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## VM Performance Data on the Web

### FCON/ESA V.3.2

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

Overview and Version 3.2.00/01 Update

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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, and to inform about the latest enhancements and future plans.

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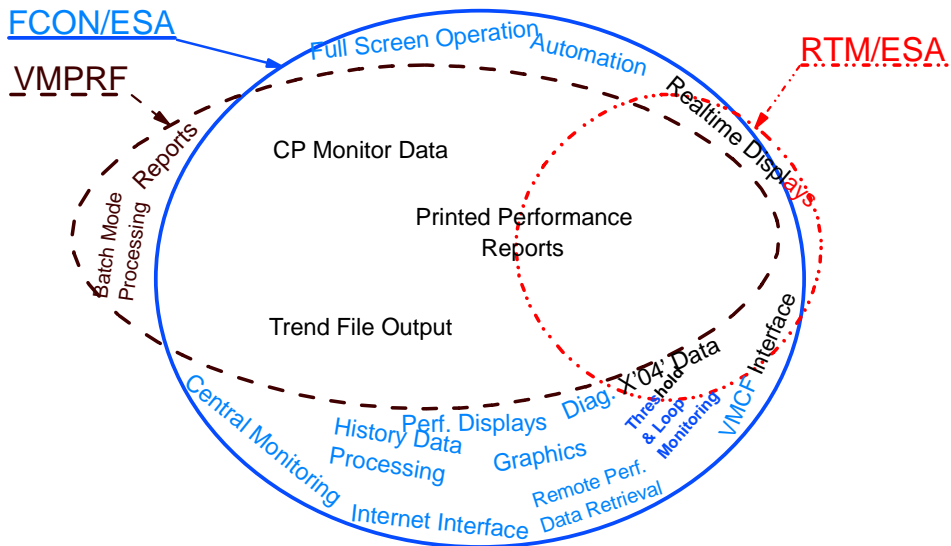
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# Program Functions



- System Operation in Full-Screen Mode  
(Full Screen Operator **CON**sole)
- Realtime Performance Monitoring
- Performance History Data Processing

# Comparison with VMPRF and RTM/ESA



# Full Screen Operating



- 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 HCP RPI035I CP/RACF communication path established to RACFVMBM
RACFVMBM: RPIINI02I Connection requested to RBM by RACFRM on path 01
RACFVMBM: RPIHBB02I RBM task handler loaded at CBB000
RACFVMBM: RPIHBB023I RBM control task TCB for RACFRM located at CB67E0
RACFVMBM: HBBRUN04I RBM command handler activated by connection to RACFRM
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 FCVSACCO 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 FCVSPPEH0   RECONNECT PBER          USERS = 1605
>09:49:55 FCVSGJE20   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 FCVSRCY3    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



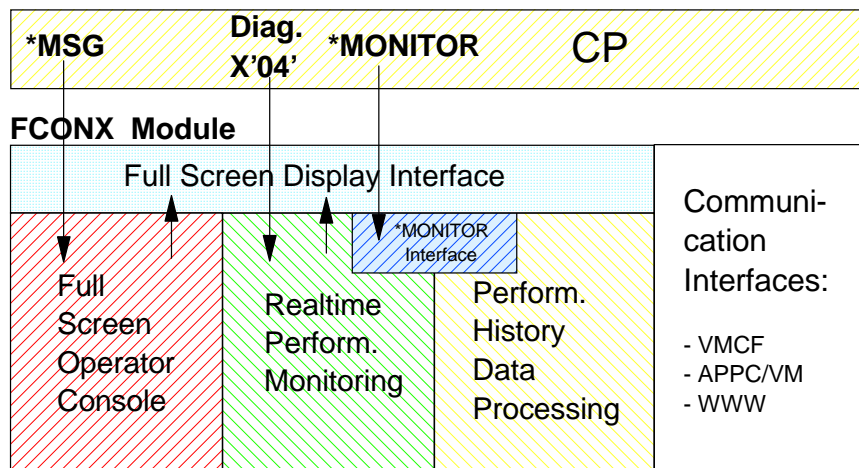
- **Special Processing of Output Lines**
  - Change appearance/behaviour of output lines
  - Reroute output lines to another user
  - Trigger execution of REXX procedures or CMS modules
  - PROP like facilities, but it isn't PROP ..
- **Timer Facility**
  - Specify time and selectable days of the week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

# Performance Monitoring



- Realtime Performance Monitoring
  - Powerful, easy to use
  - Exception/threshold monitoring
  - Printing performance data
  - Central monitoring facility for multiple systems
  - Multiple (remote) access to realtime perf. data
- History Data Collection / Analysis

# Performance Monitoring ...



# Initial Menu



```

FCX124                Performance Screen Selection                Perf. Monitor

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

D. Monitor data        21. User resource usage* 3D. Response time (all)*
E. Monitor settings   22. User paging load*   3E. RSK data menu*
F. System settings    23. User wait states*  3F. Scheduler queues
G. System configuration 24. SFS server data*   3G. Scheduler data
                        25. User response time* 3H. SFS/BFS logs menu*
                        26. Resources/transact.* 3I. System log
                        27. User communication* 3K. TCP/IP data menu*
                        28. Multitasking users* 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 <<
OD00 OSA >TCPIP ... 1 17.4 ... .2 55.9 .2 56.3 56.3 .0 .00
OD02 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 F9O007 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
OD01 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 F9O008 1 8 .4 .0 .2 1.2 2.8 4.2 4.2 .0 .00
OD04 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
OFC1 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 F9O006 1 8 .2 .0 .2 2.0 3.1 5.3 5.3 .0 .00
OBE2 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
OFC6 3270-2 >SMAVM7 ... 1 .2 ... .2 18.5 .5 19.2 19.2 .0 .00
OFC7 3270-2 >SMAVM8 ... 1 .2 ... .2 18.6 .6 19.4 19.4 .0 .00
OFE1 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
OBE2 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
OFC6 3270-2 >SMAVM7     ... 1  .2  ...  .2 18.5  .5 19.2 19.2  .0  .00
OFC7 3270-2 >SMAVMA     ... 1  .2  ...  .2 18.6  .6 19.4 19.4  .0  .00
OFE1 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
C MVA 019E 2.1 0 RR C
C MBE 019E 2.0 0 RR C
C RHUB 019E 1.9 0 RR C
C ROT 019E 1.6 0 RR C
C PALM 019E 1.2 0 RR 1756 29.8 100 .1 C
C 201 - 300 $MAINT 019D .0 owner C
C CHS 019D .5 0 RR C
C MASC 019D .3 0 RR C

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
```

# 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





# 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
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

<----- CPU Load -----> Vect <-- Virtual IO/s --->
Interval  <-Seconds->  T/V  Fac
End Time  %CPU  TCPU  VCPU  Ratio %Vec  Total  DASD  Avoid  UR  Pg/s  User Status
>>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

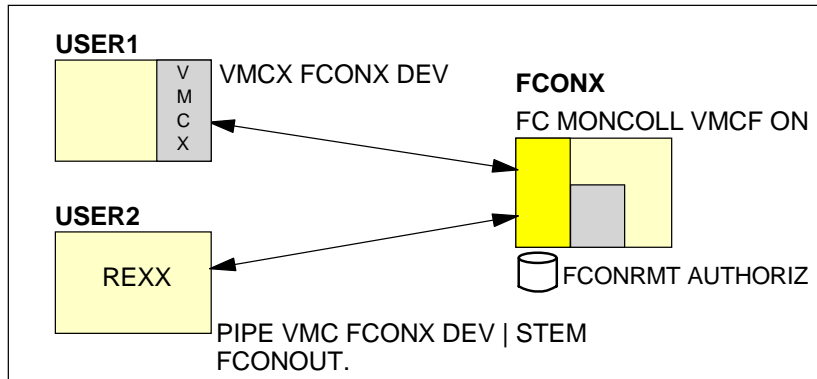
Command ==>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F10=Left  F11=Right  F12=Return
```

# Multiple (Remote) Access to Performance Data

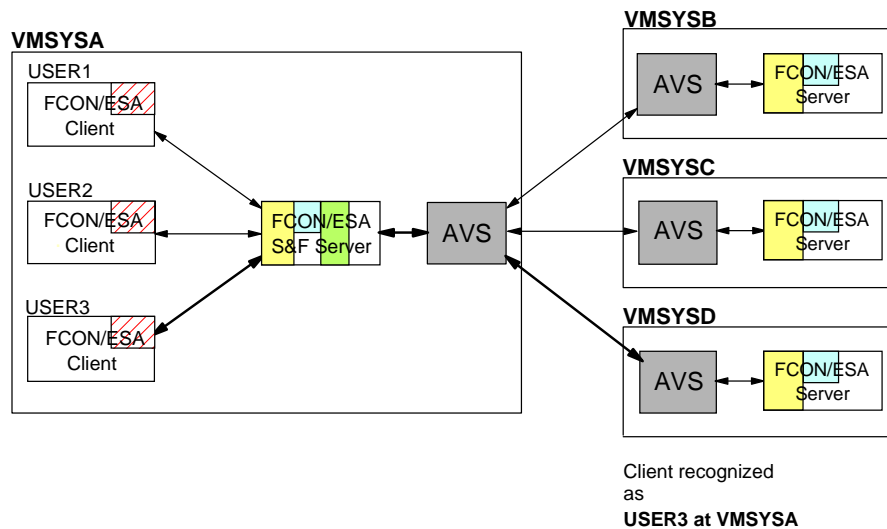


- Local VMCF Interface
- APPC/VM Local & Remote
- WWW Interface for Standard Web Browsers

# Local VMCF Interface



# APPC/VM: Store & Forward Logic





## WWW Server Interface



- Web Browsers and HTML allow platform independent implementation of graphical user interface
- Cannot do everything with HTML, but most of the important things
- JAVA applet allows implementing native graphics

## WWW Server Interface



- Interfacing directly to TCP/IP server machine
- No separate Web Server machine required for FCON/ESA performance data retrieval
- Only subset of Web Server functions implemented that is needed for performance data retrieval



# Initial Perf. Data Selection Menu



**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 loads*</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 communication*</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="#">Transtact. statistics</a>		3C. <a href="#">Logical part. load</a>
D. <a href="#">Monitor data</a>	User Data	3D. <a href="#">Response time (all)*</a>
	21. <a href="#">User resource usage*</a>	3E. <a href="#">RISK data menu*</a>

# Example for Performance Data Display



**Hyperlink selection of:**

**Sort sequence**

**Context help**

**Device details**

Device Descr.	Mdisk	Re	Rate/s	Time (msec)
<<- Device Descr. -->	Mdisk	Re	<-Rate/s->	<----- Time (msec)
>> All DASD <<				
0200 3380-K XD8K01	0	8	0.0	3.5 4.6
0201 3380-K I18K01	8	8	-1.0	1.1 4.8
0202 3380-K I18K02	9	8	-0.3	1.1 4.6
0203 3380-K I18K03	18	8	-1.0	3.3 3.8
0204 3380-K I18K04	9	8	0.0	1.1 4.8
0205 3380-K I18K05	10	8	-1.0	3.1 3.9
0206 3380-K I18K06	11	8	-1.0	2.7 3.8 4.7
0207 3380-K I18K07	7	8	-1.0	3.5 4.5



# History Data Collection



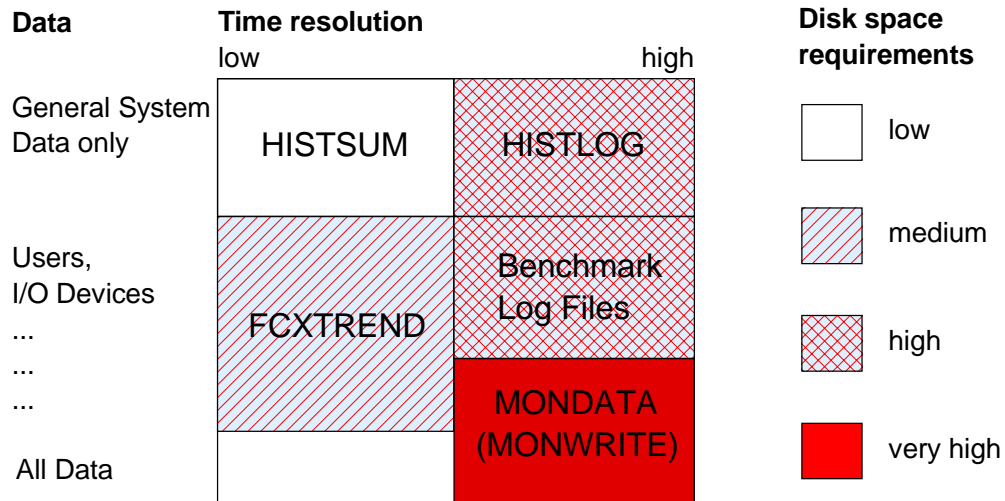
- General system data:
  - Detailed HISTLOG files (per day)
  - Summary HISTSUM files
- Selected users & I/O devices:
  - Detailed benchmark log files
- System, (selected) users, I/O devices, ...:
  - Summary FCXTREND files

# History Data Analysis



- Browsing through History Data Files
  - HISTLOG and HISTSUM files
  - FCXTREND files
  - MONDATA files (MONWRITE)
- Graphics for
  - REDISP data
  - Benchmark log files
  - HISTLOG/HISTSUM files and
  - FCXTREND files
- Numerical Analysis
  - For HISTLOG or HISTSUM files

# History Data Files



# Graphics



- 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

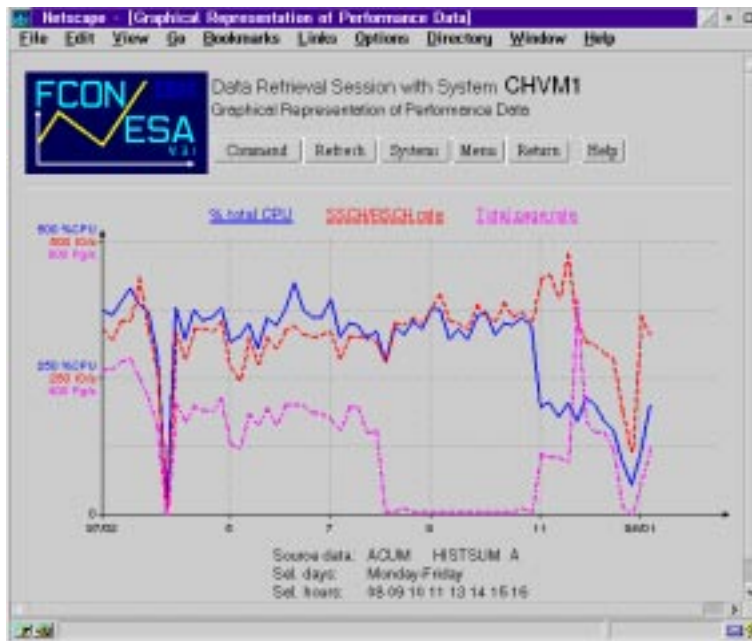
# GRAPHICS Selection Menu



FCON/ESA Overview and V.3.2.00/01 Update

VM/VSE Technical Conference 2000

# GRAPHSUM Example



FCON/ESA Overview and V.3.2.00/01 Update

VM/VSE Technical Conference 2000

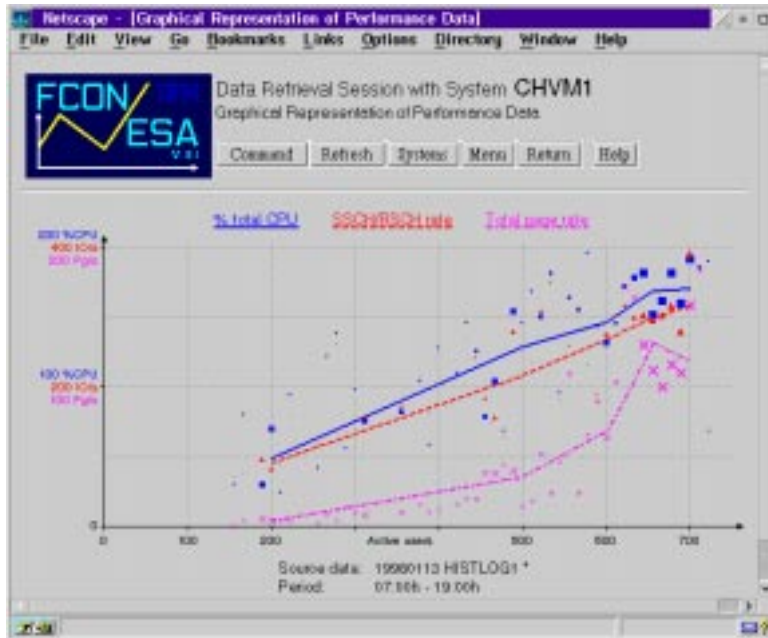
# Profile of Average Day



FCON/ESA Overview and V.3.2.00/01 Update

VM/VSE Technical Conference 2000

# GRAPHVAR Example



FCON/ESA Overview and V.3.2.00/01 Update

VM/VSE Technical Conference 2000

## Recent Enhancements Made, Enhancements Planned



- FCON/ESA Version 3.2.00

Available September 1999

- FCON/ESA Version 3.2.01

Availability planned July 2000

## FCON/ESA V.3.2.00



- New Extended Trend Files

- Additional Performance Data

- Support for Extended Channel Measurement Data
- Support for 2105 ('Shark' DASD) Data
- New TCPUSERS Display
- Some TCP/IP FL320 Fields Included

# New Extended Trend Files



- Data content similar to VMPRF trend files, i.e. fields from most 'by time' logs and also for (selected) users, I/O devices, channels, data spaces ...
- File-identification '*systemid* FCXTREND'
- Contents controlled by file FCONX TRENDREC
- Period controlled by 'T' suffix  
appended to '*hh:mm*' reset time specifications of command  
FC MONCOLL RESET *hh:mm hh:mmT hh:mm hh:mmT*  
(similar to 'P' suffix for controlling PRINT output)

# New Extended Trend Files ...



## FCONX TRENDREC

```
*-----*
* FCON/ESA Trend File Definition. This file defines the kind *
* of records to be generated when a trend file build request *
* is processed ('T'-suffix appended to FC MONCOLL RESET times). *
*-----*

* General Trend Record Selection
RECORDS  CHANNEL  NSS  DSPACES  USER  DASD  SEEKS  SFS  MTUSER  TCPIP

* Specific User Selection
* USERID  userid1  userid2  userid3  userid4  ...
  USERID  FCONMNT  OPERATOR  TCPIP  VTAM

* Specific DASD Selection
DEVNO    0781 0782 0784 0786 0788
DEVNO    0798 0799
```

# Additional Performance Data



- Support for Extended Channel Path Measurement Data
  - SYSTEM domain record 20 with VM/ESA V.2.4. Record 18 no longer created when record 20 is available.
  - Only on systems with extended channel path measurement facility
  - Provides data for new FICON channels (group 2) and older channels (group 1)
- New FCHANNEL Display
  - FCHANNEL display with FICON channel specific data
  - CHANNEL and LCHANNEL displays with overall channel utilization data for both group 1 and group 2 channels also based on new monitor record when available

# FCHANNEL Display (FICON Channels)



```
FCX215      CPU 9021  SER 52429  Interval 08:30:08 - 12:03:08  Perf. Monitor
-----
          <----- FICON Channel Utilization % ----->
          <-- Total for System -->  <-Own Partition-->  <--Total Data-->
Channel      Bus Work <Data Units>  Work <Data Units>  <Transfer Rate->
Path         Cycle Units Write  Read  Units Write  Read  <- (Bytes/s) -->
ID   Shrd  T_BCy T_WUn T_DUW  T_DUR  L_WUn L_DUW  L_DUR  Write/s  Read/s
F0   Yes   9   24   0    0    0    0    0    0        0    0
F4   Yes  23   10   1    1   10   1    1  419080  541960
F5   Yes   9    1   0    0    0    0    0    0        0    0
```

# Additional Performance Data



## ■ Support for 2105 ('Shark' DASD) Data

- Concept of 'Parallel Access Volumes'
- New DASD monitor record fields show whether a device is set up as an alias parallel access volume, and provide the device number of the corresponding 'base' device.

## ■ Parallel Access Volumes Indication on Reports

Alias PAV volumes are shown as

*devno -> baseno*

on CACHDBSE, DEVICE and IOASSIST displays, i.e. the 'device type' field contains the base PAV device number.

# PAV on DEVICE Display



```
FCX108      CPU 9021  SER 52429  Interval 11:21:26 - 11:22:26  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      .2      .4      .7      1.3      1.3      .0      .00
153F 3390-2 MISC2  CP      0      4      .0      .0      ...      ...      ...      ...      .0
6700 3390-3 TEST1          0      2      .0      .0      .3      .1      1.6      2.0      2.0      .0      .00
6701 3390-3 CMSPAV          0      2      .0      .0      .1      .0      .4      .5      .5      .0      .00
6702 3390-3 CMSPV2          0      2      .0      .0      .3      .1      .2      .6      .6      .0      .00
...
67F7 ->6702 CMSPV2          0      2      .4      .0      .2      .1      .3      .6      .6      .0      .00
67F8 ->6701 CMSPAV          0      2      .4      .0      .2      .0      .3      .5      .5      .0      .00
67F9 ->6701 CMSPAV          0      2      .4      .0      .2      .0      .3      .5      .5      .0      .00
67FA ->6701 CMSPAV          0      2      .4      .0      .2      .1      .3      .6      .6      .0      .00
67FB ->6701 CMSPAV          0      2      .4      .0      .2      .1      .3      .6      .6      .0      .00
67FC ->6700 TEST1          0      2      .4      .0      .2      .0      .4      .6      .6      .0      .00
67FD ->6700 TEST1          0      2      .4      .0      .2      .0      .4      .6      .6      .0      .00
67FE ->6700 TEST1          0      2      .4      .0      .2      .1      .4      .7      .7      .0      .00
67FF ->6700 TEST1          0      2      .4      .0      .2      .1      .4      .7      .7      .0      .00
```



# Additional Performance Data ...



## ■ TCPUSERS Display Added

- Based on TCP/IP Event Appldata
- Provides Activity Log for TCP/IP Users (client machines)

## ■ Additional Buffer Pools

- TCPCONF + addr. translation, IP route & segment ackn. data
- TCPBPLOG + segment ackn. buffer pool and new layout
- TCPSESS bytes sent /received support for large numbers
- TCPUSERS bytes sent /received support for large numbers

# TCPMENU Display (TCP/IP Data Selection Menu)



```
FCX203      CPU 9672  SER 65993      TCP/IP Displays      Perf. Monitor
.
. Server      Log File
S Userid     Name        Description
. TCPIP      TCPACTLG    General TCP/IP activity log
. TCPIP      TCPBPLOG    TCP/IP buffer pools log
. TCPIP      TCPCONF     TCP/IP server configuration
. TCPIP      TCPDATLG    General TCP/IP data transfer log
. TCPIP      TCPICMP     TCP/IP ICMP messages log
. TCPIP      TCPLINKS    TCP/IP links activity log
. TCPIP      TCPSESS     TCP/IP TCP and UDP sessions log
. TCPIP      TCPUSERS    TCP/IP users activity log
. TCPIPX     TCPACTLG    General TCP/IP activity log
. TCPIPX     TCPBPLOG    TCP/IP buffer pools log
. TCPIPX     TCPCONF     TCP/IP server configuration
. TCPIPX     TCPDATLG    General TCP/IP data transfer log
. TCPIPX     TCPICMP     TCP/IP ICMP messages log
. TCPIPX     TCPLINKS    TCP/IP links activity log
. TCPIPX     TCPSESS     TCP/IP TCP and UDP sessions log
. TFTPDP     TFTPLOG     TCP/IP TFTP activity log
```

# TCPUSERS Display (Users Activity Log)



```
FCX214      CPU 9021  SER 52429  Interval 08:30:08 - 12:03:08  Perf. Monitor
TCP/IP Users Activity Log for Server TCPIP

      User          Completed   Time  <-Total Bytes X-ferred->  <Roundtrip> ...
      Name          Sessions  /Sess  <-- TCP -->  <-- UDP -->  <Time (s)-> ...
Time    Name      TCP  UDP  (sec)  Recvd  Sent  Recvd  Sent  Smooth  Var.  ...
>>Mean>> Z90WAKE2  333  0  1.124  91913  32827  0  0  .145  .072  ..
>>Mean>> Z90WAKE  583  0  1.068  866k  633k  0  0  .018  .007  ..
>>Mean>> Total...  916  0  1.089  958k  666k  0  0  .064  .030  ..

12:02:08 Z90WAKE2  10  0  .840  2760  986  0  0  .100  .051  ..
12:02:08 Z90WAKE   8  0  1.924  22472  14469  0  0  .025  .011  ..
12:02:08 Total...  18  0  1.322  25232  15455  0  0  .066  .033  ..

12:03:08 Z90WAKE2  10  0  1.010  2760  985  0  0  .128  .056  ..
12:03:08 Z90WAKE   9  0  1.641  25281  16293  0  0  .021  .006  ..
12:03:08 Total...  19  0  1.309  28041  17278  0  0  .077  .032  ..
```

# FCON/ESA V.3.2.01



- Additional Performance Data
  - Reusable Server Kernel displays
- Trend File Records
  - User totals and classes records added, always created
  - Reusable Server Kernel summary data records added, selectable
  - 'FC MONCOLL RESET ..' for more than 8 reset times
- Graphics Support for Extended Trend File Variables

# RSKMENU Display (RSK Data Selection Menu)



```

FCX216      CPU 9672  SER 65993      RSK Displays      Perf. Monitor
.
Server      Display
S Userid    Name      Description
. BPIDX1    RSKDET    Reusable Server Kernel details
. BPIDX1    RSKDISK   RSK disk performance log
. BPIDX1    RSKLOG    General RSK performance log
. BPIDX1    RSKSTOR   RSK storage utilization log
. BPSERV    RSKDET    Reusable Server Kernel details
. BPSERV    RSKDISK   RSK disk performance log
. BPSERV    RSKLOG    General RSK performance log
. BPSERV    RSKSTOR   RSK storage utilization log
. BPSRV1    RSKDET    Reusable Server Kernel details
. BPSRV1    RSKDISK   RSK disk performance log
. BPSRV1    RSKLOG    General RSK performance log
. BPSRV1    RSKSTOR   RSK storage utilization log
. MPTEST    RSKDET    Reusable Server Kernel details
. MPTEST    RSKDISK   RSK disk performance log
. MPTEST    RSKLOG    General RSK performance log
. MPTEST    RSKSTOR   RSK storage utilization log
    
```

# RSKDET Display (RSK Server Details)



```

FCX217      CPU 9672  SER 65993  Interval 12:46:05 - 12:51:04  Perf. Monitor

Reusable Server Kernel Details: BPIDX1

<----- Services Activity ----->
Service  Trans <Bytes/s>  Service  Trans <Bytes/s>  Service  Trans <Bytes/s>
Name     /s Recv Sent     Name     /s Recv Sent     Name     /s Recv Sent
>Total>> 16.79  813 611k  APPC     .000  0  0  AUTH     .000  0  0
CACHE    .000  0  0  CMS      .000  0  0  CONFIG   .000  0  0
CONSOLE  .000  0  0  CP       .000  0  0  ECHO     .000  0  0
ENROLL   .000  0  0  HTTP    16.79  813 611k  IUCV     .000  0  0
...

<----- Line Driver Activity ----->
Line     Trans <Bytes/s>  Line     Trans <Bytes/s>  Line     Trans <Bytes/s>
Driver   /s Recv Sent     Driver   /s Recv Sent     Driver   /s Recv Sent
>Total>> 16.79  813 611k  CONSOLE  .000  0  0  MSG      .000  0  0
SPOOL    .000  0  0  SUBCOM   .000  0  0  TCP      16.79  813 611k
...
    
```

# RSKDISK Log (RSK Disk Perf. Log)



FCX219 CPU 9672 SER 65993 Interval 09:41:04 - 12:51:04 Perf. Monitor

Reusable Server Kernel Disk Perf. Log: MPTEST

Interval End Time	<----- Authorize ----->				<----- Enrollment Sets ----->				<--- Act ive
	Permit /s	Inquire /s	<Retrieval> Rows/s	%Hit	Act ive	<--Total--> Record Bytes	<--Activity/s--> Insrt Remov Retrv		
>>Mean>>	.000	.000	.000	..	2	212 71232	.000 .000 22.54	1	
11:11:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
11:16:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
11:21:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
11:26:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
11:31:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
11:36:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
11:41:04	.000	.000	.000	..	2	212 71232	.000 .000 41.06	1	
11:46:04	.000	.000	.000	..	2	212 71232	.000 .000 60.83	1	
11:51:04	.000	.000	.000	..	2	212 71232	.000 .000 65.54	1	
11:56:04	.000	.000	.000	..	2	212 71232	.000 .000 15.44	1	
12:01:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
12:06:04	.000	.000	.000	..	2	212 71232	.000 .000 .000	1	
...									

# RSKLOG (General RSK Log)



FCX218 CPU 9672 SER 65993 Interval 09:41:04 - 12:51:04 Perf. Monitor

Reusable Server Kernel Log: MPTEST

Interval End Time	<----- Services ----->				<--- Line-Drivers ---->				<----- Tr		
	Act ive	Trans /s	<---Bytes--> Recv/s Sent/s	%	Act ive	Trans /s	<---Bytes--> Recv/s Sent/s	Act ive	Total MBytes	Used	Re
>>Mean>>	23	5.676	280 60024	..	5	5.676	280 60024	0	....	..	
11:11:04	23	.037	0 4	..	5	.037	0 4	0	....	..	
11:16:04	23	.127	2 12	..	5	.127	2 12	0	....	..	
11:21:04	23	.000	0 0	..	5	.000	0 0	0	....	..	
11:26:05	23	.000	0 0	..	5	.000	0 0	0	....	..	
11:31:05	23	.000	0 0	..	5	.000	0 0	0	....	..	
11:36:05	23	.000	0 0	..	5	.000	0 0	0	....	..	
11:41:05	23	10.43	516 651k	..	5	10.43	516 651k	0	....	..	
11:46:04	23	15.26	766 1020k	..	5	15.26	766 1020k	0	....	..	
11:51:05	23	16.44	794 613k	..	5	16.44	794 613k	0	....	..	
11:56:05	23	3.877	195 282k	..	5	3.877	195 282k	0	....	..	
12:01:05	23	.000	0 0	..	5	.000	0 0	0	....	..	
12:06:05	23	.000	0 0	..	5	.000	0 0	0	....	..	
...											

# RSKSTOR Log (RSK Storage Log)



FCX220 CPU 9672 SER 65993 Interval 09:41:04 - 12:51:04 Perf. Monitor

Reusable Server Kernel Storage Log: MPTEST

<----- Storage Groups ----->							<----->				
Act- <----- Paging Activity ----->							Act- <----- s				
Interval	Rows	IO/s	Page/s	ms/Pg	IO/s	Page/s	ms/Pg	Rows	Bytes	% Used	Rate/s
>>Mean>>	2	1.883	450.4	...	1.883	450.3	...	17	97430k	88	44.43
11:16:04	3	.000	.000	...	.000	.000	...	16	9043k	75	3.518
11:21:04	3	1.750	418.6	...	1.747	417.8	...	16	9043k	75	3.130
11:26:04	3	1.685	402.8	...	1.685	402.8	...	16	9043k	75	3.057
11:31:04	3	1.670	399.0	...	1.670	399.0	...	16	9043k	75	3.027
11:36:04	3	1.688	404.5	...	1.688	404.5	...	16	9043k	75	3.064
11:41:04	3	9.524	2280	...	9.524	2280	...	17	138M	84	93.33
11:46:04	3	1.775	424.2	...	1.775	424.2	...	17	138M	97	114.3
11:51:04	3	1.716	410.6	...	1.716	410.6	...	17	138M	96	117.1
11:56:04	3	1.647	393.8	...	1.647	393.8	...	17	138M	98	33.92
12:01:04	3	1.642	393.4	...	1.642	393.4	...	17	138M	98	2.984
12:06:04	3	1.732	413.1	...	1.732	413.1	...	17	138M	98	3.136
...											

# Graphics Support for Extended Trend File Variables



- Several Hundred Variables Predefined
  - Variables for overall system load  
Similar to HISTLOG/HISTSUM file variables
  - Also perf. variables by user, channel, I/O device ..
- New GRAPHICS Menu Layout  
for selection of additional specifications needed  
for new trend file variables
- Also Direct Selection via GRAPHxxx Command

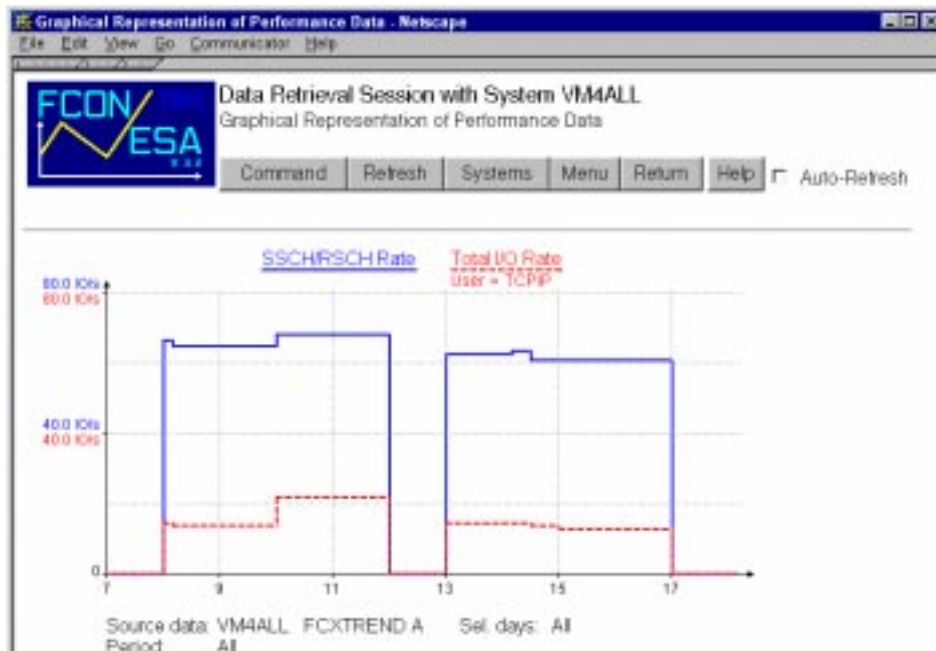
# New GRAPHICS Selection Menu



FCON/ESA Overview and V.3.2.00/01 Update

VM/VSE Technical Conference 2000

# WWW Profile of Average Day



FCON/ESA Overview and V.3.2.00/01 Update

VM/VSE Technical Conference 2000

# Marketing Information

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- **Field developed program**
  - Maintenance commitment up to the end of 2001
- **Licence cost for Version 3** (graduated OTC)
  - from CHF 10'000 (approx. US\$ 6200, min. charge, up to group 18)
  - to CHF 45'000 (approx. US\$ 28000, max. charge, above group 60)
  - (Excl. VAT., Prices valid up to the end of 2000, subject to change)
- **Contact the Author for Download Instructions of Test Code**
- **Contact your SE for more information**
  - Marketing summary available as file FCXABSTR LIST3820 from the FCONX disk of TOOLS at EMEAVM2
  - Or contact the author:
    - Eginhard Jaeger
    - VNET: JA at CHVM1
    - Internet: ja@ch.ibm.com