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## **FCON/ESA for VM Performance and its Future in z/VM**

**FCON/ESA V.3.2.04**

VM/ESA Full Screen Operator Console  
and Graphical Realtime Performance Monitor  
(5788-LGA)

Overview

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## Abstract

FCON/ESA, a field developed program, is a very powerful VM/ESA performance monitor, and it is also designed to improve operator efficiency and productivity by means of its integrated full screen operating interface. This presentation is intended to give a general overview over the program's capabilities.

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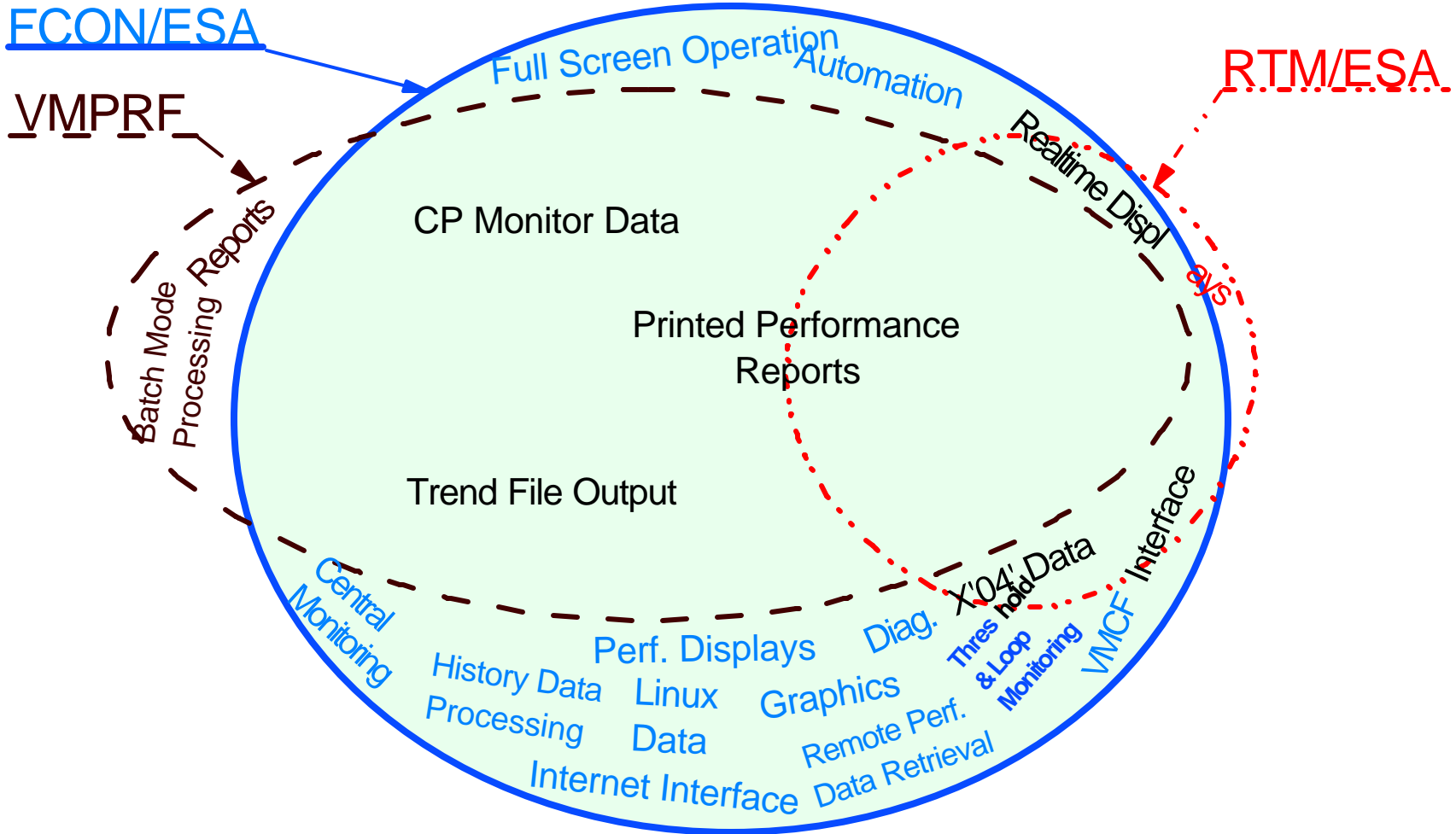
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# Program Functions

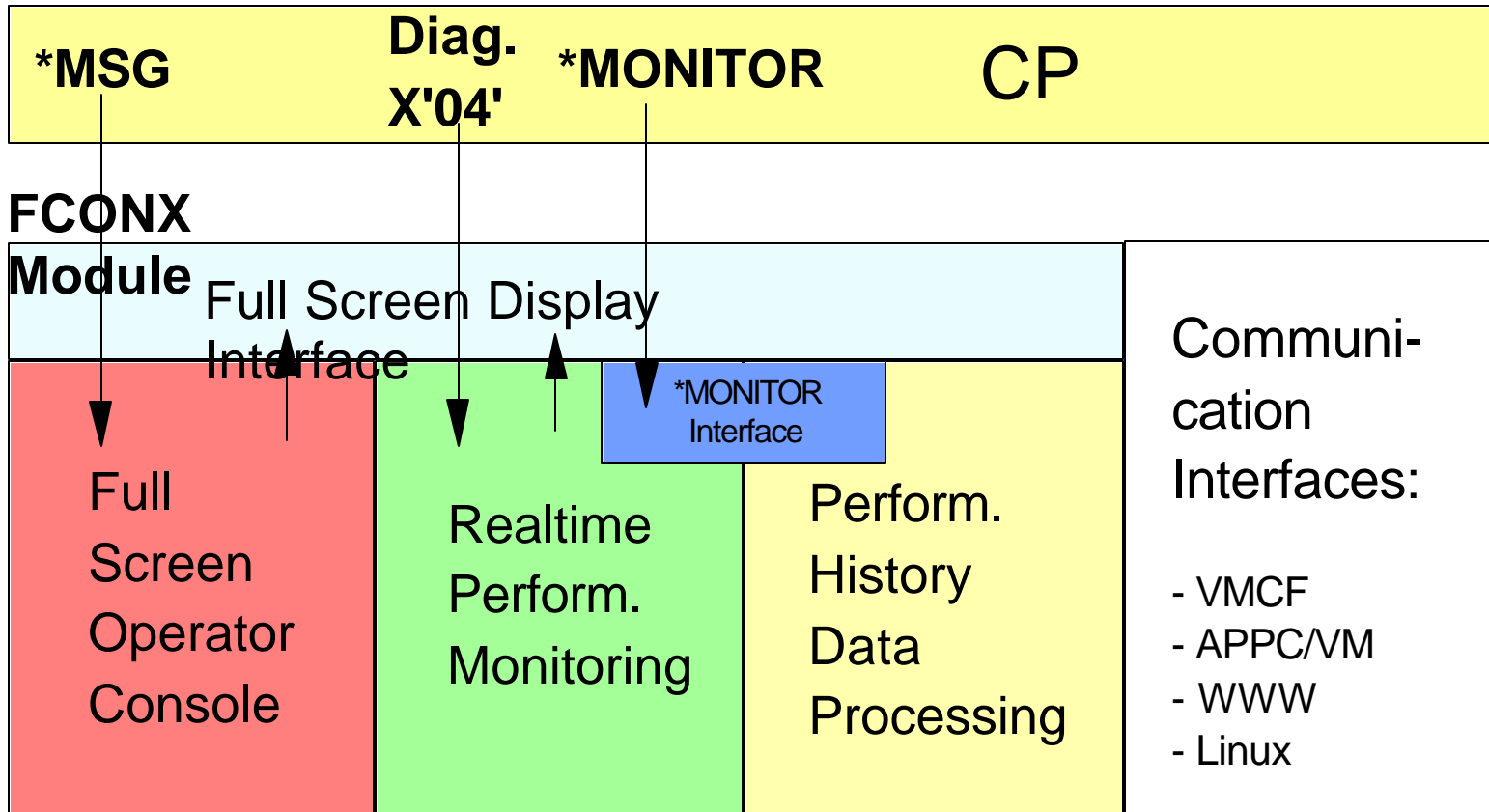
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- System Operation in Full-Screen Mode  
(Full Screen Operator **CON**sole)
- Realtime Performance Monitoring
  - Basics
  - Central monitoring facility for multiple systems
  - Multiple (remote, WWW) access to realtime perf. data
- Performance History Data Processing

# Comparison with VMPRF and RTM/ESA



# The FCONX Module ...



# Full Screen Operating

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- For efficient system console operating
  - Automatic scrolling of general output
  - Messages/warnings remain pending
  - Handle other machines (VTAM) as secondary users
- Redisplay facility for previous console output
  - Browse through previous days' logs
  - 'Locate' facility

# Basic Mode Display

```

FCX001      VM/ESA Full Screen Op. Console / Perf. Monitor      Autoscroll 12
*34 09:34:50 MSG FROM MNTPROD : Please mount tape ST5461 on 580
*35 09:40:27 MSG FROM MNTPROD : Please mount tape ST6345 on 581
09:43:16 HCPRI035I CP/RACF communication path established to RACFVMBM
RACFVMBM: RPIINI002I Connection requested to RBM by RACFRBM on path 01
RACFVMBM: RPIHBB021I RBM task handler loaded at CBB000
RACFVMBM: RPIHBB023I RBM control task TCB for RACFRBM located at CB67E0
RACFVMBM: HBBRUN041I RBM command handler activated by connection to RACFRBM
09:47:26 USER DSC LOGOFF AS CLH      USERS = 1598 FORCED BY SYSTEM
09:47:27 USER DSC LOGOFF AS BATCH5   USERS = 1597 FORCED BY BATCH
09:48:43 USER DSC LOGOFF AS BATCH4   USERS = 1596 FORCED BY BATCH
09:48:54 USER DSC LOGOFF AS MRU      USERS = 1595 FORCED BY SYSTEM
09:49:36 USER DSC LOGOFF AS PK       USERS = 1594 FORCED BY SYSTEM
09:49:42 USER DSC LOGOFF AS AIXHOT   USERS = 1593 FORCED BY SYSTEM
09:50:06 USER DSC LOGOFF AS BATCH4   USERS = 1605 FORCED BY BATCH
09:50:21 FCNSKG24 LOGOFF AS TAU      USERS = 1604 FORCED BY FCONX
09:52:13 USER DSC LOGOFF AS THL      USERS = 1611 FORCED BY SYSTEM
09:52:23 USER DSC LOGOFF AS EDD      USERS = 1610 FORCED BY SYSTEM
09:52:43 FCVSACC0 DISCONNECT ACS     USERS = 1609 FORCED BY SYSTEM

```

Command ===> \_\_\_\_\_

F1=Help F2=Redisplay F3=Quit

# Redisplay Mode



```
FCX002                Viewing Log File '19990623 CONLOG  A'                Redisp. Mode
                                                                Line  3267 of  3293
>09:49:42 AUTO LOGON   ***          BATCH4  USERS = 1605  BY BATCH
>09:49:49 FCVSPEH0    RECONNECT PBER      USERS = 1605
>09:49:55 FCVSJE20    LOGON AS  TFUC      USERS = 1606
>09:49:59 FCNSG84A    LOGOFF AS  PEC      USERS = 1605
>09:50:04 FCVSPFY0    LOGON AS  RHEN      USERS = 1606
  09:50:06 USER DSC    LOGOFF AS  BATCH4   USERS = 1605  FORCED BY BATCH
  09:50:21 FCNSKG24    LOGOFF AS  TAU      USERS = 1604  FORCED BY FCONX
>09:50:21 FCVSCBB0    LOGOFF AS  FGA      USERS = 1603
>09:50:33 FCVSP7D0    LOGON AS  CBUE      USERS = 1604
>09:50:36 FCVSR3Y3    LOGON AS  HRO      USERS = 1605
>09:50:57 FCNSGC22    LOGOFF AS  GCIBLM   USERS = 1604
>09:51:01 FCNST707    LOGON AS  BKI      USERS = 1605
>09:51:03 FCVSAB40    LOGOFF AS  WEIS     USERS = 1604
>09:51:09 FCVSCBB0    LOGON AS  FGA      USERS = 1605
>09:51:12 FCNSKY4E    LOGON AS  RUCH      USERS = 1606
>09:51:17 FCVSAB40    LOGON AS  WEIS     USERS = 1607
>09:51:24 FCVSRDX4    LOGON AS  CORADS   USERS = 1608  BY DER
>09:51:35 ACBAT006    LOGON AS  RH       USERS = 1609
>09:51:48 FCVSPKF0    LOGON AS  ROMU     USERS = 1610
>09:52:00 FCVSDBD0    LOGON AS  EFX      USERS = 1611
>09:52:00 AUTO LOGON   ***          FSTCHECK  USERS = 1612  BY AOSERVE
>09:52:03 FCNSKG24    LOGON AS  TAU      USERS = 1613
>09:52:03 FCVSRDX4    LOGOFF AS  CORADS   USERS = 1612
  09:52:13 USER DSC    LOGOFF AS  THL      USERS = 1611  FORCED BY SYSTEM
  09:52:23 USER DSC    LOGOFF AS  EDD      USERS = 1610  FORCED BY SYSTEM
>09:52:43 DCSSAW17    LOGOFF AS  RKE      USERS = 1609
  09:52:43 FCVSACC0    DISCONNECT ACS     USERS = 1609  FORCED BY SYSTEM
```

Command ==>

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F10=Left F11=Right F12=Return



# System Automation

---

- **Special Processing of Output Lines**
  - Change appearance/behaviour of output lines
  - Reroute output lines to another user
  - Trigger execution of REXX procedures or CMS modules
  - PROP like facilities, but it isn't PROP ..
  
- **Timer Facility**
  - Specify time and selectable days of the week or a date
  - Scheduled actions processed like cmd line input
    - FCON/ESA subcommands
    - CMS commands / REXX procedures
    - CP commands

# Realtime Perf. Monitoring

---

## ■ Basics

- Selection
- Sorting
- Context help
- Thresholds/exceptions
- Benchmarking

## ■ Central Monitoring Facility

## ■ Multiple (Remote) Access to Perf. Data

- RSCS
- VMCF
- APPC/VM
- WWW

# Initial Menu



FCX124

## Performance Screen Selection

Perf. Monitor

### 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

Pointers to related or more detailed performance data  
can be found on displays marked with an asterisk (\*).

Select performance screen with cursor and hit ENTER

Command ==> \_\_\_\_\_

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return

# I/O Device Display



```

FCX108      CPU 9672  SER 65993  Interval 08:09:35 - 08:14:37  Perf. Monitor
Sort  ----->
Context ----->
help ----->
Device ----->
details ----->
  <--- Device Descr. --->  Mdisk Pa-  <---Rate/s--->  <----- Time (msec) ----->  Req.
  Addr Type  Label/ID  Links ths  I/O Avoid  Pend Disc  Conn Serv  Resp CUWt  Qued
  >> All DASD <<
  0D00 OSA  >TCPIP  ...  1 17.4  ...  .2 55.9  .2 56.3  56.3  .0 .00
  0D02 OSA  >TCPIPX  ...  1 16.8  ...  .2 57.9  .2 58.3  58.3  .0 .00
  061D 3390-3 4AU008  10  8  1.3  .3  .2  .4  3.1  3.7  3.7  .0 .00
  0696 3390-2 F90007  1  8  1.3  .0  .2  1.2  3.0  4.4  4.4  .0 .00
  02D5 3390-3 1IBK95  14  8  1.0  .5  .2  1.6  5.1  6.9  6.9  .0 .00
  0BF1 3745  >VTAM  ...  1  .9  ...  .3  1.5  1.3  3.1  3.1  .0 .00
  026E 3380-K VSAOP1  1  8  .8  .0  .2  .5  2.5  3.2  3.2  .0 .00
  0D01 OSA  >TCPIP  ...  1  .6  ...  .1  .1  .2  .4  .4  .0 .00
  024E 3380-K VS7OP1  1  8  .5  .0  .2  1.7  2.7  4.6  4.6  .0 .00
  0697 3390-2 F90008  1  8  .4  .0  .2  1.2  2.8  4.2  4.2  .0 .00
  0D04 OSA  >TCPIPX  ...  1  .4  ...  .2 2523  .2 2523  2523  .0 .00
  0BC1 3745  >VTAM  ...  1  .4  ...  .2  1.3  .9  2.4  2.4  .0 .00
  026A 3380-K VSAU10  1  8  .3  .0  .2  1.2  2.6  4.0  4.0  .0 .00
  1BC1 3745  >SMAVMA  ...  1  .3  ...  .2  1.3  .8  2.3  2.3  .0 .00
  0FC1 3270-2  ...  1  .3  ...  .2 20.1  .6 20.9  20.9  .0 .00
  0280 3390-3 TDSK02 CP  2  8  .3  .1  .2  2.0  2.2  4.4  4.4  .0 .00
  0695 3390-2 F90006  1  8  .2  .0  .2  2.0  3.1  5.3  5.3  .0 .00
  0BE2 3745  >VTAM  ...  1  .2  ...  .3  1.4  1.0  2.7  2.7  .0 .00
  0112 3390-3 VM09D1  4  4  .2  .0  .3  7.3  2.2  9.8  9.8  .0 .00
  0129 3390-3 VMX014  4  4  .2  .0  .4  7.3  2.2  9.9  9.9  .0 .00
  0133 3390-3 VMX020  4  4  .2  .0  .3  .1  2.2  2.6  2.6  .0 .00
  0FC6 3270-2 >SMAVM7  ...  1  .2  ...  .2 18.5  .5 19.2  19.2  .0 .00
  0FC7 3270-2 >SMAVMA  ...  1  .2  ...  .2 18.6  .6 19.4  19.4  .0 .00
  0FE1 3270-2 >SMAVM9  ...  1  .2  ...  .2 17.8  .5 18.5  18.5  .0 .00
  Select a device for I/O device details
  Command ==>
  F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
  
```

# Context Help



```
FCX108      CPU 9672  SER 65993  Interval 08:09:35 - 08:14:37  Perf. Monitor
.-- Device Descr. -->  Mdisk Pa- <-Rate/s-> <----- Time (msec) -----> Req.
Addr Type  Label/ID  Links ths  I/O Avoid Pend Disc Conn Serv Resp CUWt Qued
>> All DASD <<      ....      .0   .0   .4  1.7  2.0  4.1  4.1  .0  .00
```

## Help Text

Disc Device disconnected time (msec). This is the average time that the device remained disconnected from the channel while executing I/O requests. For DASD it includes the time spent for executing the SEEK and SET SECTOR orders and also any re-connect misses. High values may indicate overloaded paths, or many long SEEKS to data at opposite ends of the device.

The value also includes the 'device-active-only' time where that information is available.

F12=Return

```
0280 3390-3 TDSK02 CP      2  8  .3  .1  .2  2.0  2.2  4.4  4.4  .0  .00
0695 3390-2 F90006      1  8  .2  .0  .2  2.0  3.1  5.3  5.3  .0  .00
0BE2 3745  >VTAM          ... 1  .2  ...  .3  1.4  1.0  2.7  2.7  .0  .00
0112 3390-3 VM09D1      4  4  .2  .0  .3  7.3  2.2  9.8  9.8  .0  .00
0129 3390-3 VMX014      4  4  .2  .0  .4  7.3  2.2  9.9  9.9  .0  .00
0133 3390-3 VMX020      4  4  .2  .0  .3  .1  2.2  2.6  2.6  .0  .00
0FC6 3270-2 >SMAVM7      ... 1  .2  ...  .2 18.5  .5 19.2 19.2  .0  .00
0FC7 3270-2 >SMAVMA      ... 1  .2  ...  .2 18.6  .6 19.4 19.4  .0  .00
0FE1 3270-2 >SMAVM9      ... 1  .2  ...  .2 17.8  .5 18.5 18.5  .0  .00
```

Select a device for I/O device details

Command ==>

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F10=Left F11=Right F12=Return

# I/O Device Details



FCX110 CPU 9672 SER 65993 Interval 08:16:25 - 08:17:26 Perf. Monitor

**Detailed Analysis for Device 4E1E ( SYSTEM )**

Device type : 3390-3	Function pend.: .2ms	Device busy : 0%
VOLSER : C9-SYS	Disconnected : 5.8ms	I/O contention: 0%
Nr. of LINKs: 5272	Connected : 7.5ms	Reserved : 0%
Last SEEK : 425	Service time : 13.5ms	SENSE SSCH : 0
SSCH rate/s : .4	Response time : 13.5ms	Recovery SSCH : 0
Avoided/s : 70.9	CU queue time : .0ms	Throttle del/s: ...

Status: MDCACHE USED

Path(s) to device 02D5: 0E 4E  
 Channel path status : ON ON

Device	Overall CU-Cache Performance							Split	
DIR ADDR VOLSER	IO/S	%READ	%RDHIT	%WRHIT	ICL/S	BYP/S	IO/S	%READ	%RDHIT
28 4E1E C9-SYS	.5	100	23	0	.0	.0	No SEQ./	CACHE	FW

MDISK	Extent	Userid	Addr	IO/s	VSEEK	Status	LINK	VIO/s	%MDC	MDIO/s
C	141 - 200	\$MAINT	019E	.0		owner				
C		MVA	019E	2.1	0	RR				
C		MBE	019E	2.0	0	RR				
C		RHUB	019E	1.9	0	RR				
C		ROT	019E	1.6	0	RR				
C		PALM	019E	1.2	0	RR	1756	29.8	100	.1
C	201 - 300	\$MAINT	019D	.0		owner				
C		CHS	019D	.5	0	RR				
C		MASC	019D	.3	0	RR				

Command ==> \_\_\_\_\_  
 F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return

# User Details



FCX115 CPU 9672 SER 65993 Interval 08:19:28 - 08:20:29 Perf. Monitor

## Detailed data for user CHMAIL (sec. user: CHCNTL)

Total CPU	: .9%	Storage def.	: 16.384kB	Page fault rate:	.0/s
Superv. CPU	: .4%	Resident pgs	: 760kB	Page read rate	: .0/s
Emulat. CPU	: .5%	Proj. WSET	: 760kB	Page write rate:	.0/s
VF total	: ....%	Reserved pgs	: 0kB	SPOOL pg reads	: 1.5/s
VF overhead	: ....%	Locked pages	: 0kB	SPOOL pg writes:	.8/s
VF emulation:	....%	XSTORE dedic.:	0kB	Main > XSTORE	: .0/s
VF load rate:	..../s	XSTORE pages	: 124kB	XSTORE > main	: .0/s
I/O rate	: 5.6/s	DASD slots	: 523	XSTORE > DASD	: .0/s
UR I/O rate	: 9.6/s	IUCV X-fer/s	: .0/s	MDC insert rate:	.0/s
Diag. X'98'	: .0/s	Share	: 1500	MDC I/O avoided:	1.7/s
*BLOCKIO	: .0/s	Max. share	: ...		

#I/O active	: 0	Active	: 50%	PSW wait	: 50%	I/O act.	: 0%
Stacked blk	: ..	Page wait	: 0%	CF wait	: 0%	Eligible	: 0%
Stat.: XC ,QDS,DORM		I/O wait	: 0%	Sim. wait:	50%	Runnable	: 0%

Data Space Name	Size	Mode	RD/s	WR/s	XRD/s	XWR/s	Mig/s	Stl/s	Xlat/s
BASE	454M	Priv	...	...	...	...	...	...	...

## Device activity and status:

0009 3215 .3		000C 254R		CL *, EOF		NOH NCNT
000D 254P	CL A, CO 01, NOH NCNT	000E 1403		CL A, CO 01, NOH NCNT		
0100 3380 .0	1A73,RR, 25CYL,--->0	0101 3380 .0	1950,RR, 10CYL,--->0			
0190 3390 .0	4E1E,RR, 140CYL,--->0	0191 3380 2.9	1A73,WR, 28% MDC eff.			
019A 3380 .0	194C,RR, 400CYL,--->0	019B 3380 .0	0101,RR, 30CAL,--->0			
019E 3390 .0	4E1E,RR, 60CYL,--->0	0200 3380 2.4	1A74,WR, 36% MDC eff.			

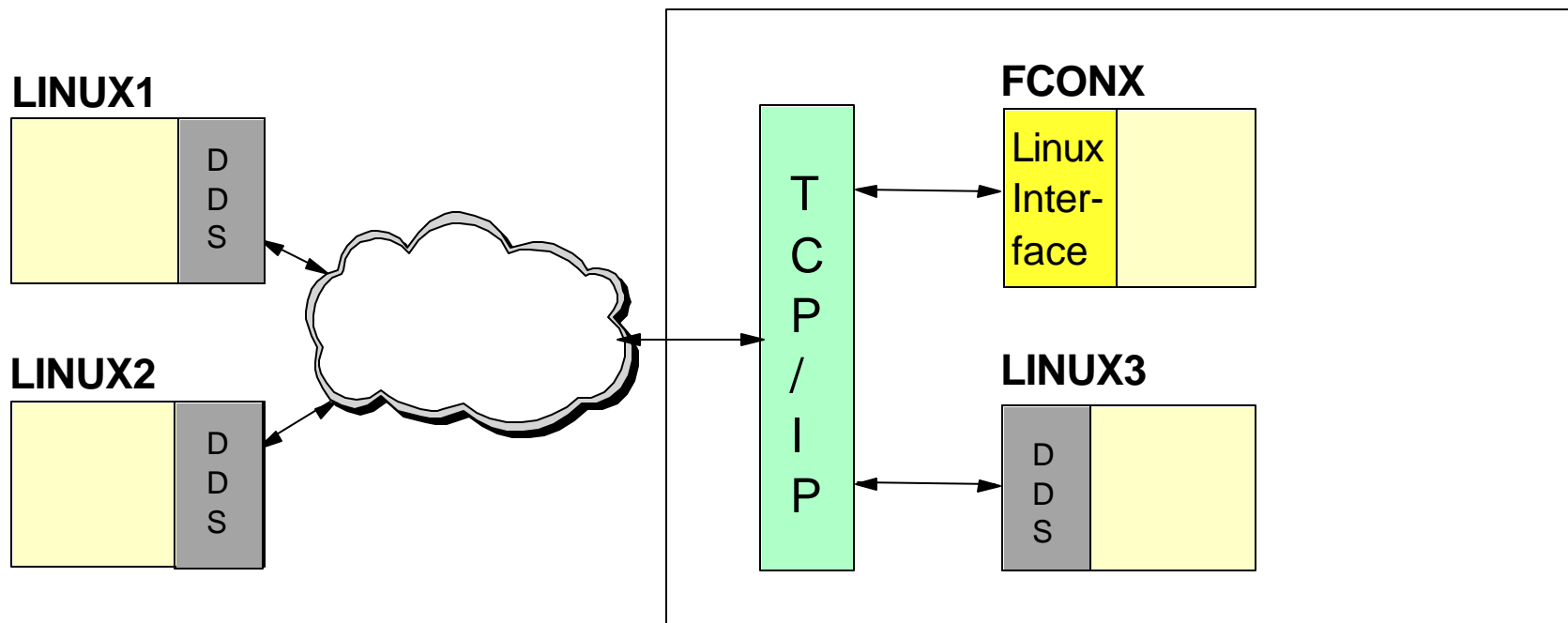
Enter 'STorage Display' for storage details

Command ==>

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return

# Accessing Linux Perf. Data

## Concept



FC MONCOLL LINUXUSR ON



# Linux Internal Performance

## e.g. CPU Load Details



FCX230 CPU 9672 SER 15585 Interval 05:42:00 - 05:43:00 Perf. Monitor

### Linux CPU Utilization for System NC

Processor	<--- Percent CPU Utilization --->					<-Accumulated (s)->		
	Total	User	Kernel	Nice	Idle	TotTm	UserTm	KernTm
>>Mean>>	0.99	0.14	0.85	0	99.00	---	---	---
cpu0	2.09	0.34	1.74	0	97.90	---	---	---
cpu1	1.24	0.19	1.04	0	98.75	---	---	---
cpu2	0.26	0	0.26	0	99.73	---	---	---
cpu3	0.36	0	0.36	0	99.63	---	---	---

### Process Name

syslogd.293	1.05	0	1.05	0	---	2744	30.94	2713
apachegat.24106	0.31	0	0.31	...	---	566.5	2.41	564.1
nmbd.499	0.31	0.03	0.28	0	---	8222	1479	6742
gengat.24115	0.3	...	0.3	...	---	753.9	1.8	752.1
procgat.24121	0.28	...	0.28	...	---	498.7	21.73	477
netgat.24118	0.25	...	0.25	...	---	289.1	0.93	288.2
kupdate.3	0.2	0	0.2	0	---	543.9	0	543.9
rpc.nfsd.30568	0.2	0.15	0.05	0	---	335.3	65.53	269.7
rpc.mountd.30557	0.18	0.06	0.11	0	---	111.1	5.95	105.1
httpd.464	0.13	0.01	0.11	0	---	826.9	16.09	810.8
inetd.346	0.06	0	0.06	0	---	32.94	1.92	31.02
help_nc_to_surv.505	0.05	0.05	0	0	---	1474	613.4	860.6
httpd.17648	0.01	0	0.01	0	---	0.76	0.03	0.73
httpd.17846	0.01	0	0.01	0	---	0.74	0.04	0.7
init.1	0	0	0	0	---	22.36	1.62	20.74
lpd.369	0	0	0	0	---	0.01	...	0.01

Command ==>

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return

# Thresholds / Exceptions

---

- **Threshold Monitoring**
  - General system load
  - I/O load / performance
  - User load
- **Exception Monitoring**
  - Loop detection
  - Idle users
  - Lost Channel Paths to I/O Devices
  - Cache Status
- **Use for Automation**
  - Handle messages with 'FC PROCESS ..'

# Exception Log



```
FCX153      CPU 3090  SER 12878      Except.  Log      Perf. Monitor
12:31:19 FCXUSL317A User GUP %CPU 48.0 exceeded threshold 30.0 for 5 min.
13:01:19 FCXUSL317A User RACFVMBM %CPU 66.5 exceeded threshold 30.0 for 5 min.
13:01:19 FCXUSL317A User RACFVMBM IO/s 268 exceeded threshold 100 for 5 min.
13:11:19 FCXUSL317A User CORWIWI %CPU 61.5 exceeded threshold 30.0 for 5 min.
13:11:19 FCXUSL317A User CORWIWI IO/s 997 exceeded threshold 100 for 5 min.
13:46:19 FCXUSL317A User CORSBS3 IO/s 153 exceeded threshold 100 for 5 min.
13:46:19 FCXUSL317A User SQ3PSBS %CPU 52.1 exceeded threshold 30.0 for 5 min.
14:01:19 FCXUSL317A User CORSBS3 IO/s 204 exceeded threshold 100 for 5 min.
14:06:18 FCXUSL317A User CORSBS3 IO/s 122 exceeded threshold 100 for 10 min.
14:06:18 FCXUSL317A User CORWIWI %CPU 62.4 exceeded threshold 30.0 for 5 min.
14:06:18 FCXUSL317A User CORWIWI IO/s 1001 exceeded threshold 100 for 5 min.
14:16:19 FCXUSL317A User SQ3PSBS %CPU 32.6 exceeded threshold 30.0 for 5 min.
14:36:18 FCXUSL317A User SQ3PSBS IO/s 103 exceeded threshold 100 for 5 min.
14:38:48 LINK ZCHVM1 RESTARTED. PLEASE CHECK IF OK.
14:38:48 LINK ZURLVM1 RESTARTED. PLEASE CHECK IF OK.
14:43:49 LINK ZCHVM1 RESTARTED. PLEASE CHECK IF OK.
14:43:49 LINK ZURLVM1 RESTARTED. PLEASE CHECK IF OK.
14:46:18 FCXUSL317A User SQ3PSBS %CPU 30.5 exceeded threshold 30.0 for 5 min.
15:26:10 FCXPER315A XPAGE rate 2105 exceeds limit 1800 (Q1=36 Qx=31)
15:30:25 FCXUSL317A User KRAETZIG %CPU 48.1 exceeded threshold 30.0 for 5 min.
15:30:26 FCXUSL317A User MEINETS B %CPU 35.3 exceeded threshold 30.0 for 5 min.
15:30:27 FCXUSL317A User LUNG %CPU 41.2 exceeded threshold 30.0 for 5 min.
15:31:11 FCXPER315A XPAGE rate 2296 exceeds limit 1800 (Q1=27 Qx=29)
```

Command ==> \_\_\_\_\_

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return

# User Thresholds / Exceptions



```

FCX112      CPU 9672  SER 65993  Interval 11:24:35 - 11:29:35  Perf. Monitor
.
  <----- CPU Load -----> Vect <-- Virtual IO/s ---->
    <--Seconds-->      T/V  Fac
Userid    %CPU  TCPU  VCPU  Ratio %Vec Total  DASD  Avoid  UR  Pg/s  User Status
>System<    .2   82.0  56.7   1.4  .0   .4   .1   .0   .0  .0   ---,---,---
GRIM        43.1 129.3 118.8   1.1  .0   .0   .0   .0   .0  .0   ESA,CL3,LOOP
TEST        7.0  20.9  11.1   1.9  .0  128   .8   .6   .0  .0   XC, CL3,DISP
SMAVMA      3.9  11.6   5.9   2.0  .0   1.9  1.5   .0   .0  .0   ESA,---,DORM
NETVIEW     2.4   7.1   6.9   1.0  .0   1.6  1.6   1.4  .0  .0   XC, ---,DORM
SMAVM7      1.5   4.6   2.8   1.6  .0   1.5  1.2   .0   .0  .0   ESA,---,DORM
DEHMEL      1.4   2.2   2.0   1.1  .0   1.4  1.2   1.2  .0  .0   XC, ---,DORM
STUTVMX3    .9   2.8   1.7   1.6  .0   2.7  2.2   .0   .0  .0   ESA,CL0,DISP
TCPIPX      .9   2.6   1.5   1.7  .0  17.4   .0   .0   .0  .0   ESA,CL0,DISP
STUTVMX2    .8   2.3   1.6   1.4  .0   2.1  1.8   .0   .0  .0   ESA,CL0,DISP
TCPIP       .8   2.5   1.5   1.7  .0  16.7   .0   .0   .0  .0   ESA,CL0,DISP
EHNIESAT    .5   1.5   1.0   1.5  .0   .5   .4   .0   .0  .0   ESA,---,DORM
STUTVMX4    .4   1.3   .8    1.6  .0   .6   .3   .0   .0  .0   ESA,CL0,DISP
VTAM        .4   1.2   .8    1.5  .0   3.2   .0   .0   .0  .0   XC, CL0,DISP
STUTVMX1    .3   .9    .7    1.3  .0   .4   .4   .0   .0  .0   ESA,---,DORM
AVSVM       .2   .5    .3    1.7  .0   .0   .0   .0   .0  .0   ESA,---,DORM
FCONX2      .2   .5    .4    1.3  .0   .0   .0   .0   .0  .0   XC, ---,DORM
RSCSERV     .2   .6    .5    1.2  .0   .3   .3   .2   .0  .0   XC, ---,DORM
TOOLS       .2   .5    .4    1.3  .0   .2   .2   .1   .0  .0   XC, ---,DORM
BOOTPD      .1   .3    .3    1.0  .0   .0   .0   .0   .0  .0   XC, ---,DORM
DATAMOVE    .1   .2    .2    1.0  .0   .1   .1   .1   .0  .0   XC, ---,DORM
DIRMAINT    .1   .2    .2    1.0  .0   .1   .1   .1   .0  .0   ESA,---,DORM
FCONX       .1   .2    .2    1.0  .0   .0   .0   .0   .0  .0   XC, ---,DORM
FISCHER     .1   .3    .2    1.5  .0   .6   .4   .3   .0  .0   XC, ---,DORM
Select a user for user details
Command ===> _____
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
    
```

# Benchmarking

---



- For creating detailed performance logs for
  - selected users
  - selected I/O devices
  
- Helps tracking temporary perf. problems related to specific users or I/O devices

# Benchmark Log Selection Menu



FCX173 CPU 9672 SER 65993 BENCHMRK Log Data Perf. Monitor

Userid	Log File	Description
S Devnum	Name	Description
. BOOTPD	MTUSRLOG	User multitasking data log
. BOOTPD	UCOMMLOG	User IUCV and VMCF communications log
. BOOTPD	UPAGELOG	User paging load log
. BOOTPD	URESPLOG	User response time log
. BOOTPD	USERLOG	User resource consumption log
. BOOTPD	USTATLOG	User wait state log
. BOOTPD	UTRANLOG	User resources per transaction log
. HMFAONET	UCOMMLOG	User IUCV and VMCF communications log
. HMFAONET	UPAGELOG	User paging load log
. HMFAONET	URESPLOG	User response time log
. HMFAONET	USERLOG	User resource consumption log
. HMFAONET	USTATLOG	User wait state log
. HMFAONET	UTRANLOG	User resources per transaction log
. 02A8	CACHDLOG	I/O device CU cache data log
. 02A8	CACHELOG	Extended function cache data log
. 02A8	CPOWNLOG	CPOWNed I/O device log
. 02A8	DEVLOG	General I/O device performance log
. 02A8	SEEKDLOG	I/O device SEEKS distances log
. 02A8	SEEKLLOG	I/O device SEEKS locations log

Select a user or device log with cursor and hit ENTER

Command ===> \_\_\_\_\_

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return

# User Log Example



FCX162 CPU 9672 SER 65993 Interval 12:59:35 - 13:34:35 Perf. Monitor

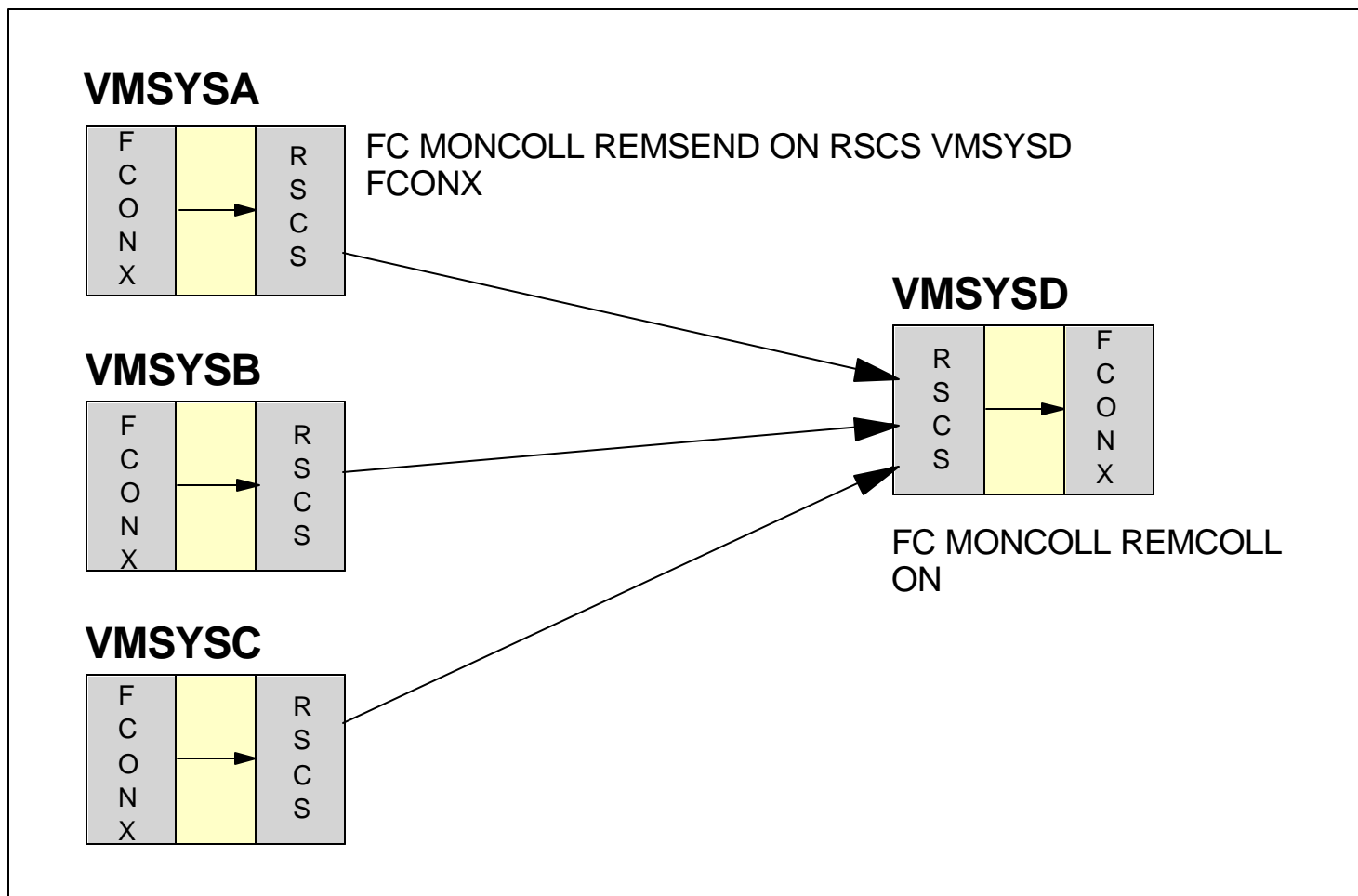
## Resource Usage Log for User HMFAONET

Interval End Time	<----- CPU Load ----->				Vect T/V Fac	<-- Virtual IO/s ---->					User Status
	%CPU	TCPU	VCPU	Ratio		%Vec	Total	DASD	Avoid	UR	
>>Mean>>	.2	4	2	1.5	.0	1.3	1.3	.6	.0	.0	---,---,----
11:54:35	.1	.3	.2	1.5	.0	.8	.8	.3	.0	.0	XC, ---, DORM
11:59:35	.1	.3	.2	1.5	.0	1.1	1.1	.5	.0	.0	XC, ---, DORM
12:04:35	.2	.6	.4	1.5	.0	1.2	1.2	.5	.0	.0	XC, ---, DORM
12:09:35	.2	.5	.3	1.7	.0	1.1	1.0	.4	.0	.0	XC, ---, DORM
12:14:35	.4	1.1	.7	1.6	.0	1.7	1.6	.7	.0	.0	XC, ---, DORM
12:19:35	.1	.4	.2	2.0	.0	1.4	1.4	.7	.0	.0	XC, ---, DORM
12:24:35	.1	.4	.2	2.0	.0	1.4	1.4	.7	.0	.0	XC, ---, DORM
12:29:35	.1	.3	.2	1.5	.0	.7	.7	.2	.0	.0	XC, ---, DORM
12:34:35	.1	.4	.2	2.0	.0	1.0	1.0	.4	.0	.0	XC, ---, DORM
12:39:35	.2	.5	.3	1.7	.0	1.3	1.3	.6	.0	.0	XC, ---, DORM
12:44:35	.1	.3	.2	1.5	.0	.9	.9	.4	.0	.0	XC, ---, DORM
12:49:35	.1	.3	.2	1.5	.0	1.1	1.0	.5	.0	.0	XC, ---, DORM
12:54:35	.2	.5	.3	1.7	.0	1.6	1.6	.8	.0	.0	XC, ---, DORM
12:59:35	.2	.5	.3	1.7	.0	1.7	1.7	.8	.0	.0	XC, ---, DORM
13:04:35	.1	.3	.2	1.5	.0	1.1	1.1	.5	.0	.0	XC, ---, DORM
13:09:35	.1	.4	.2	2.0	.0	1.2	1.2	.4	.0	.0	XC, ---, DORM
13:14:35	.1	.4	.3	1.3	.0	1.0	1.0	.4	.0	.0	XC, ---, DORM
13:19:35	.1	.3	.2	1.5	.0	1.0	1.0	.5	.0	.0	XC, ---, DORM
13:24:35	.2	.5	.3	1.7	.0	1.7	1.7	.8	.0	.0	XC, CL2, DISP
13:29:35	.1	.4	.3	1.3	.0	1.4	1.4	.7	.0	.0	XC, ---, DORM
13:34:35	.4	1.3	1.0	1.3	.0	2.0	2.0	.8	.0	.0	XC, ---, DORM

Command ===>

F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F10=Left F11=Right F12=Return

# Central Monitoring Facility







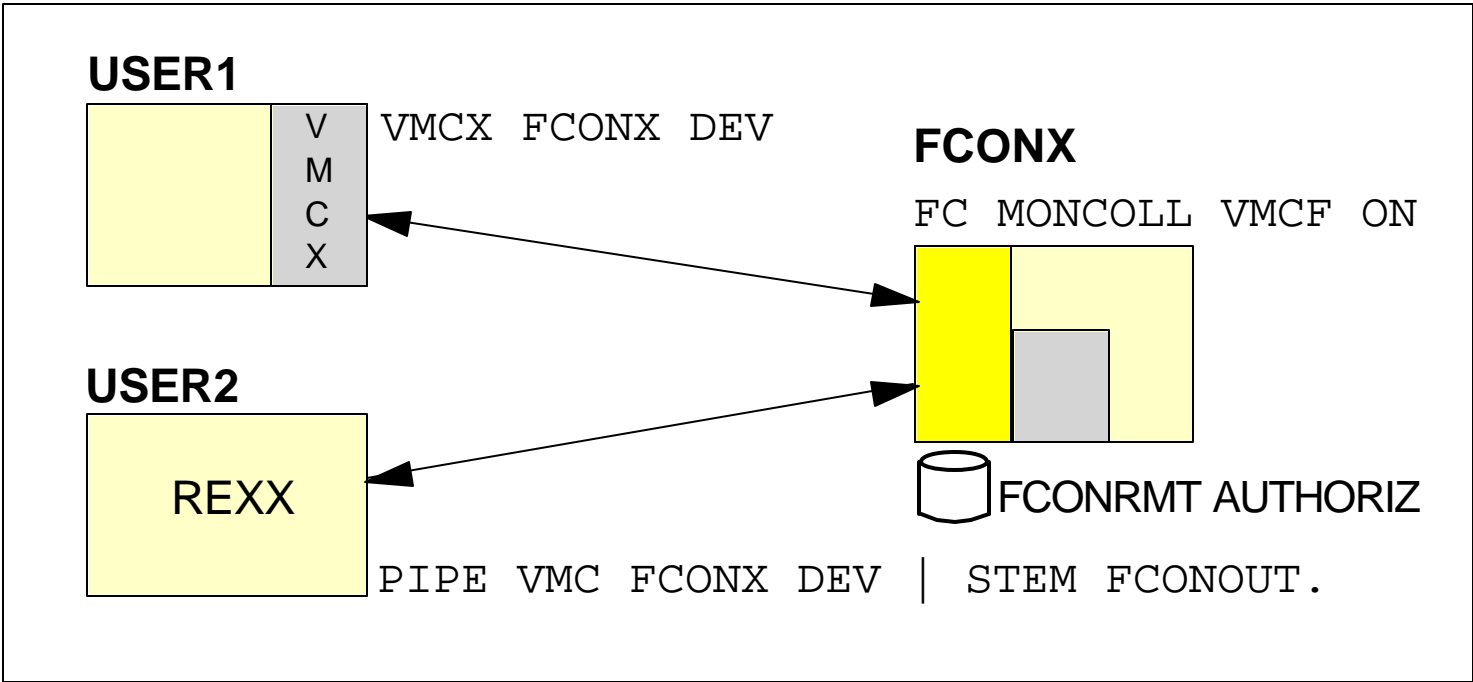
# Multiple (Remote) Access to Performance Data

---

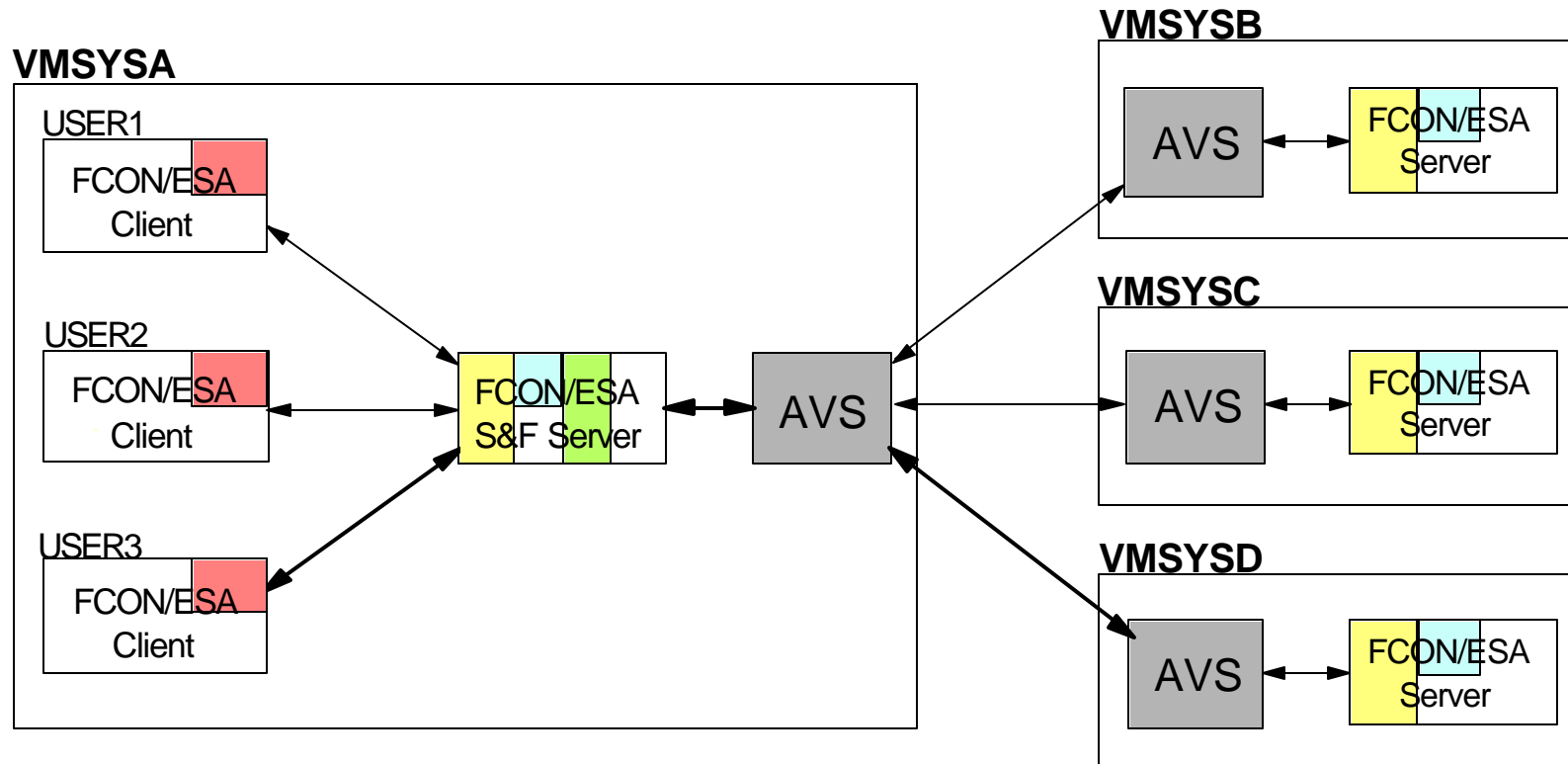


- Local VMCF Interface
- APPC/VM Local & Remote
- WWW Interface for Standard Web Browsers

# Local VMCF Interface



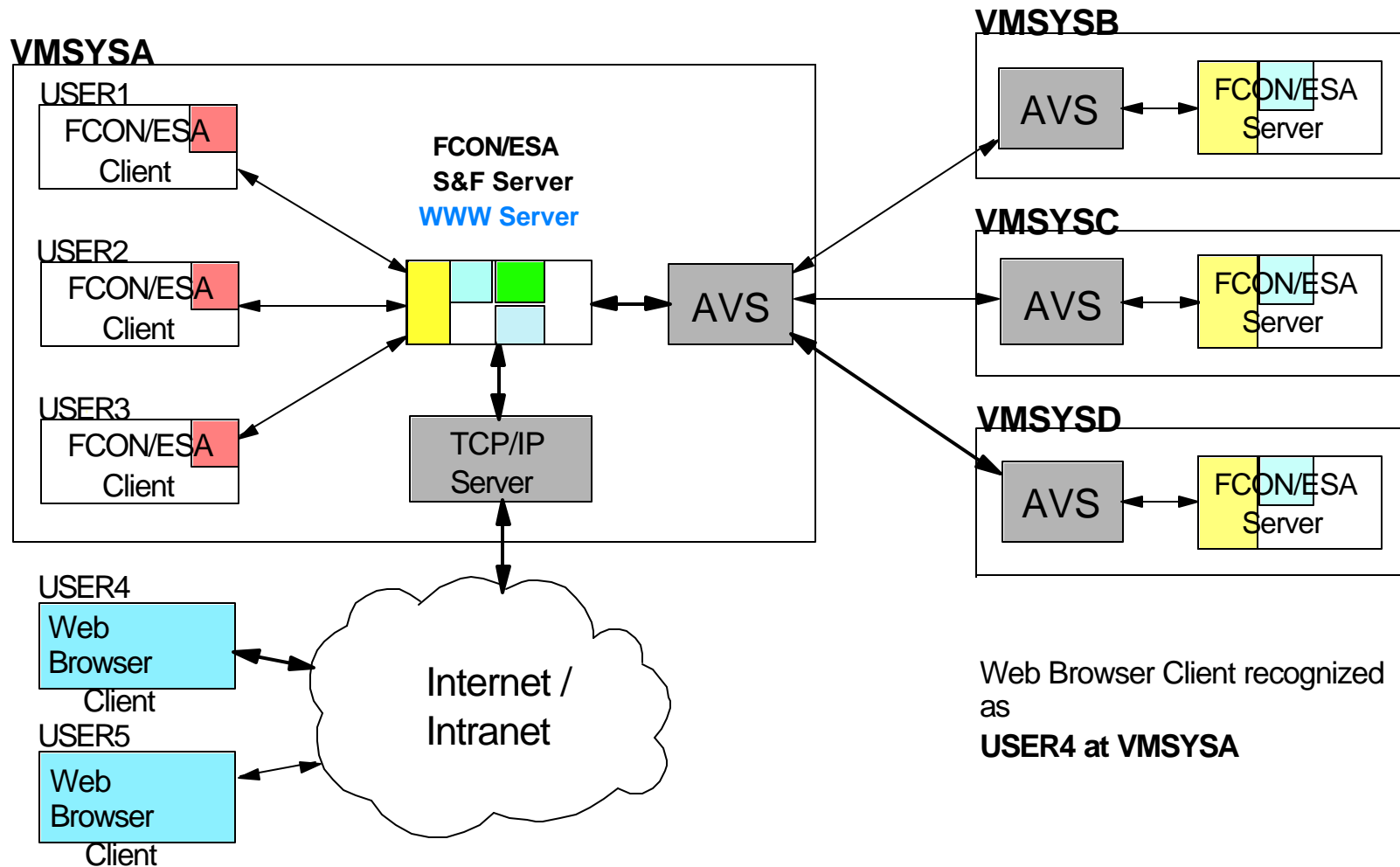
# APPC/VM: Store & Forward Logic



Client recognized as  
**USER3 at VMSYSA**



# WWW Server Interface





# Initial Perf. Data Selection Menu

**Initial Performance Data Selection Menu - Netscape**

File Edit View Go Communicator Help

Bookmarks Location: 8DE/a?v=%2F00A23B18%2F88DE%2F&form=02&s=Menu What's Related

**FCON/ESA V3.2**

**Data Retrieval Session with System VM4ALL**  
Initial Performance Data Selection Menu

Command Refresh Systems Forw Help  Auto-Refresh

---

**Performance Screen Selection**

General System Data	I/O Data	History Data (by Time)
1. <a href="#">CPU load and trans.</a>	11. <a href="#">Channel load</a>	31. <a href="#">Graphics selection</a>
2. <a href="#">Storage utilization</a>	12. <a href="#">Control units</a>	32. <a href="#">History data files*</a>
3. <a href="#">Storage subpools</a>	13. <a href="#">I/O device load*</a>	33. <a href="#">Benchmark displays*</a>
4. <a href="#">Priv. operations</a>	14. <a href="#">CP owned disks*</a>	34. <a href="#">Correlation coeff.</a>
5. <a href="#">System counters</a>	15. <a href="#">CU-cached disks*</a>	35. <a href="#">System overview</a>
6. <a href="#">CP IUCV services</a>	16. <a href="#">Cache extend. func.*</a>	36. <a href="#">Auxiliary storage</a>
7. <a href="#">SPOOL file display*</a>	17. <a href="#">DASD I/O assist</a>	37. <a href="#">CP communications*</a>
8. <a href="#">LPAR data</a>	18. <a href="#">DASD seek distance*</a>	38. <a href="#">DASD load</a>
9. <a href="#">Shared segments</a>	19. <a href="#">DASD seek locations*</a>	39. <a href="#">Minidisk cache*</a>
A. <a href="#">Shared data spaces</a>	1A. <a href="#">I/O configuration</a>	3A. <a href="#">Paging activity</a>
B. <a href="#">Virt. disks in stor.</a>	1B. <a href="#">I/O config. changes</a>	3B. <a href="#">Processor load</a>
C. <a href="#">Transact. statistics</a>	User Data	3C. <a href="#">Logical part. load</a>
D. <a href="#">Monitor data</a>	21. <a href="#">User resource usage*</a>	3D. <a href="#">Response time (all)*</a>
		3E. <a href="#">RSK data menu*</a>

Select Performance Data



# Example for Performance Data Display

Hyperlink selection of:

Sort sequence

Context help

Device details

General I/O Device Load and Performance - Netscape

File Edit View Go Communicator Help

**FCON/ESA V.3.2** Data Retrieval Session with System VM4ALL  
Select a device for I/O device details




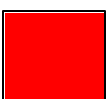
Command Refresh Systems Menu Forw

---

Interval 15:36:35-15:41:37, on 2000/04/06 (Select [average](#) for

<-->	Device	Descr.	-->	Mdisk	Pa	<-Rate/s->	<----->	Time (msec)			
Addr	Type	Label/ID		Links	ths	I/O	Avoid	Pend	Disc	Conn	Serv
>>	All	DASD	<<	....		.0	.0	.2	.9	3.5	4.6
<a href="#">0200</a>	3380-K	XDSK01		0	8	.0	.0	.3	.1	.4	.8
<a href="#">0201</a>	3380-K	1IBK31		8	8	.1	.0	.4	.5	2.7	3.6
<a href="#">0202</a>	3380-K	1IBK32		9	8	.0	.3	.1	.1	.4	.6
<a href="#">0203</a>	3380-K	1IBK33		18	8	.1	.0	.4	.3	3.1	3.8
<a href="#">0204</a>	3380-K	1IBK34		9	8	.0	.0	.3	.1	.4	.8
<a href="#">0205</a>	3380-K	1IBK35		10	8	.1	.0	.3	.1	3.5	3.9
<a href="#">0206</a>	3380-K	1IBK36		11	8	.1	.0	.2	.7	3.8	4.7
<a href="#">0207</a>	3380-K	1IBK37		7	8	.1	.0	.4	.6	3.5	4.5

# History Data Files

Data	Time resolution		Disk space requirements
	low	high	
General System Data only	HISTSUM	HISTLOG	 low
Users, I/O Devices	FCXTREND	Benchmark Log Files	 medium
...		MONDATA (MONWRITE)	 high
...			
All Data			 very high

# Processing History Data Files

---



- Concurrent with Realtime Monitoring
  - HISTDATA menu for browsing through HISTSUM, HISTLOG and benchmark log files
  - Graphics for all FCON/ESA based history files
  
- Alternatively to Realtime Monitoring
  - MONSCAN fn ft fm  
for browsing through raw CP monitor data files
  - TRNDSCAN fn ft fm  
for browsing through FCXTREND files

- Simple Plots with Commands **PLOT...**
  - No additional graphics SW required
  
- GDDM Line Graphics with Commands **GRAPH...**
  - Requires GDDM on the system where graphics are to be shown
  
- Line Graphics with Java Applet via WWW Interface
  - Based on graphics capability of WS and Web Browser's Java support
  - No additional graphics SW required

# GRAPHICS Selection Menu

Graphics Selection Menu - Netscape

File Edit View Go Communicator Help

**FCON** **IBM**  
**ESA**  
v.3.2

Data Retrieval Session with System VM4ALL  
Graphics Selection Menu

Command Refresh Systems Menu Return Help  Auto-Refresh

---

Output format : Line graphics

Data origin : File ACUM HISTSUM D

Graphics type : Summary graphics (coarse time scale)

Selected period : FROM 1999/10/01 TO 1900/03/31

Selected days : M-F

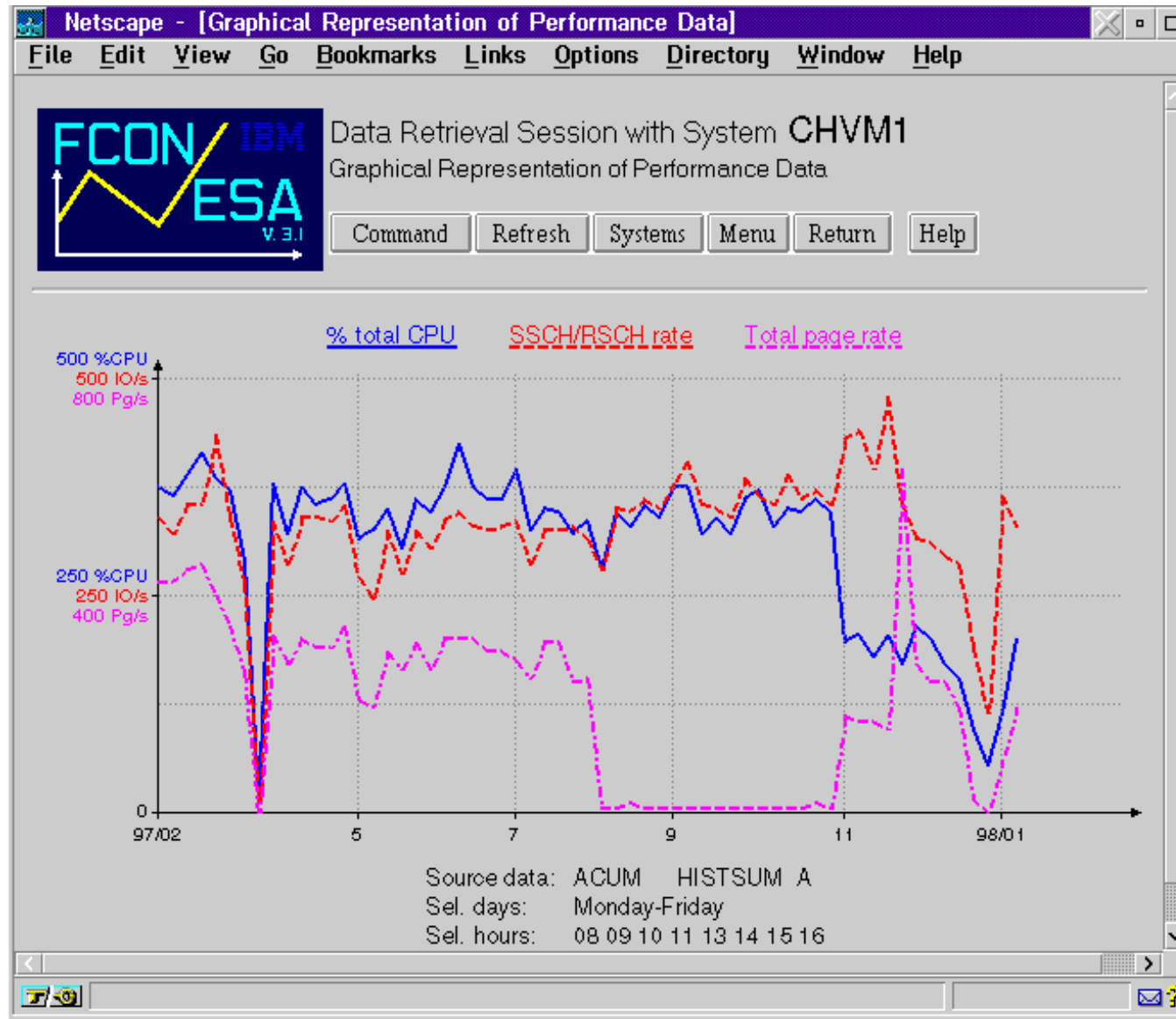
Selected hours : 08 09 10 11 13 14 15 16

X-Variable : ACT Active users Truncate at

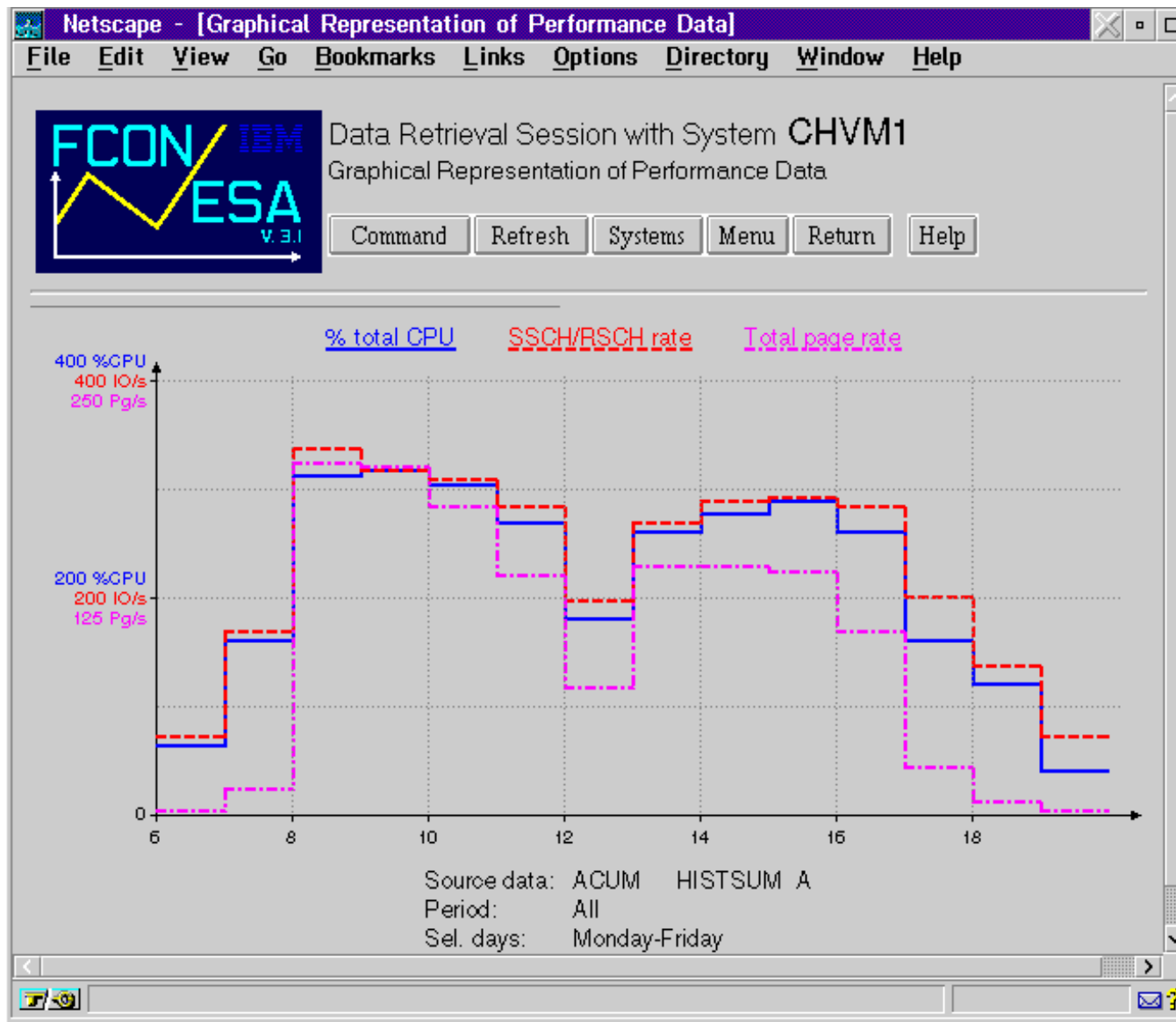
Y-Variables : CPU % total CPU Cumulative

IO/S SSCH/RSCH rate

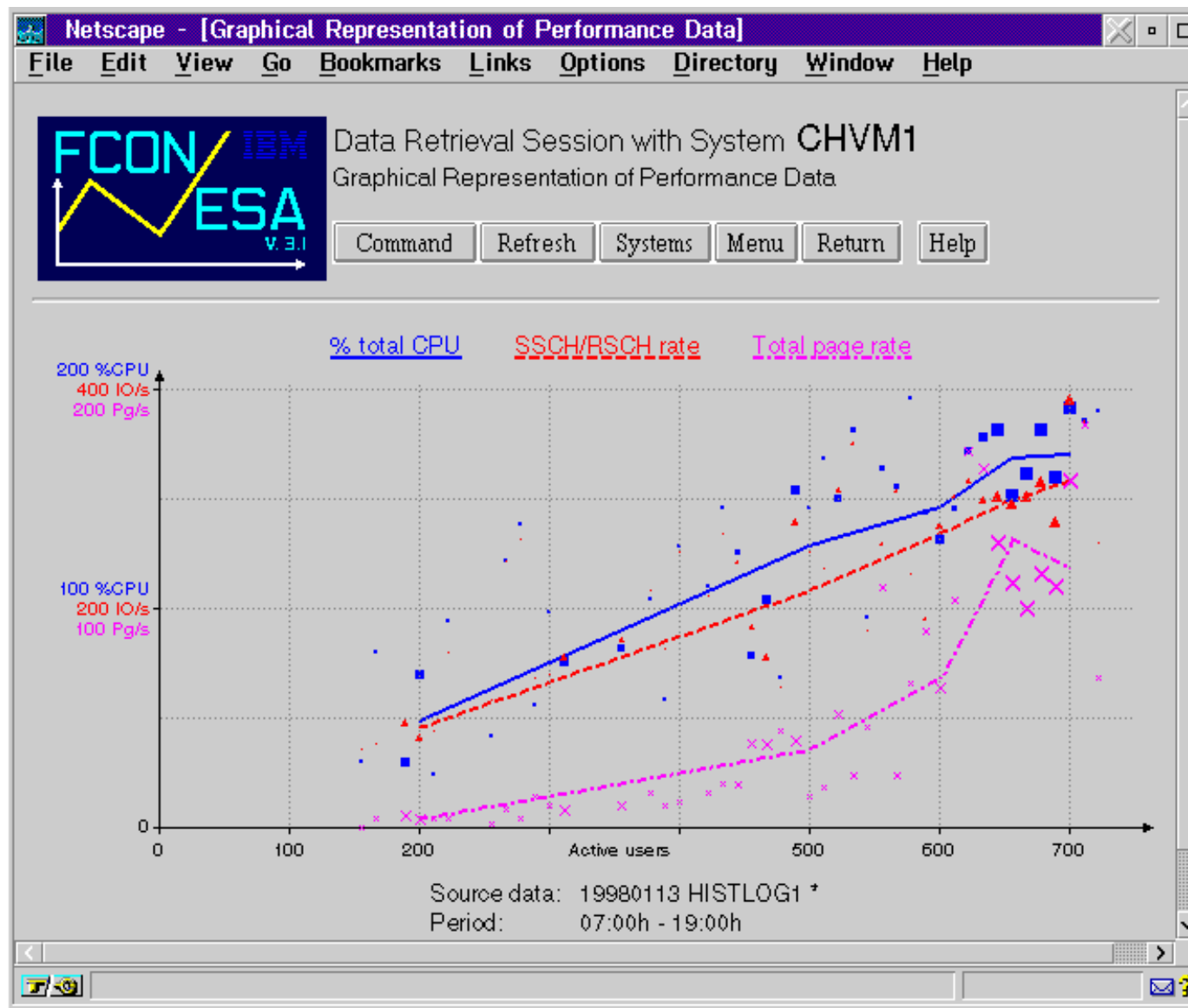
# GRAPHSUM Example



# Profile of Average Day

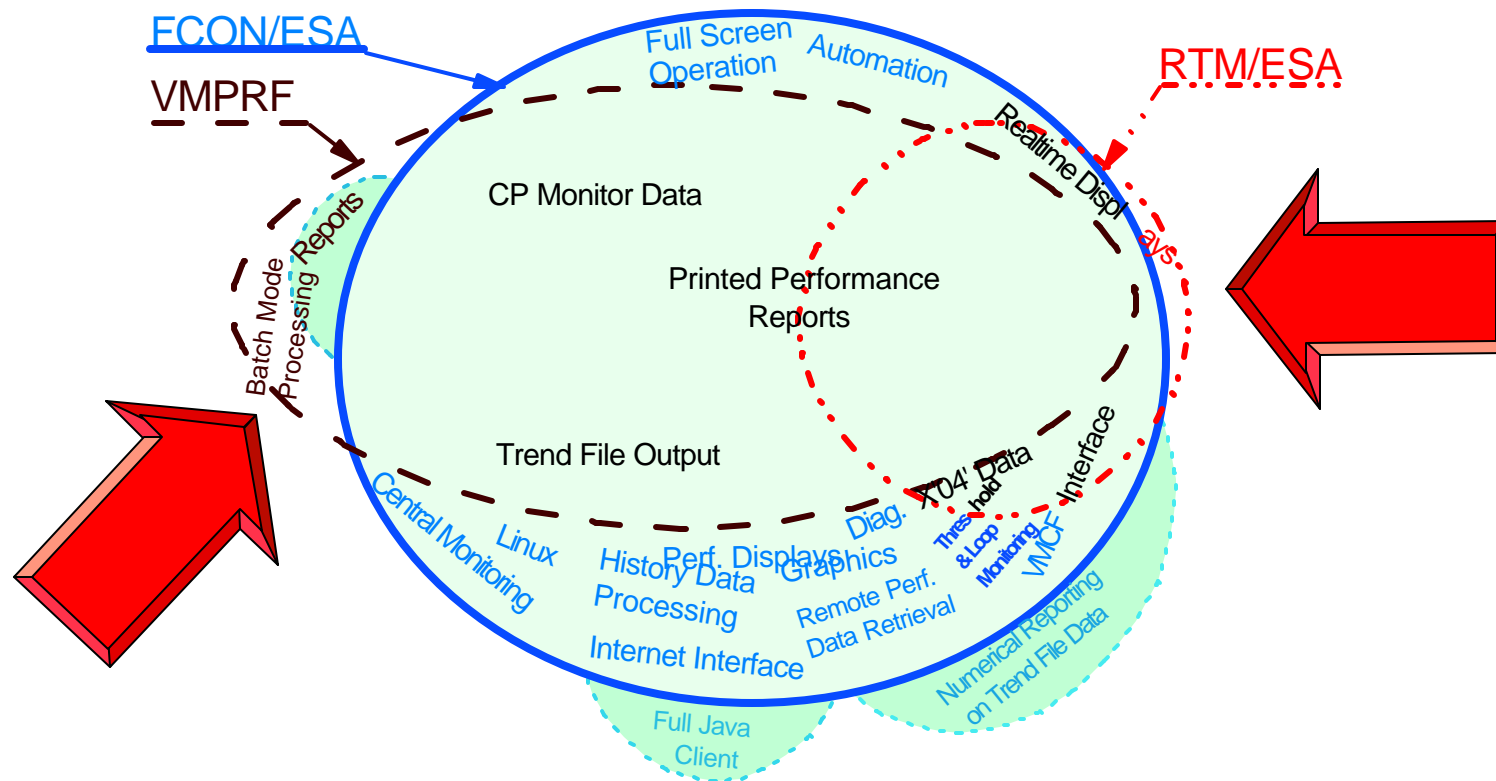


# GRAPHVAR Example





# What Next?



Statement of Direction:  
FCON/ESA based feature to replace RTM & PRF

# What next ... ?

---

## Priorities

- Tolerate/exploit new z/VM releases
- Implement data/features from RTM
- Implement missing VMPRF features:
  - Independent REPORT / TREND / SUMMARY Periods
  - Creation of INTERIM reports
  - Allow batch processing mode