



# Rocket z/VM Training VM Workshop 2025

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From Setup to Insight: Building a Complete z/VM Performance  
Monitoring Pipeline

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# Abstract

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- Learn how to rapidly stand up a comprehensive z/VM performance monitoring environment using IBM tools. Beginning with core data collection and the Performance Toolkit, you'll then enable OMEGAMON for deep system and Linux visibility, and finalize your solution with the z/VM Performance Data Pump for data integration and analytics. Walk away with a clear, repeatable blueprint for operational insight.

# Free! Bonus disclaimer!!

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# Speaker's background: "Embrace the Weird!"

- I wrote my first mainframe programs in 1979 (OS/MVT 21.8F using CALL-OS, FORTRAN, BASIC, and York APL); first IBM 370 assembler code in 1980.
  - "I think I'm making progress."
- A one-line career summary: "Deep on IBM Z System virtualization, Unix & Linux; broad on... a bunch of weird stuff."
  - VM since 1979; Various incarnations of Unix since 1983
  - Linux since the beginning of Linux (Slackware, 5.25" floppies, 1993)
  - Enough MVT /VS/1 /MVS /OS/390 / z/OS to be dangerous
  - z/VM Product Engineer at Rocket Software, Inc. since 2003
    - Role expanded beyond z/VM to "Geek of Virtualization and Container Technology on IBM Z" in 2022.
    - More recently: Custodian of Rocket TMON for VSE
- It continues to be a long, strange trip:
  - IBM 8100, IBM 3650, CADAM, Amoeba, Plan 9, MUSIC, OS/2, UTS, SCO Unix, TeraData, NetWare, HP-UX, AIX, Ultrix, Solaris, Cluster / High-Performance Computing (Linux+Beowulf, Myrinet, InfiniBand), Image Processing, Embedded Systems, First IT Security Officer for U. of Arkansas
    - Outside of IT: Gentleman Farmer, Certified Emergency Medical Responder, State of AR Law Enforcement Officer
    - More generally: "I'm having a great career based on working with the weird stuff."

Not me 😊

# Outline

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## Presentation roadmap

- Foundations: Things you should already know or have
- Boundaries: Scope and scale
- Architecture Review: z/VM system organization
- Big Picture: Recommended order of operations
- Enabling and customizing Performance Toolkit
- Enabling IBM Tivoli OMEGAMON XE on z/VM and Linux
- Enabling z/VM Performance Data Pump
- Wrap-up: Q&A, Feedback, Discussion

# Things you should already..

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- ...know: Basic z/VM systems programming / systems administration skills.
- ...know: How to navigate the z/VM documentation library.
  - <https://www.vm.ibm.com/library/>
- ...have: License to use the z/VM Performance Toolkit feature.
- ...have: Some understanding of basic system performance metrics.

# Boundaries: Scope and scale

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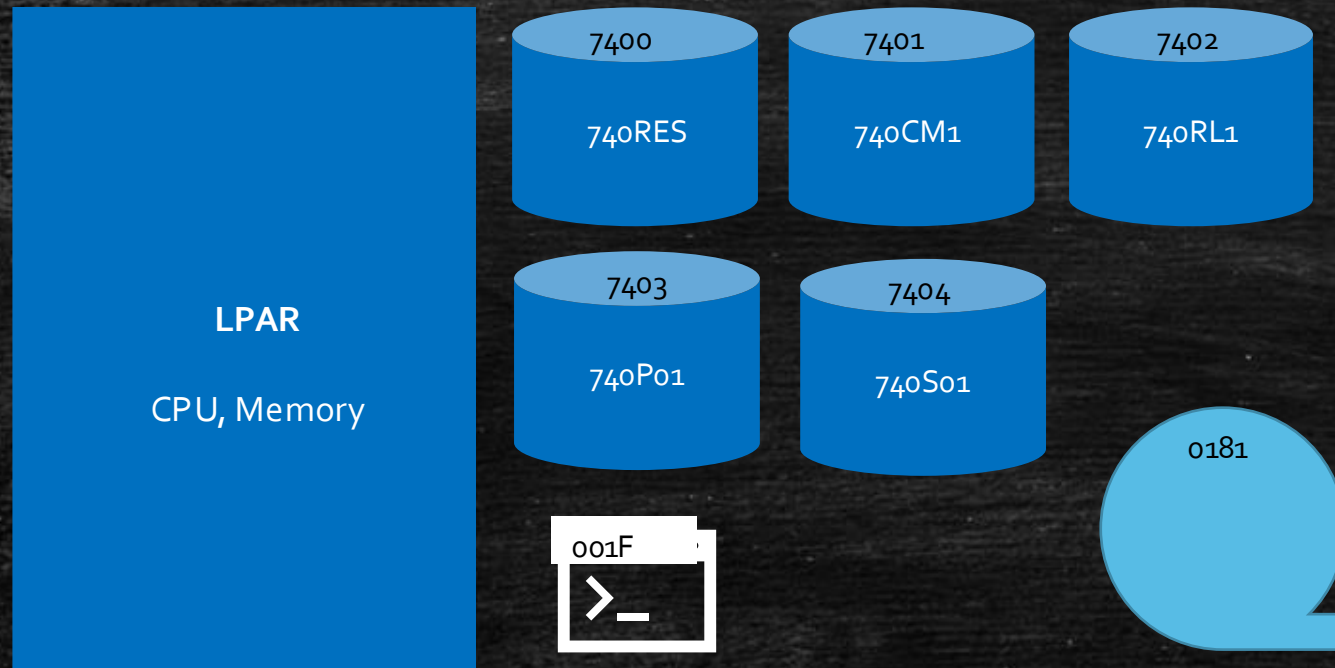
- **My** “one size” is unlikely to fit **your** “all.”
  - Scope of discussion
    - Focus: IBM z/VM systems management tools
      - *Concepts apply to other tool suites; implementation details (obviously?) differ*
    - (Mostly) focused on non-SSI z/VM configuration
  - IBM documentation is great ... as a collection of engineering specifications
    - It’s... less great.. As procedural instruction for accomplishing a task
  - Intent: Share enough knowledge to ease deployment and customization

# Architecture Review: z/VM system organization

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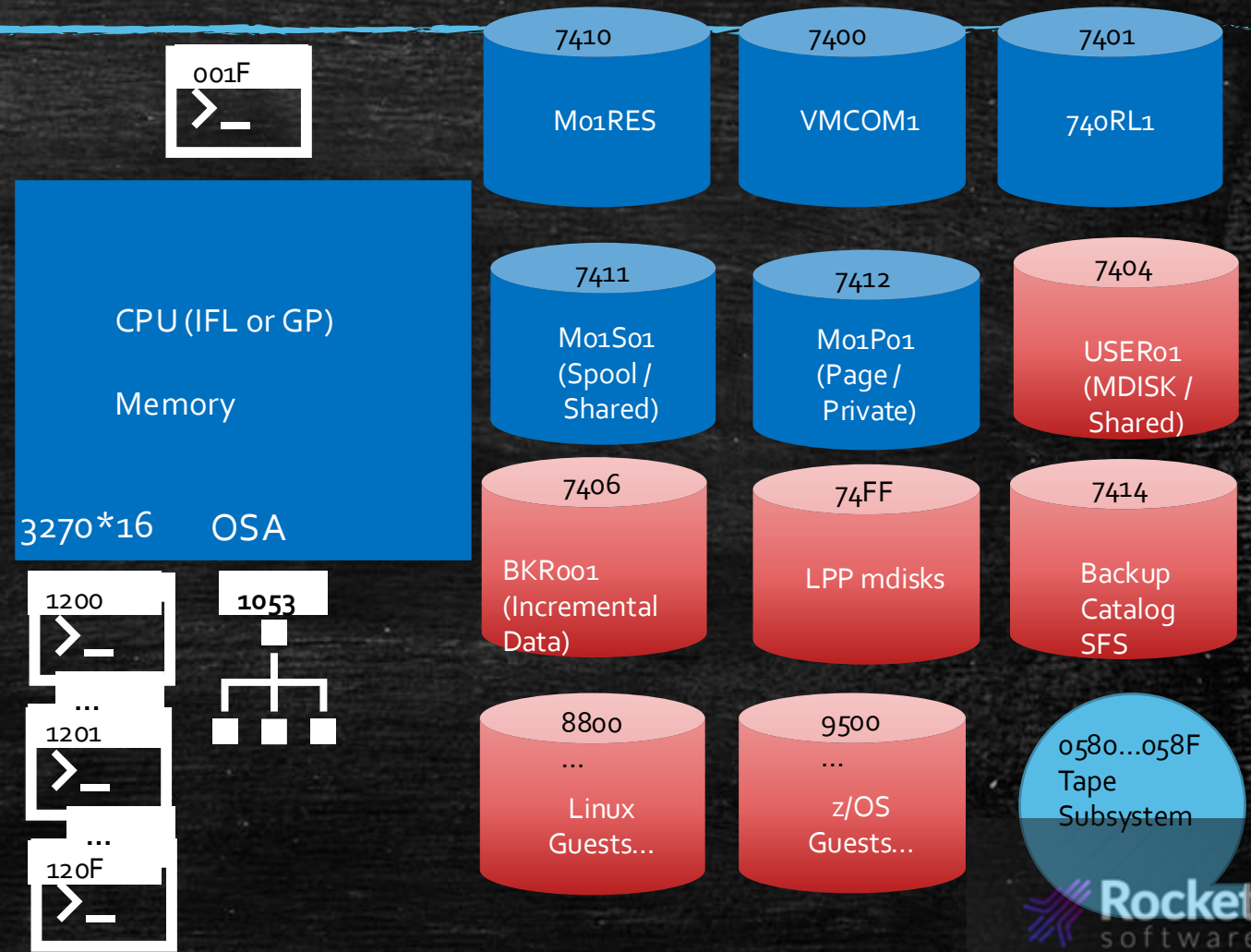
- Many “moving parts” to a fully configured z/VM system
- *Thousands* of performance metrics available via CP MONITOR
- “It’s better to know.”
  - ...and knowing makes it easier to handle those inevitable inconvenient questions.

# Architecture Review: Minimal z/VM system organization



# Architecture Review: Somewhat more realistic z/VM system organization

- Expands on the minimum:
  - CPU, Memory, Console, OSA, Tape
  - ...DASD
    - The z/VM minimum set, **plus**...
    - System infrastructure volumes
      - *Program products, non-IBM SFS, installation materials, additional page / spool capacity, RACF database...*
    - User / Guest volumes
      - *i.e. production workload data*
  - ...TAPE
    - *Though perhaps not actual, physical "tape"*



# Big Picture: Suggested order of operations

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- “Once z/VM installation is complete...”
  - ...but ideally, before you deploy production workload
- The minimum: Performance Toolkit (PTK)
  - Basic “green screen” function
  - Web interface
- Enterprise-grade monitoring: OMEGAMON for z/VM and Linux
  - z/VM performance data integration with enterprise-wide OMEGAMON
- A little something extra: Performance Data Pump
  - z/VM performance data integration with modern observability tools

# Foundation:

## z/VM Performance Toolkit (PTK) – 3270

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- What does it do?
  - Consumes: CP MONITOR data – raw z/VM performance metrics
  - Produces: A variety of human-readable z/VM performance reports
- How do I turn it on and make it useful?
  - Take the following steps:

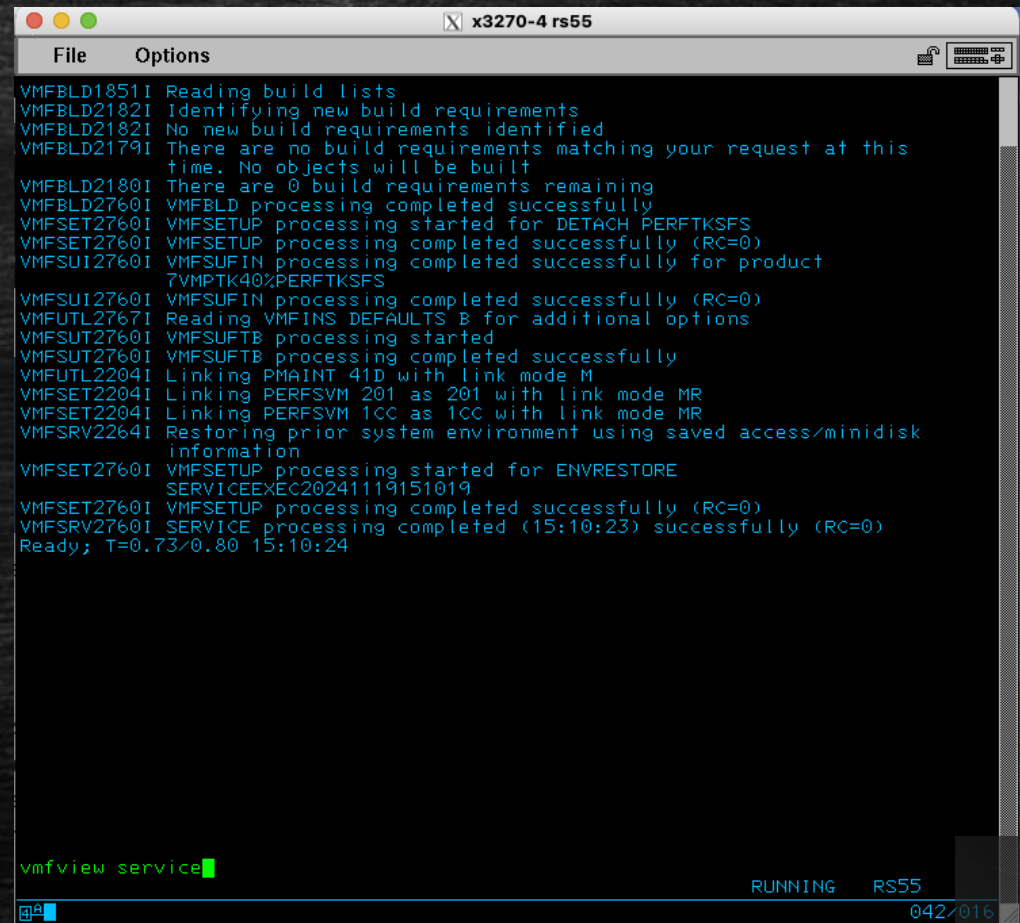
# z/VM Performance Toolkit (PTK): Enable & Customize

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- Verify your license entitlement (PTK is a separately licensed feature of z/VM)
- Enable PTK
  - Details: Performance Toolkit for VM, FL740 Memo to Users (Gl13-4368-03)
- Customize PTK for use
  - Program Directory (Gl13-4361-03)
    - <https://www.vm.ibm.com/progdir/>
  - z/VM: Performance Toolkit Reference (SC24-6303-74) and
  - z/VM: Performance Toolkit Guide (SC24-6302-74)
    - <https://www.vm.ibm.com/library/74opdfs.html>

# z/VM Performance Toolkit (PTK): Enable & Customize

- As MAINT740...
- Follow instructions in the Program Directory, Ch. 6, Section 6.1
- Check your work
  - **VMFVIEW SERVICE**

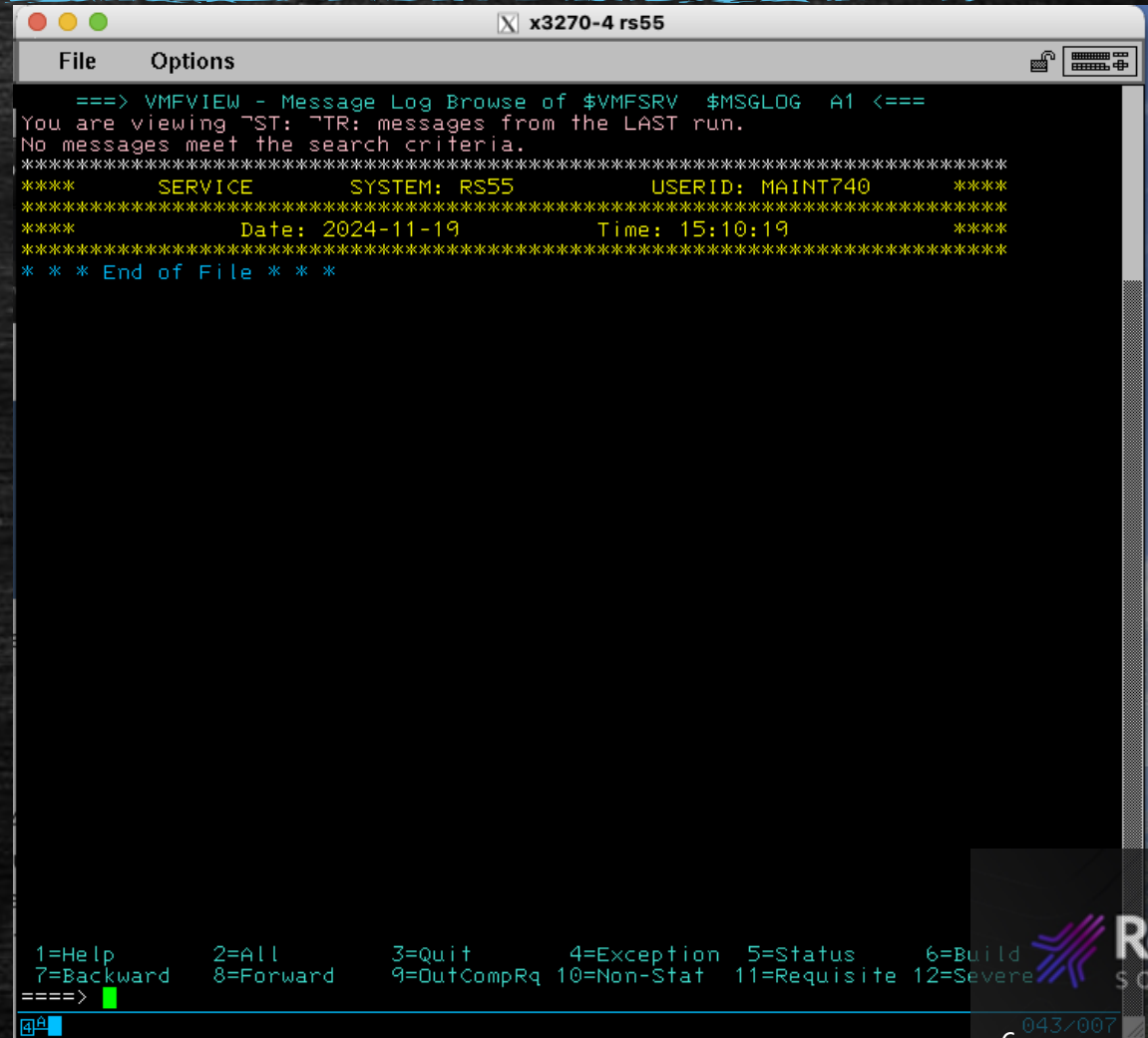


```
File Options
VMFBLD1851I Reading build lists
VMFBLD2182I Identifying new build requirements
VMFBLD2182I No new build requirements identified
VMFBLD2179I There are no build requirements matching your request at this
time. No objects will be built
VMFBLD2180I There are 0 build requirements remaining
VMFBLD2760I VMFBLD processing completed successfully
VMFSET2760I VMFSETUP processing started for DETACH PERFTKSFS
VMFSET2760I VMFSETUP processing completed successfully (RC=0)
VMFSUI2760I VMFSUFIN processing completed successfully for product
7VMPTK40%PERFTKSFS
VMFSUI2760I VMFSUFIN processing completed successfully (RC=0)
VMFUTL2767I Reading VMFINS DEFAULTS B for additional options
VMFSUT2760I VMFSUFTB processing started
VMFSUT2760I VMFSUFTB processing completed successfully
VMFUTL2204I Linking PMAINT 41D with link mode M
VMFSET2204I Linking PERFSVM 201 as 201 with link mode MR
VMFSET2204I Linking PERFSVM 1CC as 1CC with link mode MR
VMFSRV2264I Restoring prior system environment using saved access/minidisk
information
VMFSET2760I VMFSETUP processing started for ENVRESTORE
SERVICEEXEC20241119151019
VMFSET2760I VMFSETUP processing completed successfully (RC=0)
VMFSRV2760I SERVICE processing completed (15:10:23) successfully (RC=0)
Ready; T=0.73/0.80 15:10:24

vmfview service
RUNNING RS55
042/016
```

# z/VM Performance Toolkit (PTK): Enable & Customize

- As MAINT740...
- Follow instructions in the Program Directory, Ch. 6, Section 6.1
- Check your work
  - **VMFVIEW SERVICE**



The screenshot shows a terminal window titled 'x3270-4 rs55' with a menu bar containing 'File' and 'Options'. The main display area shows the output of the 'VMFVIEW' command, which is a message log browse. The output includes the following text:

```
====> VMFVIEW - Message Log Browse of $VMFSRV $MSGLOG A1 <====  
You are viewing 7ST: 7TR: messages from the LAST run.  
No messages meet the search criteria.  
*****  
***** SERVICE SYSTEM: RS55 USERID: MAINT740 *****  
***** Date: 2024-11-19 Time: 15:10:19 *****  
*****  
* * * End of File * * *
```

At the bottom of the terminal, there is a legend for navigation keys:

```
1=Help      2=All      3=Quit      4=Exception  5=Status      6=Build  
7=Backward  8=Forward  9=OutCompRq 10=Non-Stat 11=Requisite 12=Severe
```

The prompt '====>' is followed by a green cursor. In the bottom right corner of the terminal window, the text '043/007' is visible.

# z/VM Performance Toolkit (PTK): Enable & Customize

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- As MAINT740...
- Continue with Program Directory section 6.3 (Tailoring Performance Toolkit for z/VM Customization Files)
- Example: Update FCONX \$PROFILE to disable (enormous) daily reports using LOCALMOD

**– LOCALMOD PERFTK FCONX \$PROFILE**

# z/VM Performance Toolkit (PTK): Enable & Customize

Change:

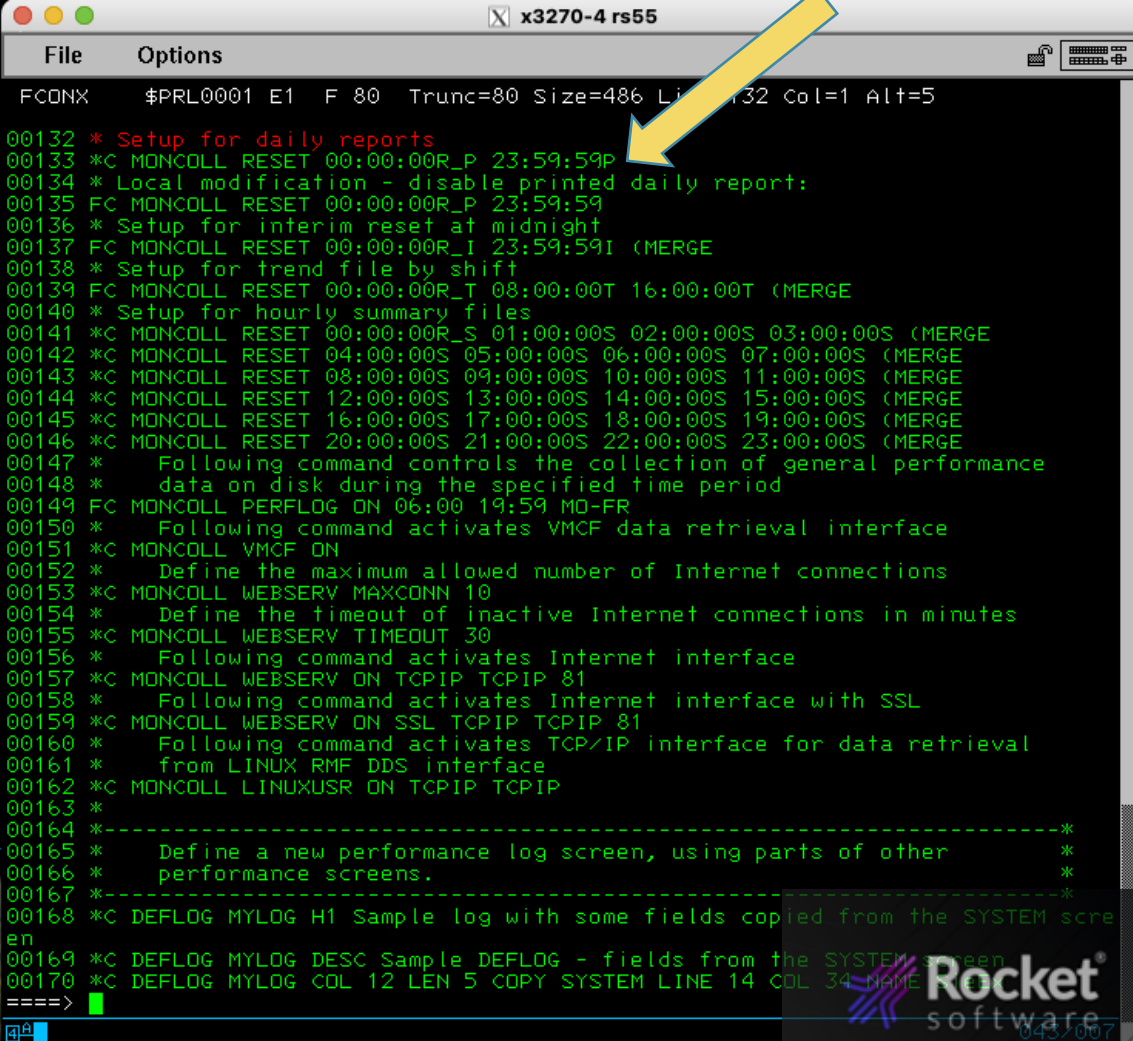
```
FC MONCOLL RESET 00:00:00R_P 23:59:59P
```

...(line 133, commented out with a "\*" to...

```
FC MONCOLL RESET 00:00:00R_P 23:59:59
```

...(line 135, trailing "P" removed)

Then: Save changes with the XEDIT "FILE" command.



```
x3270-4 rs55
File Options
FCDNX $PRL0001 E1 F 80 Trunc=80 Size=486 Lin 132 Col=1 Alt=5
00132 * Setup for daily reports
00133 *C MONCOLL RESET 00:00:00R_P 23:59:59P
00134 * Local modification - disable printed daily report:
00135 FC MONCOLL RESET 00:00:00R_P 23:59:59
00136 * Setup for interim reset at midnight
00137 FC MONCOLL RESET 00:00:00R_I 23:59:59I (MERGE
00138 * Setup for trend file by shift
00139 FC MONCOLL RESET 00:00:00R_T 08:00:00T 16:00:00T (MERGE
00140 * Setup for hourly summary files
00141 *C MONCOLL RESET 00:00:00R_S 01:00:00S 02:00:00S 03:00:00S (MERGE
00142 *C MONCOLL RESET 04:00:00S 05:00:00S 06:00:00S 07:00:00S (MERGE
00143 *C MONCOLL RESET 08:00:00S 09:00:00S 10:00:00S 11:00:00S (MERGE
00144 *C MONCOLL RESET 12:00:00S 13:00:00S 14:00:00S 15:00:00S (MERGE
00145 *C MONCOLL RESET 16:00:00S 17:00:00S 18:00:00S 19:00:00S (MERGE
00146 *C MONCOLL RESET 20:00:00S 21:00:00S 22:00:00S 23:00:00S (MERGE
00147 * Following command controls the collection of general performance
00148 * data on disk during the specified time period
00149 FC MONCOLL PERFLDG ON 06:00 19:59 MO-FR
00150 * Following command activates VMCF data retrieval interface
00151 *C MONCOLL VMCF ON
00152 * Define the maximum allowed number of Internet connections
00153 *C MONCOLL WEBSERV MAXCONN 10
00154 * Define the timeout of inactive Internet connections in minutes
00155 *C MONCOLL WEBSERV TIMEOUT 30
00156 * Following command activates Internet interface
00157 *C MONCOLL WEBSERV ON TCP/IP TCP/IP 81
00158 * Following command activates Internet interface with SSL
00159 *C MONCOLL WEBSERV ON SSL TCP/IP TCP/IP 81
00160 * Following command activates TCP/IP interface for data retrieval
00161 * from LINUX RMF DDS interface
00162 *C MONCOLL LINUXUSR ON TCP/IP TCP/IP
00163 *
00164 *-----*
00165 * Define a new performance log screen, using parts of other *
00166 * performance screens. *
00167 *-----*
00168 *C DEFLOG MYLOG H1 Sample log with some fields copied from the SYSTEM scre
en
00169 *C DEFLOG MYLOG DESC Sample DEFLOG - fields from the SYSTEM screen
00170 *C DEFLOG MYLOG COL 12 LEN 5 COPY SYSTEM LINE 14 COL 34 NAME
====> █
```

# z/VM Performance Toolkit (PTK): Enable & Customize

Change:

```
FC MONCOLL RESET 00:00:00R_P 23:59:59P
```

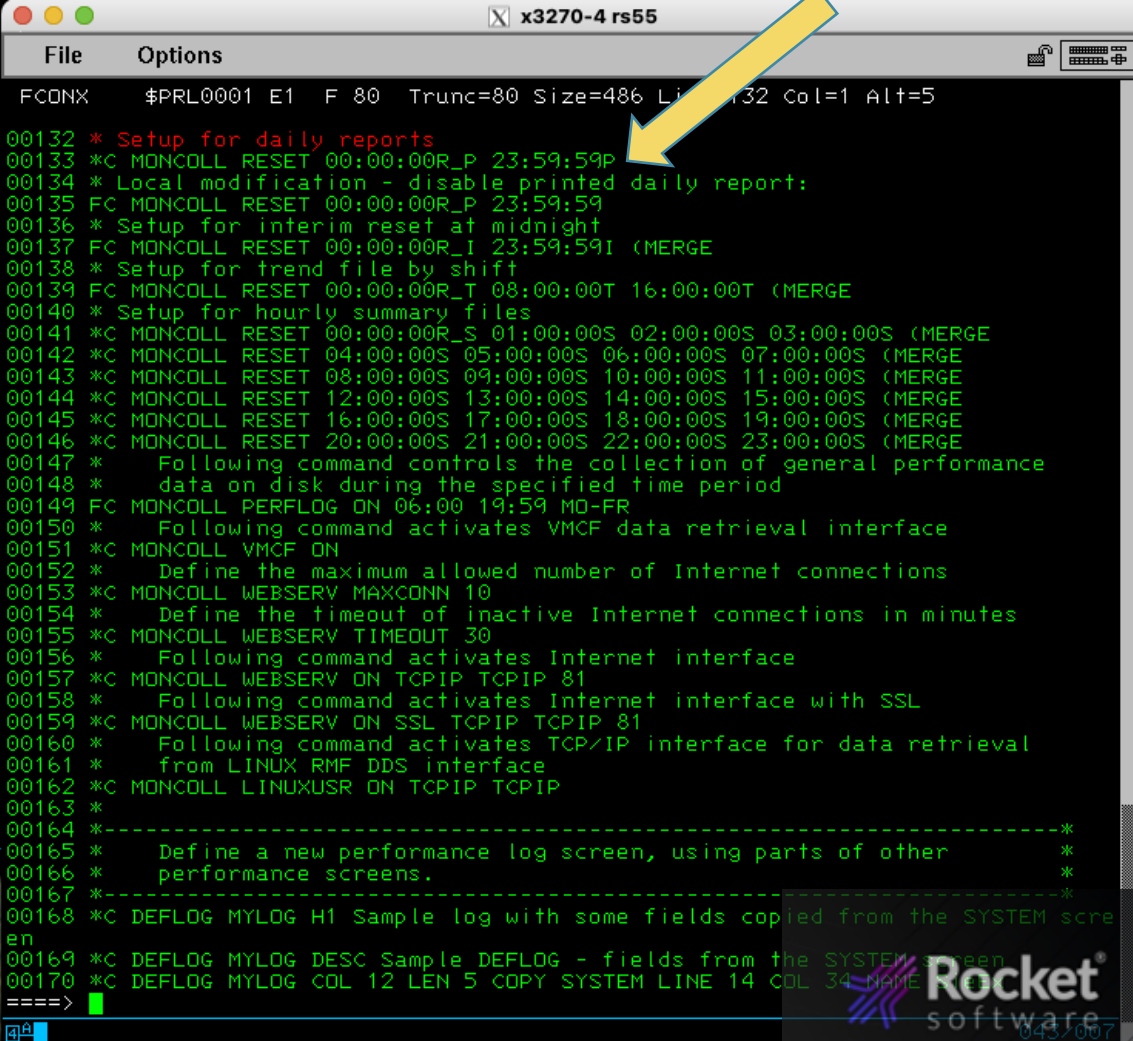
...(line 133, commented out with a "\*" to...

```
FC MONCOLL RESET 00:00:00R_P 23:59:59
```

...(line 135, trailing "P" removed)

Then: Save changes with the ~~XEDIT~~ "FILE" command...

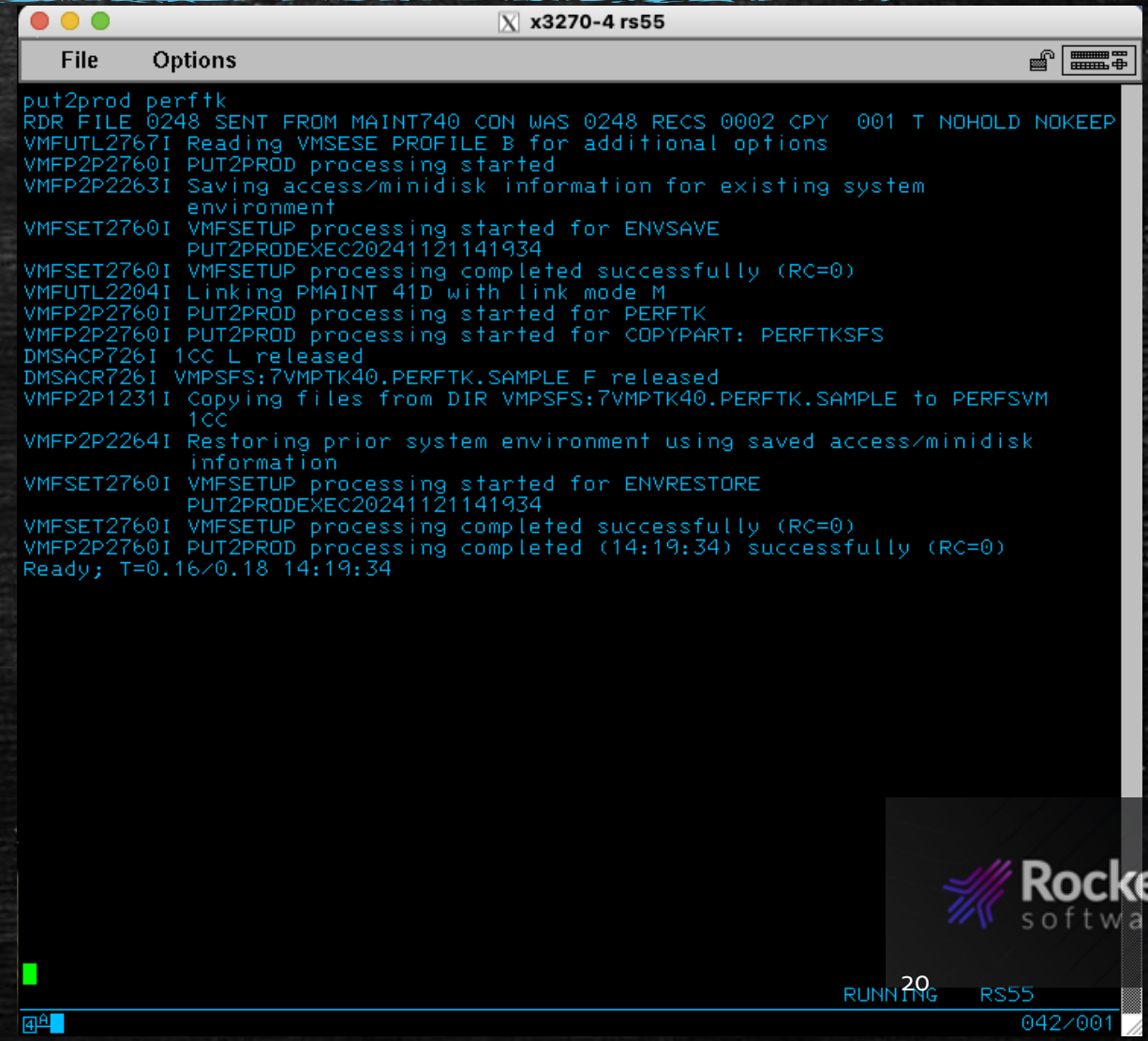
Then: Issue command **SERVICE PERFTK BUILD**  
to deploy the updated version of FCONX \$PROFILE  
for use.



```
x3270-4 rs55
File Options
FCDNX $PRL0001 E1 F 80 Trunc=80 Size=486 Li 132 Col=1 Alt=5
00132 * Setup for daily reports
00133 *C MONCOLL RESET 00:00:00R_P 23:59:59P
00134 * Local modification - disable printed daily report:
00135 FC MONCOLL RESET 00:00:00R_P 23:59:59
00136 * Setup for interim reset at midnight
00137 FC MONCOLL RESET 00:00:00R_I 23:59:59I (MERGE
00138 * Setup for trend file by shift
00139 FC MONCOLL RESET 00:00:00R_T 08:00:00T 16:00:00T (MERGE
00140 * Setup for hourly summary files
00141 *C MONCOLL RESET 00:00:00R_S 01:00:00S 02:00:00S 03:00:00S (MERGE
00142 *C MONCOLL RESET 04:00:00S 05:00:00S 06:00:00S 07:00:00S (MERGE
00143 *C MONCOLL RESET 08:00:00S 09:00:00S 10:00:00S 11:00:00S (MERGE
00144 *C MONCOLL RESET 12:00:00S 13:00:00S 14:00:00S 15:00:00S (MERGE
00145 *C MONCOLL RESET 16:00:00S 17:00:00S 18:00:00S 19:00:00S (MERGE
00146 *C MONCOLL RESET 20:00:00S 21:00:00S 22:00:00S 23:00:00S (MERGE
00147 * Following command controls the collection of general performance
00148 * data on disk during the specified time period
00149 FC MONCOLL PERFLDG ON 06:00 19:59 MO-FR
00150 * Following command activates VMCF data retrieval interface
00151 *C MONCOLL VMCF ON
00152 * Define the maximum allowed number of Internet connections
00153 *C MONCOLL WEBSERV MAXCONN 10
00154 * Define the timeout of inactive Internet connections in minutes
00155 *C MONCOLL WEBSERV TIMEOUT 30
00156 * Following command activates Internet interface
00157 *C MONCOLL WEBSERV ON TCP/IP TCP/IP 81
00158 * Following command activates Internet interface with SSL
00159 *C MONCOLL WEBSERV ON SSL TCP/IP TCP/IP 81
00160 * Following command activates TCP/IP interface for data retrieval
00161 * from LINUX RMF DDS interface
00162 *C MONCOLL LINUXUSR ON TCP/IP TCP/IP
00163 *
00164 *-----*
00165 * Define a new performance log screen, using parts of other *
00166 * performance screens. *
00167 *-----*
00168 *C DEFLOG MYLOG H1 Sample log with some fields copied from the SYSTEM scre
en
00169 *C DEFLOG MYLOG DESC Sample DEFLOG - fields from the SYSTEM screen
00170 *C DEFLOG MYLOG COL 12 LEN 5 COPY SYSTEM LINE 14 COL 34 NAME
====>
```

# z/VM Performance Toolkit (PTK): Enable, Customize, and Deploy

- Continue as MAINT740
- Issue command **PUT2PROD PERFTK** to deploy any local modifications and/or pending service process updates into production.



```
x3270-4 rs55
File Options
put2prod perftk
RDR FILE 0248 SENT FROM MAINT740 CON WAS 0248 RECS 0002 CPY 001 T NOHOLD NOKEEP
VMFUTL2767I Reading VMSESE PROFILE B for additional options
VMFP2P2760I PUT2PROD processing started
VMFP2P2263I Saving access/minidisk information for existing system
environment
VMFSET2760I VMFSETUP processing started for ENVSAVE
PUT2PRODEXEC20241121141934
VMFSET2760I VMFSETUP processing completed successfully (RC=0)
VMFUTL2204I Linking PMAINT 41D with link mode M
VMFP2P2760I PUT2PROD processing started for PERFTK
VMFP2P2760I PUT2PROD processing started for COPYPART: PERFTKSFS
DMSACP726I 1CC L released
DMSACR726I VMPSFS:7VMPTK40.PERFTK.SAMPLE F released
VMFP2P1231I Copying files from DIR VMPSFS:7VMPTK40.PERFTK.SAMPLE to PERFSVM
1CC
VMFP2P2264I Restoring prior system environment using saved access/minidisk
information
VMFSET2760I VMFSETUP processing started for ENVRESTORE
PUT2PRODEXEC20241121141934
VMFSET2760I VMFSETUP processing completed successfully (RC=0)
VMFP2P2760I PUT2PROD processing completed (14:19:34) successfully (RC=0)
Ready; T=0.16/0.18 14:19:34

RUNNING RS55
042/001
```

# z/VM Performance Toolkit (PTK): ~~Enable, Customize, Deploy,~~ and “smoke test”

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- “So, now what?”
- LOGOFF from MAINT740
- Log on to user PERFSVM.
- **ACCESS (NOPROF** to suppress execution of PROFILE EXEC
- Review and customize PERFSVM’s PROFILE EXEC
- Best practice: Always have a fall-back plan
  - **COPY PROFILE EXEC A = EXECORIG = (OLDDATE**

# z/VM Performance Toolkit (PTK): ~~Enable, Customize, Deploy,~~ and “smoke test”

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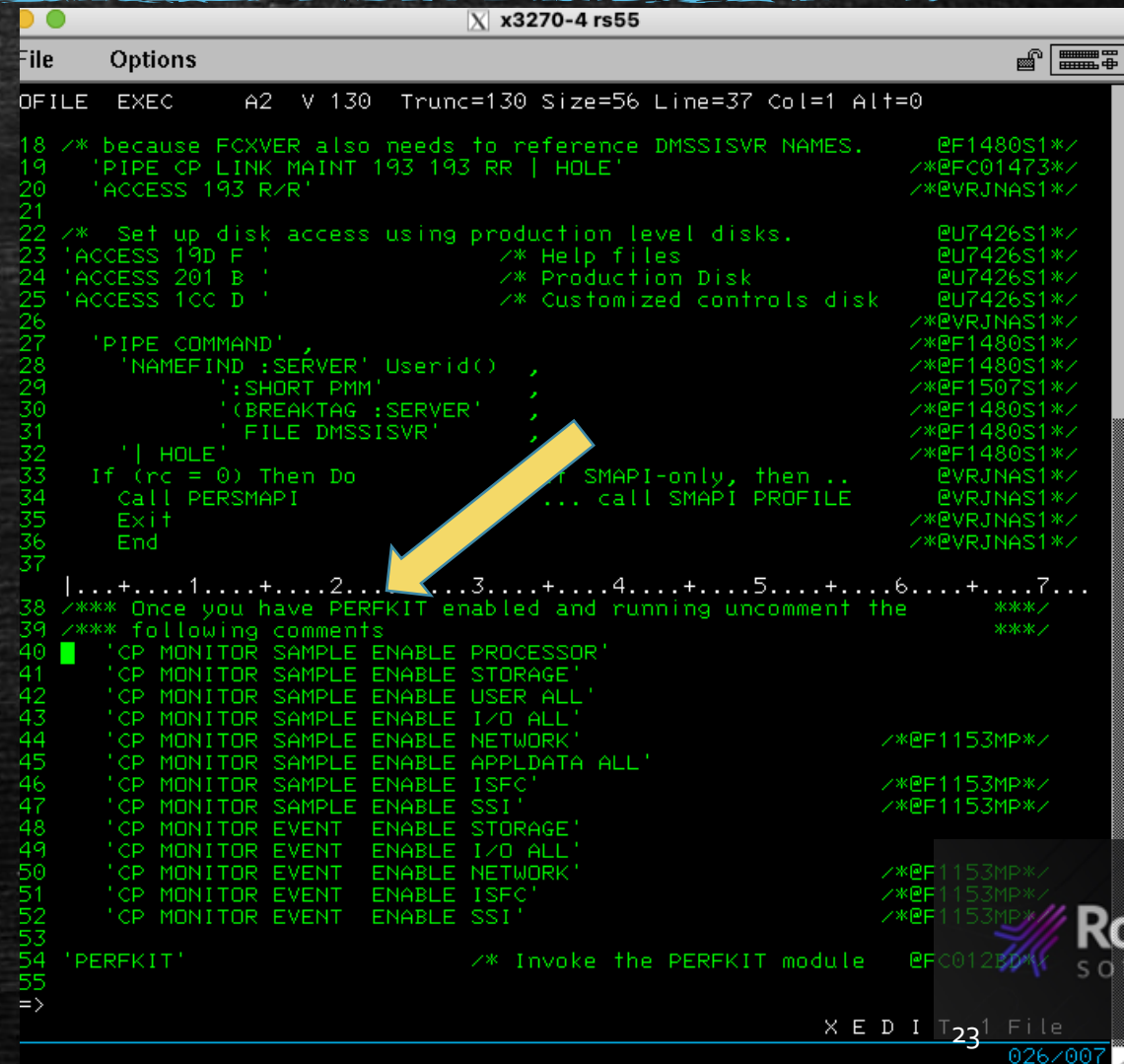
- While logged in as PERFSVM
- **XEDIT PROFILE EXEC**
- Enable CP MONITOR data collection
- “Interesting stuff” starts at line 40 of the IBM-provided default...

In the IBM-supplied default system configuration, Performance Toolkit executes in user PERFSVM. You can log on as PERFSVM to view real-time system performance information using the 3270 user interface.

For first time use, systems secured using RACF (or other External Security Manager) may need to enable login credentials for user PERFSVM. Collaborate with your security administrator to establish credentials according to your organization’s security policy.


# z/VM Performance Toolkit (PTK): Enable, Customize, Deploy, and “smoke test”

- PERFSVM
- XEDIT PROFILE EXEC
- Enable CP MONITOR data collection
- “Interesting stuff” starts at line 40 of the IBM-provided default.
- Remove REXX comment marks (“/\*”, “\*/”) from CP MONITOR commands.



```
x3270-4 rs55
File Options
DFILE EXEC A2 V 130 Trunc=130 Size=56 Line=37 Col=1 Alt=0
18 /* because FCXVER also needs to reference DMSSISVR NAMES. @F1480S1*/
19 'PIPE CP LINK MAINT 193 193 RR | HOLE' /*@FC01473*/
20 'ACCESS 193 R/R' /*@EVRJNAS1*/
21
22 /* Set up disk access using production level disks. @U7426S1*/
23 'ACCESS 19D F ' /* Help files @U7426S1*/
24 'ACCESS 201 B ' /* Production Disk @U7426S1*/
25 'ACCESS 1CC D ' /* Customized controls disk @U7426S1*/
26
27 'PIPE COMMAND' /*@EVRJNAS1*/
28 'NAMEFIND :SERVER' Userid() /*@F1480S1*/
29 ':SHORT PMM' /*@F1507S1*/
30 '(BREAKTAG :SERVER' /*@F1480S1*/
31 'FILE DMSSISVR' /*@F1480S1*/
32 '| HOLE' /*@F1480S1*/
33 If (rc = 0) Then Do /*@EVRJNAS1*/
34 Call PER SMAPI /*@EVRJNAS1*/
35 Exit /*@EVRJNAS1*/
36 End /*@EVRJNAS1*/
37
|...+...1...+...2...+...3...+...4...+...5...+...6...+...7...
38 /*** Once you have PERFKIT enabled and running uncomment the /****/
39 /*** following comments /****/
40 'CP MONITOR SAMPLE ENABLE PROCESSOR'
41 'CP MONITOR SAMPLE ENABLE STORAGE'
42 'CP MONITOR SAMPLE ENABLE USER ALL'
43 'CP MONITOR SAMPLE ENABLE I/O ALL'
44 'CP MONITOR SAMPLE ENABLE NETWORK' /*@F1153MP*/
45 'CP MONITOR SAMPLE ENABLE APPLDATA ALL'
46 'CP MONITOR SAMPLE ENABLE ISFC' /*@F1153MP*/
47 'CP MONITOR SAMPLE ENABLE SSI' /*@F1153MP*/
48 'CP MONITOR EVENT ENABLE STORAGE'
49 'CP MONITOR EVENT ENABLE I/O ALL' /*@F1153MP*/
50 'CP MONITOR EVENT ENABLE NETWORK' /*@F1153MP*/
51 'CP MONITOR EVENT ENABLE ISFC' /*@F1153MP*/
52 'CP MONITOR EVENT ENABLE SSI' /*@F1153MP*/
53
54 'PERFKIT' /* Invoke the PERFKIT module @FC012...
55
=>
```

XEDIT 23 File 026/007





# z/VM Performance Toolkit (PTK): Enable, Customize, Deploy, and “smoke test”

- After saving changes, “IPL ZCMS PARM AUTOOCR” to start PERFSVM.
- At the “Command ==>” prompt, enter MON to go to the Performance Screen Selection display.

After Performance Toolkit initialization completes, the initial PTK command prompt will be displayed. Enter **MON** at the command prompt to go into the Performance Screen Selection display:

```
FCX001 Performance Toolkit for VM Autoscroll 12
FCXBAS500I Performance Toolkit for VM FL740 (64-bit)
FCXBAS100I HMA storage 2048M.2048M is being used for temporary work area

HMA storage 2048M.2048M usage statistics:

<----- Page pool ----->
<----- at 00000000_80000000 ----->
      Total  Alloc  Used  Free
Pages  52428    0    0    0
Memory  205M    0    0    0
%      -----  .000  .000  .000

<----- Print buffer ----->
<----- at 00000000_8CCCC000 ----->
      Total  Alloc  Used  Free
Blocks 13422k  0    0    0
Memory  1843M  0    0    0
%      -----  .000  .000  .000

14:44:36 Monitor event started -- recording is activated
14:44:36 Monitor sample started -- recording is activated

Command ==> mon
F1=Help F2=Redisplay F3=Quit F12=Return
```

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Rocket software

042/018

# z/VM Performance Toolkit (PTK): Enable, Customize, Deploy, and “smoke test”

- After saving changes, “IPL ZCMS PARM AUTOOCR” to start PERFSVM.
- At the “Command ==>” prompt, enter MON to go to the Performance Screen Selection display.
- Options in RED are available (based on CP MONITOR data)
- Example: 21...

In the above color scheme, report numbers in RED indicate reports which are available because the supporting CP monitor data metrics are being collected. Move the cursor to one of the highlighted numbers and press <Enter> to view the report. Here is an example based on selecting item 21 (User resource usage):

```
x3270-4 rs55
File Options
FCX124 Performance Screen Selection (FL740) Perf. Monitor

General System Data
1. CPU data menu*
2. Storage utilization
3. SSI data menu*
4. Priv. operations
5. System counters
6. CP IUCV services
7. SPool file display*
8. LPAR data menu*
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. VM Resource Manager

I. Exceptions

K. User defined data*

I/O Data
11. Channel load
12. Control units
13. I/O device menu*
14. PCI Function menu*
15. Cache extend. func.*
16. Reserved
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 menu*
23. User wait states*
24. User response time*
25. Resources/transact.*
26. User communication*
27. Multitasking users*
28. User configuration*
29. Linux systems*
2A. CPU Pools menu*
2B. User Processor Time

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. Storage mgmt. data*
3B. Proc. load & config*
3C. LPAR logs menu*
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 26
Rocket software
042/015
```

# z/VM Performance Toolkit (PTK): Enable, Customize, Deploy, and “smoke test”

- After saving changes, “IPL ZCMS PARM AUTOOCR” to start PERFSVM.
- At the “Command ==>” prompt, enter MON to go to the Performance Screen Selection display.
- Options in RED are available (based on CP MONITOR data)
- Example: 21...

FCX112 CPU 3931 SER 68DC8 Interval 14:55:36 - 14:56:36 Perf. Monitor

Userid	CPU Load				Virtual I/O/s				UR	Pg/s	User Status
	%CPU	TCPU	VCPU	Ratio	Total	DASD	Avoid	Diag			
>>Mean>>	.01	.005	.004	1.15	.1	.1	.0	.0	.0	.0	----
BKRBKUP	0	0	0	....	0	0	0	0	0	0	EME,---,DORM
BKRCATLG	0	0	0	....	0	0	0	0	0	0	EME,---,DORM
BKRSVSFS	0	0	0	....	0	0	0	0	0	0	XC,---,DORM
DATAMOVE	.01	.004	.003	1.33	.3	.3	.3	.0	.0	.0	ESA,---,DORM
DIRMAINT	.01	.004	.003	1.33	.2	.2	.2	.0	.0	.0	ESA,---,DORM
DISKACNT	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
DMARTIN	0	0	0	....	0	0	0	0	0	0	EME,---,DORM
DTCVSW1	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	ESA,---,DORM
DTCVSW2	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	ESA,---,DORM
DTCVSW3	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	ESA,---,DORM
DTCVSW4	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	ESA,---,DORM
FTPSEVE	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	XC,---,DORM
GCS	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
LNXOMN07	.05	.028	.024	1.17	.1	.1	.0	.0	.0	.0	EME,CL3,DISP
LNXOMN08	.08	.049	.042	1.17	.4	.4	.0	.0	.0	.0	EME,CL3,DISP
LNXOMN09	.07	.043	.039	1.10	.7	.7	.0	.0	.0	.0	EME,CL1,DISP
LNXOMN10	.04	.021	.018	1.17	.0	.0	.0	.0	.0	.0	EME,CL2,DISP
MAINT740	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
OPERATOR	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
OPERSYMP	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
OPMGRM1	.00	.002	.001	2.00	.1	.1	.0	.0	.0	.0	ZXC,---,DORM
OPMGRS1	0	0	0	....	0	0	0	0	0	0	ZXC,---,DORM
PERFSVM	.03	.018	.018	1.00	.0	.0	.0	.0	.0	.0	EME,---,DORM
RACFVM	.00	.000	.000	.00	.1	.1	.0	.0	.0	.0	ESA,---,DORM
RMSMASTR	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
RSCS	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	ESA,---,DORM
RSCSAUTH	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM
RSCSDNS	.00	.001	.001	1.00	.0	.0	.0	.0	.0	.0	ESA,---,DORM
TCPIP	.01	.004	.003	1.33	.0	.0	.0	.0	.0	.0	Z,---,CL0,DISP
TMDMM	.00	.002	.001	2.00	.1	.1	.1	.0	.0	.0	EME,---,DORM
TMLM1	.00	.000	.000	.00	.0	.0	.0	.0	.0	.0	EME,---,DORM
TMTMM	.00	.001	.001	1.00	.0	.0	.0	.0	.0	.0	EME,---,DORM
VMSEVP	0	0	0	....	0	0	0	0	0	0	XC,---,DORM
VMSEVR	0	0	0	....	0	0	0	0	0	0	ESA,---,DORM

Select a user for user details or IDLEUSER for a list of idle users  
Command ==> █

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

042/015

## z/VM Performance Toolkit (PTK): Enable, Customize, Deploy, and “smoke test”

---

- Refer to *z/VM: Performance Toolkit Guide*, Chapter 3 (“A Guided Tour”) for a comprehensive introduction to Performance Toolkit.
- Refer to *z/VM: Performance Toolkit Reference*, Chapter 2 (“Performance Toolkit Reports”) for a detailed description of individual reports.
- When finished, press <PF12> repeatedly to exit Performance Toolkit and return to a CMS “Ready;” prompt. Enter **CP LOGOFF** to sign off PERFSVM and end the session.

## Beyond the Minimum: z/VM Performance Toolkit (PTK) – Browser Interface

---

- Three steps, but the documentation path is non-obvious.
- 1) Update z/VM TCPIP configuration
- 2) Update the PERFSVM CP directory to enable APPC/VM connections
- 3) Create / Update three PERFSVM configuration files

# PTK: Enabling the web browser interface

## 1) Update z/VM TCPIP configuration

---

- Detailed Guidance:
  - z/VM: Performance Toolkit Guide, Chapter 2 “Preparing Performance Toolkit”, heading “Implementation”
- Supporting details:
  - z/VM: TCP/IP Planning and Customization, Chapter 16 “Configuring the TCP/IP Server”, heading “PORT Statement”
- Task: Update PROFILE TCPIP
  - Assign a port for use by PERFSVM
  - Examples use port 81

# PTK: Enabling the web browser interface

## 1) Update z/VM TCPIP configuration

- Detailed Guidance:
  - z/VM: Performance Toolkit Guide, Chapter 2 “Preparing Performance Toolkit”, heading “Implementation”
- Supporting details:
  - z/VM: TCP/IP Planning and Customization, Chapter 16 “Configuring the TCP/IP Server”, heading “PORT Statement”
- Task: Update PROFILE TCPIP
  - Assign a port for use by PERFSVM
  - Examples use port 81

```
... 81 TCP PERFSVM NOAUTOLOG ; Performance Toolkit
```

Refer to z/VM: Performance Toolkit Guide, Chapter 2 “Preparing Performance Toolkit” under the heading “Implementation” for detailed guidance. Supporting details can be found in z/VM: TCP/IP Planning and Customization, Chapter 16 “Configuring the TCP/IP Server” under the heading “PORT Statement”.

- Yes; you could do this dynamically via OBEYFILE
- Yes; TCPIP must be restarted after PROFILE TCPIP changes are saved

PTK: Enabling the web browser interface

2) Update PERFSVM CP directory to enable APPC/VM connections

- Add the following IUCV statements to PERFSVM's CP directory entry:

```
...  
IUCV *IDENT FCXSYSTEM GLOBAL  
IUCV *IDENT FCXRES00 GLOBAL  
...
```

*Note: PERFSVM must go through a LOGOFF / LOGON cycle to activate these changes.*

*Note: For more complex configurations, refer to z/VM: Performance Toolkit Guide, Chapter 2 "Preparing Performance Toolkit" under the heading "APPC/VM Interface for Performance Data Retrieval".*

LOGOFF / LOGON required to make PERFSVM directory changes active

# PTK: Enabling the web browser interface

## 3) Create / Update three PERFSVM configuration files

---

- Two new files:
  - **FCONRMT AUTHORIZ**
  - **FCONRMT SYSTEMS**
- One existing file:
  - **FCONX \$PROFILE**
- ...all on PERFSVM's A-disk
  - PERFSVM 191 (MDISK installation)
  - VMSYS:PERFSVM. (SFS installation)

LOGOFF / LOGON required to make PERFSVM directory changes active

# PTK: Enabling the web browser interface

## 3) Create FCONRMT AUTHORIZ

---

- Create file **FCONRMT AUTHORIZ**:

```
sysname PERFSVM S&FSERV  
sysname SYSPROG1 DATA  
sysname PERFADM1 DATA
```

- ...where "sysname" is the name of your z/VM system.
- ...where SYSPROG1 and PERFADM1 are z/VM users who are authorized to view system performance data via the Performance Toolkit browser interface.
- SYSPROG1 and PERFADM1 will be prompted to authenticate using z/VM password credentials when a browser session is opened.

- 1) Identify the store-and-forward server (PERFSVM in our one-system example).
- 2) Identify z/VM users allowed to authenticate and interact with PERFSVM via the browser interface.

# PTK: Enabling the web browser interface

## 3) Create FCONRMT SYSTEMS

---

- Create file **FCONRMT SYSTEMS**:

```
sysname PERFSVM ESA N FCXRES00
```

- *...where "sysname" is the name of your z/VM system.*

Identify the systems involved in our monitoring scheme. The example assumes a single z/VM system, NOT sharing data from other z/VM systems..

## PTK: Enabling the web browser interface

### 3) Modify FCONX \$PROFILE to enable browser interface:

- Modify file FCONX \$PROFILE:

```
FC MONCOLL WEBSERV ON TCPIP TCPIP 81
```

```
FC MONCOLL VMCF ON
```

- *Best Practice: use the VMSES/E "LOCALMOD" command to manage customization of FCONX \$PROFILE.*

*If you \*know\* you're going to do this at initial deployment, make the appropriate changes when you do the initial customization of FCONX \$PROFILE.*

## PTK: Enabling the web browser interface

### 3) Modify FCONX \$PROFILE to enable browser interface:

- Modify file FCONX \$PROFILE:

```
FC MONCOLL WEBSERV ON TCPIP TCPIP 81
```

```
FC MONCOLL VMCF ON
```

- *Best Practice: use the VMSES/E "LOCALMOD" command to manage customization of FCONX \$PROFILE.*
- Restart TCPIP to pick up PROFILE TCPIP changes
- Restart PERFSVM to pick up PERFSVM changes

Reminder: TCP/IP restart is disruptive. All existing connections will be dropped.  
Make sure to add PERFSVM to XAUTOLOG so it is always collecting data

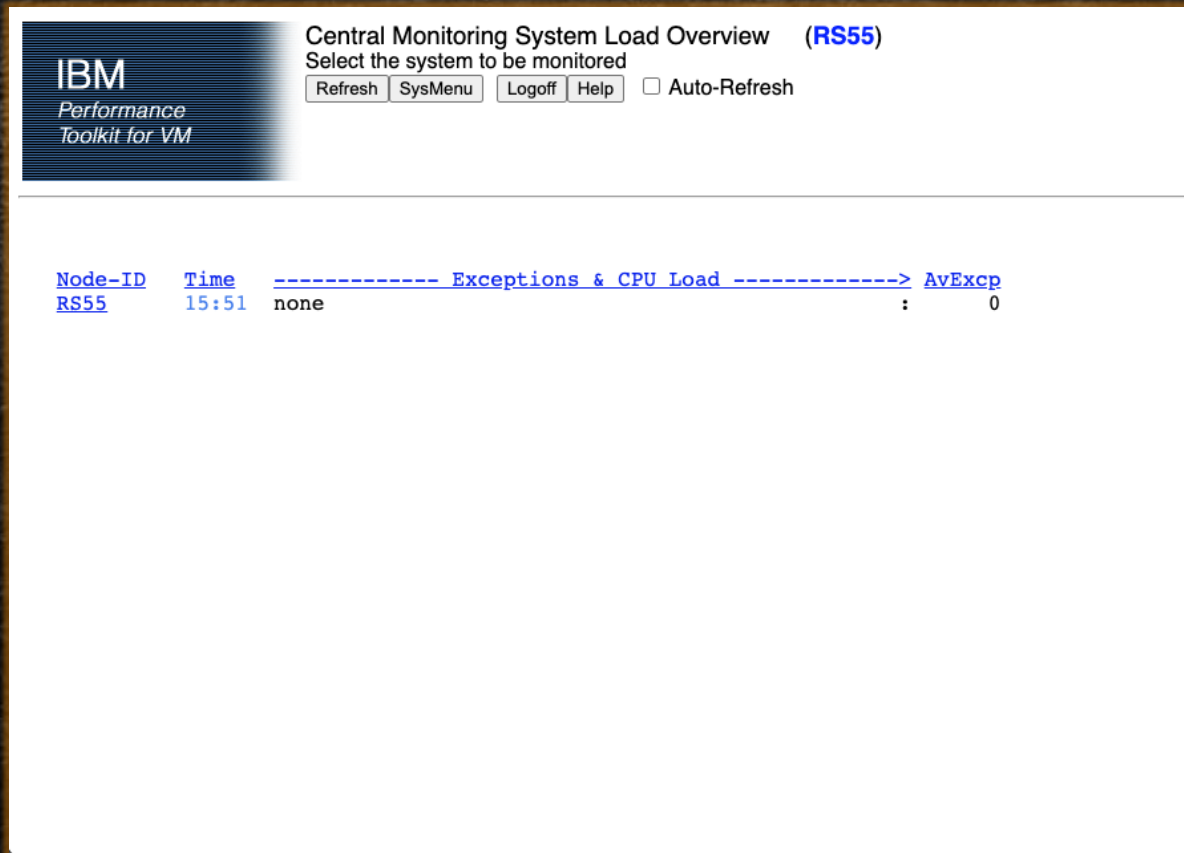
# PTK: Enabling the web browser interface

## “Smoke test”

---

- <http://my.vmsystem.corp.com:81>
- Userid / Password authentication challenge
- Example displays

# PTK: Enabling the web browser interface “Smoke test”



The screenshot shows the IBM Central Monitoring System Load Overview for system RS55. The interface includes a header with the IBM logo and the text "Performance Toolkit for VM". Below the header, there are navigation buttons for "Refresh", "SysMenu", "Logoff", and "Help", along with an "Auto-Refresh" checkbox. The main content area displays a table with the following data:

<u>Node-ID</u>	<u>Time</u>	<u>----- Exceptions &amp; CPU Load -----&gt;</u>	<u>AvExcp</u>
RS55	15:51	none	: 0

<http://my.vmsystem.corp.com:81>

After the userid / password authentication challenge, you should see...

System selection dialogue

# PTK: Enabling the web browser interface “Smoke test”

**IBM**  
Performance  
Toolkit for VM

**FCX124 Initial Performance Data Selection Menu (RS55)**  
Select performance screen

Command Refresh Systems Logoff Help  Auto-Refresh

**General System Data**

- 1. [CPU data menu\\*](#)
- 2. [Storage utilization](#)
- 3. [SSI data menu\\*](#)
- 4. [Priv. operations](#)
- 5. [System counters](#)
- 6. [CP IUCV services](#)
- 7. [SPOOL file display\\*](#)
- 8. [LPAR data menu\\*](#)
- 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. [VM Resource Manager](#)
- I. [Exceptions](#)
- K. [User defined data\\*](#)

**I/O Data**

- 11. [Channel load](#)
- 12. [Control units](#)
- 13. [I/O device menu\\*](#)
- 14. [PCI Function menu\\*](#)
- 15. [Cache extend. func.\\*](#)
- 16. [Reserved](#)
- 17. [DASD seek distance\\*](#)
- 18. [I/O prior. queueing\\*](#)
- 19. [I/O configuration](#)
- 1A. [I/O config. changes](#)

**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. [Storage mgmt. data\\*](#)
- 3B. [Proc. load & config\\*](#)
- 3C. [LPAR logs menu\\*](#)
- 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](#)

**User Data**

- 21. [User resource usage\\*](#)
- 22. [User paging menu\\*](#)
- 23. [User wait states\\*](#)
- 24. [User response time\\*](#)
- 25. [Resources/transact.\\*](#)
- 26. [User communication\\*](#)
- 27. [Multitasking users\\*](#)
- 28. [User configuration\\*](#)
- 29. [Linux systems\\*](#)
- 2A. [CPU Pools menu\\*](#)
- 2B. [User Processor Time](#)

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

<http://my.vmsystem.corp.com:81>

After the System Selection dialogue,  
you should see...

Report Selection menu

# PTK:

## “Well, that was a lot...”

---

- Yes. Yes, it was.
- Details offered because the documentation path is complex.
- Remember the goals:
  - *Provide a simplified workflow.*
  - *“Just enough” to get PTK switched on and working for a single z/VM system.*
- Advanced study:
  - You can do a lot more with PTK if you are managing multiple z/VM systems.

# Enterprise-grade monitoring: OMEGAMON XE on z/VM and Linux

---

- What does it do?
  - Consumes: z/VM performance metrics produced by Performance Tool Kit
  - Produces: z/VM integration with OMEGAMON enterprise-wide monitoring
- How do I turn it on and make it useful?
  - Take the following steps:

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

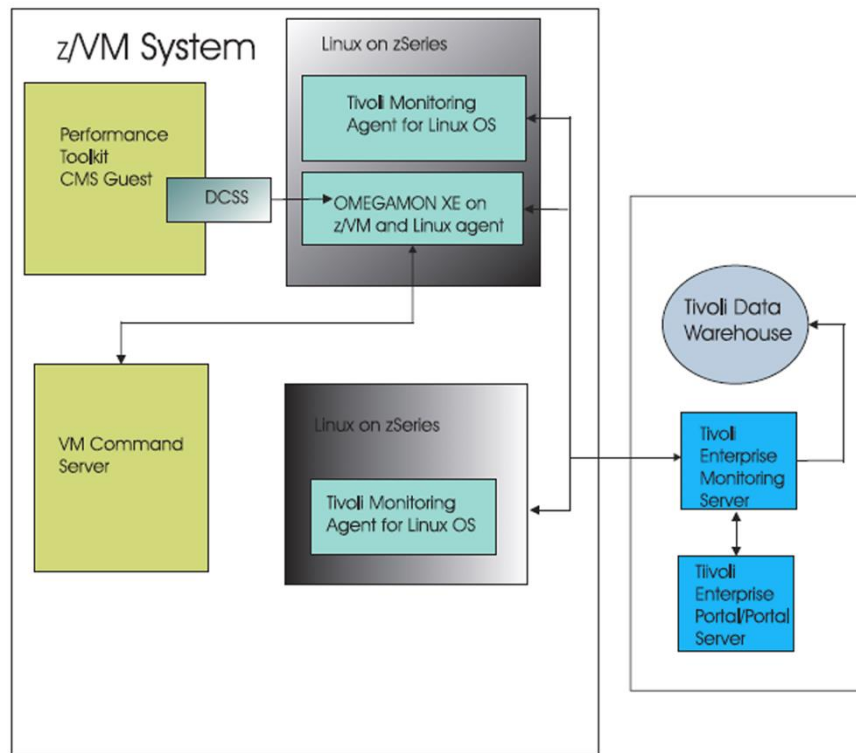
---

- Assumptions
  - OMEGAMON enterprise-wide infrastructure already in place (TEPS, TEMS, z/OS systems...)
  - Goal: Add z/VM LPAR metrics to “big picture”
  - z/VM Performance Tool Kit (PTK) is already configured
    - OMZVM consumes data generated by PTK
  - A z/VM Linux guest system is available to host OMZVM monitoring agent
    - Almost all OMZVM function executes as Linux application
    - Exception: The “Take Action” server
      - *Not discussed here, but not difficult to deploy*

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

## Architectural Overview

The following figure depicts the OMEGAMON XE on z/VM and Linux monitoring archi

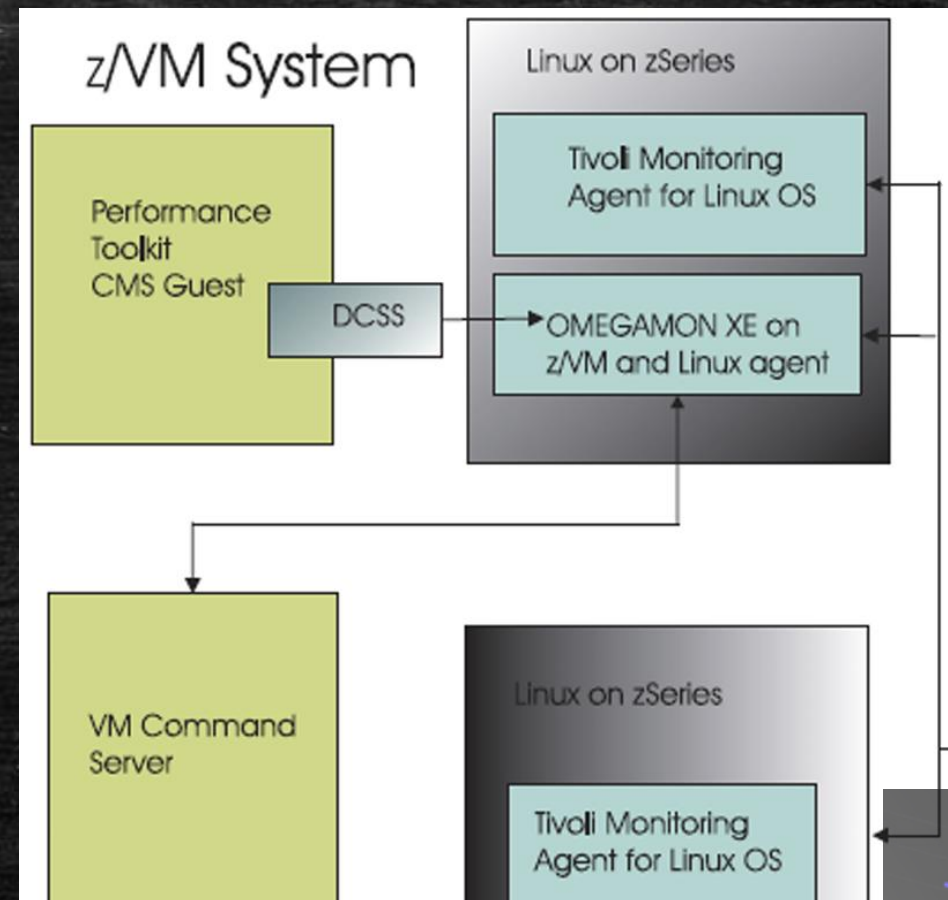


- Full OMEGAMON infrastructure consists of a ***lot*** of components...

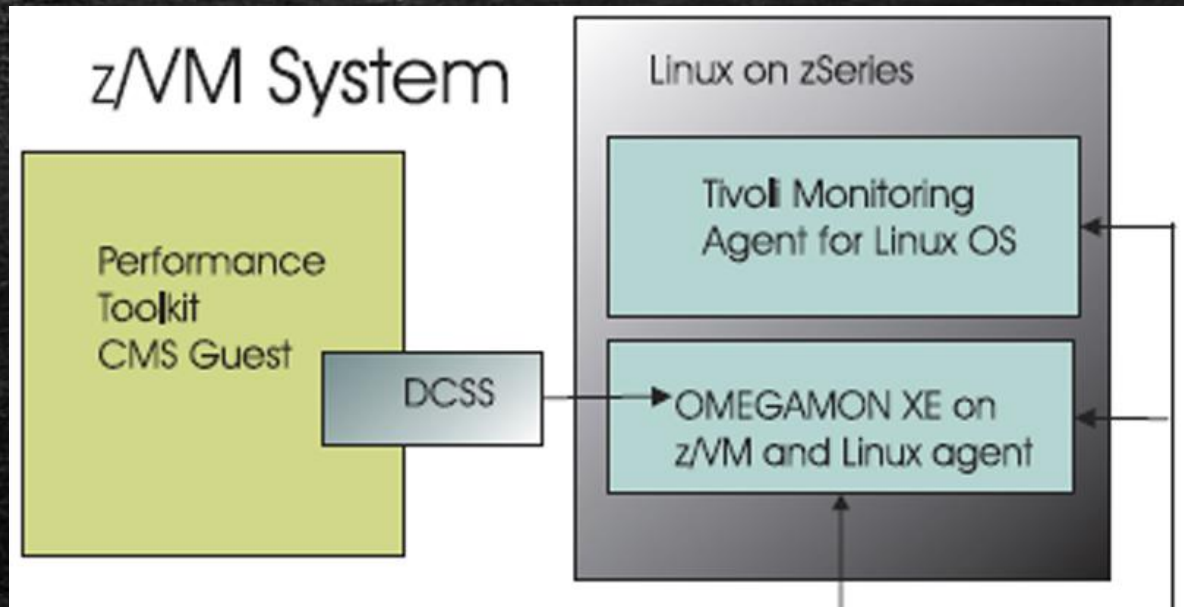
- Diagram courtesy of "OMEGAMON XE for z/VM and Linux v4.3.0 FP3 Installation and Configuration Cook Book" (John Harris John\_Harris@us.ibm.com)

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

- ...even after we limit scope to discussion of z/VM and Linux as a guest of z/VM...

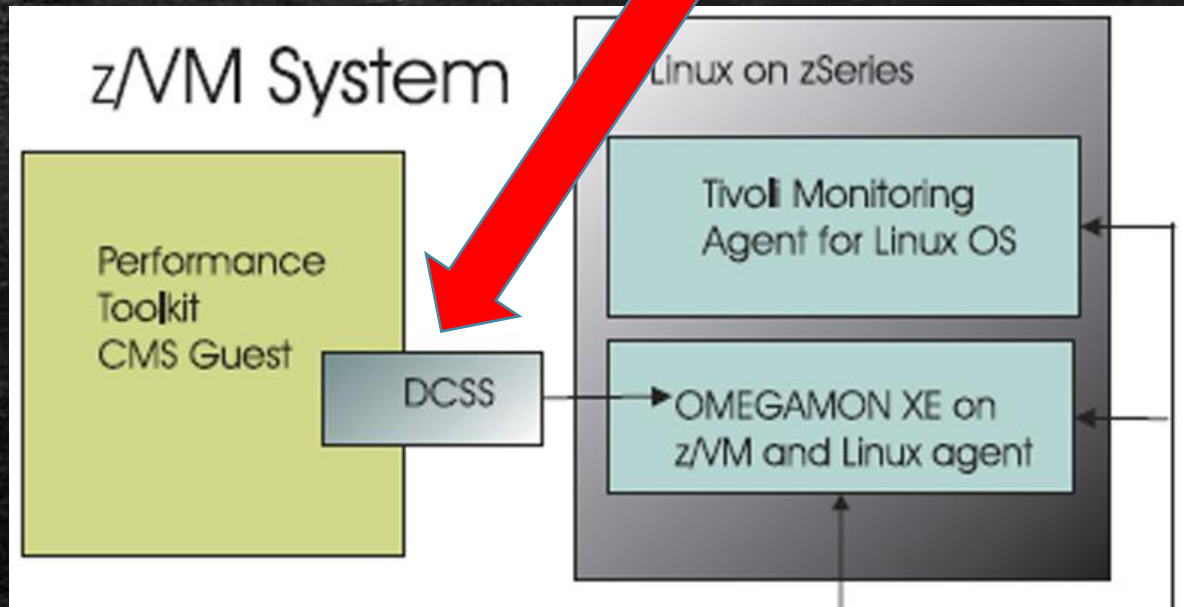


# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment



...but most of the installation and configuration problems involve setting up the interface between PTK and OMZVM.

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment



...but most of the installation and configuration problems involve setting up the interface between PTK and OMZVM.

Setting up the DCSS requires a solid understanding of both z/VM and Linux on IBM z.

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

---

- A DCSS is Shared Memory
- DCSSs provide a mechanism for multiple guest operating systems to access the same memory space.
- “It’s a data sharing solution.”

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

---

- “It’s a data sharing solution, so...”
- CP MONITOR capabilities produce raw metrics, consumed by PERFSVM.
- PERFSVM (PTK): Creates & maintains data in the “PERFOUT” DCSS.
  - ...among other functions.
- The OMZVM “VL” agent, a Linux application, consumes that data.
- PERFSVM and Linux share a common set of virtual memory pages.

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

---

- "It's just arithmetic."
  - ...in hexadecimal.
  - ...with page ranges.
- z/VM 7.4 "PERFOUT" default:

CP QUERY NSS NAME PERFOUT MAP

FILE FILENAME FILETYPE MINSIZE BEGPAG ENDPAG TYPE CL #USERS PARMREGS VMGROUP

0028 PERFOUT DCSS N/A 46000 465FF SN A 00000 N/A N/A

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

---

- Example: a Linux guest ("OMEGALNX") with a 2G virtual memory footprint:
  - 00000000 - 45FFFFFF - private OMEGALNX pages
  - 46000000 - 465FFFFFFF - shared (PERFOUT + OMEGALNX) DCSS pages
  - 46600000 - 805FFFFFFF - private OMEGALNX pages

- In "OMEGALNX" CP directory:

...

```
CP DEFINE STORAGE CONFIG 0.1120M 1126M.928M
```

...

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

---

- Planning & Configuration steps: z/VM-side
  - Review PERFOUT page range; delete/re-define if necessary
  - Update OMZVM "VL" agent Linux guest memory layout
    - ...the "CP DEFINE STORAGE CONFIG" example from the previous slide
  - LOGOFF/LOGON "VL" agent Linux guest so that directory updates take effect
  - Update **FCONX \$PROFILE**
    - *Uncomment / Add "FC MONCOLL SEGOUT ON PERFOUT"*

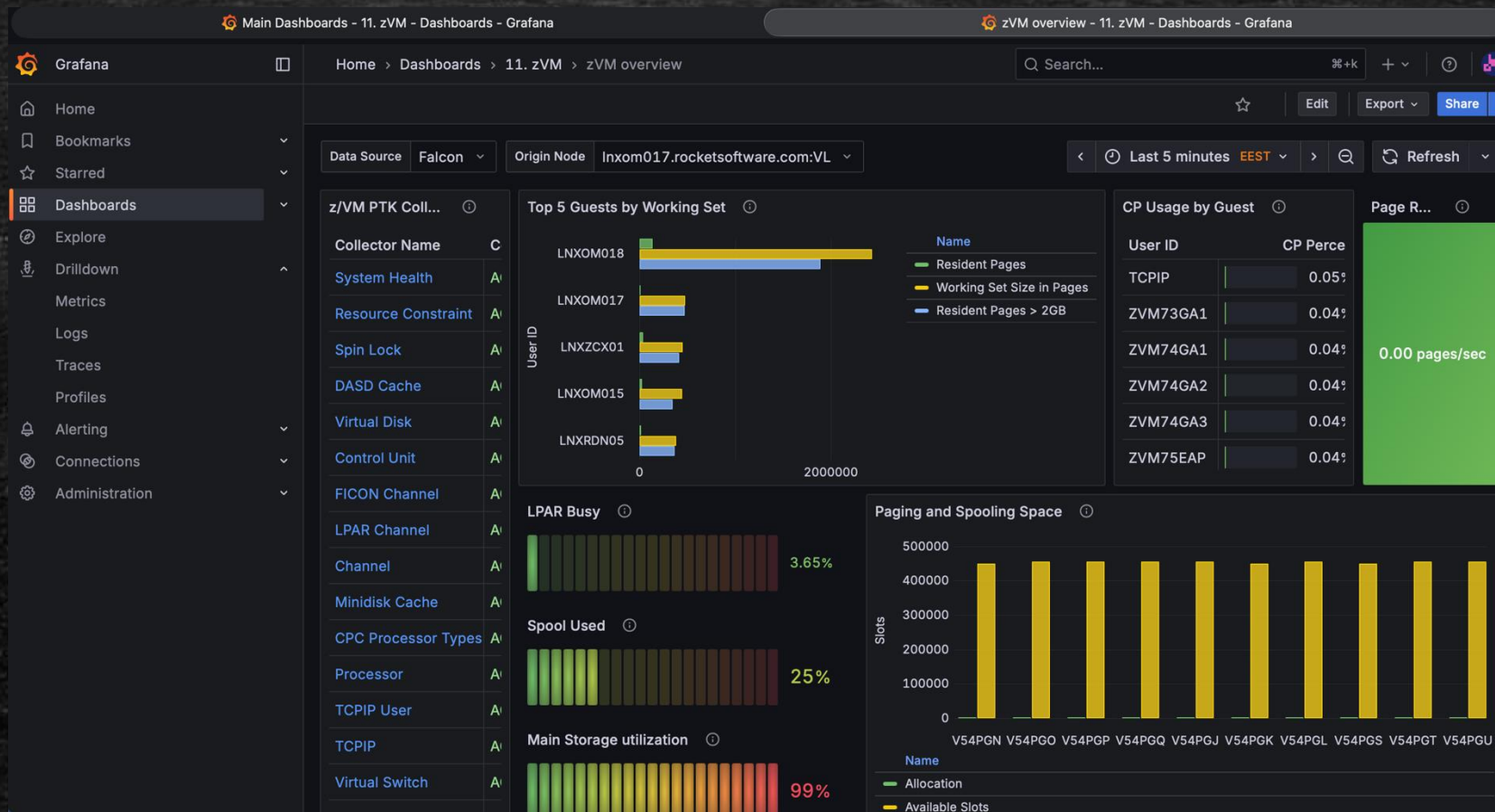
Remember to rebuild and restart PERFSVM after these changes

# OMEGAMON XE on z/VM and Linux (OMZVM): Planning, Configuration, and Deployment

---

- Configuration & Deployment steps: Linux-side
  - Great supplemental resource:
    - “OMEGAMON XE for z/VM and Linux Installation and Configuration Cook Book”
  - Be sure you have the latest “Fix Pack” (download from IBM Fix Central)
  - Unpack and execute the install script
    - *OMEGAMONTEP & TEMS hostnames or IP addresses*
    - *PTK shared DCSS name (default: PERFOUT)*
  - If necessary, update Linux startup procedures
    - Load the DCSSBLK device driver
    - Connect the PERFOUT DCSS
  - Start the VL agent
  - Pro tip: PERFSVM *must* be running before attempting to start the VL agent
    - Message *KVLAL0005E* in VL agent logs indicates problems with the PERFOUT DCSS

# Include a screenshot of new Grafana for OM zVM



# What about z/VM Performance Data Pump?

---

- Why do I care?
  - 21<sup>st</sup>-century buzzwords: “Observability”
  - 21<sup>st</sup>-century function: There’s a *lot* going on with Grafana
- Before you begin:
  - Verify your license entitlement
  - DATAPUMP is part of z/VM Performance Tool Kit
- Start here: <https://www.vm.ibm.com/related/perfkit/datapump/>
- Details here: <https://www.vm.ibm.com/related/perfkit/datapump/setup-v5.pdf>

# Broad Strokes: What about z/VM Performance Data Pump?

---

- Review the available documentation
  - IBM z/VM 7.4 documentation library: z/VM: Performance (SC24-6301-74)
    - *Appendix I. z/VM Performance Data Pump*
    - ...plus additional materials cited on previous slide
- z/VM 7.3: Apply service for VM66687
  - Not applicable for z/VM 7.4; it's part of the 7.4 base.
- Set up a Linux server
  - “Bring your own Linux”
  - Host system for **InfluxDB** (database to hold metrics gathered by DATAPUMP svm) and **Grafana** (data visualization and analysis)
  - Recommendation: Dedicate a small z/VM Linux guest
    - OMZVM users: Could host alongside the VL agent

Doc is very good. Easiest to deploy InfluxDB and Grafana as Docker containers

# Broad Strokes: What about z/VM Performance Data Pump?

---

- Set up a Linux server
  - “Bring your own Linux”
  - Host system for InfluxDB (database to hold metrics gathered by DATAPUMP svm) and Grafana (data visualization and analysis)
  - Suggestion: Set up a dedicated small z/VM Linux guest
    - OMZVM users: Could host alongside the VL agent; no compatibility issues identified
  - Customize InfluxDB and Grafana
    - *Excellent details in the IBM-provided documentation*
- Configure the DATAPUMP service virtual machine
  - Pre-defined in z/VM 7.4
  - Don't overlook the MDXSETUP step of instructions
    - *I did... the first time.*
  - Customize ...

# Broad Strokes: What about z/VM Performance Data Pump?

---

- Configure the DATAPUMP service virtual machine
  - Pre-defined in z/VM 7.4
  - Don't overlook the MDXSETUP step of instructions
    - *I did... the first time.*
  - Customize DATAPUMP configuration file "**DEFAULT DATAPUMP**"
    - Found on DATAPUMP's "A-disk"; SFS default location is **VMPSFS:DATAPUMP**.
    - Defines the connection between (CMS) DATAPUMP svm and (Linux) InfluxDB instance
  - Test!
    - Details in the IBM-provided documentation
  - Automate!
    - Add to AUTOLOG<sub>1</sub> / AUTOLOG<sub>2</sub> **PROFILE EXEC**

# Broad Strokes: What about z/VM Performance Data Pump?

---

- What's this thing good for, really?
- Looking at z/VM performance data
  - Keywords: Observability, Visualization, Dashboard
- Active development going on in this space!
  - Watch:
    - z/VM New Function: <http://www.vm.ibm.com/newfunction/index.html>
    - z/VM Performance Data Pump: <https://www.vm.ibm.com/related/perfkit/datapump/>
  - As recently as...
    - April 2025: z/VM Energy Consumption
    - May 2025: z/VM Neural Network Processor dashboard
      - ...z16: Usage by topology
      - ...z17: Sharing of AI Accelerators

# Summary

---

- “It’s all about fiddly little details”
  - Performance Tool Kit setup is mostly a z/VM sysprog / sysadmin job
  - OMEGAMON for z/VM and Linux setup requires a solid understanding of...
    - z/VM concepts and facilities (PTK, CP MONITOR setup, “what’s this DCSS thing?”)
    - Linux sysadmin skills (package installation)
    - OMEGAMON infrastructure (VL agent “plugs in” to a complex environment)
    - Documentation path is complex because the target environments are complex
  - Performance Data Pump
    - Requires moderate “domain specific” knowledge for both z/VM and Linux
    - Container packaging of InfluxDB and Grafana simplify this task
    - IBM-provided documentation provides excellent guidance

# Questions, Comments, Feedback...?

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- **“I WOULD RATHER HAVE QUESTIONS THAT CANNOT BE ANSWERED THAN ANSWERS THAT CANNOT BE QUESTIONED.”**

Richard Feynman (1918 – 1988), Theoretical Physicist

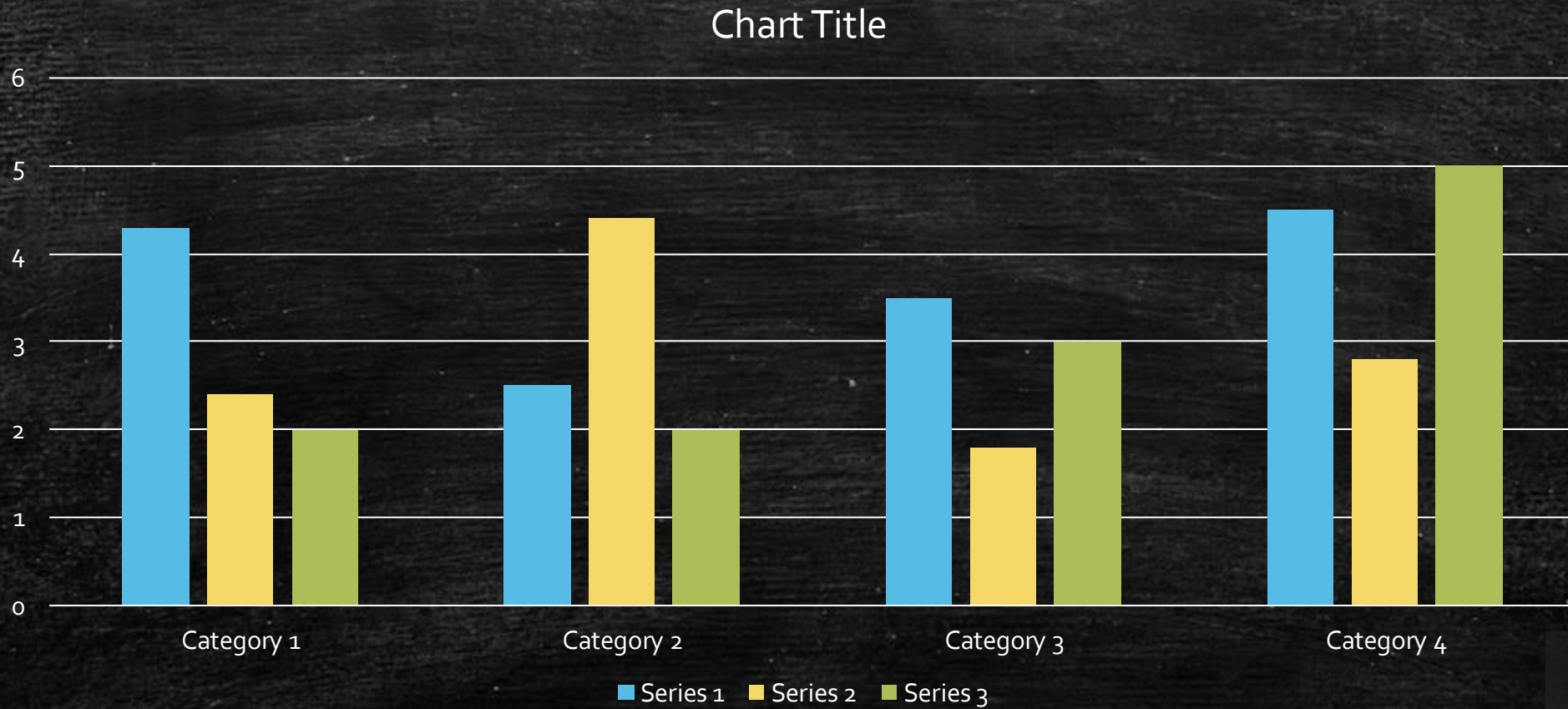


# Title and Content Layout with List

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- Add your first bullet point here
- Add your second bullet point here
- Add your third bullet point here

# Title and Content Layout with Chart



# Two Content Layout with Table

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- First bullet point here
- Second bullet point here
- Third bullet point here

Class	Group A	Group B
Class 1	82	95
Class 2	76	88
Class 3	84	90

# Two Content Layout with SmartArt

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## Group A

- Task 1
- Task 2

## Group B

- Task 1
- Task 2

## Group C

- Task 1

- First bullet point here
- Second bullet point here
- Third bullet point here

Add a Slide Title - 1

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Add a Slide Title - 2

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Add a Slide Title - 3

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Add a Slide Title - 4



Add a Slide Title - 5

