Common Problems with IP Performance Management

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Agenda

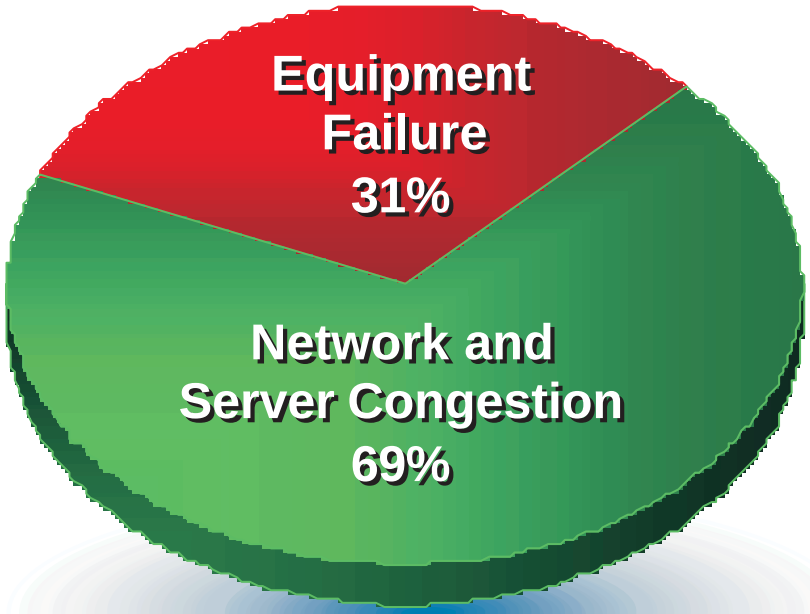
Introduction and background

Performance Methodologies

7 Common Problems

- Am I miss-using buffer space?
- What are response times?
- What's going on in the IP Stack?
- What is system availability?
- Who is using my resources?
- Who is hogging resources?
- What connections are there available?

Productivity Loss and Application Downtime



"Congestion-related performance degradation has been found to cause the majority of network downtime costs"

Michael Howard
President, Infonetics Research

Increasing Importance of Performance

Performance Management

The practice of managing network service response time, consistency and quality for individual services and services overall

Performance Related Risks

- **Network degradation and failure**
- **Application timeouts and failure**
- **Application degradation**

Loss of Customers

The Performance Problem

Over-provisioning

- Lots of provisions (rare)
- More resources than can be consumed
  - Food on a cruise
  - Congressional parking spaces
  - AOL CD-ROMs

Over-subscribing - lots of subscribers

- Lots of subscribers (common)
- Many users consume all the resources
  - Batteries, chain saws, interstate lanes during a hurricane
  - Phone calls on Mothers' Day
  - Many to few: whenever there's a bottleneck or funnel
  - Fast to slow: things will back up

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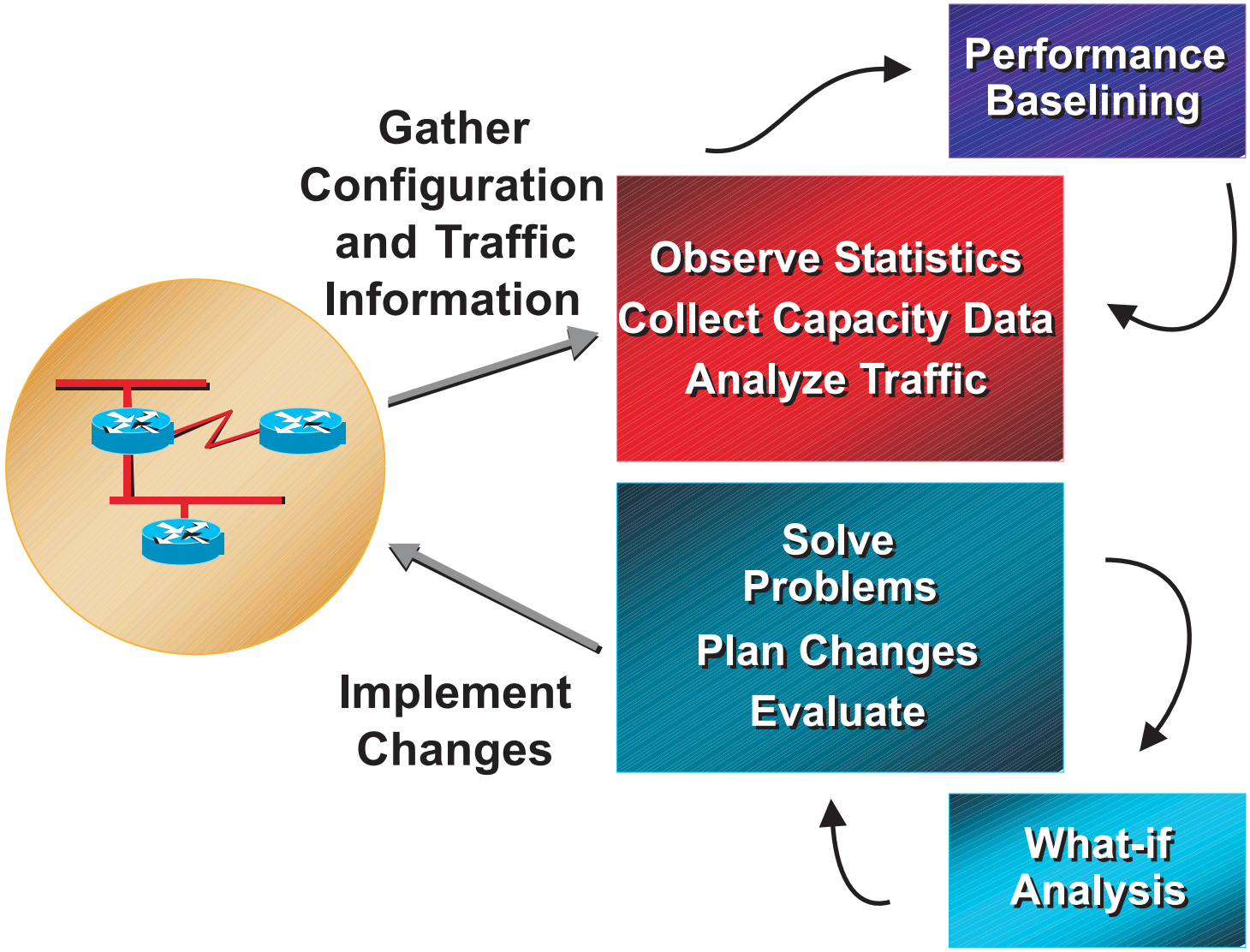
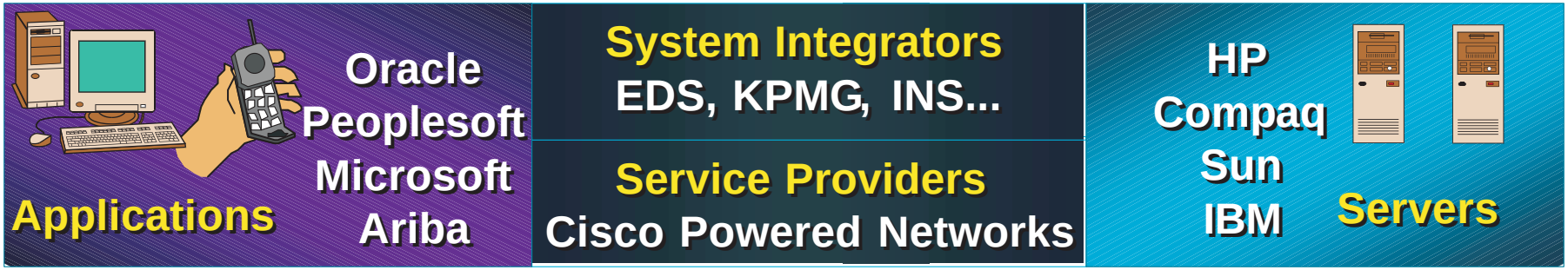
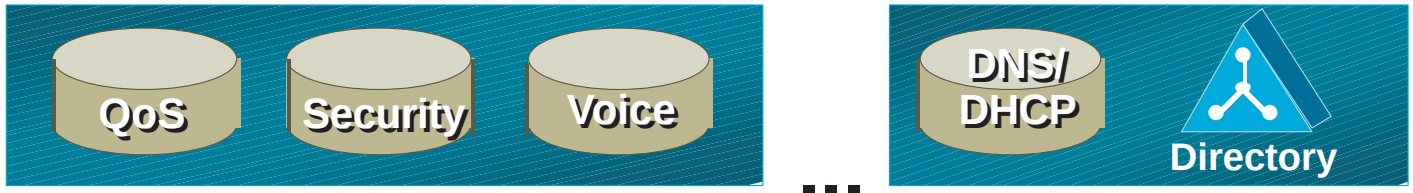
Effective Performance Management



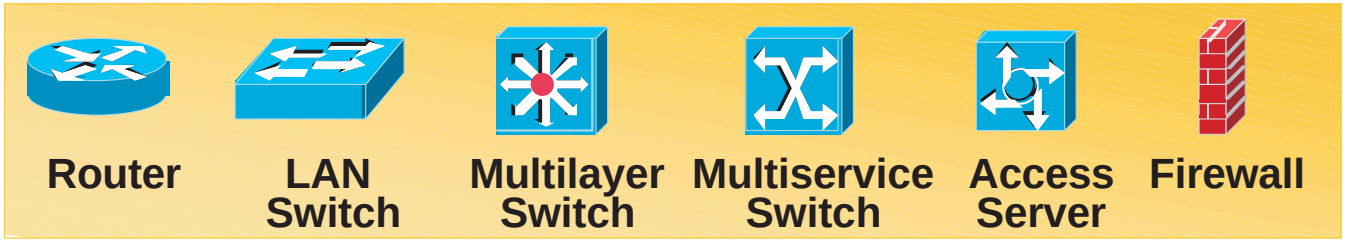
Network Complexity



DiffServ IntServ RSVP DHCP/DNS VoIP
IPSec CIM/DEN LDAP COPS



Policy and Control Servers ... Registration and Directory



Intelligent Network Devices

IP Resource Bottlenecks

CPU

Memory

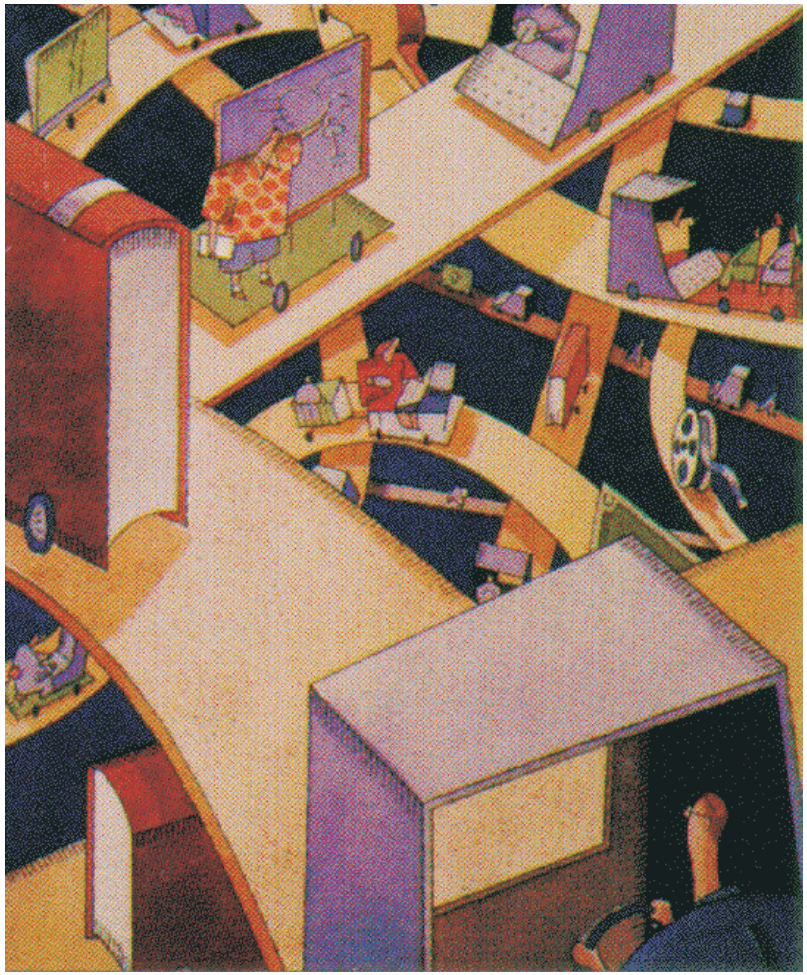
Buffering, queuing, and latency

Interface and pipe sizes

Network Capacity

Speed and distance

Application characteristics



Results in

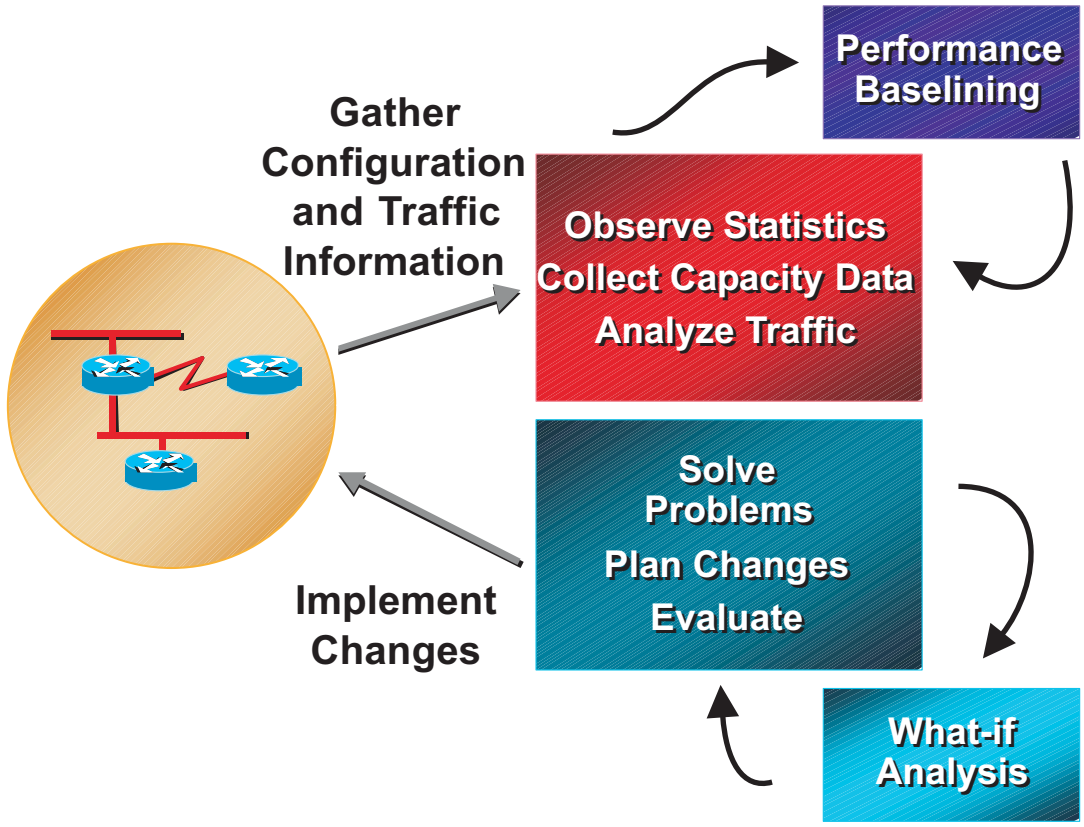
Network capacity problems

Utilization overload

Application failure

Information to Collect

- Link/segment utilization
- CPU utilization
- Memory utilization
- Response time
- Queue/buffer drops
- Broadcast volumes
- Traffic shaping parameters
- RMON statistics
- Packet/frame drops/loss
- Environment specific



Performance Plan

Develop information collection plan

- **Define parameters to be monitored/measured and the threshold**
- **Acquire proper authority to change threshold**
- **Determine frequency of monitoring and reporting**
- **Determine frequency of alerting mechanism**
- **Define parameters that trigger alert mechanism**

Define performance areas of interest

Report and interpret results

Determine tools for collecting information

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The Problem
Buffer Utilization

Buffers are critical component of any operating system
Buffers are critical components of any application

Running low or out of buffers on any system can cause
- immediate application failure
- system slowdown impacting all applications
- need to restart system

Running low or out of buffers on any application can cause
- immediate application failure
- domino effect on related resources and applications
- intermittent application oddities

Tuning buffer utilization is important
- How do you know hat you are using?
- How do you know you are about ready to exceed limits?

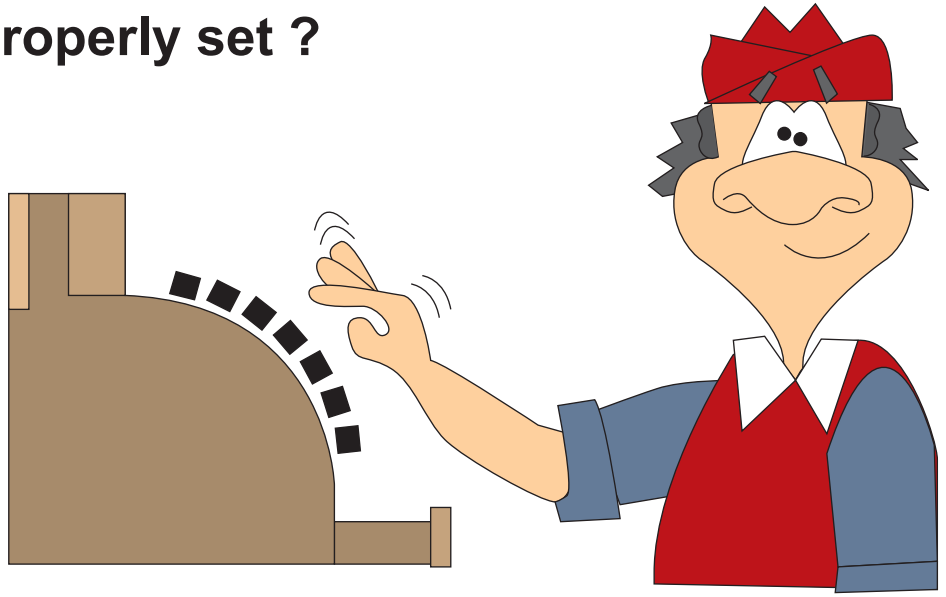
Elements

Do you have your buffers pools properly set ?

What are you currently using?

What buffer areas are in expansion?

What is the expansion increments?



If I reallocate buffers can I alert if a buffer reaches a certain utilization point?

Can alerts be forwarded to my operations console, whichever one I choose?

What are the totals for my system and are leaks occuring?

Understanding Buffer Storage

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
11/22/2002	9:03	*TOTAL*	68	16	320	0	0	64	64	64	64	64
11/22/2002	9:03	TCPIP	44	16	320	0	0	64	64	0	0	0
11/22/2002	9:03	VTAM	24	0	320	0	0	64	0	0	0	0
*	*	*	*	*	*	*	*	*	*	*	*	*
11/22/2002	9:13	*TOTAL*	68	16	320	0	0	64	64	64	64	64
11/22/2002	9:13	TCPIP	44	16	320	0	0	64	64	0	0	0
11/22/2002	9:13	VTAM	24	0	320	0	0	64	0	0	0	0
*	*	*	*	*	*	*	*	*	*	*	*	*
11/22/2002	9:23	*TOTAL*	60	16	320	0	0	64	64	64	64	64
11/22/2002	9:23	TCPIP	40	16	320	0	0	64	64	0	0	0
11/22/2002	9:23	VTAM	20	0	320	0	0	64	0	0	0	0
*	*	*	*	*	*	*	*	*	*	*	*	*

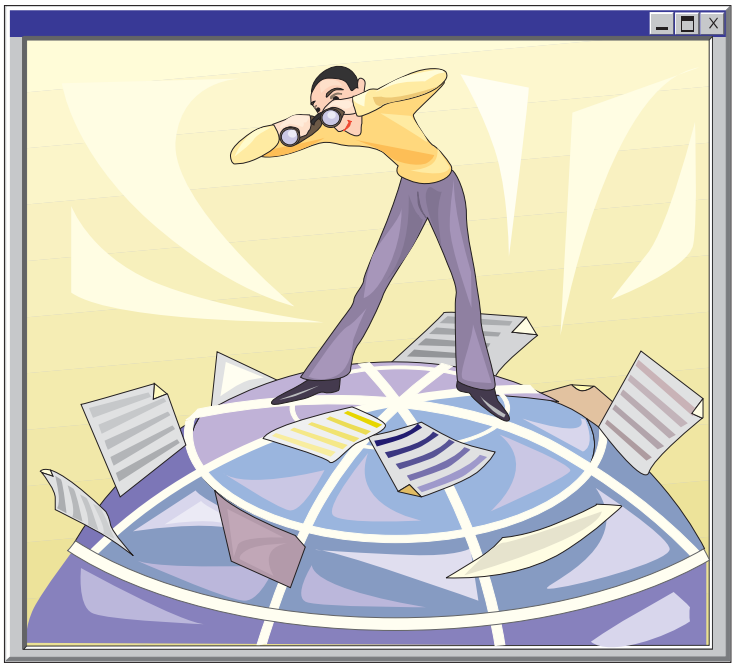
The Problem Response Time

Web users expect 2 to 5 second response time

SNA users expect sub-second response time

No one is ever happy with what they get

External customers may go elsewhere



Where is the problem?

- **Network?**
  - **Router have long ques?**
  - **Is the Lan to slow?**
  - **Is the route long?**
- **Operating system?**
  - **Too long to queue for transmit?**
- **Application?**
- **Protocol?**
  - **Window size improperly set?**
  - **MTU size improperly set?**

Elements

What are overall response times in my network?

What are response times for different size frames?

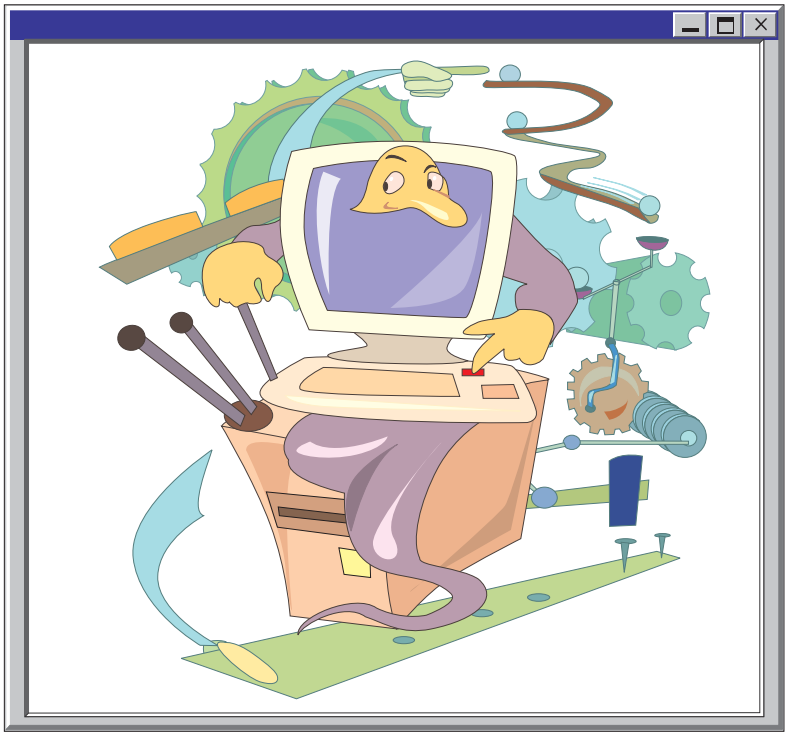
Can I look at a specific address and determine its response time?

Are both real time and historical views available?

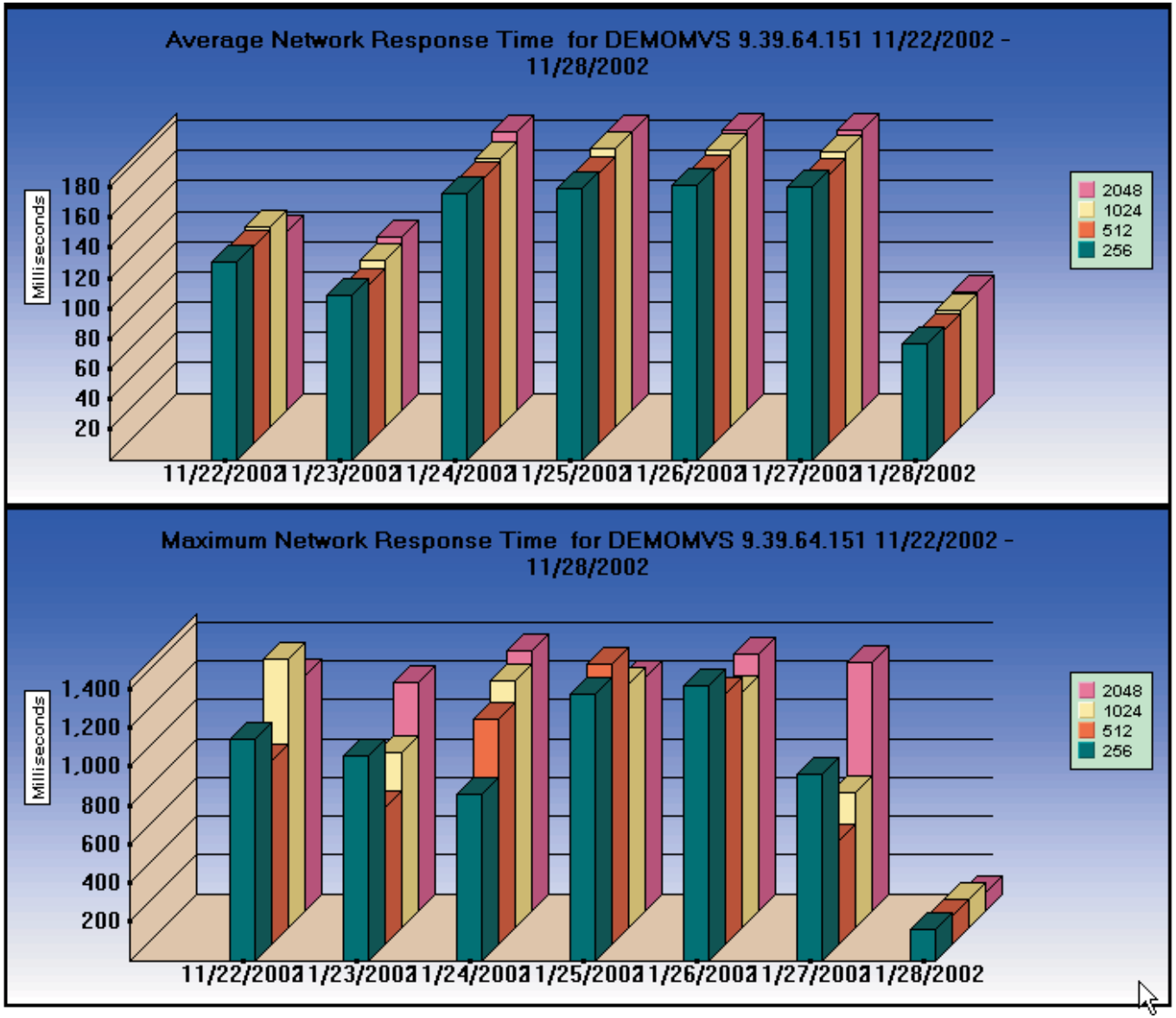
Are both graphical and tabular views available?

Can I set thresholds?

Can I send alerts?



Historical Response Time



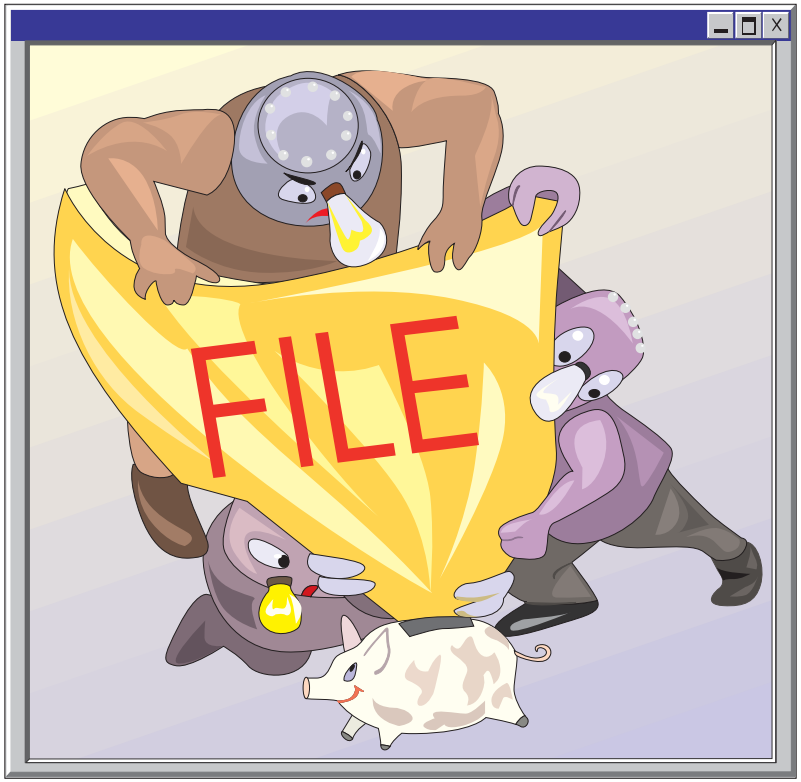
The Problem
System Utilization

Since you cannot over-provision your system (add as much memory as you want, as much DASD, etc) you need to optimize

Determining what is currently being used on the system will assist in determining how much you can grow the system

An application behaving poorly may be due to improper design, improper setting of system resources to use, or application configuration

Sluggishness of a system may be due to not enough CPU, I/O overloads, or queue latencies



Elements

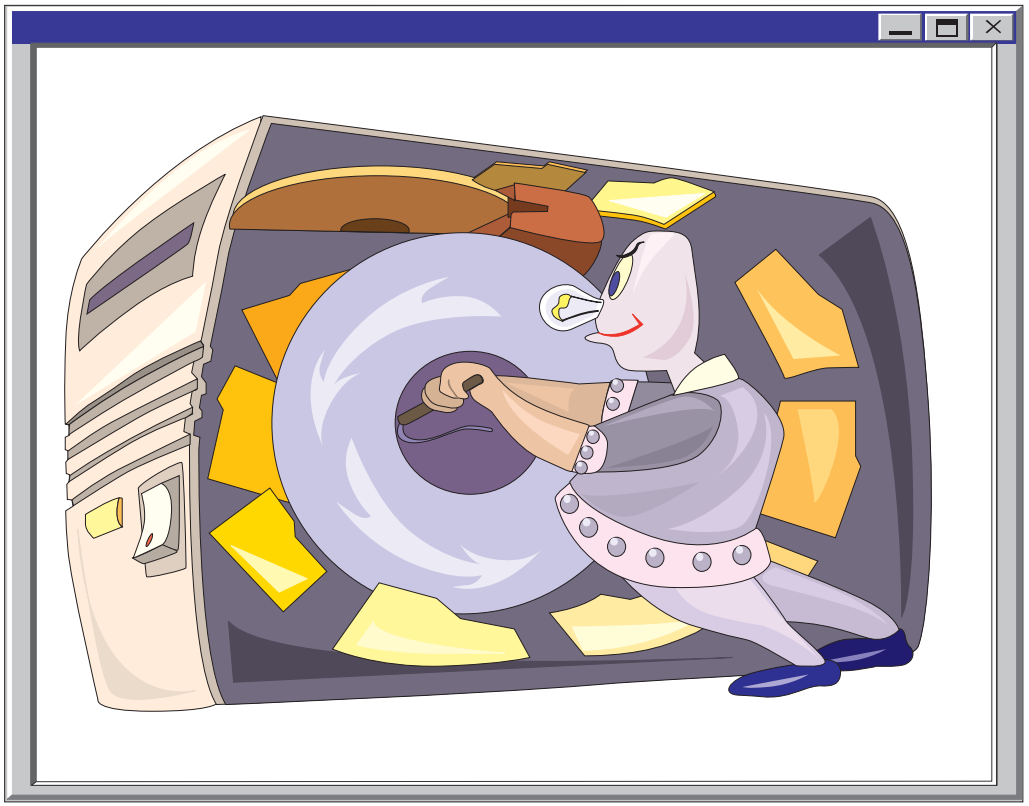
What system resources are major address spaces using?

Can I select the address space to view?

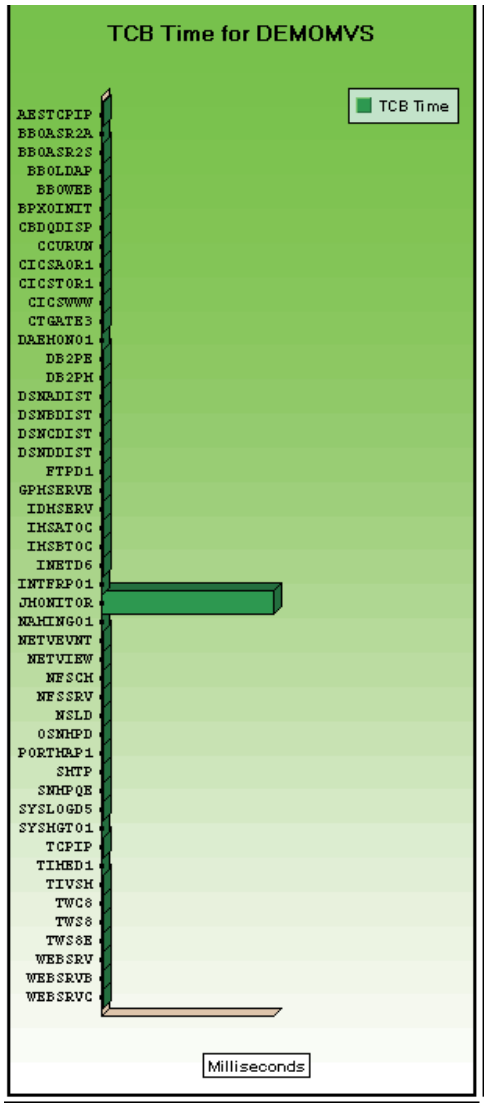
How does the utilization change within a given time?

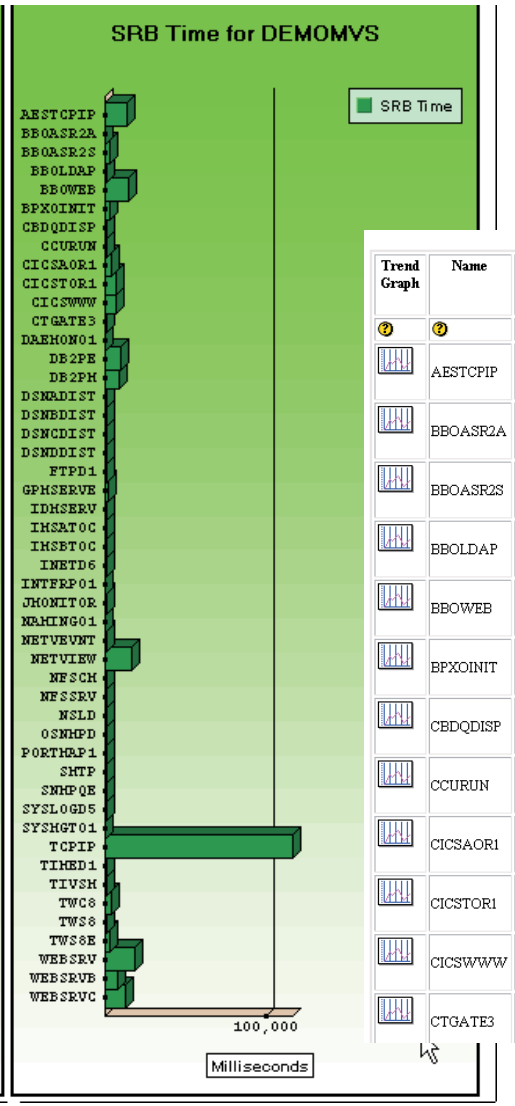
Can I freeze a screen?

Do I have the raw data available to me?



System Utilization





Trend Graph	Name	Ports	TCB Time	SRB Time	EXCPs	I/O Time	Real Page Frames	Address Space Position	Last Swap	Hiperspace	Perf Group	Domain	Address Space ID	Dispatch
	AESTCPIP	5050	758s 10ms	13s 150ms	626,963	5s 340ms	973	Non-swappable	-	0	0	0	139	254
	BBOASR2A	1037, 63012, 63013	0s 0ms	0s 0ms	0	0s 0ms	0	-	-	0	0	0	0	0
	BBOASR2S	1038	73s 199ms	2s 834ms	141,236	0s 265ms	73,731	In storage	Detected wait	0	0	0	180	193
	BBOLDAP	1389	31s 331ms	0s 483ms	1,620	0s 10ms	725	Logically swapped out	Detected wait	0	0	0	173	255
	BBOWEB	1039, 1040, 8080	384s 782ms	13s 806ms	96,233	0s 146ms	4,860	In storage	-	0	0	0	172	254
	BPXOINIT	10007	38s 952ms	2s 631ms	3,572	0s 0ms	91	In storage	-	0	0	0	61	255
	CBDQDISP	51107	0s 27ms	0s 7ms	333	0s 3ms	56	Logically swapped out	Long wait	0	0	0	127	255
	CCURUN	2697	2s 513ms	0s 405ms	91	0s 1ms	81	In storage	-	0	0	0	149	254
	CICSAOR1	9191	20s 977ms	3s 510ms	8,048	0s 55ms	684	Non-swappable	-	0	0	0	88	254
	CICSTOR1	3080	33s 897ms	6s 21ms	6,369	0s 49ms	651	Non-swappable	-	0	0	0	90	254
	CICSWWW	8535, 8380	31s 587ms	6s 264ms	5,384	0s 56ms	464	Non-swappable	-	0	0	0	146	254
	CTGATE3	2006	63s 767ms	0s 779ms	30,692	0s 2ms	3,608	In storage	-	0	0	0	163	193

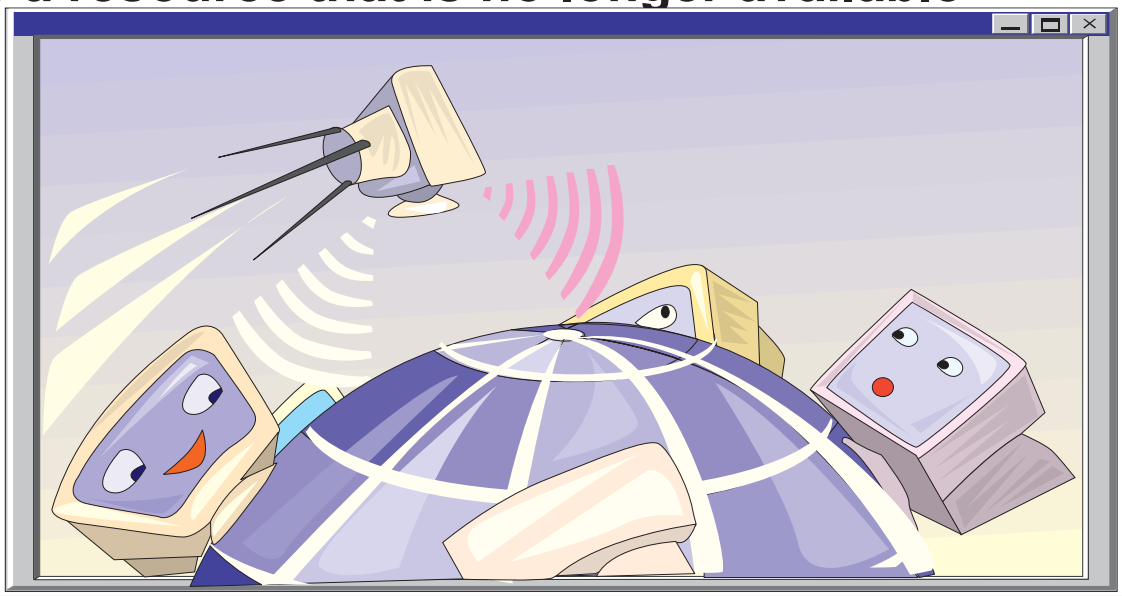
The Problem Availabilty

Resources, applications, network components that are not available impact many aspects of your system

IP is especially prone to this due to the ‘non-configurable’ operations

Critical resources can come and go with no ‘network-wide’ configuration, but this may impact other systems

Five steps may occur in a process before you realize that the six step requires a resource that is no longer available



The Elements

Can you get a quickview of overall availability?

Can you define critical resources?

Have alerts been sent?

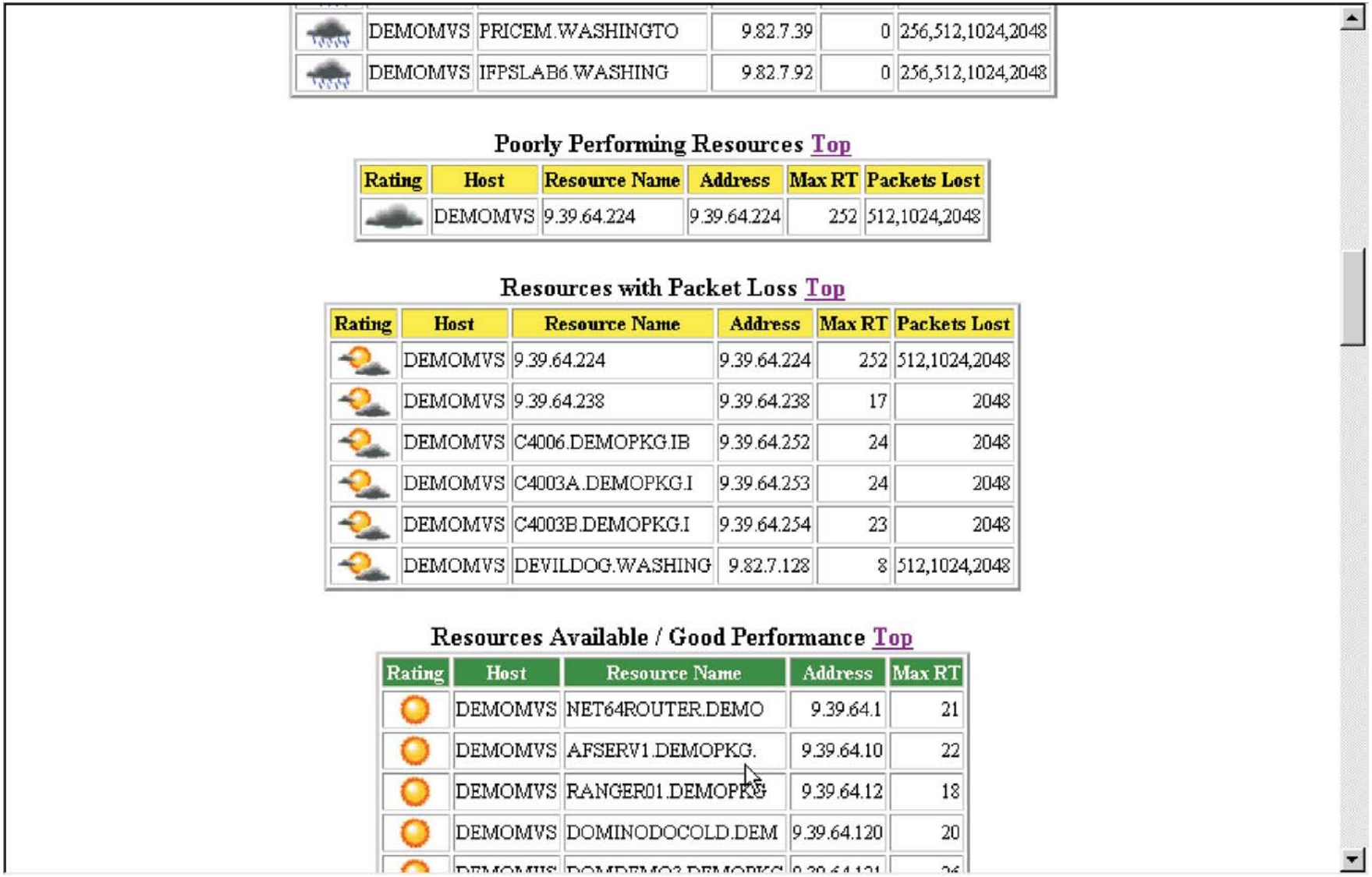
Is the system not available because the system is down or because a resource like a router is having problems (traceroute)?

Can I tell if the route is not the normal route taken?

Has the situation cleared itself up?

How can I get more details from an offending intermediary system?

Real Time Availability



	DEMOMVS	PRICEM.WASHINGTO	9.82.7.39	0	256,512,1024,2048
	DEMOMVS	IFPSLAB6.WASHING	9.82.7.92	0	256,512,1024,2048

Poorly Performing Resources Top

Rating	Host	Resource Name	Address	Max RT	Packets Lost
	DEMOMVS	9.39.64.224	9.39.64.224	252	512,1024,2048

Resources with Packet Loss Top

Rating	Host	Resource Name	Address	Max RT	Packets Lost
	DEMOMVS	9.39.64.224	9.39.64.224	252	512,1024,2048
	DEMOMVS	9.39.64.238	9.39.64.238	17	2048
	DEMOMVS	C4006.DEMOPKG.IB	9.39.64.252	24	2048
	DEMOMVS	C4003A.DEMOPKG.I	9.39.64.253	24	2048
	DEMOMVS	C4003B.DEMOPKG.I	9.39.64.254	23	2048
	DEMOMVS	DEVILDOG.WASHING	9.82.7.128	8	512,1024,2048

Resources Available / Good Performance Top

Rating	Host	Resource Name	Address	Max RT
	DEMOMVS	NET64ROUTER.DEMO	9.39.64.1	21
	DEMOMVS	AFSERV1.DEMOPKG.	9.39.64.10	22
	DEMOMVS	RANGER01.DEMOPKG	9.39.64.12	18
	DEMOMVS	DOMINODOCOLD.DEM	9.39.64.120	20

The Problem
Resource Utilization

Application usage by end users is very unpredictable in IP. What was valid last week may not be valid today

An application installed on a system and active not being utilized by end users is taking system resources that could be used by other applications

Sometimes it is appropriate to block users after a given number have logged onto an application in order to conserve existing resources

Knowing who is using what on a given system can help determine long term capacity planning needs for the system

The Elements

For a given system, can you determine the applications being used?

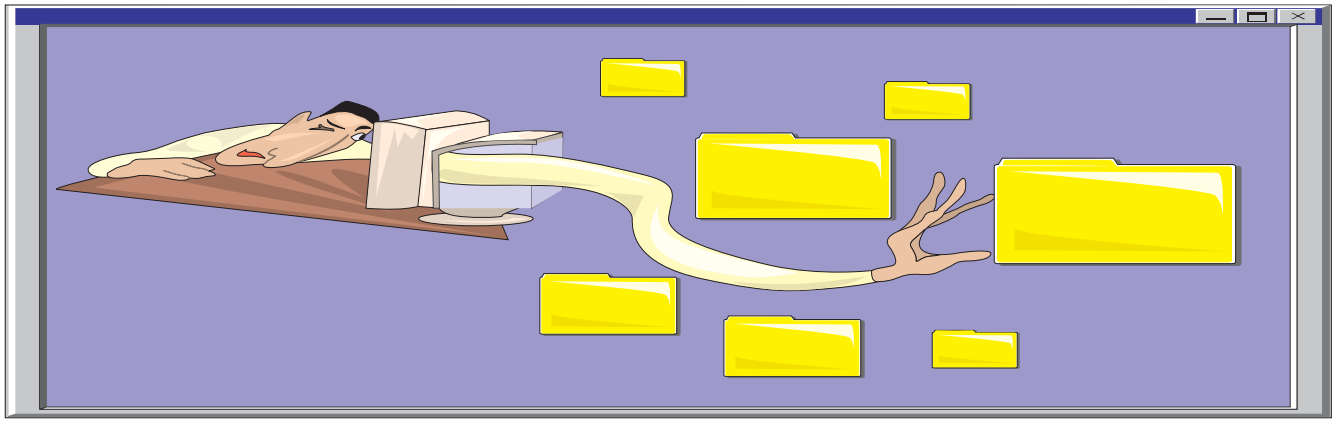
Can you tell for each application the session or user counts?

Can you tell for each application the number of bytes transferred?

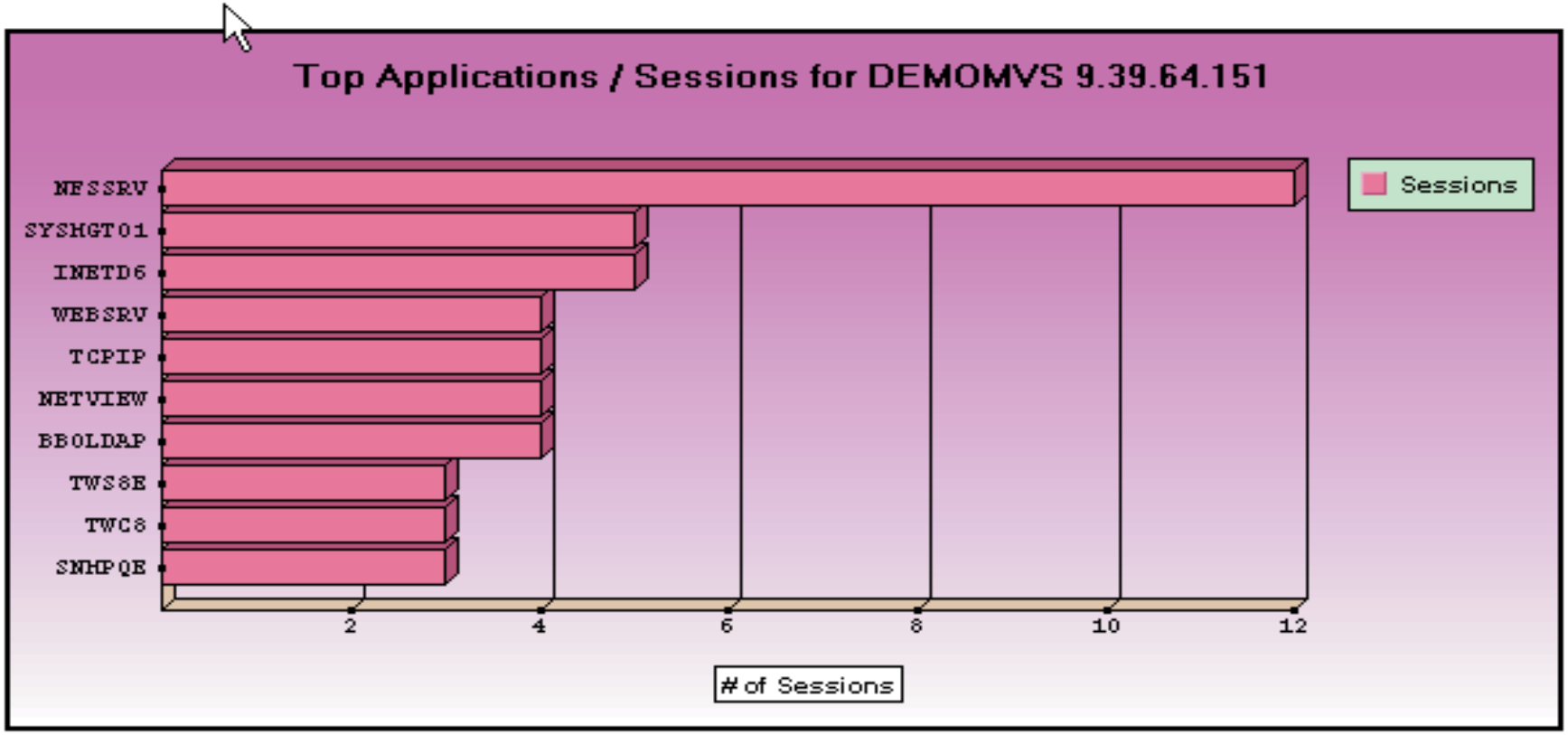
Can you get more details on a historical basis? Determine patterns like a 3% monthly growth in usage?

Can you alert on miss-use of an application?

Can you shut a user out of an application in real time?



Real Time Applications by Sessions

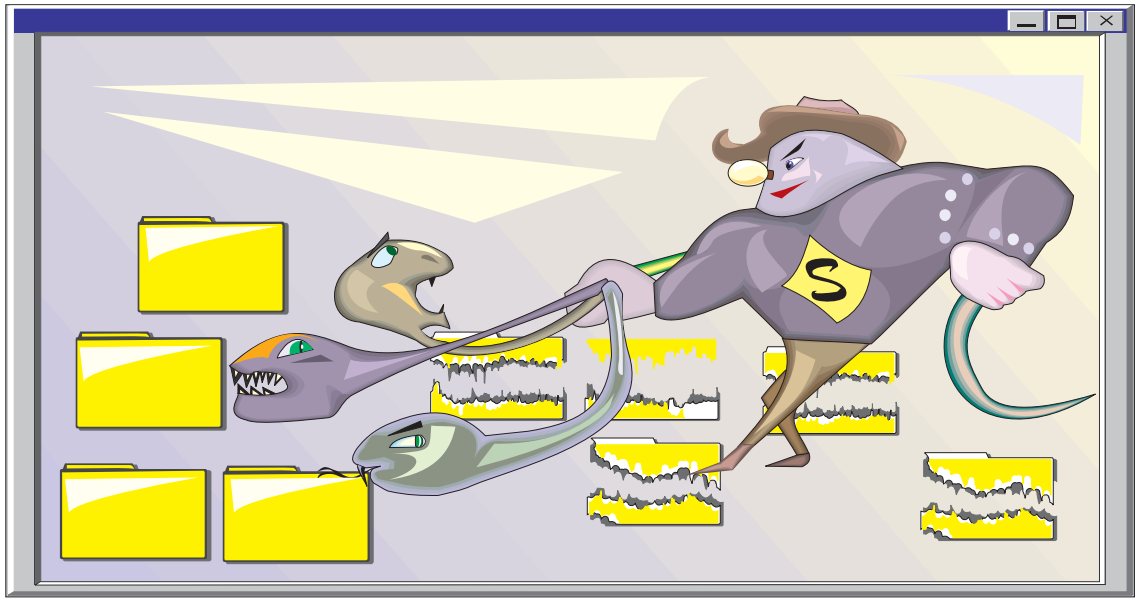


The Problem
Who is Hogging Resources

Excessive backups to a production server by end users can impact production applications

A continuous backup can reduce system resources available for other functions

Your expensive DASD may be used via FTP to hold trivial end user data (like games)



The Elements

Can you determine sessions by applications or bytes by applications?

Can you determine top 10 clients bytes transferred?

For selected clients can you determine bytes transferred?

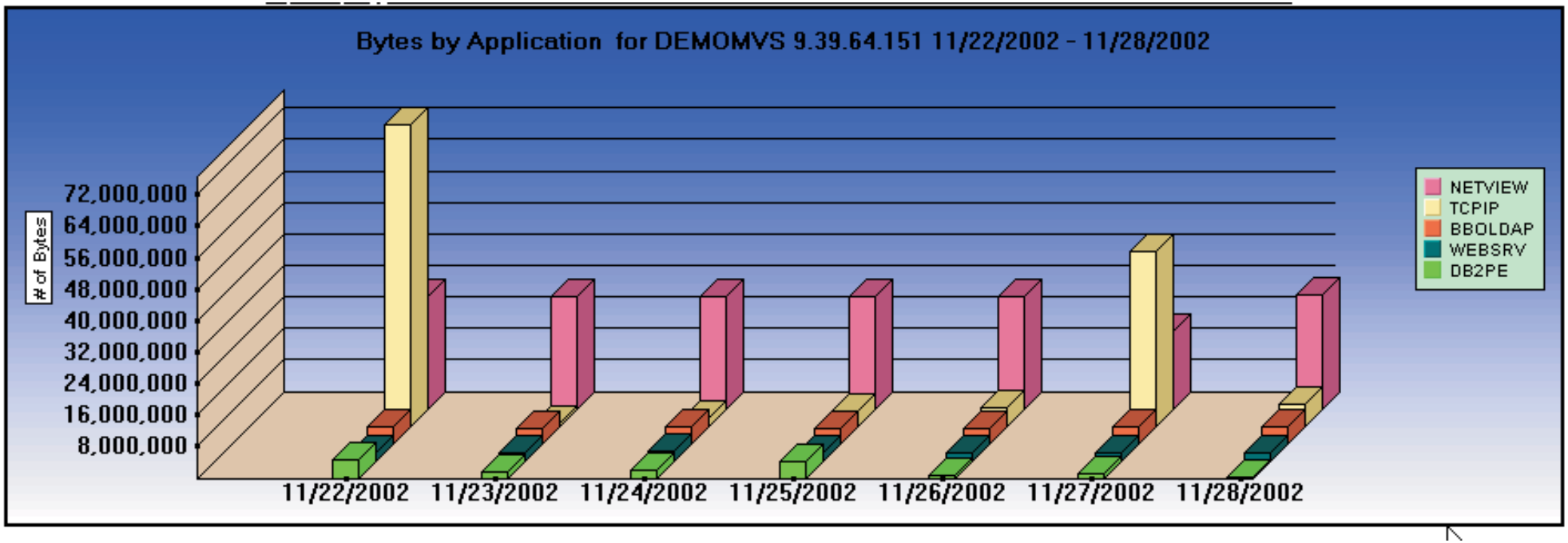
Can you determine past history?

Can you determine if alerts have been sent?

Can you view not only the IP address but the DNS name?

Can you set refresh rate?

Historical Bytes by Application

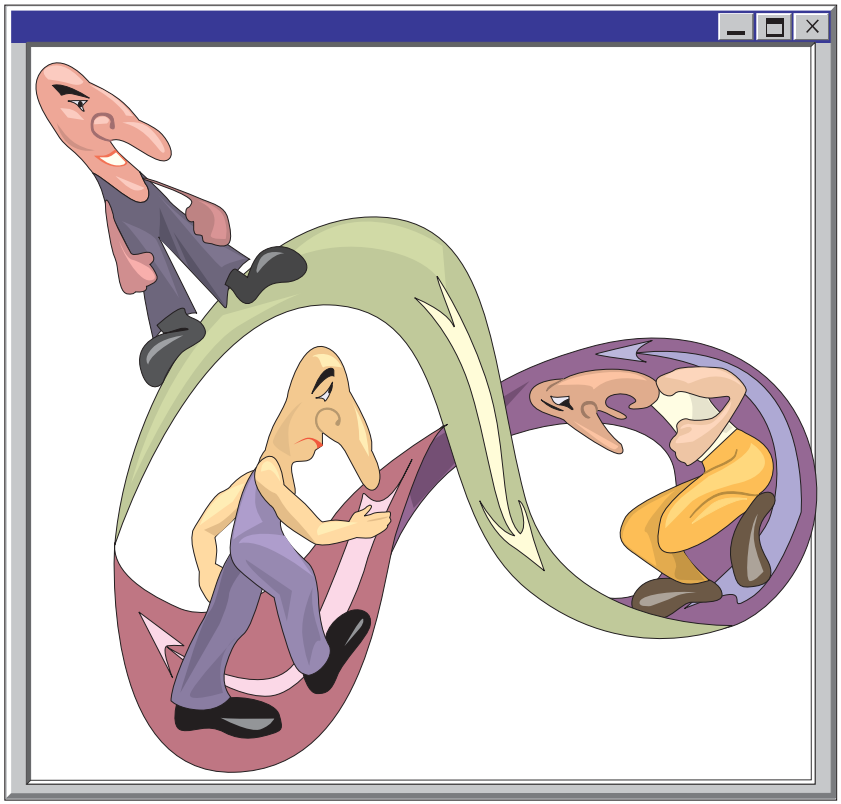


The Problem
A System Perspective

You are dealing with a system, not just a standalone computer. Other tools in the network may give you the views you want, but without access, the information is not readily available to you

Standalone CPU based tools are not expandable to view the outside components

Others will need to be involved as you delve into problems, but the tools at your disposal need to give you basic information in order to proceed



The Elements

Can you determine information on not only the CPU involved, but also other network components that may be impacting the problem?

Can you determine availability and response times for the users of your CPU?

Real time and historical data is needed
.. One to solve immediate problems
... One to allow capacity planning

Are commands access provided as well as alerting to operational consoles

Can a new employee quickly learn the system?

Performance Management

SysPoint

Stack Name	Stack IP Address	CSM Buffer Alerts	Link Alerts	Port Alerts	Session Alerts	Critical Res. Avail. Alerts	Critical Res. Perf. Alerts	Stack Bytes In	Stack Bytes Out	Total Channel Links	Not Ready Channel Links	Not Ready Channel Devices	Active Listeners	Inactive Listeners	UDP Sessions	TCP Sessions	% Avail. Critical Resources
DEMOMVS	9.39.64.151	0	0	0	0	0	0	83,344	96,032	2	0	0	68	0	18	86	100%
HSLECNJE	9.82.130.125	0	0	0	0	0	0	7,488	5,952	7	0	0	21	1	11	24	71.4%
?	9.39.6																
?	9.82.1																

Sessions

Name	Port	Bytes In	Bytes Out	Bytes PerCent	Number of Sessions	Session PerCent	Sessions not Established	Sessions TimeWait or Closed
BBOLDAP	1389	3,075,771	13,276,401	11.5%	3	13.6%	0	0
BBOASR2S	1038	22,759	3,728	0%	1	4.5%	0	0
BBOWEB	1039	684	63	0%	1	4.5%	0	0
BBOWEB	1040	6,632,443	1,537,324	5.7%	1	4.5%	0	0
NETVEVNT	1035	0	17,680	0%	1	4.5%	0	0
NETVIEW	1047	48,555,520	61,352,448	77.1%	1	4.5%	0	0
BBOASR2A	1037	1,368	126	0%	1	4.5%	0	0
TWC8	1036	0	740	0%	1	4.5%	0	0
TWC8	424	740	0	0%	1	4.5%	0	0
SYSMGT01	900	252	2,736	0%	3	13.6%	0	0
TCPIP	1026	1,462	840	0%	1	4.5%	0	0
TCPIP	1025	840	1,462	0%	1	4.5%	0	0
AESTCPIP	5050	46	0	0%	4	18.2%	3	3
WEBSRV	1042	6,621,199	1,534,719	5.7%	1	4.5%	0	0
WEBSRV	1041	684	63	0%	1	4.5%	0	0

Service Level Management

Define performance requirements
Define upgrade criteria by performance
Measure performance
Review thresholds and baseline

Threshold	WAN	LAN
CPU	75-90%	75-90%
Link	80-90%	40-90%
Memory	50%	50%
Output Queue	200	25
Buffer Misses	Any	Any
Broadcast Vol	10/Sec	300/Sec
FECN/BECN	10/Sec	N/A

Performance Summary

You never solve performance problems.....You just keep moving them

The basic performance issues remain the same.....But QoS adds a new view

Emerging applications need higher levels of performance

Performance data readily available .....but the interpretation and action plans are lax

Complexity

Expect change and new ideas to emerge

Policy systems required to ease administration complexity

What about VM?

- Performance tools from IBM
  - ibm.com/vm/perf
- RTM - Short-term study or problem solving
  - ibm.com/vm/related/rtm
- PRF - Long-term trend analysis or capacity planning
  - ibm.com/vm/related/prf
- FCON - The best of both, coming soon to z/VM!
- RMF PM with support for Linux
  - ibm.com/eserver/zseries/zos/rmf/rmfhtmls/pmweb/pmlin.htm
- Performance publication
  - ibm.com/vm/perf/docs

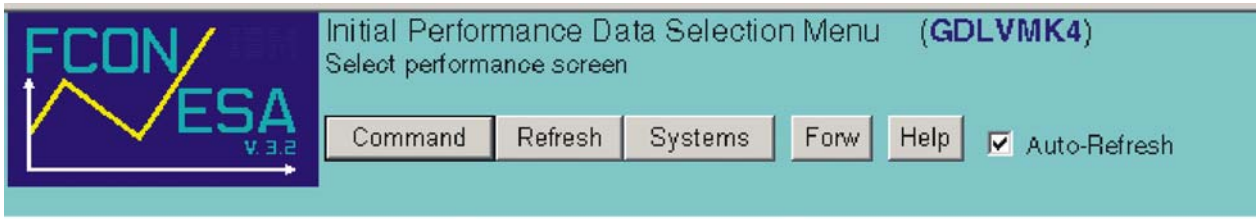
FCON:

- The 'Full Screen Operator CONsole and Graphical Real Time Performance Monitor' (FCON) is a CMS utility designed to assist operators and systems programmers or analysts in the following areas:
  - System console operation in full screen mode
    - Designed to facilitate the operation of VM systems, thereby improving operator efficiency and productivity
  - Performance monitoring on z/VM systems
    - An enhanced real time performance monitor allows systems programmers to monitor system performance and to analyze bottlenecks
    - Designed to improve the systems programmer's productivity when analyzing the system, and to allow even a more casual user to work efficiently with the tool
    - Helps systems programmers to make more efficient use of system resources, to increase system productivity and to improve end-user satisfaction

FCON in Full Screen Mode

- General system output (informational messages and replies to commands entered) can automatically be scrolled, using an enhanced scrolling logic
- Messages from other virtual machines are numbered and left pending at the top of the screen until explicitly deleted, even if automatic scrolling is active
- The last few important "action" messages (number can be specified) can also be left pending at the top of the screen until explicitly deleted
- Optionally additional processing of output lines which meet certain user specifications.
- A redisplay facility allows browsing through the day's accumulated console log, or through previous day's logs

FCON Selection Menue



General System Data
1. CPU load and trans.
2. Storage utilization
3. Storage subpools
4. Priv. operations
5. System counters
6. CP IUCV services
7. SPOOL file display*
8. LPAR data
9. Shared segments
A. Shared data spaces
B. Virt. disks in stor.
C. Transact. statistics

D. Monitor data
E. Monitor settings
F. System settings
G. System configuration

H. Exceptions

I. User defined data*

I/O Data
11. Channel load
12. Control units
13. I/O device load*
14. CP owned disks*
15. Cache extend. func.*
16. DASD I/O assist
17. DASD seek distance*
18. I/O prior. queueing*
19. I/O configuration
1A. I/O config. changes

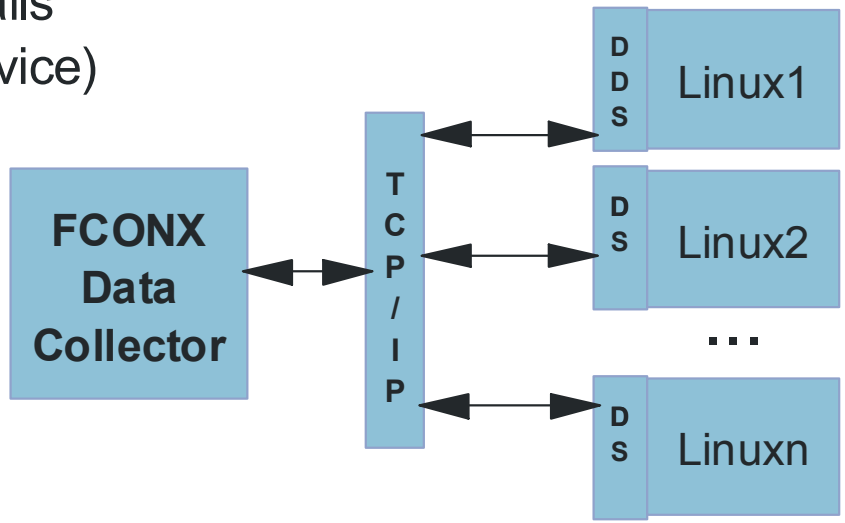
User Data
21. User resource usage*
22. User paging load*
23. User wait states*
24. User response time*
25. Resources/transact.*
26. User communication*
27. Multitasking users*
28. User configuration*
29. Linux systems*

History Data (by Time)
31. Graphics selection
32. History data files*
33. Benchmark displays*
34. Correlation coeff.
35. System summary*
36. Auxiliary storage
37. CP communications*
38. DASD load
39. Minidisk cache*
3A. Paging activity
3B. Proc. load & config*
3C. Logical part. load
3D. Response time (all)*
3E. RSK data menu*
3F. Scheduler queues
3G. Scheduler data
3H. SFS/BFS logs menu*
3I. System log
3K. TCP/IP data menu*
3L. User communication
3M. User wait states

FCON in Performance Mode

- Based on the Linux DDS interface from RMF PM
  - DDS installed and active on all Linux systems monitored
  - Performance data is stored on the Linux systems
  - Performance data retrieved in XML format
- Performance reports
  - System data
  - CPU utilization details
  - Memory utilization and activity details
  - Network activity (overall and by device)
  - File system size and utilization

```
FCONX LINUXUSR:
*Linux-ID IP Address
*|        |
LINUX1    1.222.333.444:8803
LINUX2    1.222.333.445:8803
...       ...
LINUXn    1.222.333.nnn:8803
```



FCON Performance Data Selection

Linux Performance Data Selection
FCON in Performance Monitor Mode

FCON/ESA V3.2

Linux Performance Data Selection (GDLVMK4)
FCXLXI642I Connecting to W3VML at 9.117.32.48:08803

Command | Refresh | Systems | Menu | Forw | Help | Auto-Refresh

Interval 18:32:00-18:33:00, on 2002/08/06 (Select average for mean data)

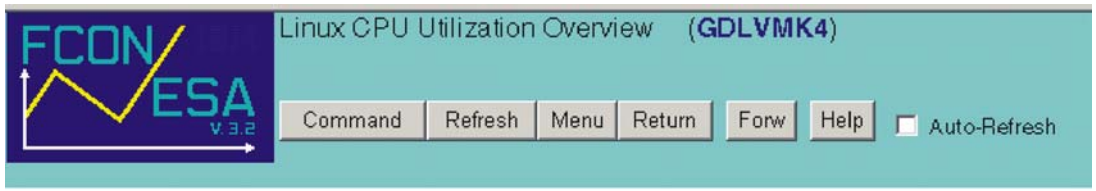
Linux Performance Data Selection for System W3VML

System Data

Processes created per second	0.083
Context switches per second	113.1
Apache: Requests per second	...
Bytes per request	...
Busy threads	...
Idle threads	...
404 Errors per minute	...

S	Perform.	Reports	Description
_	LXCPU	W3VML	CPU utilization details
_	LXMEM	W3VML	Memory utilization & activity details
_	LXNETWRK	W3VML	Network activity (overall & by device)
_	LXFILSYS	W3VML	File system size and utilization

FCON Performance CPU Utilization



Interval 18:33:00-18:34:00, on 2002/08/06 (Select average for mean data)

Linux CPU Utilization for System W3VML

	<--- Percent CPU Utilization ---->					<-Accumulated (s)->		
Processor	Total	User	Kernel	Nice	Idle	TotTm	UserTm	KernTm
>>Mean>>	0.63	0.33	0.29	0	99.36	---	---	---
cpu0	0.63	0.34	0.28	0	99.36	---	---	---
Process Name								
gpmddsrv.5378	0.28	0.25	0.03	...	---	...	...	...
procgat.646	0.16	0.03	0.13	...	---	32.64	4.79	27.85
gengat.633	0.03	...	0.03	...	---	4.82	...	4.76
gpmddsrv.654	0.01	0.01	...	...	---	...	...	...
gpmddsrv.9810	0.01	...	0.01	...	---	...	...	...
nscd.338	0.01	...	0.01	...	---	208.9	29.04	179.9
gpmddsrv.18180	0	0	0	0	---	...	...	...
gpmddsrv.18181	0	0	0	0	---	...	...	...
gpmddsrv.18182	0	0	0	0	---	2.81	0.84	1.97
gpmddsrv.24455	0	0	0	0	---	...	...	...
gpmddsrv.24456	0	0	0	0	---	3.09	0.9	2.19
gpmddsrv.27167	0	0	0	0	---	...	...	...
gpmddsrv.27168	0	0	0	0	---	2.57	0.84	1.73
gpmddsrv.29851	0	0	0	0	---	...	...	...
gpmddsrv.29852	0	0	0	0	---	...	...	...

RTM Real Time Monitor

- Provides real time performance information and action logging

```
+-------------------------------------------------------------------------------+
| z/VM CPU2064 SERIAL 123456  512M DATE 03/10/02   START 03:19:12 END 03:19:43 |
|           *                                                                   |
| <USERID> %CPU %CP %EM ISEC PAG  WSS  RES   UR PGES SHARE VMSIZE TYP,CHR,STAT |
| USER52     92  45  47   .0  .0   70   70   .0  254   100     4M VUB,---,DISP |
| USER41     37   0  37   18  .0   41   41   .0    0   100     3M VUX,---,SIMW |
| USER90     36   2  34   19  .0  365  365   .0  257   100     6M VUB,QDS,DISP |
|                                                                               |
|<--- DEVICE ---> <----- DEVICE  RDEV  DATA ------> <-- MEASUREMENT FACILITY ->|
|                    *                                                          |
| DEV TYPE VOLSER IOREQST SEC  %Q %ER R %LK  LNK PA %UT  ACC  FPT  DCT   CN %CN|
|01A0 3380 PGPK02    1958  61 .00 .00   .00    1  4  15    2    0    0    2  15|
|0206 3380 DISK01    1458  45 1.7 .00   .00   92  4  69   15    0   12    2  12|
|0225 3350 DISK92     817  25  13 .00   .00 1140  4  10    4    0    0    3 9.4|
|03E2 3380 PGPK23     750  23  28 .00   .06  202  4  39   17    0   14    2 6.3|
|                                                                               |
| <---------- CPU STATISTICS --------> <-- VECTOR ---> <STORAGE><XSTORE>       |
|  NC %CPU %US %EM %WT %SY %SP  XSI %SC NV %VT %OT RSTR %ST PSEC %XS XSEC   TTM|
|-> 6  491 204 268 109  12 .06  45K  99  0   0   0    0  28  356  96  568 1.420|
|<-..  290  76 203 110  11 .03  28K  98 ..   0   0    0  15  130  96  411 3.650|
+----------------------<-- 08 LOG ACTIONS INDICATED -->----------------------+
```

RTM Action Logging

- RTM will monitor selected counters for "above limit" situations
- When the limit is exceeded, a message can be sent to a service machine to handle the exception

```
+-------------------------------------------------------------------+--------+
|    03/10/02   RTM 4.1.0   INTERVAL ANALYSIS LOG ------>   11:51:49   | ACTION |
+-------------------------------------------------------------------+--------+
|  1) PAGE REQUEST LIMIT EXCEEDED: SYSTEM 32 SEC                    |   12   |
|  2) SUPERVISOR LIMIT EXCEEDED: USER01 43%                         |    8   |
|  3) SUPERVISOR LIMIT EXCEEDED: USER04 63%                         |    8   |
|  4) PAGE REQUEST LIMIT EXCEEDED: USER88 72 SEC                    |   12   |
|  5) EXCESSIVE CHANNEL PATH UTILIZATION: 25% CTCA-03F0             |   25   |
+-------------------------------------------------------------------+--------+
```

RTM Logging

LOGMSG	STATUS	LIMIT	MSGCT	USERID->	LOG MESSAGE 12:00:00 -> 14:38:37
0	ON	100	0		IO RATE EXCEEDED nnnn
1	ON	0	0	OPERATOR	INTERVENTION REQUIRED:
3	ON	0	0	OPERATOR	USERID DISCONNECTED AND DISABLED
5	ON	50	82		STORAGE LIMIT EXCEEDED:
8	ON	40	0		SUPERVISOR LIMIT EXCEEDED:
10	OFF	120	0		userid HAS BEEN IDLE FOR nnn MINUTES
12	ON	25	0		PAGE REQUEST LIMIT EXCEEDED:
13	ON	90	12		CPU UTILIZATION nnn%
16	ON	100	0		STORAGE UTILIZATION nnn%
18	ON	0	0		VOLUME volser MOUNTED:
19	ON	100	43		I/O RATE LIMIT EXCEEDED:
21	ON	0	0		PROCESSOR VARIED OFFLINE:
22	ON	75	0		EXCESSIVE DEVICE PERCENT UTILIZATION: nnn%
23	ON	500	56		EXCESSIVE DEVICE DISCONNECT TIME: nnnn
24	ON	100	310		EXCESSIVE QUEUING IN CHANNEL SUBSYSTEM: nnnn
25	ON	20	42		EXCESSIVE CHANNEL PATH UTILIZATION: nnn%
26	ON	0	0	OPERATOR	DISPATCH LIST ABSOLUTE SHARES NOT AVAILABLE
27	ON	0	0	OPERATOR	TABLE LIMIT EXCEEDED -
34	ON	0	0		XSTORE BLOCKS UNAVAILABLE nnn TIMES
35	ON	3000	4		AVERAGE TRANSACTION TIME: n.nnn SECONDS
36	ON	0	0		DEVICE DYNAMICALLY DELETED