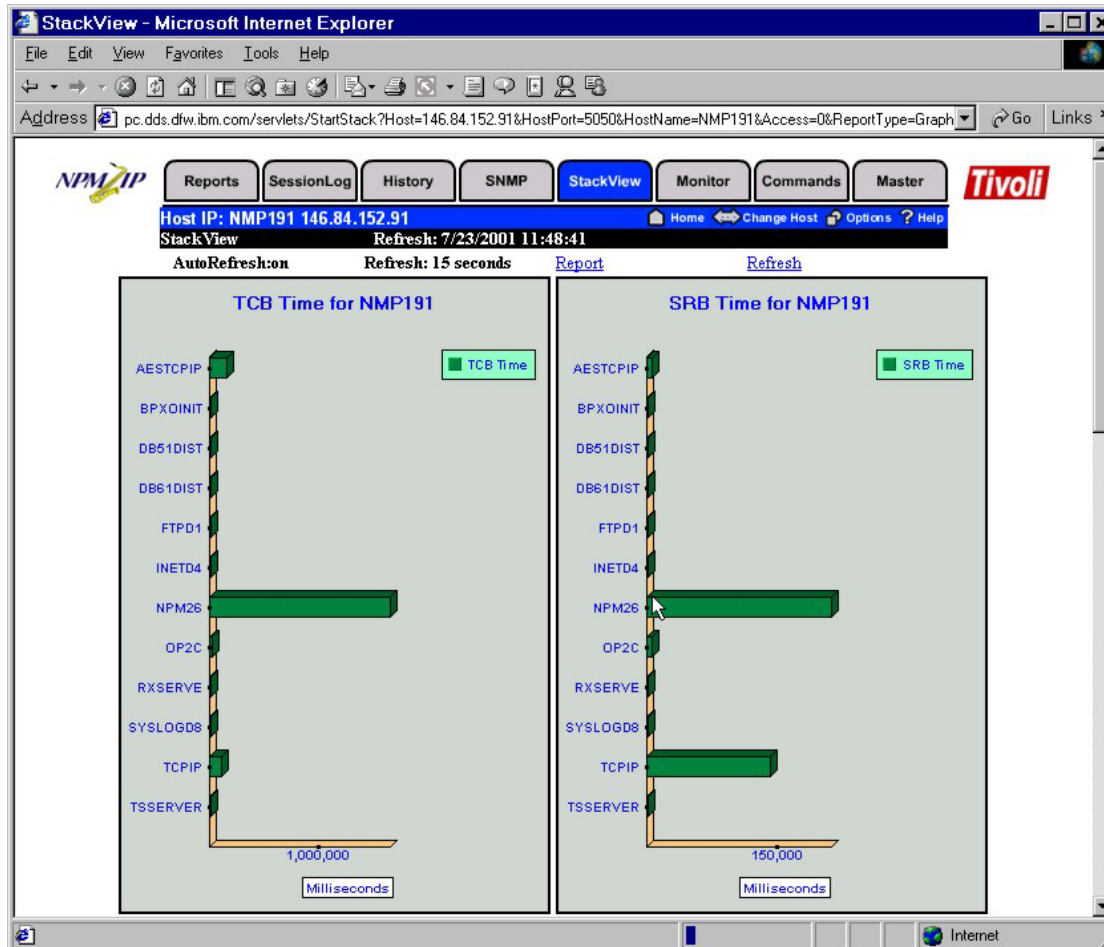
# ***Problem : Something is Using all TCB's***

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- **Customer reported on TCP/IP for OS/390 listserver that some application in his system was using up all TCB's. This was having a rippling effect and causing other applications to fail or begin performing poorly**
- **Customer resolution to the problem was to begin stopping application until he found the application in question**
- **This action while it did find the offending application, took an excessive amount of time and had a negative impact on all users**
- **What were the options?**



# Track TCB Utilization on the IP stack



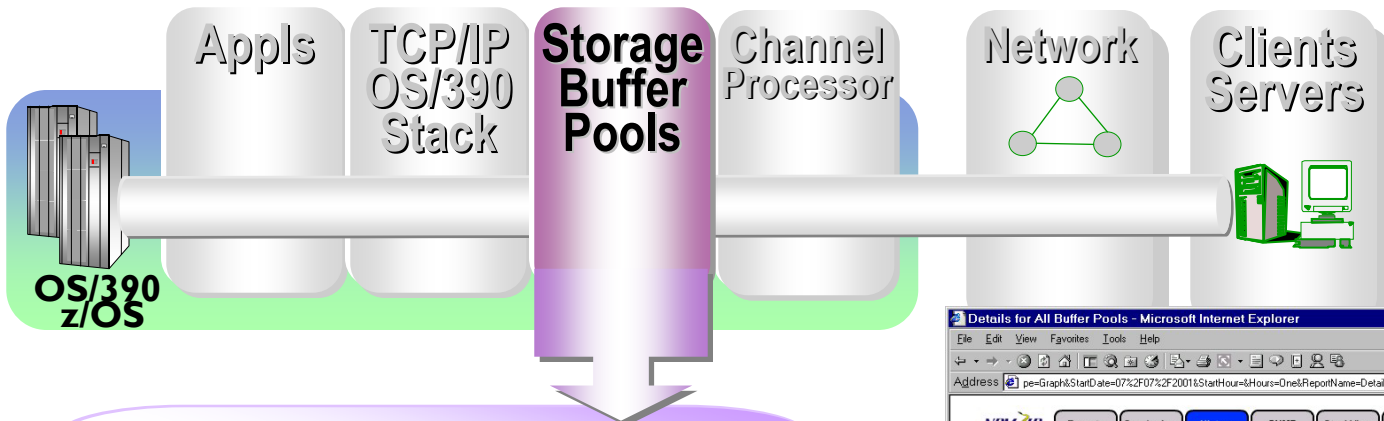
**Watch TCB utilization with refresh**

**Quickly determine culprit application**

**Only take down that one application**



# Storage and Buffer Pools



Is TCP/IP data backing up into my OS/390?

CSM

DSP

ECSA

VTAM Buffers

Details for All Address Spaces - Microsoft Internet Explorer

Host IP: 6B0R013 9.82.2.206

Monitoring Interval: 4 Minutes

Date (mm/dd/yyyy)	Time	Address Space Name	ECSA 4K	ECSA 16K	ECSA 32K
08/21/2001	0:03	*TOTAL*	72	32	0
08/21/2001	0:03	NET	44	0	0
08/21/2001	0:03	TCPPIP	32	32	0
08/21/2001	0:07	*TOTAL*	76	32	0
08/21/2001	0:07	NET	44	0	0
08/21/2001	0:07	TCPPIP	32	32	0
08/21/2001	0:11	*TOTAL*	76	32	0
08/21/2001	0:11	NET	40	0	0
08/21/2001	0:11	TCPPIP	36	32	0
08/21/2001	0:15	*TOTAL*	76	32	96
08/21/2001	0:15	NET	44	0	96
08/21/2001	0:15	TCPPIP	36	32	96
08/21/2001	0:19	*TOTAL*	76	48	96
08/21/2001	0:19	NET	44	0	96
08/21/2001	0:19	TCPPIP	36	48	96

Details for All Buffer Pools - Microsoft Internet Explorer

Host IP: 9.82.2.208

Monitoring Interval: 4 Minutes

Date (mm/dd/yyyy)	Time	Sample #	Buffer Pool Name	Buffer Size	Expansion Increment	Times Expanded	Expansion Threshold	Contraction Threshold	Current Total	Current Available	Max Used	Max Total	Expansion Limit	Buffers Requested
07/07/2001	0:00	1	IOBuf	3,154	100	0	50	61	200	179	40	200	58,334	0
07/07/2001	0:00	1	BSSBuf	260	14	0	14	61	28	27	1	28	0	0
07/07/2001	0:00	1	LPBuf	2,032	2	0	1	61	348	345	11	348	0	0
07/07/2001	0:00	1	XDBuf	697	5	0	4	14	10	10	0	10	0	0
07/07/2001	0:00	1	LFBuf	120	30	0	1	61	150	32	118	150	0	0
07/07/2001	0:00	1	CRPLBuf	144	50	0	338	61	1,700	1,572	155	1,700	0	0
07/07/2001	0:00	1	SFBuf	112	32	0	1	61	128	110	18	128	0	0
07/07/2001	0:00	1	SFBuf	176	21	0	1	61	21	21	1	21	0	0
07/07/2001	0:00	1	APBuf	56	56	0	3	61	56	56	0	56	0	0
07/07/2001	0:00	1	TIBuf	632	60	0	120	61	360	360	19	360	0	0
07/07/2001	0:00	1	CRA4	4,080	10	0	20	61	30	48	9	50	0	0
07/07/2001	0:00	1	CRA3	8,176	6	0	2	61	12	11	5	12	0	0

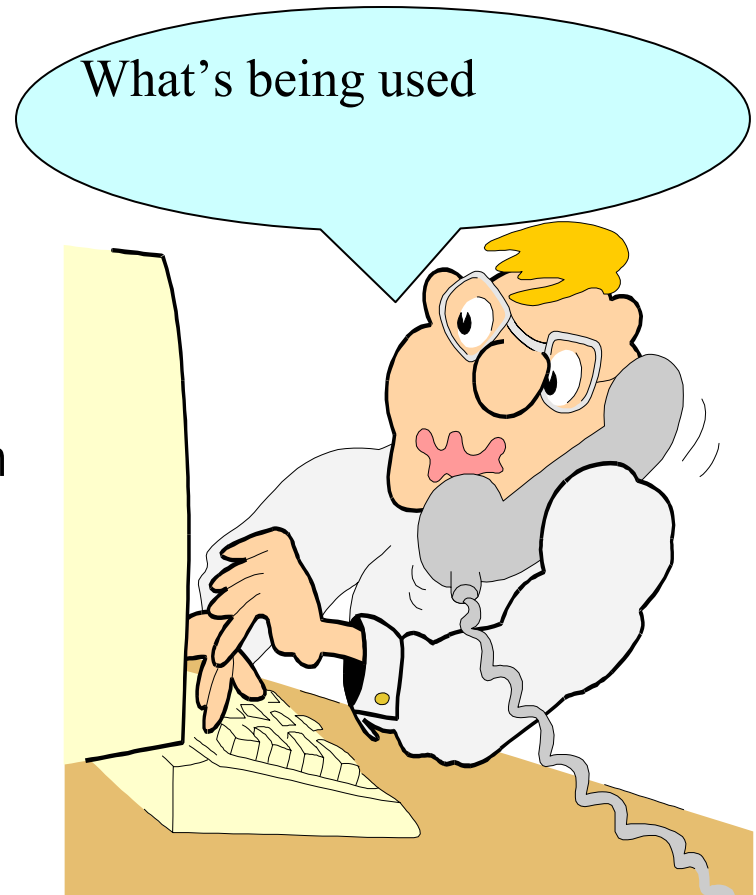
Alert for % total free for any storage area

# ***Problem: Getmain Errors, IP Storage Failures***

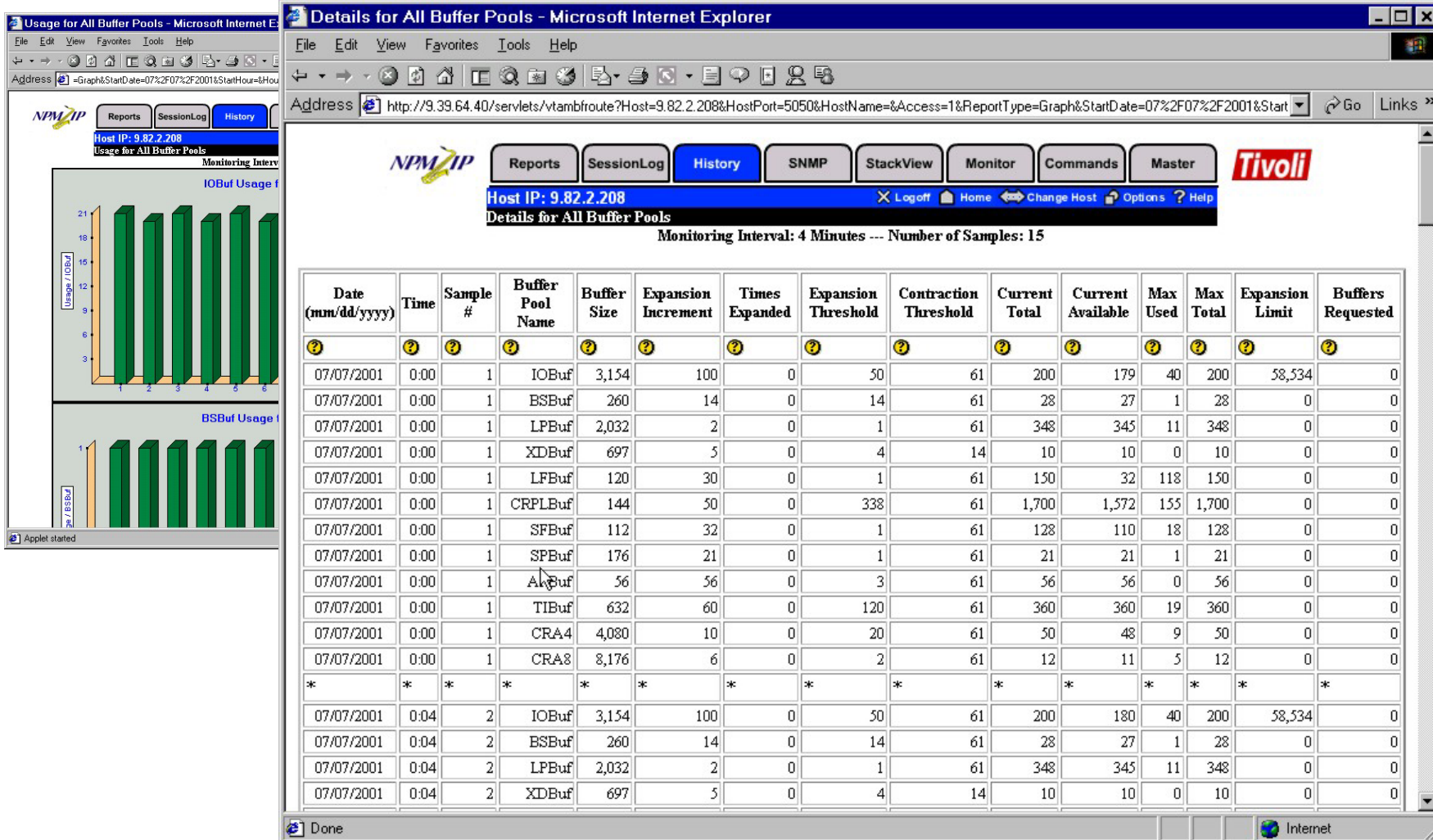
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- Customer getting frequent GETMAIN and IP storage failure errors
- Needed visibility into usage to determine new settings

Is an address space using too much  
Is storage being released  
Is storage reaching saturation  
Is space allocated and not used



# Vtam Buffer Utilization





# CSM Buffer Utilization

Details for All Address Spaces - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [07%2F07%2F2001&StartHour=11&EndDate=07%2F07%2F2001&EndHour=11&ReportName=Details+for+All+Address+Spaces&AddressSpace=&x=42&y=11](#) Go Links >>

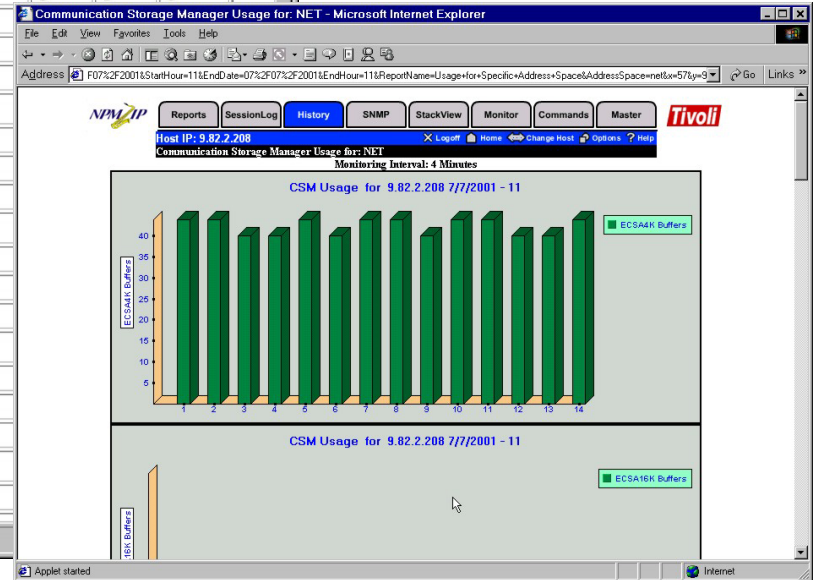

Reports SessionLog History SNMP StackView Monitor Commands Master


Host IP: 9.82.2.208 [Logoff](#) [Home](#) [Change Host](#) [Options](#) [Help](#)

Details for All Address Spaces

Monitoring Interval: 4 Minutes

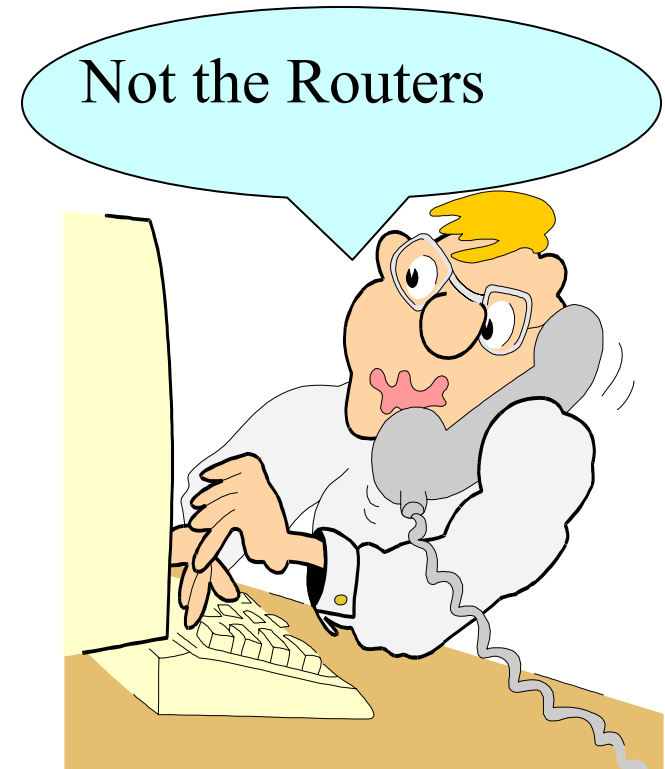
Date (mm/dd/yyyy)	Time	Address Space Name	ECSA 4K	ECSA 16K	ECSA 32K	ECSA 60K	ECSA 180K	DSP 4K	DSP 16K	DSP 32K	DSP 60K	DSP 180K
07/07/2001	11:02	*TOTAL*	80	32	128	0	0	264				
07/07/2001	11:02	NET	44	0	128	0	0	244				
07/07/2001	11:02	TCPIP	36	32	128	0	0	20				
*	*	*	*	*	*	*	*	*	*	*	*	*
07/07/2001	11:06	*TOTAL*	80	32	128	0	0	264				
07/07/2001	11:06	NET	44	0	128	0	0	244				
07/07/2001	11:06	TCPIP	36	32	128	0	0	20				
*	*	*	*	*	*	*	*	*	*	*	*	*
07/07/2001	11:10	*TOTAL*	76	32	128	0	0	264				
07/07/2001	11:10	NET	40	0	128	0	0	244				
07/07/2001	11:10	TCPIP	36	32	128	0	0	20				
*	*	*	*	*	*	*	*	*	*	*	*	*
07/07/2001	11:15	*TOTAL*	76	32	128	0	0	264				
07/07/2001	11:15	NET	40	0	128	0	0	244				
07/07/2001	11:15	TCPIP	36	32	128	0	0	20				
*	*	*	*	*	*	*	*	*	*	*	*	*
07/07/2001	11:19	*TOTAL*	76	32	128	0	0	264				



## ***Problem: Response Time Increases to 30 Seconds***

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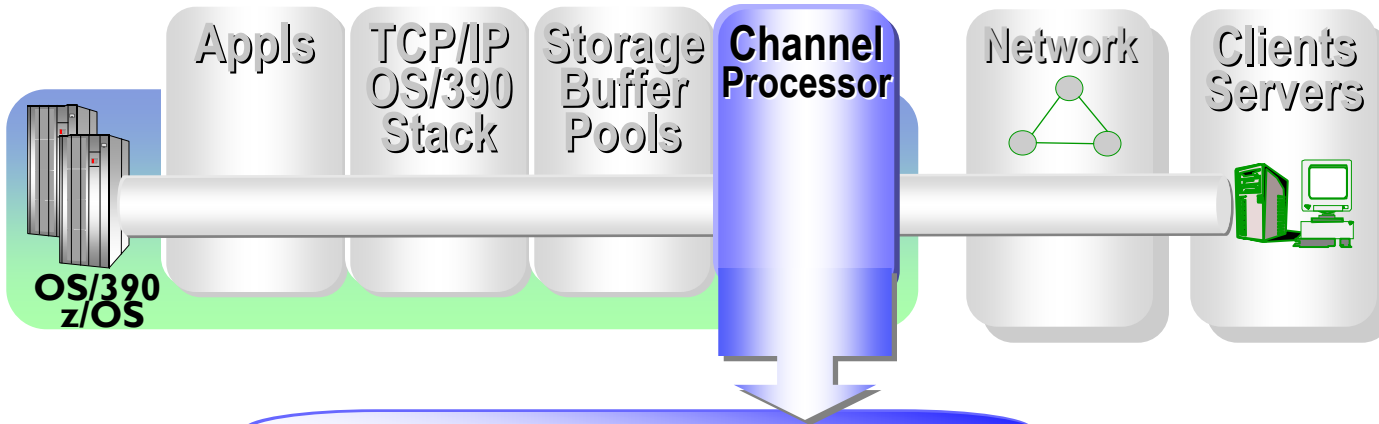
- Users started to flood the help desk with calls
- Help desk validated that the servers were OK
- Help desk validated that the routers were OK
- Started to make stabs in the dark by looking at various applications
- Used multiple tools, many logons and several hours
- Finally found that FTP was the culprit
- Could not identify who was the culprit





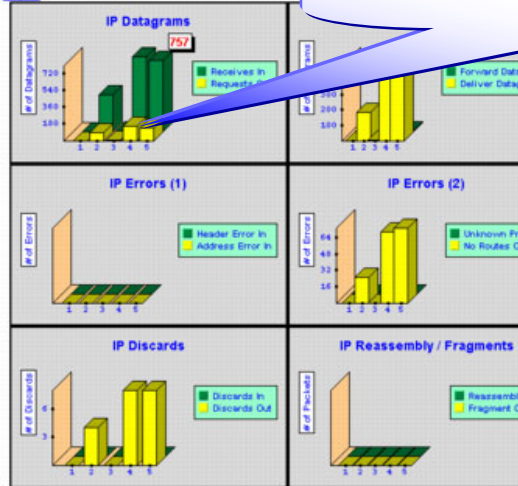


# Cisco CIP



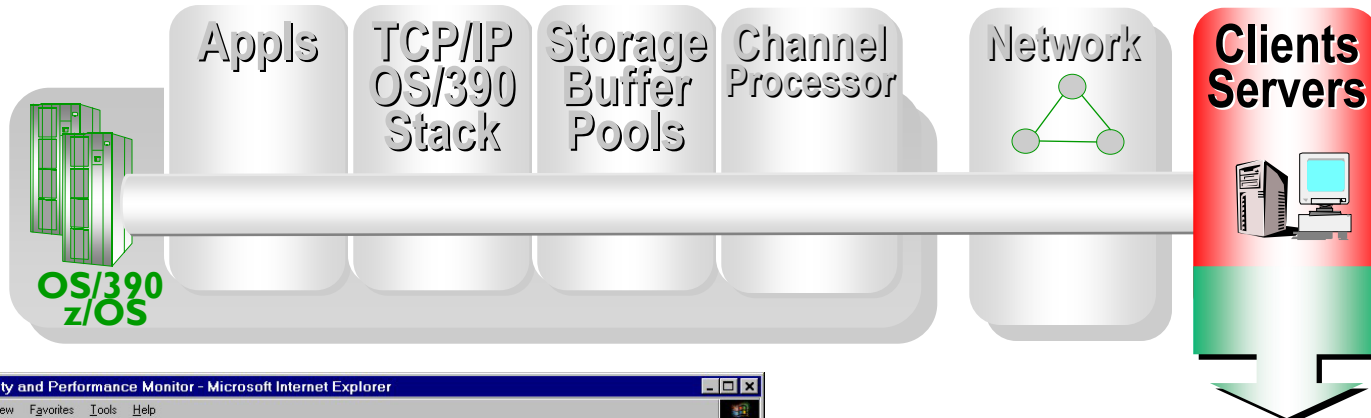
Is my Cisco CIP ok?

MIB-IP Report



				Speed	AdminStatus	OperStatus	LastChange
				?	?	?	?
1	TokenRing4/0/0	ISO88025-TokenRing	4,464	16,000,000	Up	Up	158days 0:19:06.61
2	TokenRing4/0/1	ISO88025-TokenRing	4,464	16,000,000	Up	Up	0:01:53.73
3	TokenRing4/0/2	ISO88025-TokenRing	4,464	16,000,000	Down	Down	0:01:28.04
4	TokenRing4/0/3	ISO88025-TokenRing	4,464	16,000,000	Down	Down	0:01:28.04
5	Serial4/1/0	Unknown	1,500	1,544,000	Up	Up	33days 2:13:04.87
6	Serial4/1/1	Prop PTP Serial	1,500	1,544,000	Up	Up	31days 2:39:12.54
7	Serial4/1/2	Prop PTP Serial	1,500	1,544,000	Down	Down	0:01:28.04
8	Serial4/1/3	Prop PTP Serial	1,500	1,544,000	Down	Down	0:01:28.05
9	GigabitEthernet5/0/0	Ethernet-CSMA/CD	1,500	1,000,000,000	Up	Up	193days 7:23:05.94

# Servers in the Network



What are servers available?

Availability and Performance Monitor - Microsoft Internet Explorer

Address: http://tivopc.dds.dfw.ibm.com/servlets/RTPerformance?Host=9.39.64.151&HostPort=5050&HostName=DEMOMVS&Access=1

**NPM** Reports SessionLog History SNMP StackView Monitor Commands Master **Tivoli**

Host IP: DEMOMVS 9.39.64.151 Home Change Host Options Help

Availability and Performance Monitor Refresh: 7/23/2001 11:53:35

AutoRefresh: Refresh: 60 seconds Threshold: 400 Refresh

Good Performance: 5 Unavailable: 1 Poor Performance: 0 Packet Loss: 0

**Resources Unavailable**

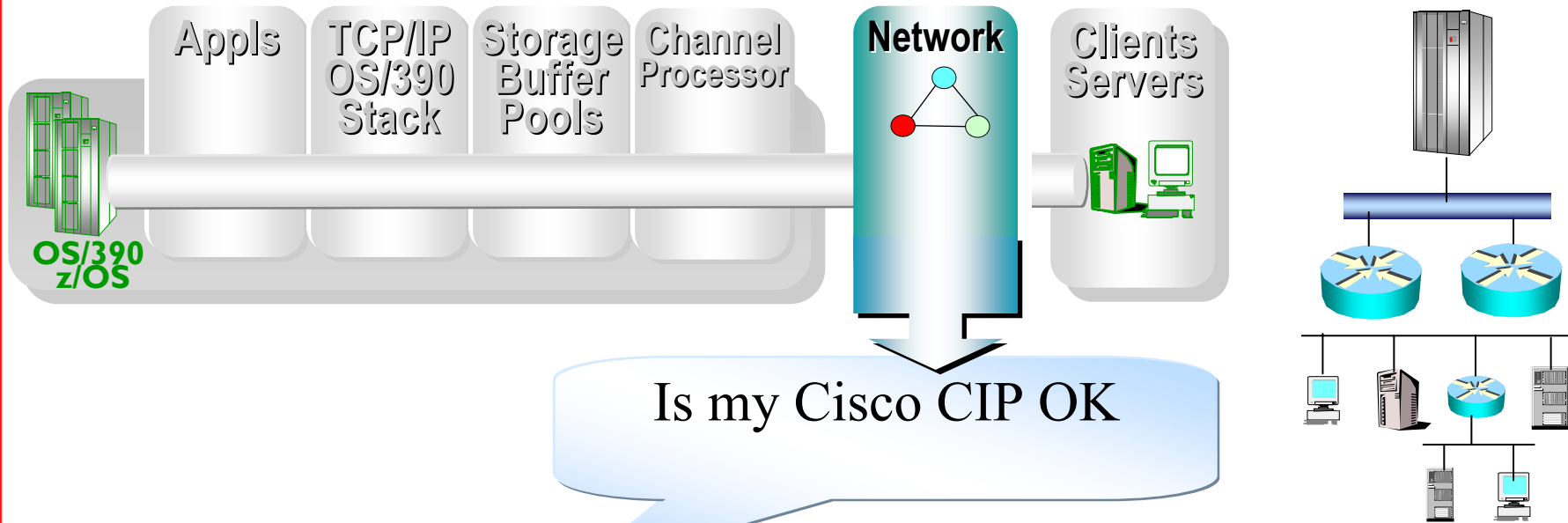
Rating	Host	Resource Name	Address	Max RT	Packets Lost
	DEMOMVS	SINGAPORE	9.184.20.41	0	256,512,1024,2048

**Resources Available / Good Performance Top**

Rating	Host	Resource Name	Address	Max RT
Good	DEMOMVS	MAINTMR	9.39.64.15	6
Good	DEMOMVS	DEMOMVS	9.39.64.151	0
Good	DEMOMVS	2210SHOWROUTER.D	9.39.64.3	9
Good	DEMOMVS	6611LAB2 WASHING	9.82.1.121	81
Good	DEMOMVS	6611LAB1 WASHING	9.82.1.122	80



# Router Analysis



Is my Cisco CIP OK

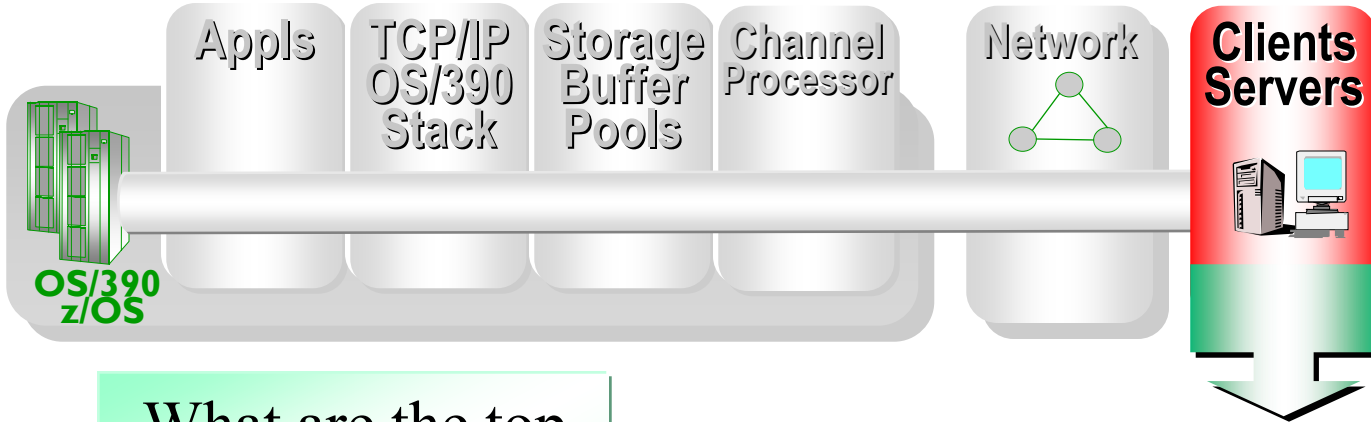
## Cisco CIP, IBM2216, TN3270

- Total memory, free memory, CPU utilization
- Daughterboards
- Subchannels

Index	Name	Total Memory	Free Memory	CPU Utilization	Time Since Last Reset
0	CIP_slot.0	131,072	115,462	21	49 days 17:02:47.00

Index	Description	Type	MTU	Speed	AdminStatus	OperStatus	LastChange
1	TokenRing4/0/0	ISO88025-TokenRing	4,464	16,000,000	Up	Up	158 days 0:19:06.61
2	TokenRing4/0/1	ISO88025-TokenRing	4,464	16,000,000	Up	Up	0:01:53.73
3	TokenRing4/0/2	ISO88025-TokenRing	4,464	16,000,000	Down	Down	0:01:28.04
4	TokenRing4/0/3	ISO88025-TokenRing	4,464	16,000,000	Down	Down	0:01:28.04
5	Serial4/1/0	Unknown	1,500	1,544,000	Up	Up	33 days 2:13:04.87
6	Serial4/1/1	Prop PTP Serial	1,500	1,544,000	Up	Up	31 days 2:39:12.54
7	Serial4/1/2	Prop PTP Serial	1,500	1,544,000	Down	Down	0:01:28.04

# Top 10 Clients



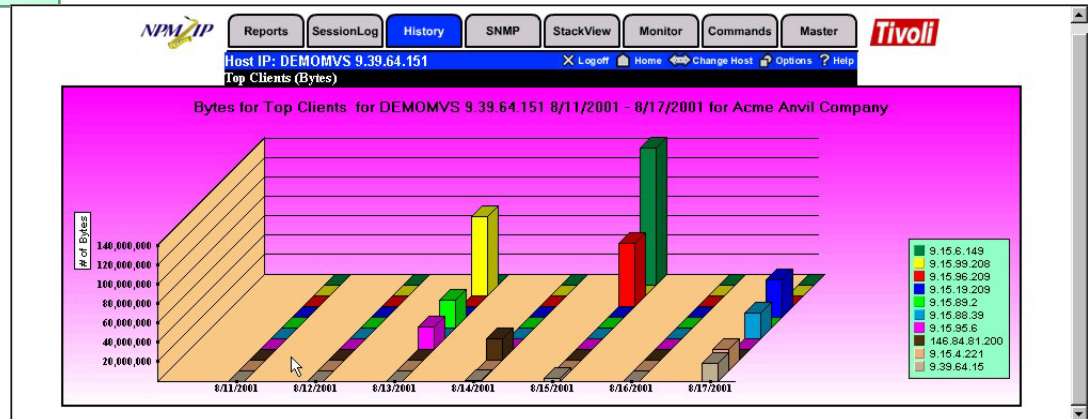
What are the top 10 clients

**Workload**

(Top users)

**Availability**

**Response time**



# Check the Status of Applications

Connect Expert - Microsoft Internet Explorer

Address: http://9.39.64.40/servelets/portocal?Host=9.82.2.208&HostPort=5050&AddrHelp=1&HostName=&Access=1

**NPM** Reports SessionLog History SNMP StackView Monitor Commands Master **Tivoli**

Host IP: 9.82.2.208

AutoRefresh: Refresh: 60 seconds

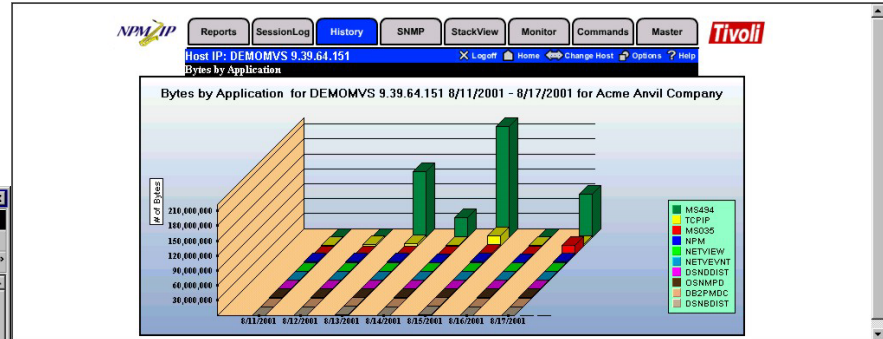
Listeners

Name	Port
GPMSERVE	8801
GPMSERVE	8803
NVCBAF13	9980
NVCBAF13	4020
NVCBAF13	9990
IAMC	1970
SMTP	25
INETD4	513
INETD4	523
INETD4	514
NV13EVNT	5120
WEB12A	8006
JUI	8080

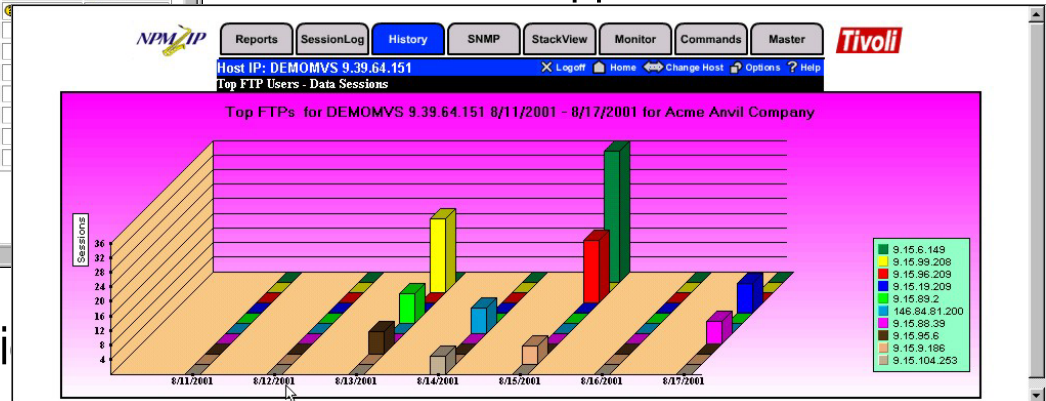
Sessions

Name	Port	Bytes In	Bytes Out	Bytes Percent	Number of Sessions	Session Percent	Sessions not Established	Sessions TimeWait or Closed
NV13EVNT	1029	0	0	0.0%	1	7.0%		
LCFD6	9405	221	0	0.0%	1	7.0%		
TCPIP	23	81,332	4,143,935	99.0%	4	30.0%		
TCPIP	1023	1,012	1,432	0.0%	1	7.0%		
TCPIP	1026	1,432	1,012	0.0%	1	7.0%		
OSNMPD	1028	0	0	0.0%	1	7.0%		
ABSTCP	5030	46	0	0.0%	5	38.0%		

Overall view of applicati



Details on Applications



Details on FTP

# See Details of FTP Transfer – Isolate User

The image shows two overlapping Microsoft Internet Explorer windows. The background window, titled "FTP Server Log - Microsoft Internet Explorer", displays a log for Host IP: 9.82.2.208. The log entries are as follows:

```
07/05/2001 10:10:15.39 FTP Cmd=QUIT , User=MOY , Arg=  
07/05/2001 10:08:32.65 FTP Cmd=RETR , User=MOY , Arg= 1  
07/05/2001 10:08:32.55 FTP Cmd=PORT , User=MOY , Arg=9  
07/05/2001 10:08:20.87 FTP Login, User=MOY  
07/05/2001 10:08:20.84 FTP Cmd=PASS , User=MOY , Arg=  
07/05/2001 10:08:19.36 FTP Cmd=USER , User= , Arg=mo  
07/05/2001 10:08:17.18 FTP Open Connection, IP=9.82.1.84,
```

The foreground window, titled "Selected User - Detail List for 9.24.34.211 - Microsoft Internet Explorer", displays a detail list for Host IP: DEMOMVS 9.39.64.151. The window includes a table with the following data:

Count	Date (mm/dd/yyyy)	Start Time	End Time	Data Set Name	Member	Total Bytes	Return Code	Return Code Description	Transmit Time	Abnormal End
1	3/6/2001	9:17:19.68	9:17:19.70	LIZH.PTF.TEMP	UW76838	4,994	250	Requested file action okay, completed.	0:00:00.02	-
2	3/6/2001	9:17:20.51	9:17:28.05	LIZH.PTF.TEMP	UW999330	587,043	250	Requested file action okay, completed.	0:00:07.54	-

# How NPM/IP Reduced the Time

- One tool checked many aspects of system

Alerts on response time rather than user 'alerts'

OS/390 internals

Servers in session with OS/390

Routers carrying traffic to the OS/390

Routers and other channel attached devices

Presents details on FTP that was the culprit in this case

Operations could then cancel the offending FTP transfer

Problem solved



# Problem: Monitored System Unavailable

- Monitored system is unavailable
- Is the system down or is there a problem in the path?

The screenshot shows the Tivoli NPM Availability and Performance Monitor interface in a Microsoft Internet Explorer browser window. The address bar shows the URL: <http://hwopc.dds.dlv.ibm.com/servlets/RTPerformance?Host=9.39.64.151&HostPort=5050&HostName=DEMOMVS&Access=1>. The interface includes a navigation menu with options like Reports, SessionLog, History, SNMP, StackView, Monitor, Commands, and Master. The main display area shows the following status:

Host IP: DEMOMVS 9.39.64.151  
Availability and Performance Monitor  
AutoRefresh: Refresh: 60 seconds Threshold: 400 Refresh

Good Performance: 5    Unavailable: 1    Poor Performance: 0    Packet Loss: 0

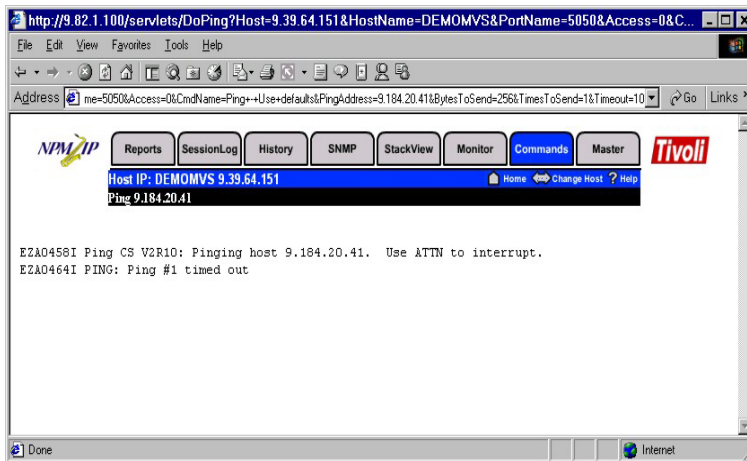
**Resources Unavailable**

Rating	Host	Resource Name	Address	Max RT	Packets Lost
🚫	DEMOMVS	SINGAPORE	9.184.20.41	0	256,512,1024,2048

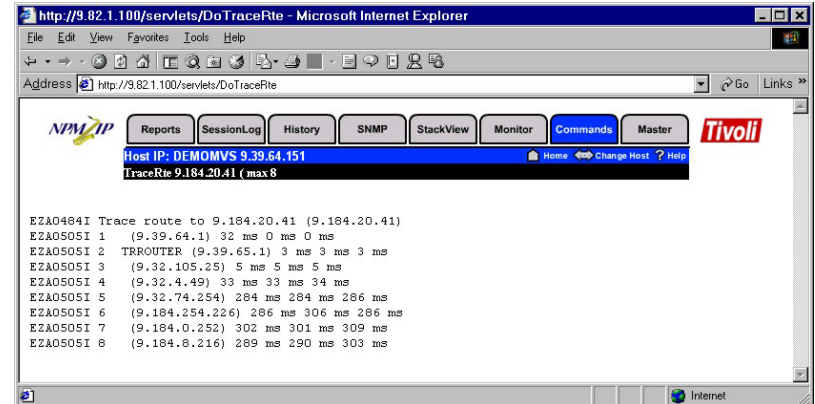
**Resources Available / Good Performance** [Top](#)

Rating	Host	Resource Name	Address	Max RT
🟡	DEMOMVS	MAINTMR	9.39.64.15	6
🟡	DEMOMVS	DEMOMVS	9.39.64.151	0
🟡	DEMOMVS	Z210SHOWROUTER.D	9.39.64.3	9
🟡	DEMOMVS	6611LAB2.WASHINGTON	9.82.1.121	81
🟡	DEMOMVS	6611LAB1.WASHINGTON	9.82.1.122	80

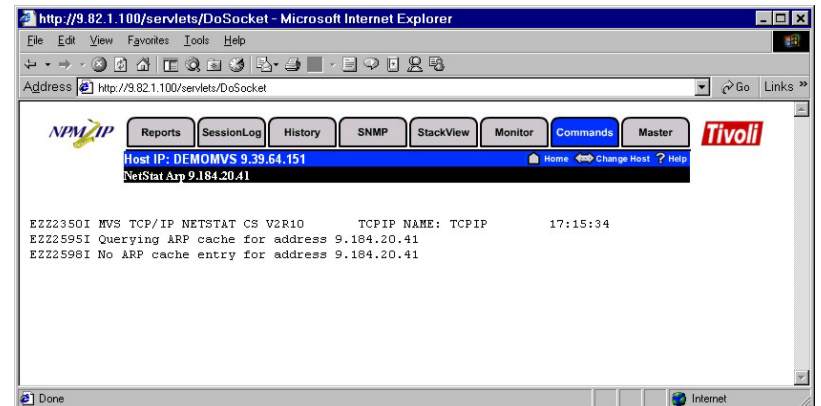
# Is the System Down or Not?



Ping reverifies  
that the device cannot  
be reached



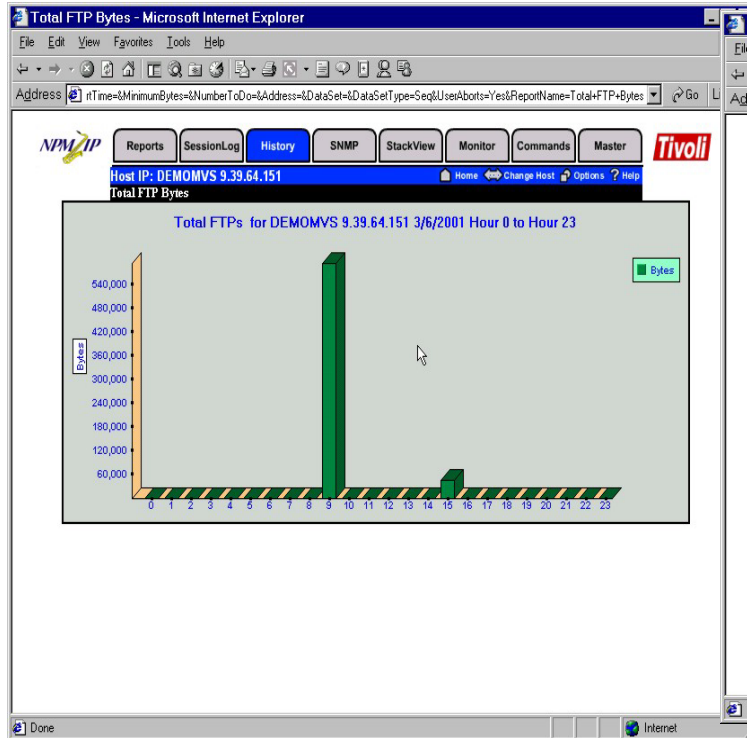
Traceroute verifies that  
the path is functional



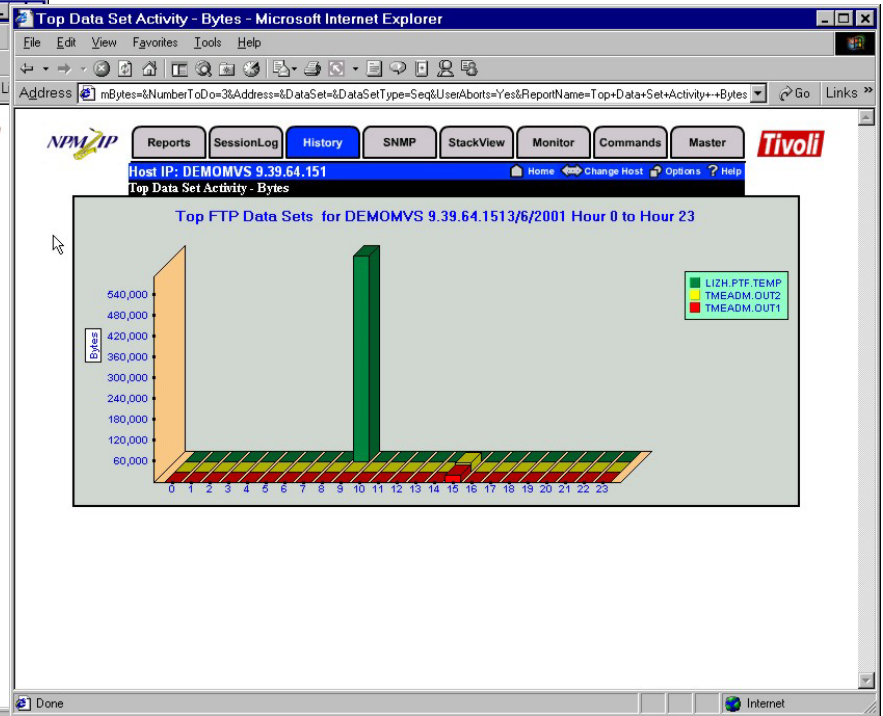
Netstat ARP verifies device unreachable



# Problem: Users Complain of FTP Failures



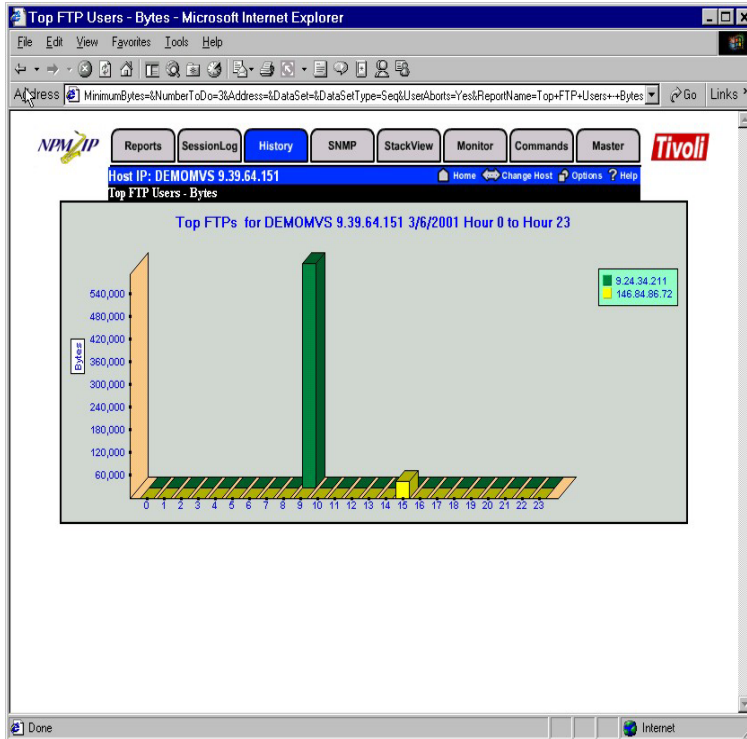
Total FTP by Bytes



FTP Data Sets



# FTP Details



Count	Date (mm/dd/yyyy)	Start Time	End Time	Data Set Name	Member	Total Bytes	Return Code	Return Code Description	Transmit Time	Abnormal End
1	3/6/2001	9:17:19.68	9:17:19.70	LIZH.PTF.TEMP	UW76858	4,994	250	Requested file action okay, completed.	0:00:00.02	-
2	3/6/2001	9:17:20.51	9:17:28.05	LIZH.PTF.TEMP	UW99930	387,043	250	Requested file action okay, completed.	0:00:07.54	-

## FTP Users

# FTP Server Log

FTP Server Log - Microsoft Internet Explorer

Address: http://9.39.64.40/servlets/doftpserlog

Navigation: Reports, SessionLog, History, SNMP, StackView, Monitor, Commands, Master

Host IP: 9.82.2.208

Log entries:

```
07/05/2001 10:10:15.39 FTP Cmd=QUIT ,User=MOY ,Arg=
07/05/2001 10:08:32.65 FTP Cmd=RETR ,User=MOY ,Arg= moy.demo.report
07/05/2001 10:08:32.55 FTP Cmd=PORT ,User=MOY ,Arg=9,82,1,84,4,176
07/05/2001 10:08:20.87 FTP Login, User=MOY
07/05/2001 10:08:20.84 FTP Cmd=PASS ,User=MOY ,Arg=
07/05/2001 10:08:19.36 FTP Cmd=USER ,User= ,Arg=moy
07/05/2001 10:08:17.18 FTP Open Connection, IP=9.82.1.84, Port=1199
```

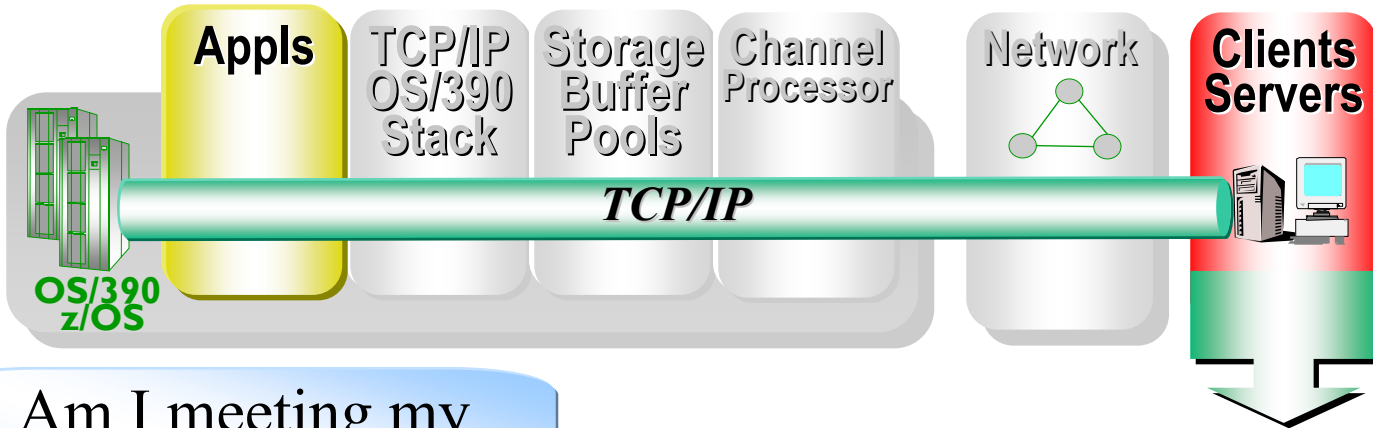
# *Items Important to Management*

---

- Service Levels
- Response Time
- Alerting
- Overall Status

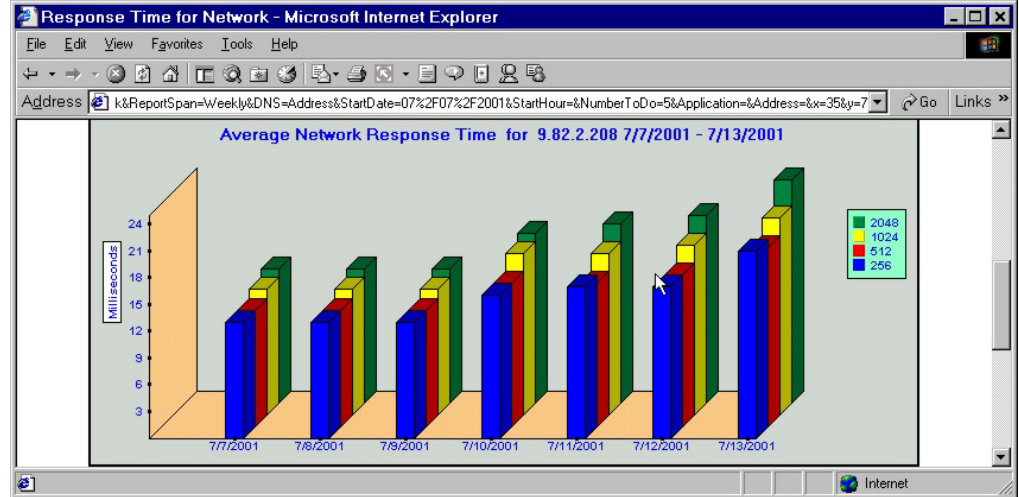


# Services levels

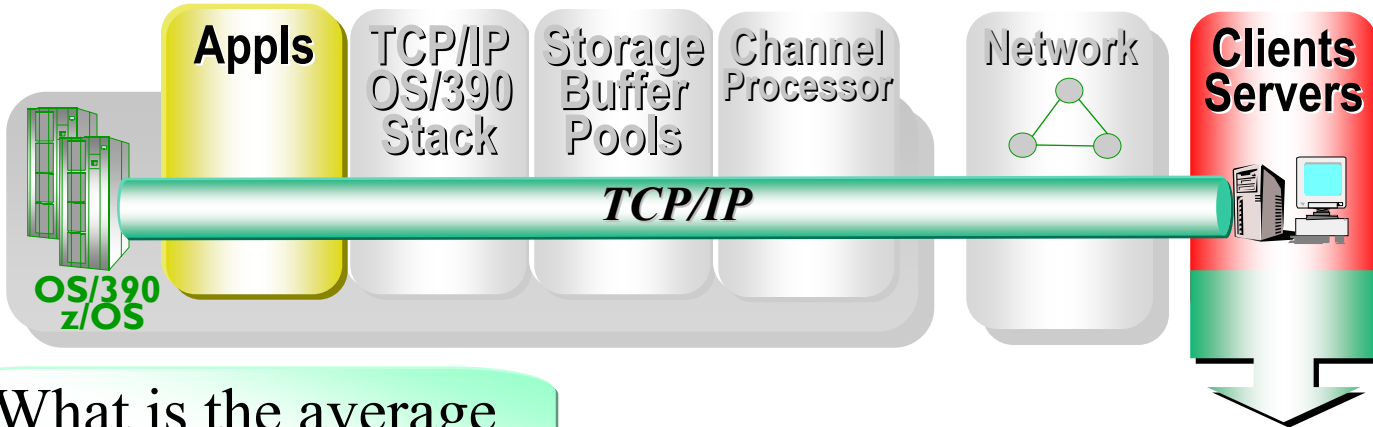


Am I meeting my service levels?

Response time  
Network capacity  
Auto traceroute

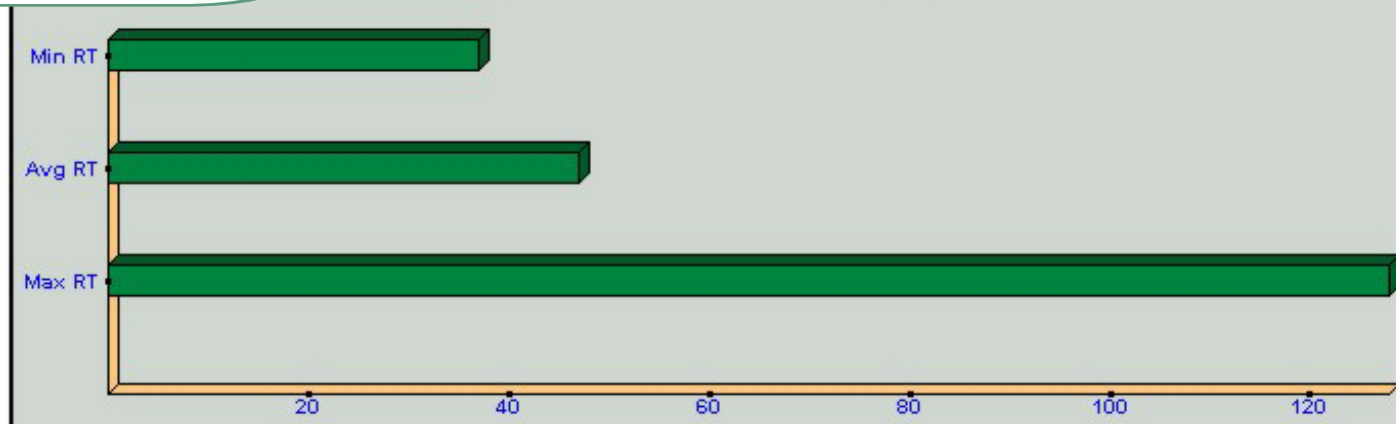


# Network Health



What is the average response time

Network Health for BOB 9.82.130.124



# Response Time Alerting

The screenshot shows the NPM 'Set Performance / Availability Alerts' window. The interface includes a menu bar (File, Edit, View, Go, Communicator, Help) and a toolbar with buttons for Reports, SessionLog, History, SNMP, StackView, Monitor, Commands, and Master. The current host is identified as DEMOMVS 9.39.64.151. The 'Start /Stop Alerting' section has radio buttons for 'Start Alerting' (selected), 'Stop Alerting', 'Performance' (selected), and 'Availability'. A 'Response Time Threshold' is set to 250. A list of resources is shown on the left, and a table displays the configuration for each resource. A terminal window at the bottom shows real-time alerting logs.

Address	Name	Performance Alerting	Response Time Threshold	Availability Alerting
9.39.64.1	NET64ROUTER.DEMO	on	100	on
9.39.64.10	AFSERV1.DEMOPKG.	off	0	off
9.39.64.101	9.39.64.101	on	100	on
9.39.64.102	9.39.64.102	off	0	off
9.39.64.103	9.39.64.103	on	100	on

```

AES901W IP=9.82.7.187      PK=2048 RT=86   TH=15   TIME=22:41:47
AES902W IP=9.184.20.69    NOT RESPONDING TIME=22:42:13
AES901W IP=9.184.19.57    PK=256  RT=308  TH=100  TIME=22:42:52
AES901W IP=9.184.19.57    PK=512  RT=324  TH=100  TIME=22:42:52
    
```

# Overall Status

The screenshot shows the Tivoli NPM IP Connect Expert web interface. The browser window title is "Connect Expert - Microsoft Internet Explorer". The address bar shows the URL: `http://9.39.64.40/servlets/portocal?&Host=9.82.2.208&HostPort=5050&AddHelp=1&HostName=&Access=1`. The interface includes a navigation menu with buttons for Reports, SessionLog, History, SNMP, StackView, Monitor, Commands, and Master. The Tivoli logo is visible in the top right. Below the navigation menu, the host IP is displayed as 9.82.2.208, and the refresh time is 7/5/2001 21:00:06. There are links for Logoff, Home, Change Host, Options, and Help. The main content area is divided into sections for AutoRefresh, Listeners, and Sessions. The Sessions section contains a table with columns for Name, Port, Bytes In, Bytes Out, Bytes Percent, Number of Sessions, Session Percent, Sessions not Established, and Sessions Time Wait or Closed.

**AutoRefresh:** Refresh: 60 seconds [Refresh](#)

**Listeners**

Name	Port
?	?
GPMSEVER	8801
GPMSEVER	8803
NVCBAP13	9980
NVCBAP13	4020
NVCBAP13	9990
IAMC	1970
SMTP	25
INETD4	513
INETD4	523
INETD4	514
NV13EVNT	5120
WEB12A	8006
JUI	8080

**Sessions**

Name	Port	Bytes In	Bytes Out	Bytes Percent	Number of Sessions	Session Percent	Sessions not Established	Sessions Time Wait or Closed
?	?	?	?	?	?	?	?	?
<a href="#">NV13EVNT</a>	<a href="#">1029</a>	0	0	0.0%	1	7.0%	0	0
<a href="#">LCFD6</a>	<a href="#">9495</a>	221	0	0.0%	1	7.0%	1	0
<a href="#">TCPIP</a>	<a href="#">23</a>	81,532	4,143,935	99.0%	4	30.0%	0	0
<a href="#">TCPIP</a>	<a href="#">1025</a>	1,012	1,432	0.0%	1	7.0%	0	0
<a href="#">TCPIP</a>	<a href="#">1026</a>	1,432	1,012	0.0%	1	7.0%	0	0
<a href="#">OSNMPD</a>	<a href="#">1028</a>	0	0	0.0%	1	7.0%	0	0
<a href="#">AESTCPIP</a>	<a href="#">5050</a>	46	0	0.0%	5	38.0%	4	4

# NetView Performance Monitor for TCP/IP

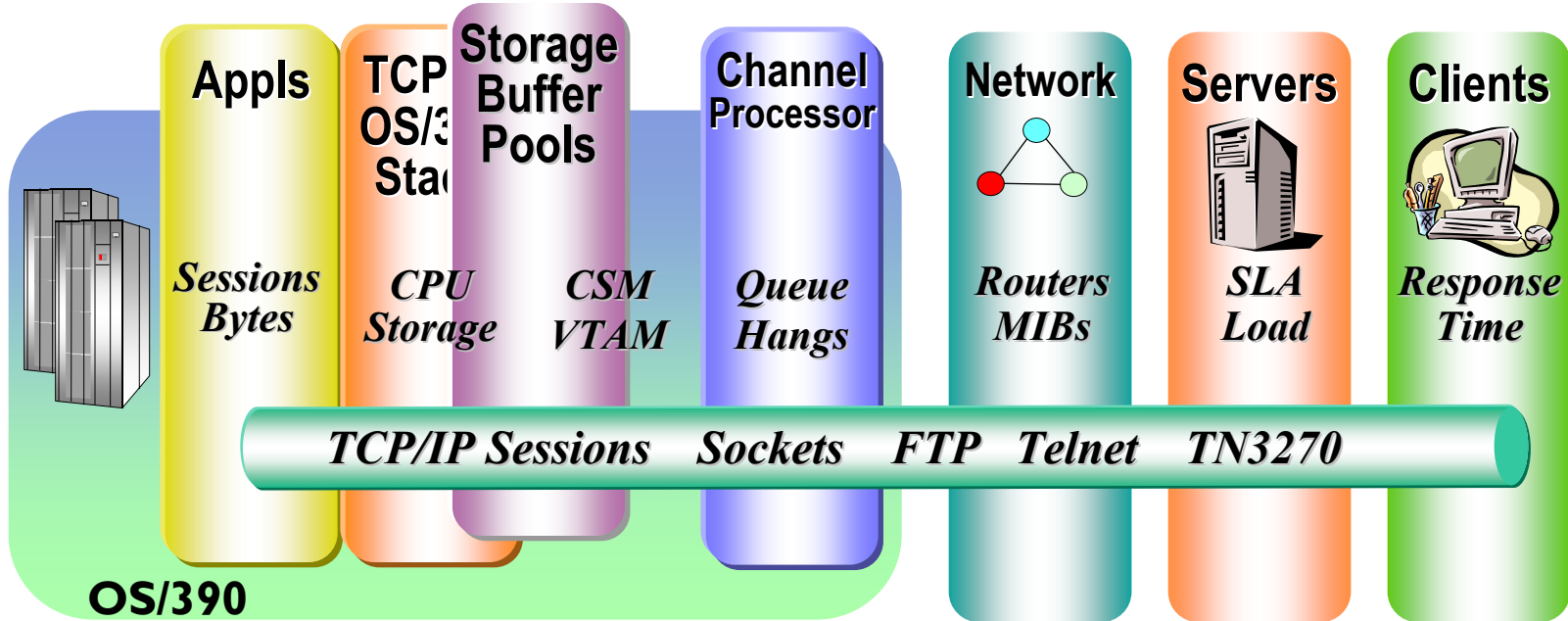
---

*Finally...*

Effective Performance Management  
for  
z/OS & OS/390 TCP/IP enterprise networks!!!



# Tivoli NPM/IP - End to End



Product number: 5698-PMI

Discussion forum: <http://groups.yahoo.com/npmip>

Web site: <http://www.tivoli.com>

