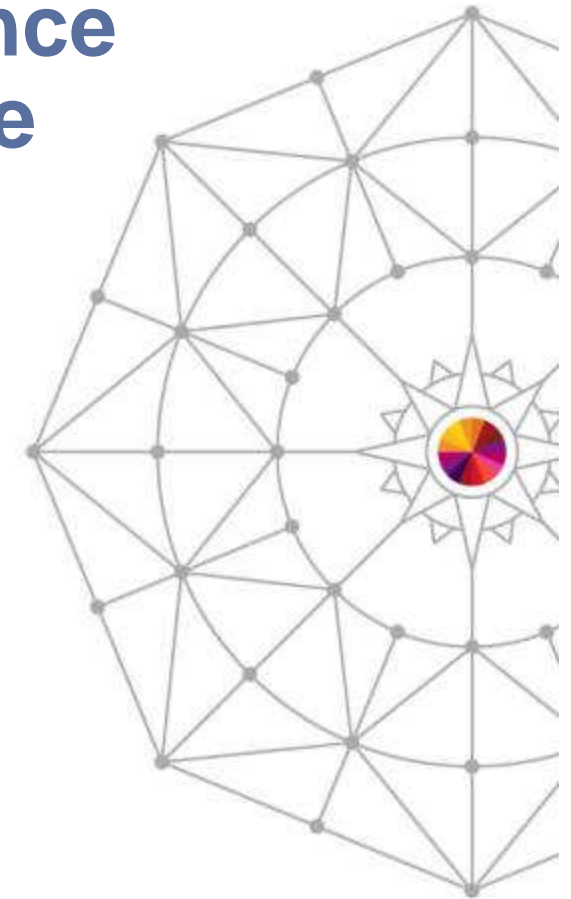




How to Use the Performance Toolkit to Generate Usable Reports

Bruce Hayden
IBM Advanced Technical Sales Support

March 12, 2014
Session Number 14590





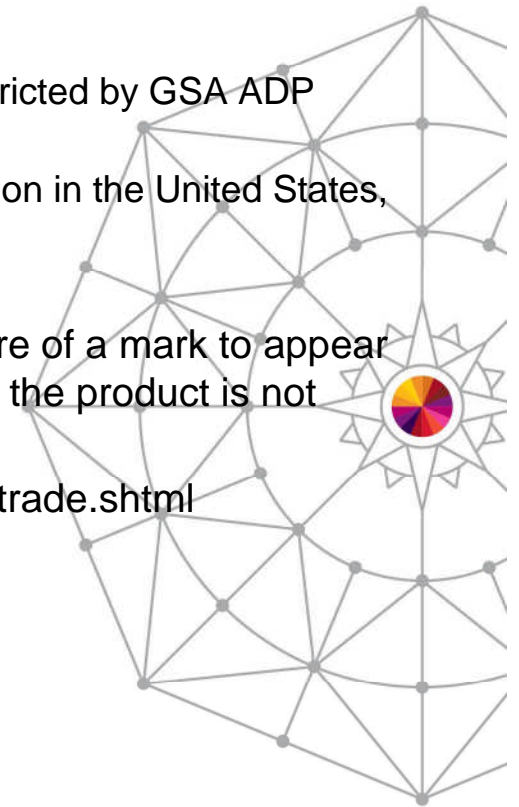
Trademarks

© Copyright IBM Corporation 2014. All rights reserved.

U.S. Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

The following are trademarks of the International Business Machines Corporation in the United States, other countries, or both.

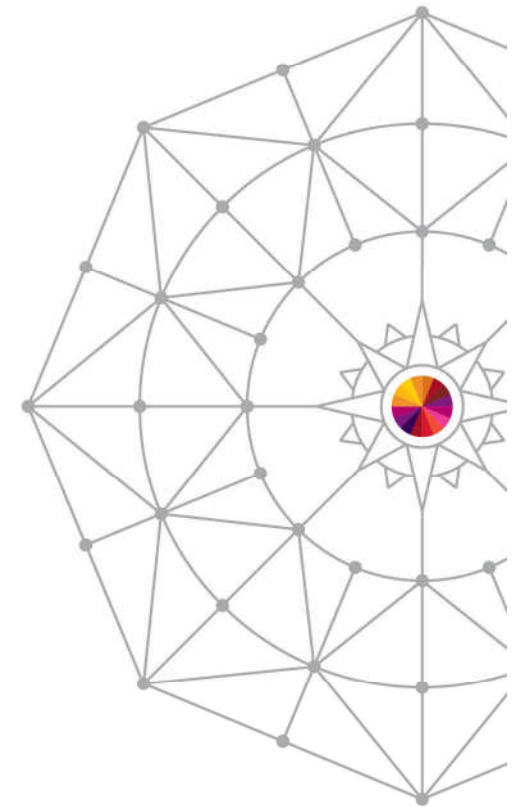
- Not all common law marks used by IBM are listed on this page. Failure of a mark to appear does not mean that IBM does not use the mark nor does it mean that the product is not actively marketed or is not significant within its relevant market.
- For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml





Agenda

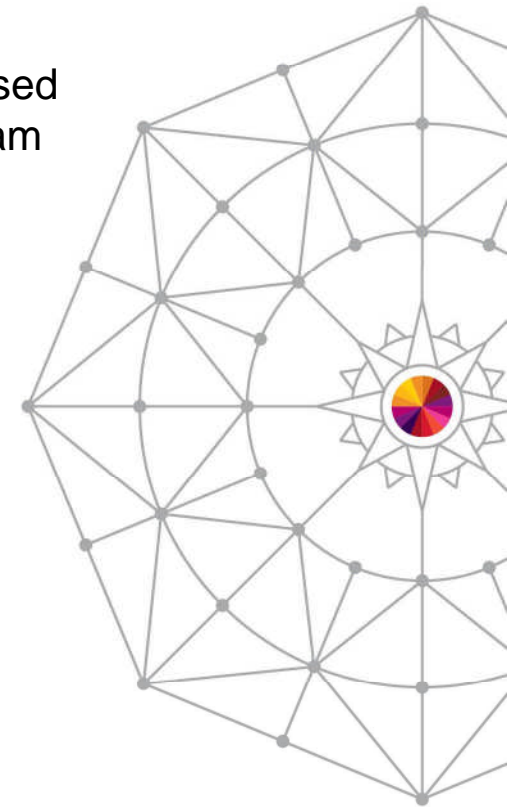
- Report generating capabilities of The Performance Toolkit
- How do I generate reports?
- What reports do I use to gather specific information?
- Some tips on making sense of monitor data with charts and graphs





Overview: The Performance Toolkit

- The Performance Toolkit is a pre-installed, optional feature of z/VM used to collect and process MONITOR data captured by the Control Program (CP).
 - Provides a real-time look at current system performance.
 - Processes data collected over time into reports to help determine normal system behavior and identify performance problems.





Report generating capabilities of The Performance Toolkit

- MONITOR - onscreen live system data
- PRINT – printed live system data
- MONSCAN – onscreen from saved data
- FCONXREP – printed summary reports from saved data
- TRNDSCAN – summary data is displayed from saved data
- BATCH – printed reports from saved data
- Benchmarking – collects performance data for a specific subset of objects (users, I/O devices, ISFC endpoints, and ISFC logical links)





Data Sources for Reports

- Live monitor data

- History files
 - ***mmdyy HISTLOGn*** – contains most of the performance data available in ‘by time’ logs.

- Trend files
 - ***systemid FCXTREND*** – cumulative file with more detailed information on system load, processors, users, disks, and channels.

- Summary files
 - ***ACUM HISTSUM*** – summary history data
 - ***systemid FCXSUMn*** – extended summary data for a single ‘summary’ period.

- Monitor data files
 - ***Dmddy Thhmmss*** – complete monitor data, generated by MONWRITE command





How do I generate reports?

- Different commands and data sources are used to generate reports.
- Some reports can be created from the PERFSVM userid. Other reports should be created from other userids with access to monitor data using PerfKit utilities and commands.





MONITOR Command

- The MONITOR command switches Performance Toolkit into performance monitoring mode, where you can view real-time monitor data by selecting from a menu of report screens.

```

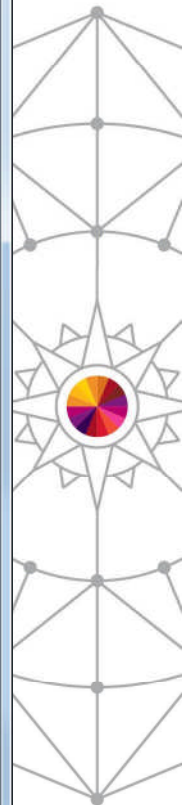
FCX124          Performance Screen Selection (FL630          )          Perf. Monitor

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. SSI data menu*          13. I/O device menu*     33. Benchmark displays*
4. Priv. operations         14. Reserved             34. Correlation coeff.
5. System counters         15. Cache extend. func.* 35. System summary*
6. CP IUCV services        16. Reserved             36. Auxiliary storage
7. SPOOL file display*     17. DASD seek distance*  37. CP communications*
8. LPAR data menu*         18. I/O prior. queueing* 38. DASD load
9. Shared segments         19. I/O configuration    39. Minidisk cache*
A. Shared data spaces      1A. I/O config. changes  3A. Storage mgmt. data*
B. Virt. disks in stor.    21. User resource usage* 3B. Proc. load & config*
C. Transact. statistics    22. User paging menu*   3C. LPAR logs menu*
D. Monitor data            23. User wait states*   3D. Response time (all)*
E. Monitor settings        24. User response time*  3E. RSK data menu*
F. System settings         25. Resources/transact.* 3F. Scheduler queues
G. System configuration    26. User communication*  3G. Scheduler data
H. VM Resource Manager     27. Multitasking users*  3H. SFS/BFS logs menu*
I. Exceptions              28. User configuration*  3I. System log
K. User defined data*      29. Linux systems*      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

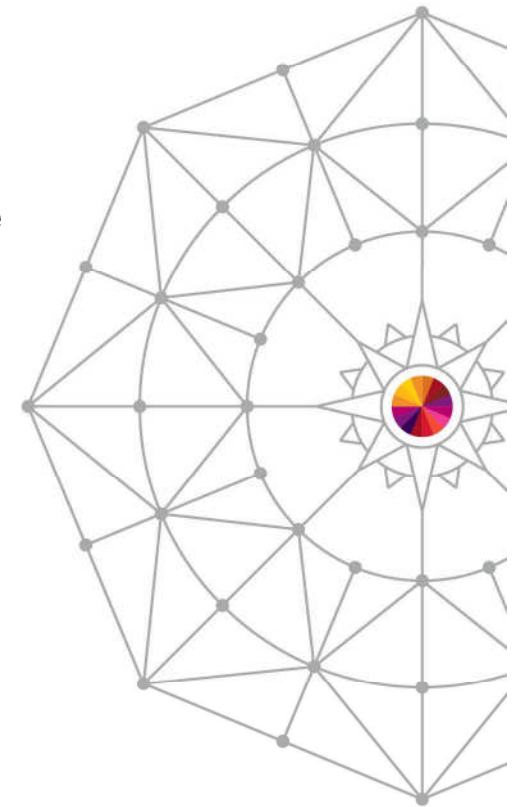
```





MONITOR Command (continued)

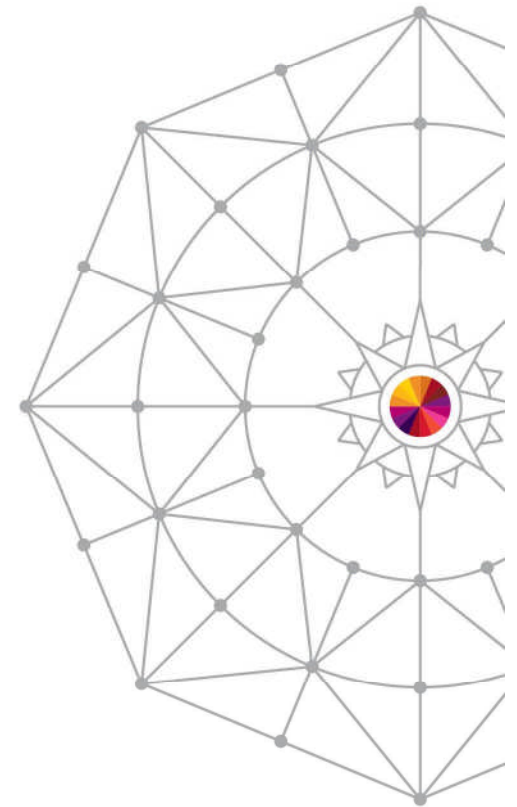
- The AVERAGE command will change the contents of a report from data obtained in the current interval (60 seconds by default) to the average value of the data over the whole period where performance data were collected or since the time when they were last reset.
- The CURRENT command will cause Performance Toolkit to resume showing values from the last monitor sample interval.
- The MONITOR command can be issued from PERFSVM and/or a user connecting to PERFSVM through the APPC interface.





PRINT Command

- The PRINT command, used while in Monitor Mode, prints an individual or a collection of PerfKit reports, either to disk or virtual printer.
- Examples:
 - **PRINT CPU** - prints the CPU display to the virtual printer of PERFSVM. Until the spool file is closed (CLOSE 00E), subsequent executions of the PRINT command will append the data to existing spool file.
 - **PRINT ON DISK** – continuously prints the data from any display you view to disk file FCOMMON LISTING A. The contents of the print file is cumulative and will continue to be saved until you issue the PRINT OFF command.





Output of PRINT Command

```

FCX100  Run 2013/10/08 13:24:04          CPU                               Page 1
                                           General CPU Load and User Transactions
From 2013/10/08 11:43:47                VM01
To   2013/10/08 13:10:47                CPU 2098-Z05   SN 1CB92
For   5220 Secs 01:27:00                z/VM   V.6.3.0 SLU 1302
    
```

CPU Load												Status or
PROC	TYPE	%CPU	%CP	%EMU	%WT	%SYS	%SP	%SIC	%LOGLD	%PR	%ENT	ded. User
P00	IFL	0	0	0	100	0	0	98	0	0	23	Master
P01	IFL	0	0	0	100	0	0	99	0	0	0	Alternate

Total SSCH/RSCH	2/s	Page rate	.0/s	Priv. instruct.	1/s
Virtual I/O rate	1/s	XSTORE paging	.0/s	Diagnose instr.	1/s
Total rel. SHARE	955	Tot. abs SHARE	0%		

Queue Statistics:	Q0	Q1	Q2	Q3	User Status:	
VMDBKs in queue	.3	.0	.0	.0	# of logged on users	13
VMDBKs loading	.0	.0	.0	.0	# of dialed users	0
Eligible VMDBKs		.0	.0	.0	# of active users	4
El. VMDBKs loading		.0	.0	.0	# of in-queue users	.3
Tot. WS (pages)	1002	0	0	0	% in-Q users in PGWAIT	0
Reserved					% in-Q users in IOWAIT	0
85% elapsed time	7.080	1.180	9.440	56.64	% elig. (resource wait)	0

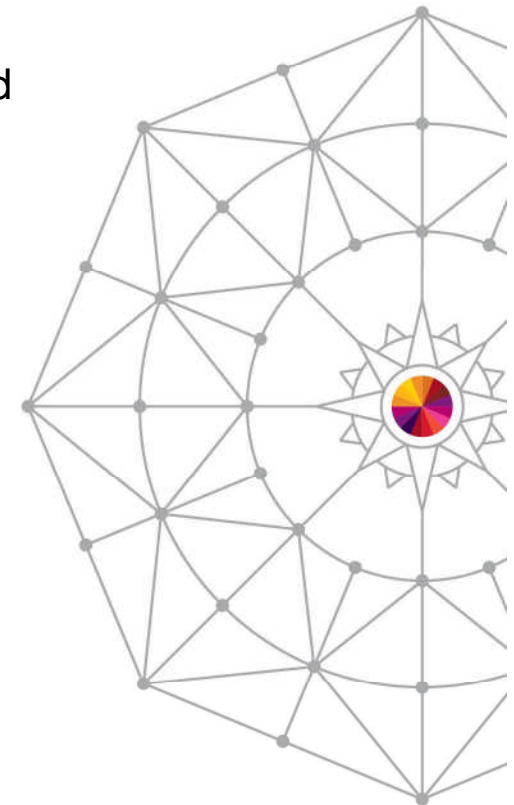
Transactions	Q-Disp	trivial	non-trv	User Extremes:	
Average users	.2	.0	.0	Max. CPU %	.....
Trans. per sec.	.3	.0	.0	Reserved	
Av. time (sec)	.829	.000	.000	Max. IO/sec	MONWRITE .5
UP trans. time		.000	.000	Max. PGS/s	.....
MP trans. time		.000	.000	Max. RESPG	TCPIP 3492
System ITR (trans. per sec. tot. CPU)			59.0	Max. MDCIO	.....
Emul. ITR (trans. per sec. emul. CPU)			15989	Max. XSTORE	.....





PRINT from APPC- or Web-connected User id

- The PRINT function will also work when issued from a user connected to PERFSVM through APPC while in MONITOR mode or a user logged in through the web interface. However:
 - **PRINT ON DISK** does not work.
 - **PRINT** or **PRINT screen** will result in a RDR file in PERFSVM's spool. Output from the PRINT command will not be cumulative (one spool file is generated per PRINT command). It is not necessary to issue the CLOSE 00E command.





MONSCAN Command

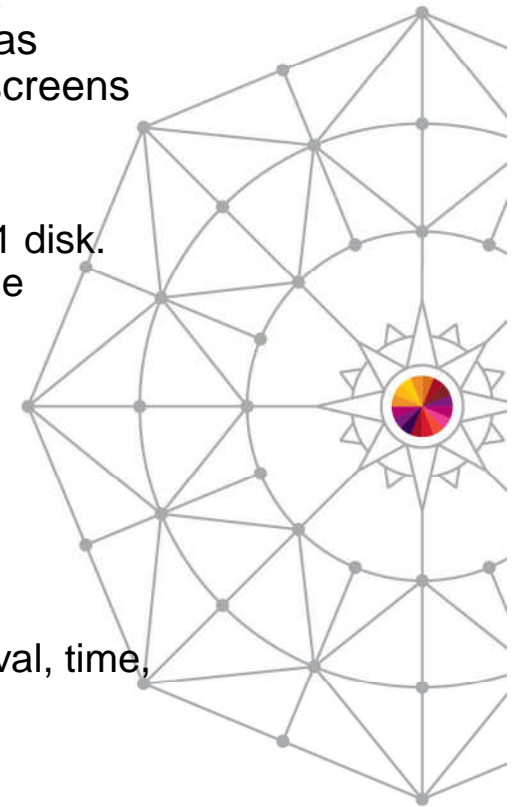
- The MONSCAN commands allows you to select a monitor file on disk or tape created by the MONWRITE utility as input for performance data analysis (the MONWRITE utility will create the fileid for the input file as ***DmmdyyThhmmss***). This data will then be displayed on PerfKit screens as if it was live data.
 - You run MONSCAN from other user ids by linking to PERFSVM's 201 disk. Enter MONSCAN from Performance Toolkit basic mode or preface the command with **PERFKIT**.

MONSCAN DISK *fn ft fm* FROM *hh:mm*

or

PERFKIT MONSCAN DISK *fn ft fm* FROM *hh:mm*

- While in MONSCAN mode, move through the data by collection interval, time, or go to the last interval:
 - NEXTSAMP – go to the next sample interval
 - NEXTSAMP hh:mm – go to the data for the given time
 - NEXTSAMP EOF – go to the last interval





MONSCAN Example

- MONSCAN D072213 T105449 X
- Select CPU screen
- NEXTSAMP to move forward through the saved intervals.

```

FCX100      Data for 2013/10/08  Interval 11:43:47 - 11:44:47  Monitor Scan

CPU Load
PROC TYPE %CPU %CP %EMU %WT %SYS %SP %SIC %LOGLD %PR %ENT  Status or
P00 IFL    0    0    0 100    0    0  96    0    0  23  Master
P01 IFL    0    0    0 100    0    0  96    0    0    0  Alternate

Total SSCH/RSCH      2/s      Page rate      .0/s      Priv. instruct.      1/s
Virtual I/O rate     1/s      XSTORE paging  .0/s      Diagnose instr.     1/s
Total rel. SHARE     3000    Tot. abs SHARE  0%

Queue Statistics:      Q0      Q1      Q2      Q3      User Status:
VMDBKs in queue      1        0        0        0      # of logged on users 13
VMDBKs loading        0        0        0        0      # of dialed users    0
Eligible VMDBKs      0        0        0        0      # of active users    4
El. VMDBKs loading   0        0        0        0      # of in-queue users  1
Tot. WS (pages)      3140    0        0        0      % in-Q users in PGWAIT 0
Reserved
85% elapsed time     7.080    1.180    9.440    56.64  % in-Q users in IOWAIT 0
% elig. (resource wait) 0

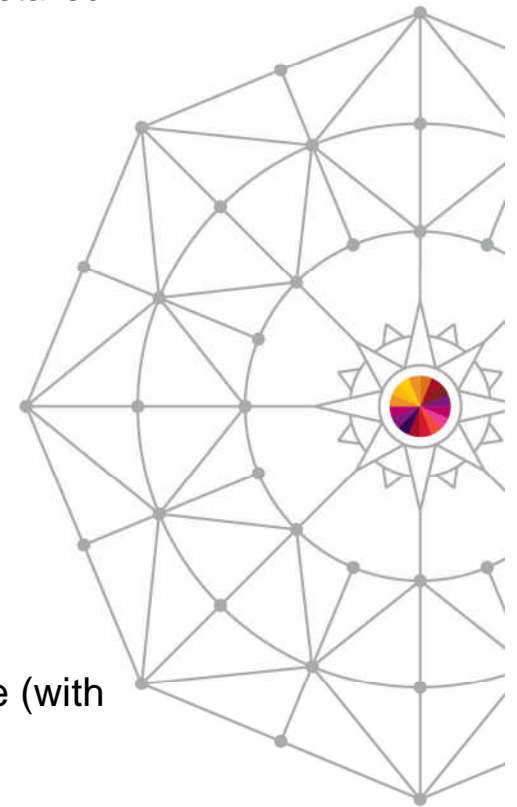
Transactions      Q-Disp      trivial      non-trv      User Extremes:
Average users      .3           .0           .0           Max. CPU %      .....
Trans. per sec.    .3           .0           .0           Reserved
Av. time (sec)     1.405       .000        .000        Max. IO/sec     MONWRITE      .5
UP trans. time     .000        .000        .000        Max. PGS/s      .....
MP trans. time     .000        .000        .000        Max. RESPG      TCPIP         3483
System ITR (trans. per sec. tot. CPU)  52.1
Emul. ITR (trans. per sec. emul. CPU) 15000
Max. MDCIO        .....
Max. XSTORE       .....

See also DSVBKACT for the Dispatch Vector activity
Command ==>
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
    
```



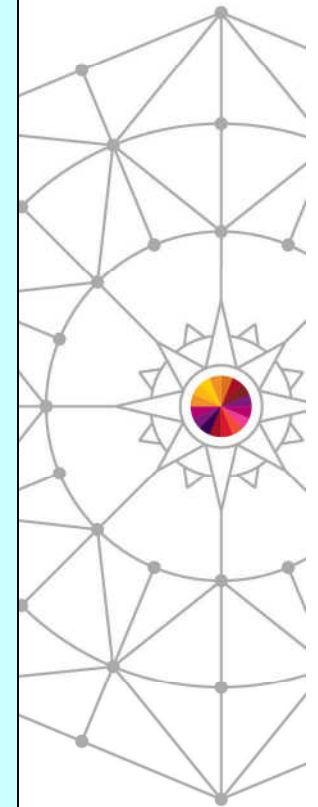
FCONXREP

- FCONXREP is not run from the Performance Toolkit environment, but it is used to analyze the summary performance history data files (ACUM HISTSUM) and detailed history logs (HISTLOG) created by Performance Toolkit.
 - Produces a table with average load values for selected performance variables on an hourly, daily, monthly, and/or yearly basis.
 - Located on PERFSVM 201 disk
 - Runs in interactive or batch mode
 - Interactive mode displays a selection menu
 - Batch mode requires a configuration file, FCONXREP SETTINGS, to provide the selection criteria for the report
 - Generates a FCONXREP LISTING file and FCONXREP IMPORT file (with output suitable for importing to a PC application).





FCONXREP Selection Menu for Summary Logs



```

FCX201      Perf. Toolkit Numerical Performance Analysis      Perf. Report

Period: Date      ==> 2013/07/11  to 2013/07/23      (YYYY/MM/DD)
      Time        ==> 08          to 17              (all hours in period)
      Sel. hours   ==>                               (only selected hours)
      ==>
      Sel. days    ==> M-F                            (only selected days)

Desired detail: HOURS ==> TOT          (ALL or TOT)
                  DAYS  ==> ALL        (ALL or TOT)
                  MONTHS ==> ALL       (ALL or TOT)

Variable selection ==> CPU             % total CPU
                  ==> LOGN            Logged-on users
                  ==> ACT             Active users
                  ==> TR/S            Trivial trans./s
                  ==> NT/S            Non-triv trans/s
                  ==>
                  ==>
                  ==>

Processing file 'ACUM HISTSUM Z1' (new SUM format)

F1=Help  F2=Browse  F3=Quit  F5=XEDIT  F10=Execute  F12=Return
  
```

How to use the Performance Toolkit to generate usable reports



FCONXREP LISTING example

Perf. Toolkit Statistics for Period 2013/07/11 to 2013/07/23, Hours to 2013/07/23, Hours 08 to 17

Input file: ACUM HISTSUM X1 Selected days: M-F

Year	Mon	Day	Hr	CPU	LOGN	ACT	TR/S	NT/S
		11		0.0	11	4	0.00	0.00
		12		0.0	11	4	0.00	0.00
		15		0.0	11	4	0.00	0.00
		16		0.0	11	4	0.00	0.00
		17		0.0	11	4	0.00	0.00
		18		0.0	11	4	0.00	0.00
		19		0.1	12	4	0.06	0.00
2013	Jul	TOT		0.0	11	4	0.01	0.00
							320	15
2013	TOT			0.0	11	4	0.01	0.00
Total				0.0	11	4	0.01	0.00



Output from a summary history file.





FCONXREP Selection Menu for Detailed History Logs

```

FCX201      Perf. Toolkit Numerical Performance Analysis      Perf. Report

Processing a detailed history log file for a single day. Please specify the
period to be analyzed, the interval to be used for calculating subtotals,
and the variables that should be included in the report.

Start and end time ==> 08:00   to   17:00   (hh:mm)

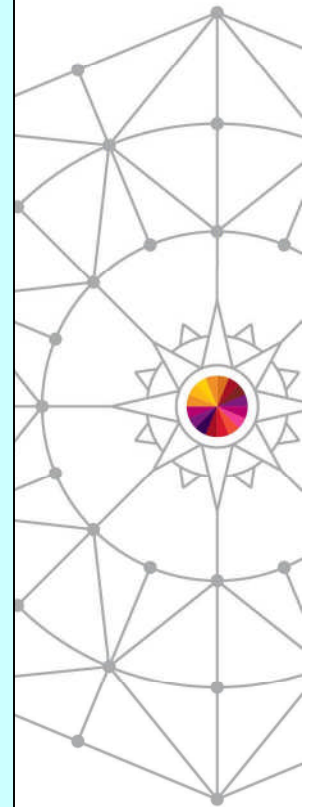
Interval (minutes) ==> 30           (Range 1-120 minutes)

Variable selection ==> CPU           % total CPU
                   ==> PG/S        Total page rate
                   ==> C1ES        C11 time slice
                   ==> TR/S        Trivial trans./s
                   ==> NT/S        Non-triv trans/s
                   ==>
                   ==>
                   ==>

Processing file '20130722 HISTLOG Z1' (new LOG format)

F1=Help  F2=Browse  F3=Quit  F5=XEDIT  F10=Execute  F12=Return

```



How to use the Performance Toolkit to generate usable reports



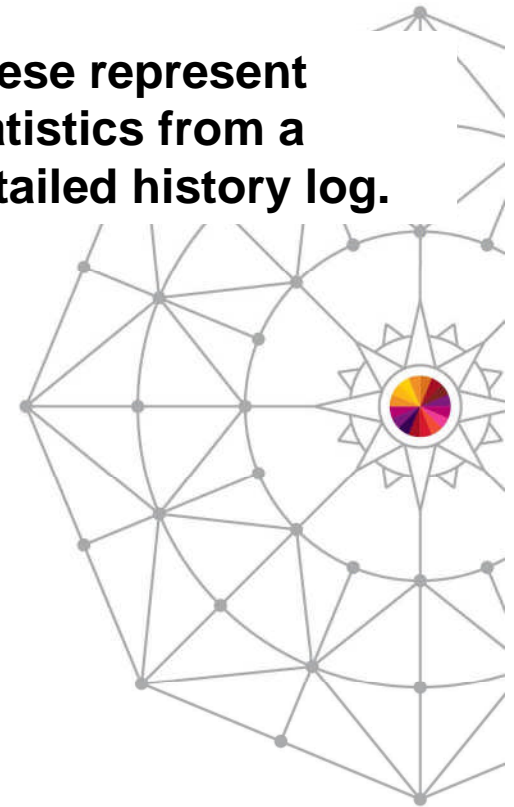
FCONXREP LISTING example

Perf. Toolkit Statistics for Detailed Log, 08:00 to 17:00

 Input file: 20130722 HISTLOG X1

Time	CPU	PG/S	C1ES	TR/S	NT/S
08:29	0.0	0.0	0.680	0.00	0.00
08:59	0.0	0.0	0.680	0.00	0.00
09:29	0.0	0.2	0.680	0.00	0.00
09:59	0.0	0.1	0.679	0.00	0.00
10:29	0.0	0.3	0.679	0.00	0.00
11:45	0.0	0.0	0.538	0.01	0.00
12:15	0.0	0.2	0.535	0.02	0.00
12:45	0.0	0.0	0.530	0.01	0.00
13:15	0.0	0.0	0.530	0.00	0.00
13:45	0.0	0.0	0.530	0.00	0.00
14:02	0.0	0.0	0.530	0.00	0.00
Total	0.0	0.1	0.602	0.00	0.00

These represent statistics from a detailed history log.





TRNDSCAN Mode

- Data from extended trend data files can be browsed while in Trend File Scan Mode.
 - Cannot be run in virtual machine where active realtime monitoring takes place.
 - ‘Average’ data is shown for the period between two reset times at the beginning and end of the interval. The FCONTROL MONCOLL RESET command is used to define the interval and generate trend records.
 - Invoke with **PERFKIT TRNDSCAN *fn ft fm*** command, where the filename is the system id and filetype is FCXTREND.



How to use the Performance Toolkit to generate usable reports



Trend Scan Mode Main Menu

```

FCX124          Performance Screen Selection (FL630          )          Trend Scan

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. SSI data menu*          13. I/O device menu*     33. Benchmark displays*
4. Priv. operations         14. Reserved             34. Correlation coeff.
5. System counters         15. Cache extend. func.* 35. System summary*
6. CP IUCV services         16. Reserved             36. Auxiliary storage
7. SPOOL file display*     17. DASD seek distance*  37. CP communications*
8. LPAR data menu*         18. I/O prior. queueing* 38. DASD load
9. Shared segments         19. I/O configuration    39. Minidisk cache*
A. Shared data spaces      1A. I/O config. changes  3A. Storage mgmt. data*
B. Virt. disks in stor.    21. User resource usage* 3B. Proc. load & config*
C. Transact. statistics    22. User paging menu*   3C. LPAR logs menu*
D. Monitor data           23. User wait states*   3D. Response time (all)*
E. Monitor settings       24. User response time* 3E. RSK data menu*
F. System settings        25. Resources/transact.* 3F. Scheduler queues
G. System configuration    26. User communication* 3G. Scheduler data
H. VM Resource Manager     27. Multitasking users* 3H. SFS/BFS logs menu*
I. Exceptions              28. User configuration* 3I. System log
K. User defined data*      29. Linux systems*      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 (*).

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

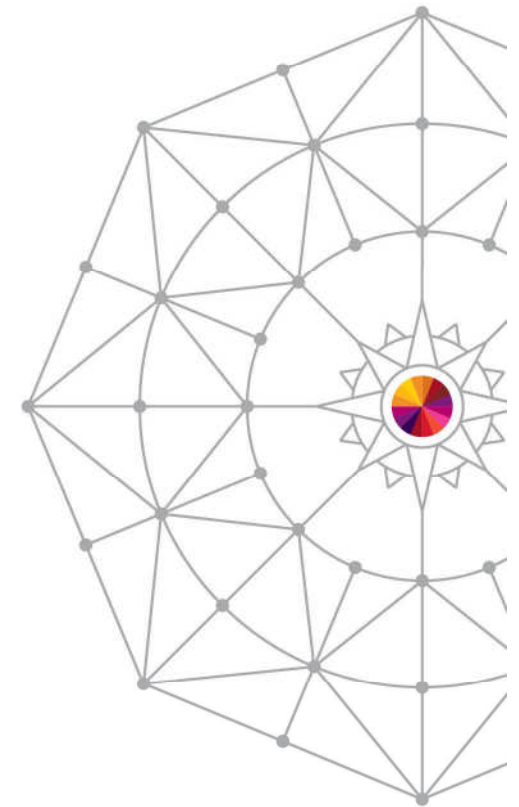
Complete your session evaluations online at www.SHARE.org/Anaheim-Eval
 IBM Advanced Technical Sales Support





Working in Trend Scan Mode

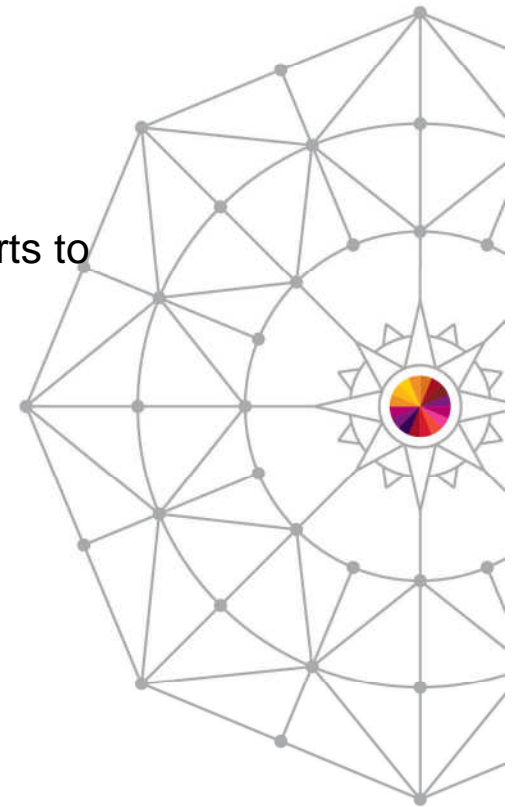
- Select screens in the same way you would in Monitor Mode.
- NEXTSAMP and SKIPSAMP commands allow you to view data for another period:
 - NEXTSAMP will let all the intermediate data be read and processed
 - SKIPSAMP will skip intermediate data records





BATCH

- The Performance Toolkit BATCH command generates reports from monitor data files created by the MONWRITE utility.
 - Input files:
 - **BATCH MASTER**: parameter file which points to other files containing settings for the reports and identifying which reports to produce.
 - fn* SETTINGS** – set timeframe for reports, identify users or devices to benchmark, define output settings
 - fn* REPORTS** – lists the PerfKit reports to produce
 - Output file:
 - ***fn* LISTING A**





BATCH input files

```
BATCH      MASTER      A1

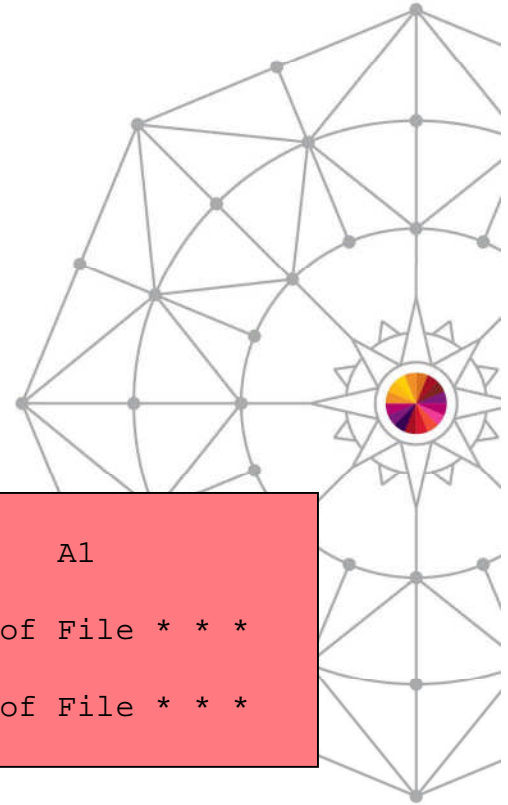
00000 * * * Top of File * * *
00001 SETTINGS PAGE SETTINGS
00002 REPORTS PAGE REPORTS
00003 * * * End of File * * *
```

```
PAGE      SETTINGS A1

00000 * * * Top of File * * *
00001 FC MONCOLL RESET 00:00:00R_P 11:59:00P
00002 FC SET PAGESIZE OFF
00003 * * * End of File * * *
```

```
PAGE      REPORTS  A1

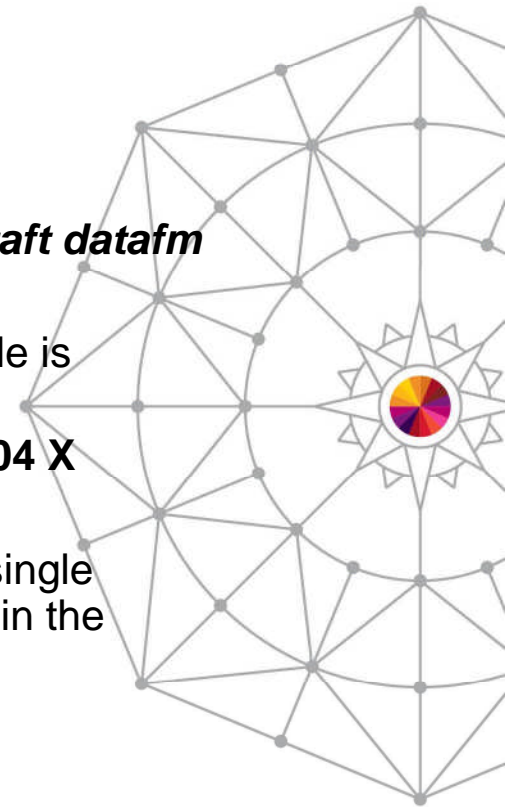
00000 * * * Top of File * * *
00001 PAGELOG
00002 * * * End of File * * *
```





Using BATCH

- From a user id with access to the MONWRITE data file:
 - Create a MASTER, SETTINGS, and REPORTS file.
 - Link and access PERFSVM's 201
 - **PERFKIT BATCH *masterfn masterft masterfm* DISK *datafn dataft datafm***
 - From the example on the previous page, if the MONWRITE data file is D070513 T195504 X, the command would be:
 - **PERFKIT BATCH BATCH MASTER A DISK D070513 T195504 X**
 - The output file would be FCONX LISTING A and would contain a single report, the PAGELOG, for each interval between resets contained in the data.



How to use the Performance Toolkit to generate usable reports



Example FCONX LISTING file

```
1FCXTOC Run 2013/07/22 16:04:50 Table of Contents Page i
PERFKIT Reports in Order of Appearance
From 2013/07/22 10:55:49
To 2013/07/22 11:15:49 CPU 2098-Z05 SN 2CB92
For 1200 Secs 00:20:00 z/VM V.6.2.0 SLU 1101
```

```
Rpt ID Report Description Page From Date/Time To Date/Time
FCX143 Total Paging Activity, by Time 1 2013/07/22 10:55:49 - 2013/07/22 11:15:49
1FCX143 Run 2013/07/22 16:04:50 PAGELOG Page 1
Total Paging Activity, by Time
From 2013/07/22 10:55:49 VMSYS1
To 2013/07/22 11:15:49 CPU 2098-Z05 SN 2CB92
For 1200 Secs 00:20:00 z/VM V.6.2.0 SLU 1101
```

<----- Expanded Storage ----->										<-Real Stor->			<----- Paging to DASD ----->				<Page Table>	
Interval	Paging	PGIN	Path	PGOUT	Total	Est. Life	Page Migr	DPA	Est. Life	Reads	Write	Total	Shrd	Guest	System	Total	Reads	Writes
End Time	Blocks	/s	%	/s	/s	sec	/s	Frames	Life	/s	/s	/s	/s	/s	/s	/s	/s	/s
>>Mean>>	0	.0	.0	.0	.0	....	.0	10641	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
10:56:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
10:57:49	0	.0	.0	.0	.0	....	.0	10641	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
10:58:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
10:59:49	0	.0	.0	.0	.0	....	.0	10636	....	.0	.0	.0	.5	.0	.0	.0	.0	.0
11:00:49	0	.0	.0	.0	.0	....	.0	10641	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
11:01:49	0	.0	.0	.0	.0	....	.0	10639	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:02:49	0	.0	.0	.0	.0	....	.0	10641	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:03:49	0	.0	.0	.0	.0	....	.0	10641	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:04:49	0	.0	.0	.0	.0	....	.0	10640	....	.0	.0	.0	.5	.0	.0	.0	.0	.0
11:05:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
11:06:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
11:07:49	0	.0	.0	.0	.0	....	.0	10644	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
11:08:49	0	.0	.0	.0	.0	....	.0	10644	....	.0	.0	.0	.4	.0	.0	.0	.0	.0
11:09:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.5	.0	.0	.0	.0	.0
11:10:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:11:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:12:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:13:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:14:49	0	.0	.0	.0	.0	....	.0	10642	....	.0	.0	.0	.3	.0	.0	.0	.0	.0
11:15:49	0	.0	.0	.0	.0	....	.0	10644	....	.0	.0	.0	.3	.0	.0	.0	.0	.0



FCNTROL BENCHMRK

- Use the FCNTROL BENCHMRK subcommand to create individual 'per sample' logs for performance objects such as users, devices, ISFC endpoints, and ISFC logical links.
 - These logs can be displayed on the BENCHMRK Log Data screen (#33) and saved to a file if requested.

- An example of using FC BENCHMRK to monitor users:
 - From PERFSVM running PERFKIT in monitor mode:
 - FC BENCHMRK USER RESRCHOG
 - FC BENCHMRK USER RESHOG2





BENCHMRK Log Data Example

- When benchmarking is turned on for these two users, the following logs are generated in the BENCHMRK Log Data screen:

```

FCX173      CPU 2098  SER 3CB92      BENCHMRK Log Data      BRUCEATS

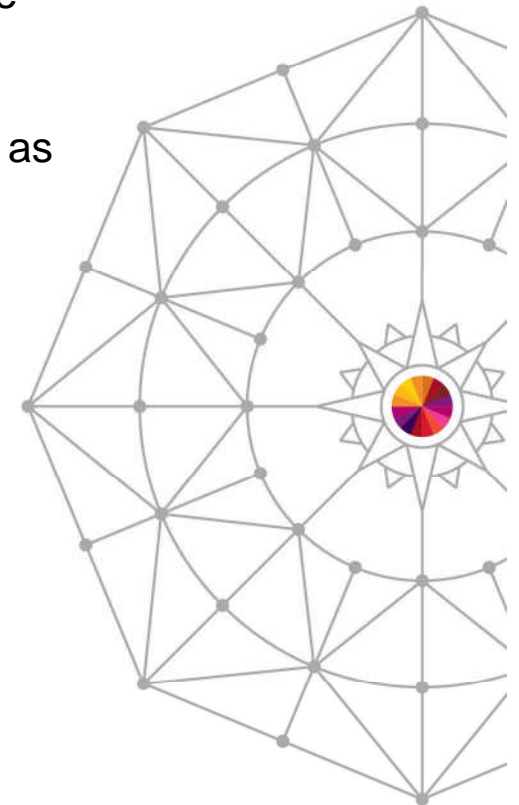
  Object      Log File
$ ID          Name          Description
. RHEL5F     LXCPULOG      Linux CPU load log
. RHEL5F     LXMEMLOG      Linux memory util./activity log
. RHEL5F     UCOMMLOG      User IUCV and VMCF communications log
. RHEL5F     UPAGELOG      User paging load log
. RHEL5F     UPGACTLG      User page activity log
. RHEL5F     UPGUTLLG      User page utilization log
. RHEL5F     UQDIOLOG      User QDIO activity log
. RHEL5F     USERLOG      User resource consumption log
. RHEL5F     USTATLOG      User wait state log
. RHEL6B     LXCPULOG      Linux CPU load log
. RHEL6B     LXMEMLOG      Linux memory util./activity log
. RHEL6B     UCOMMLOG      User IUCV and VMCF communications log
. RHEL6B     UPAGELOG      User paging load log
. RHEL6B     UPGACTLG      User page activity log
. RHEL6B     UPGUTLLG      User page utilization log
. RHEL6B     UQDIOLOG      User QDIO activity log
. RHEL6B     URESPLOG      User response time log
Select an object log with cursor and hit ENTER
Command ==> _
F1=Help  F4=Top  F5=Bot  F7=Bkwd  F8=Fwd  F12=Return
  
```




What reports do I use to gather specific information?

- The components of any system are interdependent, which makes analyzing system performance more complicated than looking at one report or set of data.

The following charts provide suggestions for what reports are useful as a **starting point** for gathering and analyzing data for specific components of the system.





General System Health

- **CPU load and trans screen (1. CPU).** Look for unusual (for your system) statistics.
 - High CPU rates
 - High paging rates
 - High user extremes

- **System Summary Log screen (35. SYSSUMLG)** – shows a summary of system performance by time. Look for unusual spikes in fields like CPU % Busy or paging rates.





Memory

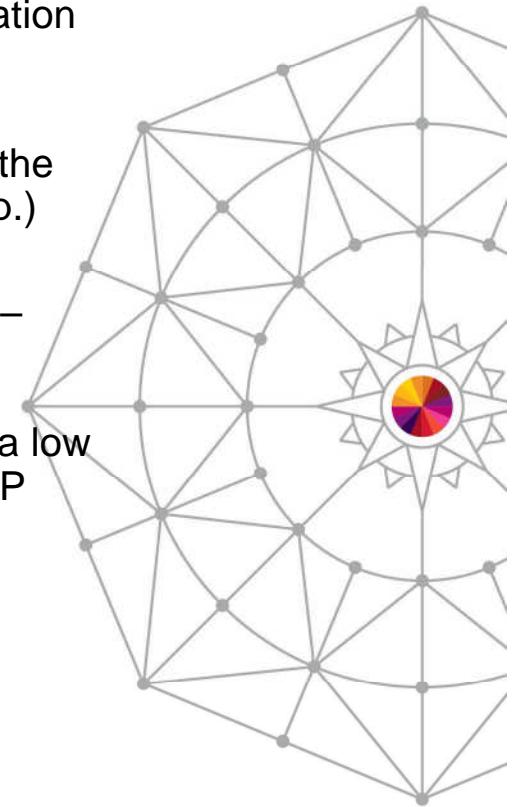
- **CPU load and trans. screen (1. CPU)** - Page rate and XSTORE paging indicate current paging activity. Higher than normal activity may indicate excessive memory constraint.
- **Storage Utilization (2. STORAGE)** – provides detailed main storage and XSTORE statistics.
- **Available List Log Screen (3A. AVAILLOG VM 6.2)** – tells how many storage frames are available by time. The “Times empty” columns indicate when CP is out of memory on its various free storage lists. Large values here are a sign of memory constraint.
- **Storage Management Logs Menu (3A. STORMENU)** – shows a list of all available ‘by time’ logs related to storage management. **STORLOG** and **PAGELOG** provide statistics to help you identify normal and ‘spiking’ situations. **AGELLOG** and **STEALLOG** for 6.3 systems show how the system is managing the global aging list and how successful it is fulfilling page requests.
- **CP owned disks (14. CPOWNERD VM 6.2, 13 DEVICE CPOWNERD VM 6.3)** – check paging efficiency (Block Page Size should be > 10), queue length (zero is best), and available paging space (Used %) here.
- **User wait states (23. USTAT)** - %PGW identifies users frequently in page wait, %CPU identifies users waiting to run on a logical CPU.



Processor

- **CPU load and trans. screen (1. CPU)** - %CPU (total processor utilization), %CP (CP utilization of the processor), and %EMU (virtual machine utilization of the processor) provide the current usage of all system CPUs.
- **User resource usage (21. USER)** – lets you see which users are using the most CPU. (Select the %CPU column to sort the highest users to the top.)
- **Processor Load and Configuration Logs screen (3B – PROCMENU)** – shows the processor specific 'by time' logs.

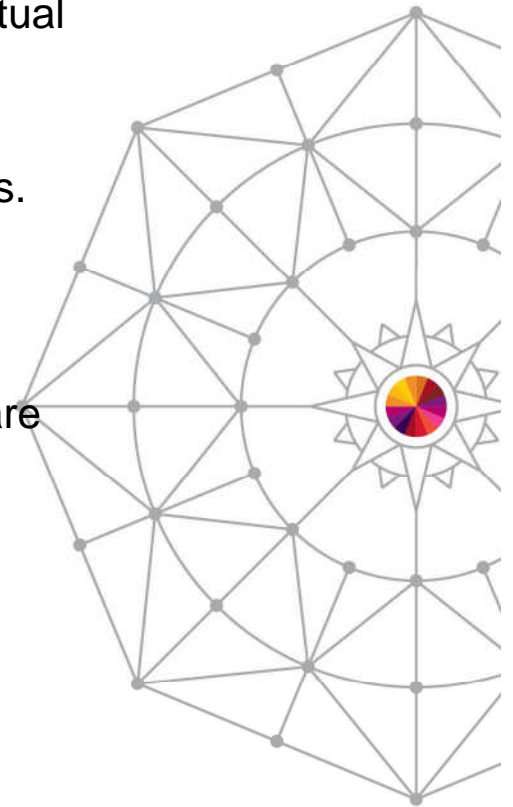
PROCSUM can be used to find CP overhead (T/V ratio close to 1.0 and a low SIE Intercepts / second to SIE Instructions / second ratio indicates low CP overhead.).





I/O

- **CPU load and trans. screen (1. CPU)** – Total SSCH/RSCH and Virtual I/O rate indicates system I/O activity and virtual I/O activity.
- **I/O device load screen (13. DEVICE)** – displays I/O rates of devices. Individual devices can be selected for I/O Device Details Screen (**DEVICE devno**).
- **Channel load screen (11. CHANNEL)** – indicates which channels are experiencing channel busy conditions.



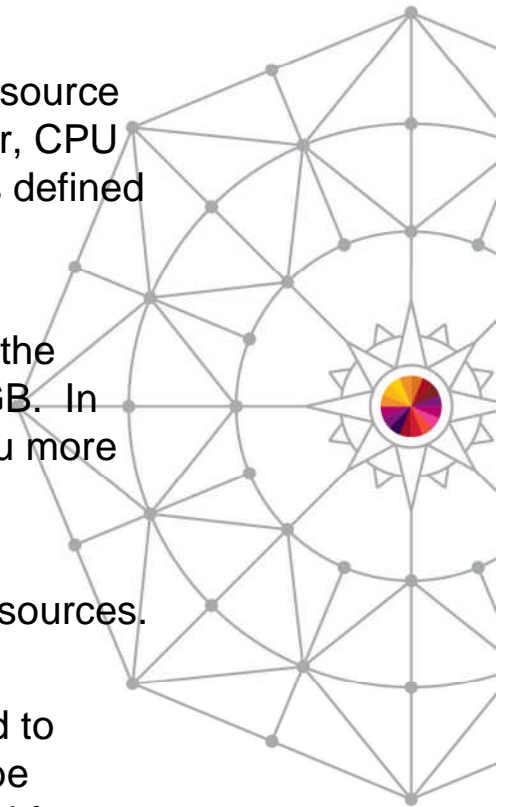


USER

- **User Resource Screen (21. USER)** – provides a snapshot of running users resource consumption.

USER *userid* or selecting the user from the screen will display the User Resource Details screen which contains general performance information for that user, CPU and I/O load of each virtual processor (if running virtual MP), virtual devices defined to the user, etc.

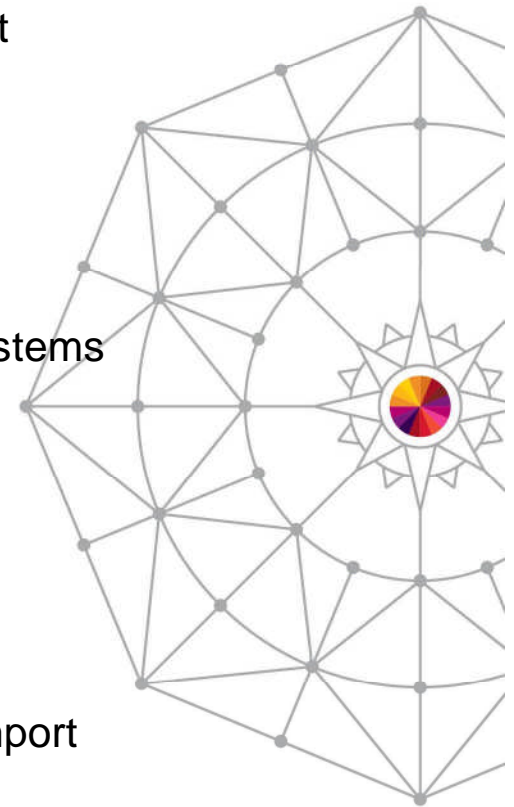
- **User Page Data Screen (22. UPAGE)** - shows paging by userid, including the number of pages resident and locked in memory, both above and below 2GB. In z/VM 6.3, the **UPGACT** and **UPGUTL** screens have been added to give you more detail on paging activity per user and the number of pages used per user.
- **User wait states (23. USTAT)** – find out what users are waiting for what resources.
- **FCONTROL BENCHMRK *userid*** – use the FC BENCHMRK subcommand to select users for which ‘per sample’ logs are to be created. These logs can be viewed from the Benchmark displays (BENCHMRK) screen. They are useful for identifying baseline normal behavior and spotting spikes.





Some tips on making sense of monitor data with charts and graphs

- The key to uncovering many chronic performance issues and to spot performance trends on your system is to look at monitor data from a graph or chart.
- Performance Toolkit itself has some graphics capabilities:
 - Graphical charts when used in conjunction with GDDM (most systems don't have this) on a 3270 emulator
 - Line graphics when used with the web browser interface
 - Simple plots (both web browser and 3270)
 - The ability to write data to a file in a way that makes it easy to import to pc-based graphics tools and spreadsheets.
 - Invoked with **GRAPHICS** subcommand or #31 from the main menu.



How to use the Performance Toolkit to generate usable reports



Graphics Selection Menu

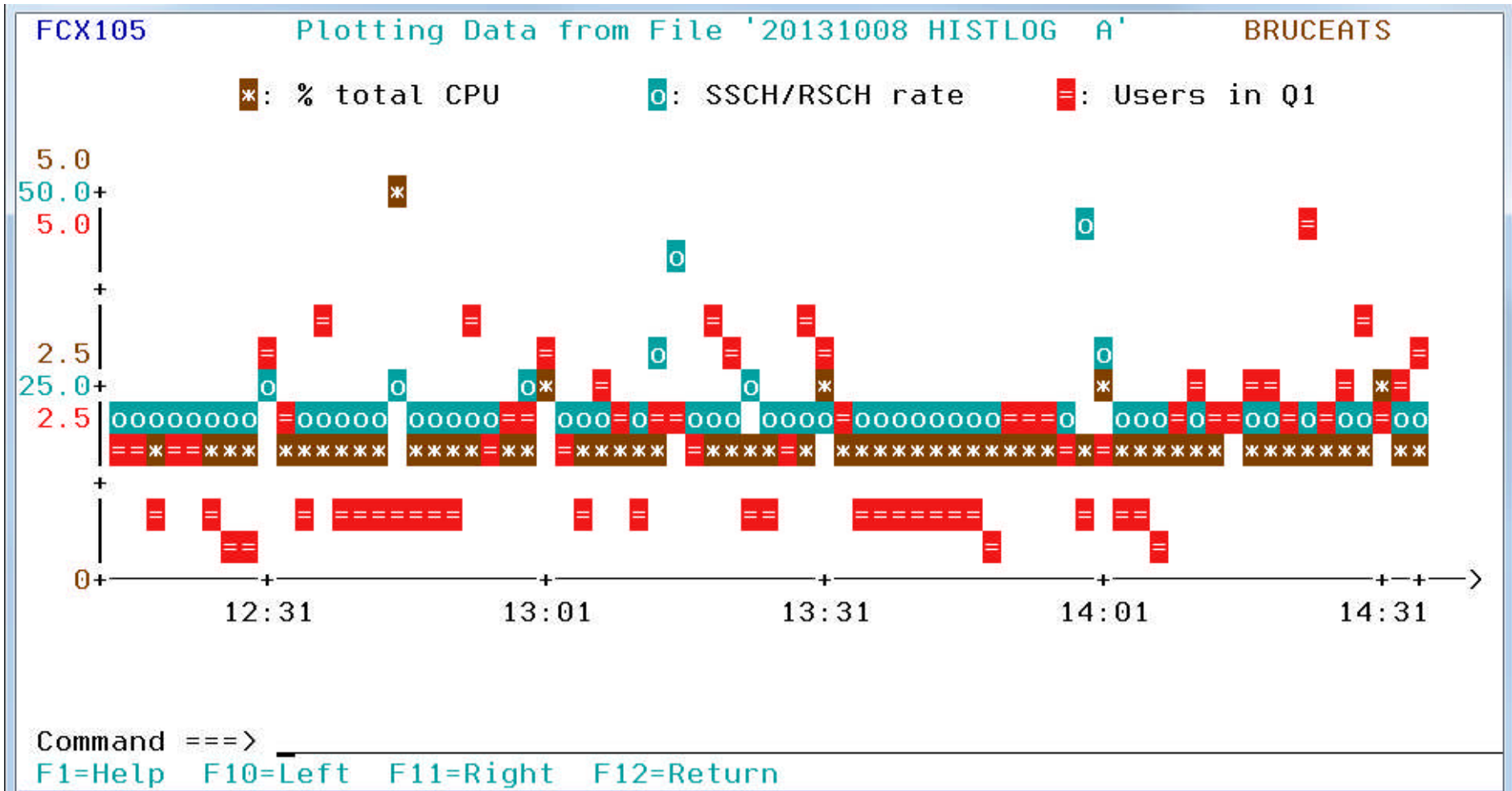
FCX128		Graphics Selection Menu		BRUCEATS	
General Specifications					
Format	: PLOT	Truncate X-var. at:	_____		
Data origin	: FILE 20131008 HISTLOG A	Y-var. cumulative (Y/N):	N		
Graphics type	: DETailed history	Scatter plot (Y/N):	Y		
Selected period:	Last measurements				
Selected hours :	_____				
Selected days :	All days				
Variables Selection			Trend Record Selection		
Var	Name	Description	Display	Record Details	
X	: ACT	- Active users	_____	_____	
Y	* : CPU	- % total CPU	_____	_____	
	o : IO/S	- SSCH/RSCH rate	_____	_____	
	= : Q1	- Users in Q1	_____	_____	
	/ : _____	-	_____	_____	
To select graphics					
Command ==> _____					
F1=Help F4=Top F5=Bot F7=Bkwd F8=Fwd F12=Return					

- This screen is designed to help you generate performance graphics based on history data (data origin FILE fn ft fm) or the current day's REDISP buffer (data origin STORAGE).

How to use the Performance Toolkit to generate usable reports



3270 Plot from Graphics Menu



How to use the Performance Toolkit to generate usable reports



Graph from Performance Toolkit Web Server

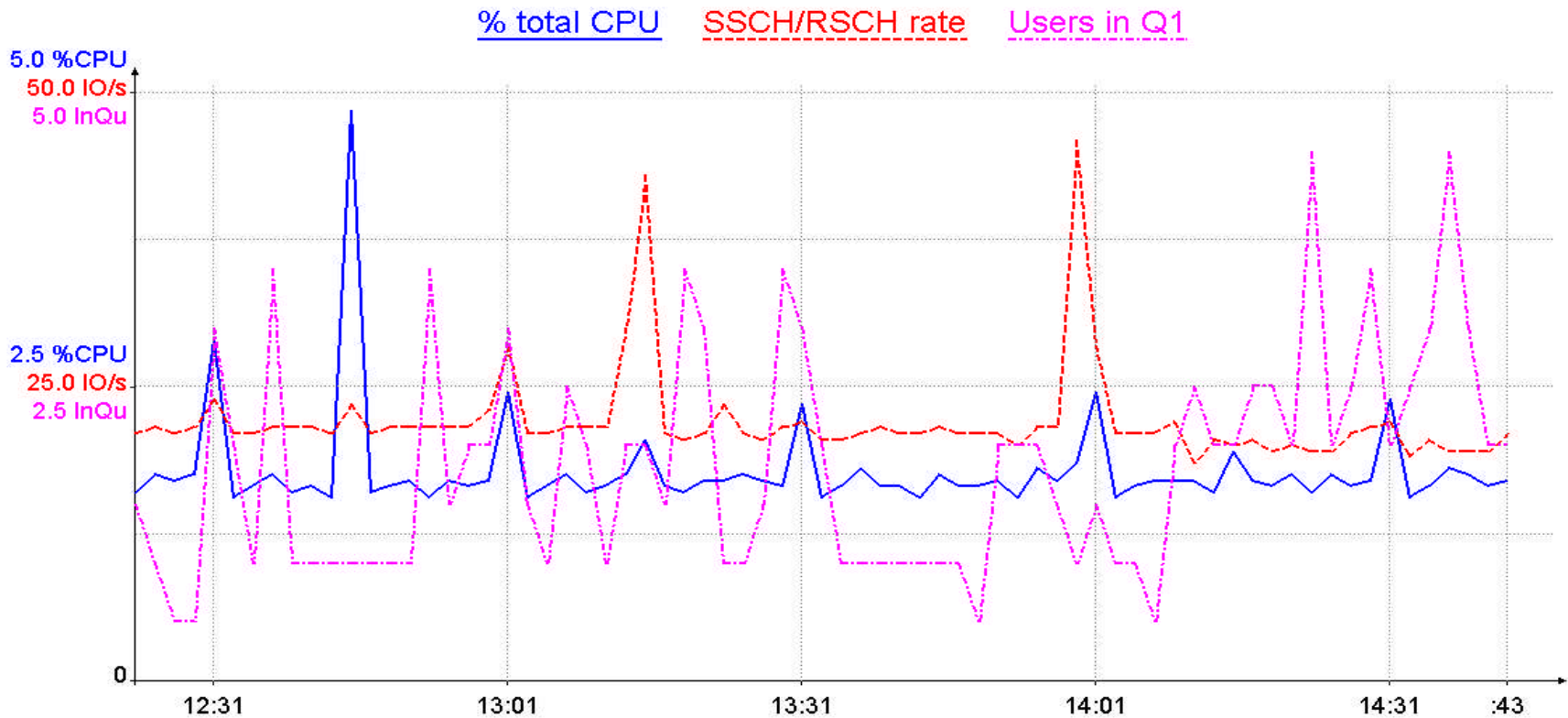
Firefox ▾

IBM
Performance Toolkit for VM

FCX105 Graphical Representation of Performance Data (BRUCEATS)

Command Refresh Menu Return Left Right Logoff Help

Auto-Refresh



Source data: 20131008 HISTLOG A

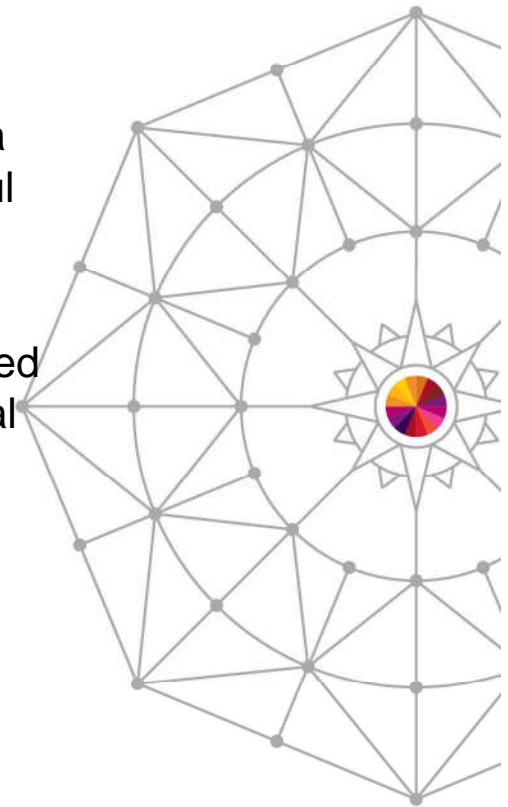
Complete your session evaluations online at www.SHARE.org/Anaheim-Eval
IBM Advanced Technical Sales Support





Create Charts and Graphs from Printed Reports

- Whether you obtain a report on disk from the PRINT command or use the BATCH facility, the contents of that file can be easily imported to a PC graphics program or spreadsheet. LOG files are particularly helpful in identifying trends and performance problems.
- The following charts provide an example of using the log files generated by benchmarking a userid, USERLOG and USTATLOG, to get a visual sense of the behavior and performance of a user.



How to use the Performance Toolkit to generate usable reports

Input Data: USERLOG



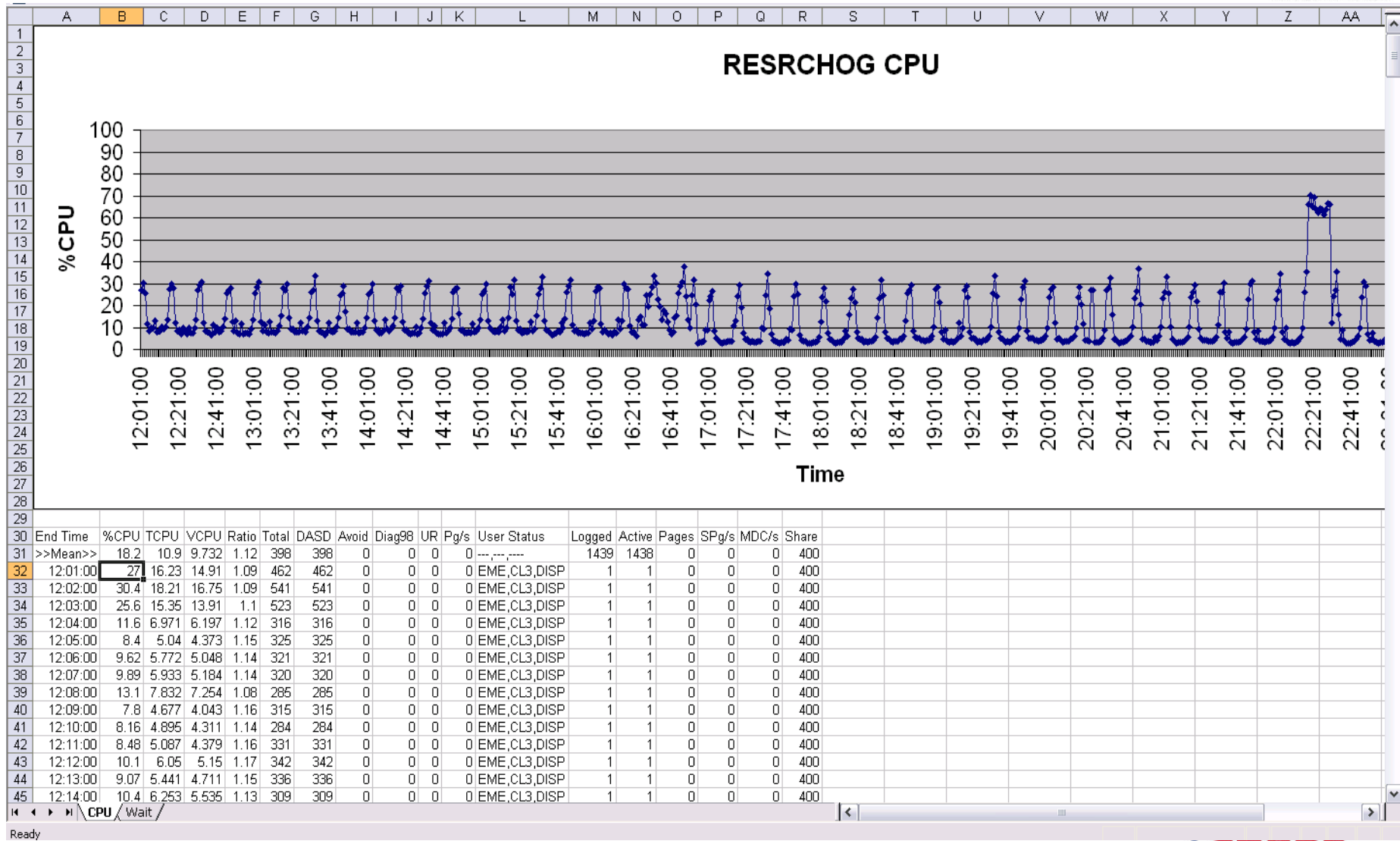
- FCX162 CPU 2098 SER 2CB92 Interval 12:01:00 - 00:00:00

Resource Usage Log for User RESRCHOG

Interval	<----- CPU Load ----->				<----- Virtual IO/s ----->						<-User Time->		<--Spool-->		MDC		
	<-Seconds->				T/V	Total	DASD	Avoid	Diag98	UR	Pg/s	User Status	Logged	Active	Pages	SPg/s	MDC/s	Share
>>Mean>>	18.2	10.90	9.732	1.12	398	398	.0	.0	.0	.0	---	1439	1438	0	.00	.0	400
12:01:00	27.0	16.23	14.91	1.09	462	462	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:02:00	30.4	18.21	16.75	1.09	541	541	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:03:00	25.6	15.35	13.91	1.10	523	523	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:04:00	11.6	6.971	6.197	1.12	316	316	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:05:00	8.40	5.040	4.373	1.15	325	325	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:06:00	9.62	5.772	5.048	1.14	321	321	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:07:00	9.89	5.933	5.184	1.14	320	320	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:08:00	13.1	7.832	7.254	1.08	285	285	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:09:00	7.80	4.677	4.043	1.16	315	315	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:10:00	8.16	4.895	4.311	1.14	284	284	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:11:00	8.48	5.087	4.379	1.16	331	331	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:12:00	10.1	6.050	5.150	1.17	342	342	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:13:00	9.07	5.441	4.711	1.15	336	336	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:14:00	10.4	6.253	5.535	1.13	309	309	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:15:00	13.5	8.093	7.214	1.12	362	362	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:16:00	27.3	16.38	14.99	1.09	440	440	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:17:00	29.9	17.96	16.58	1.08	448	448	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:18:00	28.0	16.82	15.42	1.09	521	521	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:19:00	12.2	7.345	6.583	1.12	319	319	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:20:00	8.45	5.068	4.462	1.14	281	281	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:21:00	8.88	5.327	4.715	1.13	308	308	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:22:00	7.12	4.270	3.718	1.15	289	289	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:23:00	9.99	5.995	5.493	1.09	260	260	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:24:00	8.18	4.907	4.280	1.15	294	294	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:25:00	7.08	4.247	3.646	1.16	312	312	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:26:00	9.91	5.947	5.240	1.13	353	353	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:27:00	7.65	4.587	3.972	1.15	309	309	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:28:00	7.63	4.579	3.999	1.15	300	300	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:29:00	9.69	5.812	5.083	1.14	324	324	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400
12:30:00	13.4	8.029	7.104	1.13	379	379	.0	.0	.0	.0	EME,CL3,DISP	1	1	0	.00	.0	400

How to use the Performance Toolkit to generate usable reports

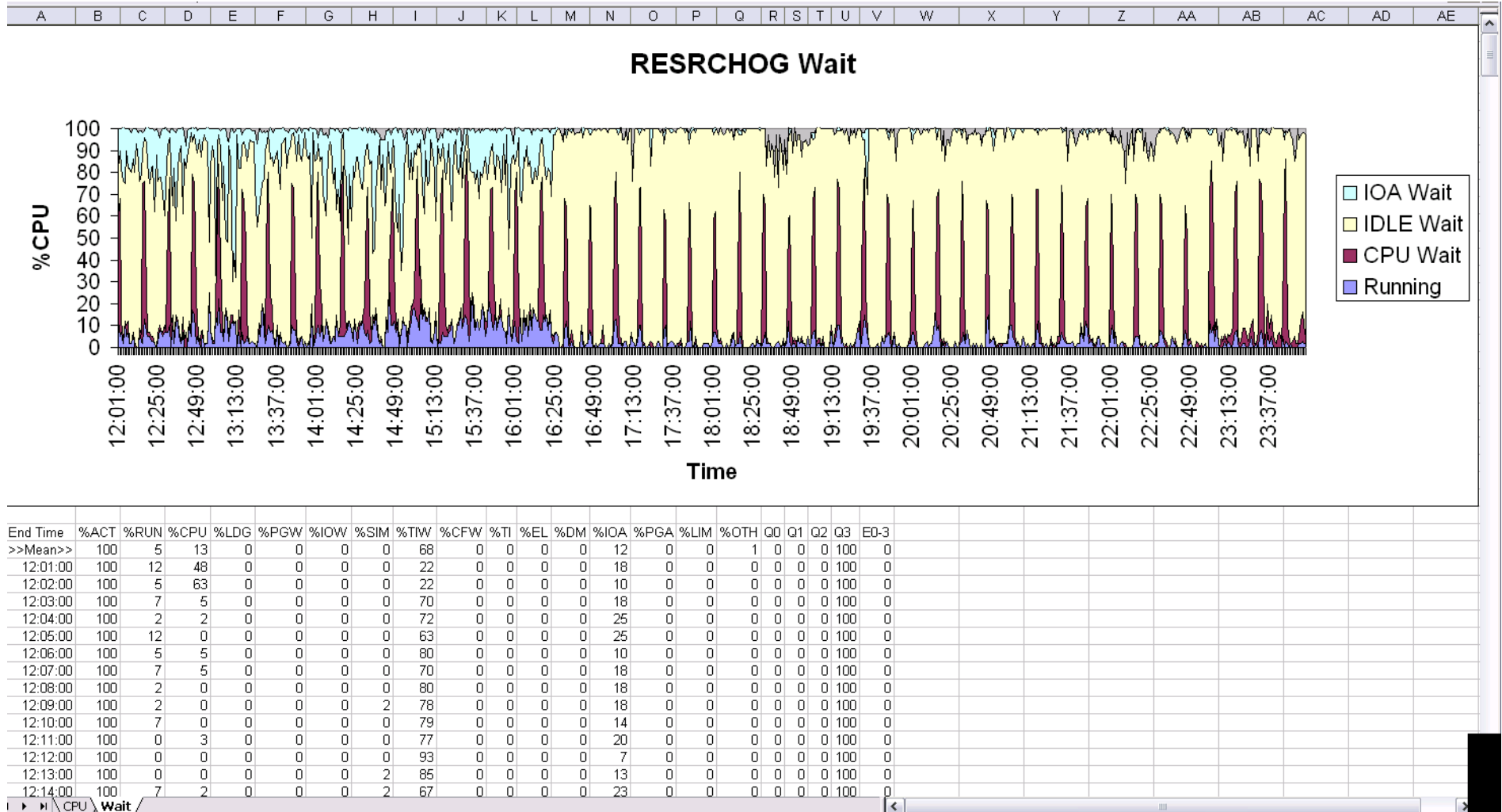
Data Imported to Spreadsheet



How to use the Performance Toolkit to generate usable reports



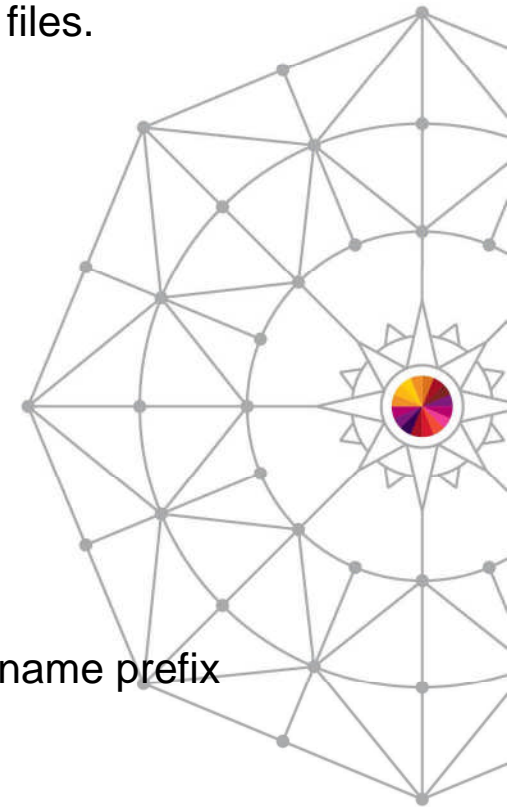
Exported Data from USTATLOG report





Using CSVGEN

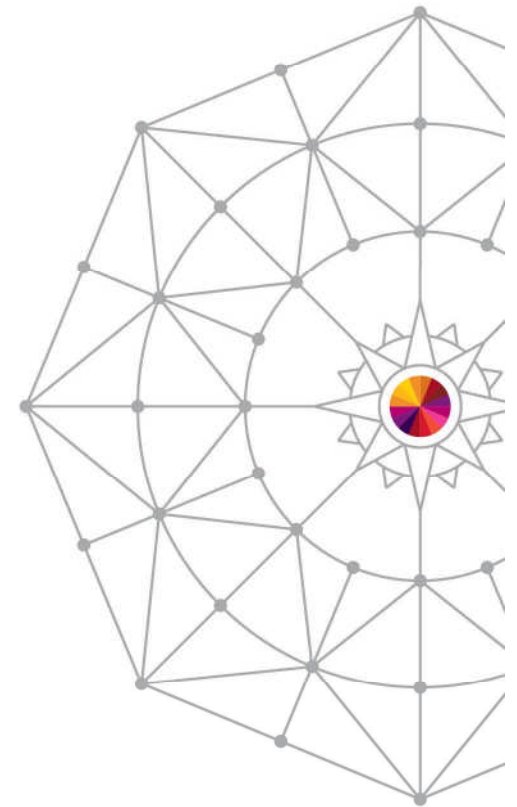
- The Performance Toolkit CSV Generator (CSVGEN) is a tool for converting trend, summary, and history record files into CSV (comma separated value) files.
- It is found on the VM home page as a VMARC download sample
<http://www.vm.ibm.com/related/perfkit/csvgen.html>
<http://www.vm.ibm.com/related/perfkit/CSVGEN.VMARC>
- The download file contains a PDF file as documentation
- The primary exec is CSVGEN, which has this syntax:
 CSVGEN *format input-file output-mode output-prefix* (*options*
- The *format* is the input file format:
 - H for a histlog or histsum file
 - S for a summary record file
 - T for a trend record file
- The output file or files are created on the *output-mode* disk with a file name prefix of *output-prefix*
- However: This tool was written for z/VM 5.4 and there were updates to Perfkit for z/VM 6.2.
 - I have tested and made updates for it to read 6.2 Histlog and Histsum files.





Using CSVGEN, example

- Read the accumulated history summary file (ACUM HISTSUM) and import CPU usage into a spreadsheet
- CSVGEN H ACUM HISTSUM P A VM1 (FINALIZE)
 - H – Process a history file
 - fn ft – Input file ACUM HISTSUM
 - P – filemode of my accessed PERFSVM 191 disk
 - A – Filemode of disk to put output file on
 - VM1 – 3 char prefix plus “_” put on output file (VM1_)
 - (FINALIZE – Option to convert file to variable records
- File VM1_HIST CSV A is created
 - A large file, 377 columns of data, one line for each hour
- For demonstration, I only use the columns I want:
 - 'PIPE < VM1_HIST CSV A',
 - '| spec fs , f1-2 1 /,/ next f11-15 next',
 - '| > VM1_CPU CSV A'
- Download the result and import into a spreadsheet



How to use the Performance Toolkit to generate usable reports



CSVGEN output

- I now have a spreadsheet with only the data I want
- It would be easy to automate this process

	A	B	C	D	E	F	G
1	Date	Time	CPU	%US	%CP	%EM	%SY
2	Date	Time	Percent total CPU	Percent user CPU	Percent CP (supervisor) time	Percent emulation time	Percent system time
3	20130326	04:08:01 PM	2.19129944	1.65869141	0.72390878	1.46527481	0.78260666
4	20130326	05:00:00 PM	1.28499603	0.74999744	0.90332967	0.62166315	0.78666478
5	20130326	06:00:00 PM	1.13999653	0.61264163	0.89999592	0.49333084	0.78430808
6	20130326	07:00:00 PM	1.13220024	0.85097438	0.89067411	0.48813331	0.77639872
7	20130327	06:00:00 AM	1.17499542	0.62666494	0.88999557	0.76499707	0.77166539
8	20130327	07:00:00 AM	1.17832851	0.88833463	0.89166284	0.77333039	0.76999837
9	20130327	08:00:00 AM	1.1933279	0.90333068	0.89499587	0.78430706	0.77333194
10	20130327	09:00:00 AM	1.20505619	0.66833007	0.89499664	0.5500015	0.76833189
11	20130327	10:00:00 AM	1.18332863	0.89666438	0.88833261	0.78166348	0.75999957
12	20130327	11:00:00 AM	1.16672325	0.88666457	0.88499552	0.77000093	0.76333237
13	20130327	12:00:00 PM	1.29666233	0.75500154	0.89666235	0.88333023	0.77166593
14	20130327	01:00:00 PM	1.19166088	0.88833129	0.91332954	0.77499694	0.78666508
15	20130327	02:00:00 PM	1.16832829	0.63166475	0.88832927	0.76666361	0.76833189
16	20130327	03:00:00 PM	1.21832752	0.68333	0.90999675	0.5549975	0.77999824
17	20130327	04:00:00 PM	1.22166157	0.67166412	0.66832983	0.55000049	0.54166842
18	20130327	05:00:00 PM	1.3183279	0.78430706	0.90999603	0.91166228	0.78666478
19	20130327	06:00:00 PM	1.17832851	0.88333154	0.89666259	0.76833034	0.77333218
20	20130327	07:00:00 PM	1.17457199	0.88995695	0.89575863	0.77300763	0.76694834
21	20130328	06:00:00 AM	1.17499447	0.88499802	0.88832927	0.76666361	0.77499872
22	20130328	07:00:00 AM	1.17999554	0.88833106	0.88833284	0.77000093	0.77000272
23	20130328	08:00:00 AM	1.19832802	0.90499747	0.90333325	0.54166383	0.78499854
24	20130328	09:00:00 AM	1.20999432	0.67097342	0.90166241	0.55000126	0.78166503

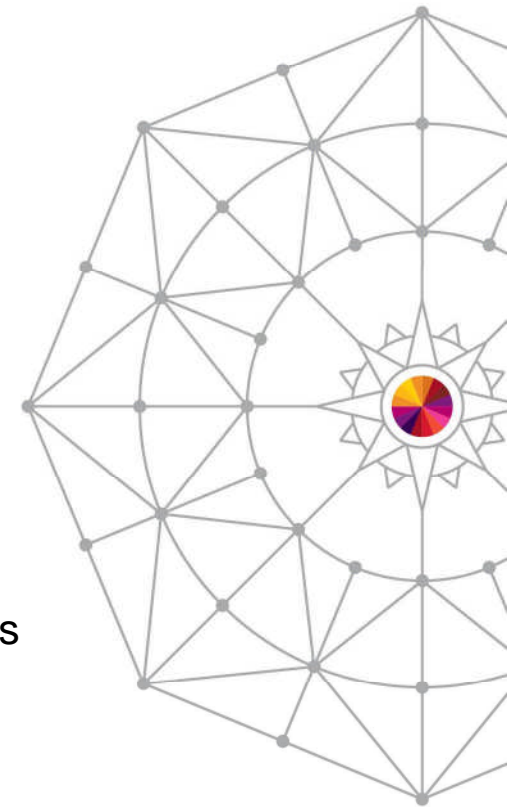
Complete your session evaluations online at www.SHARE.org/Anaheim-Eval





Summary

- The Performance Toolkit has a variety of ways to collect, display, and create reports for VM performance data.
 - Nearly 200 reports
 - Both ‘live’ and historical performance data is available for use
 - Most information can be found in more than one report
- Reports can be generated and viewed
 - Onscreen
 - In files
 - In graphics generated by Performance Toolkit or other applications importing Perfkit reports.





The End

Thank you for listening!

Session 14590

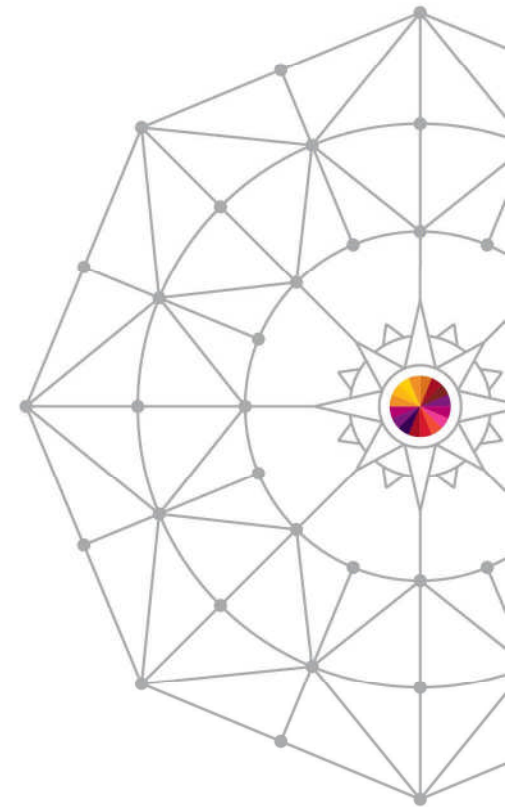
Contact information:

Bruce Hayden

bjhayden@us.ibm.com

IBM Plant #1

Endicott, NY



Thank you to Pam Bryant for the original presentation

Complete your session evaluations online at www.SHARE.org/Anaheim-Eval
IBM Advanced Technical Sales Support

