Are There Free Tools to Use on my z/VM System?

Session 17240

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Agenda

- Where do you find free tools?
- How about support?
- Getting tools from a web site to your z/VM system
- Essential Tools
  - Pipelines
  - VMARC
  - TRACK
- Tools for:
  - System Programmers
  - Working with Linux
  - Service Machines
  - Programming
  - Tools for CMS
  - Other

Where do you find free tools?

These sites have the majority of download options

- z/VM downloads page
  - http://www.vm.ibm.com/downloads has background information, license agreement, etc.
  - http://www.vm.ibm.com/downloads/packages has the list of packages
  - 478 packages currently (2 new ones in July!)
- VM Workshop tools page
  - http://www.vmworkshop.org/tools
  - Multiple pages of tools, some modern, some old.
- Sine Nomine Associates VM tools page
  - http://www.sinenomine.net/vm/products
  - Multiple pages of tools, some free, some for sale
- Pages hosted by vm.marist.edu
  - Pipelines: http://vm.marist.edu/~pipeline/
  - Track: http://vm.marist.edu/track/

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Where do you find free tools?

A few other sites I have found

- Slippery Rock University
  - http://zvm.sru.edu/~DOWNLOAD/ (also migrated to vmworkshop.org)

- Homerow.net
  - http://homerow.net/
  - Tools such as smcli (SMAPI command line tool), VMA to read VMARC files

- Dave Jones
  - http://www.vsoft-software.com/
  - (Wasn't working correctly last I checked, moved to vmworkshop.org?)

- Sourceforge
  - Zoom systems management tool (http://sourceforge.net/projects/system-zoom/)

- Samples included with z/VM
  - Drawlogo exec on CP samples disk
  - Spoolaid package on RSCS samples disk
  - See this presentation from Rick Barlow about several VM "goodies":
    - http://linuxvm.org/present/SHARE112/S9153rb.pdf

Support?

- Well, no, usually not anything official
  - Although there are exceptions
- Usually "best effort" basis by the author
  - If the author is still around!
- Options
  - Self support
  - Community support
  - Alternative tools
  - Supported products

- Some questions to ask:
  - How critical is this tool to your business?
  - Do you have the skills to support it yourself?
  - OK, it works great now, but will it have problems on a future release or future environment?
  - Should you be migrating to a supported product?

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Can you support it yourself?

- What language is it written in?
    - Interpreted, like Rexx?
    - Assembler?
    - Other high level language
    - Is the source code included?
- If compiled or assembled, do you have that software?
    - For assembler, do you need high level assembler or can CMS's Assembler F work?

- How well is it documented?
    - Is there a document or help file included?

- Do you have the skills to fix or improve it?
    - Rexx is "easy", sure, but some Rexx code can be pretty complicated to figure out.
    - CMS Pipelines?
        - How much is used
        - Do you have the skills to change or update it?

Other Inhibitors

- Restrictions on what software can go on your system
  - Restrictions on where code comes from (i.e. non-product code.)
  - Code review
  - Sandbox vs. production systems

- Difficulties downloading and/or uploading
  - Restrictions on what can go on your workstation
  - No connection from VM to the internet
  - Don't know how to do it correctly

- The Chicken and Egg problem, which comes first?
  - Where do I get VMARC?
  - How do I download VMARC and make it a usable module?
  - The VM downloads page has VMARC and instructions for downloading
    - Hold on for more details!
    - It also links to a version that runs on Windows, Linux, and even z/OS!
      http://homerow.net/zvm/vma/

Pipelines on CMS

- Many tools use Pipelines in Rexx execs
  - A very essential tool to have in your toolbox!
  - Replaces many old Rexx functions and utilities
  - What would programming on CMS be without it?
- You should understand the 2 different levels

- Pipelines is a standard part of CMS
  - Usually this is called CMS Pipelines, built in Pipelines, or Endicott Pipelines
  - Or terms like copper plumbing, indoor plumbing, etc. Not antique, but maybe a bit dated.
- The most up to date is the Runtime Library found on the Marist site
  - Called Marist pipes, Princeton pipes (for where it used to be hosted), or uplevel pipes
  - Or terms like plastic pipes and modern plumbing. The most up to date available!
  - http://vm.marist.edu/~pipeline/index.html
- The Marist site has a lot more than just the code
  - Manuals, hints, tips, education, white papers
  - Many code samples, complete packages, and extensions.

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Pipelines on CMS

IBM's Future plans?

- IBM is investigating if it can bring the latest version of CMS Pipelines into the z/VM product.

- If you have requirements or your own views on this task, please contact me (bjhayden@us.ibm.com) or Rob van der Heij (robvdheij@nl.ibm.com) via email. We'd especially like to know how this would help you use and run your workloads and systems.

- Various approaches are being considered to balance customer value with the resources available for this effort.

- IBM plans and directions are subject to change without notice

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The PICKPIPE tool

- This is the suggested tool for loading the Runtime Library or downgrading to CMS Pipelines
  - Found on the VM Downloads page, referenced on the Marist Pipeline page
  - http://www.vm.ibm.com/download/packages/descript.cgi?PICKPIPE
  - Help file included in the package

- Usage:
  - PICKPIPE Uplevel   - Load the runtime library level (PIPELINE MODULE)
  - PICKPIPE Cms   - Load the built in CMS level (DMSPIPE MODULE)
  - PICKPIPE Test   - Load a test level (NXPIPE MODULE)
  - PICKPIPE Query   - Show what level and type is loaded

- Other features
  - Using a shared segment for the Pipeline code
  - Setting the Pipeline style (configuration variables)
  - Stacking (push) a new level or purging (pop) the current level (or all levels)

Downloading tools (continued)

- Now, back to downloading tools

- Pipelines has stages that can help you with your uploaded data
  - Converting files to fixed record format
  - Converting files back to CMS record format
  - Which one you use depends on what you downloaded
- Downloading VMARC MODULE from the VM downloads page
  - Go to http://www.vm.ibm.com/download/vmarc.module and save the file
    - Or more likely: Go to http://www.vm.ibm.com/download and right click "here" and "save as" the file
  - Upload that file from your PC to VM in binary. It will create (by default) a variable length format file.
  - Use Pipelines to reformat the file:
    - PIPE < VMARC MODULE A | deblock cms | > VMARC MODULE A
    - If you changed the uploaded file name or put it on a different disk, use the correct name
  - Why does this work on this file?
    - When the VM web server hosting the VM site downloads a module, it adds a 2 byte record length to the front of each CMS record. "deblock cms" uses that length to recreate the records.

The VMARC tool

- VMARC is a data compaction and file archiving utility for CMS
  - Originally written by John Fisher of RPI with updates by others

- VMARC archives are formatted Fixed 80 byte records
  - When you upload, specify Fixed 80 format and binary
    - From a PC to VM: enter "site fix 80" or "quote site fix 80"
    - From VM to an FTP server: enter "binary F 80"
  - Or – reformat the file after uploading
    - PIPE < tool upload a | fblock 80 00 | > tool vmarc a fixed

- To unpack the archive:
  - All files to your A disk: vmarc unpack tool vmarc a
  - All files to a different disk, such as Z: vmarc unpack tool vmarc a = = z
  - Other options: VMARC ?
    - Also download the HELP file from
      http://www.vm.ibm.com/download/vmarc.helpcms
      - Process it with PIPE < vmarc helpcms a | deblock cms | > vmarc helpcms a

So – More than 500 tools – how to talk about them?

- I put the tools into a few categories:

- System Programmer tools
    - Help you manage your system
- Working with Linux
    - Tools to work with disks
- SVM (Service Virtual Machines)
    - These run in a disconnected user
- Programming tools
    - Functions, utilities, screen drivers, examples, etc.
- CMS tools
    - For any CMS user, privileged or not
- Other
    - Linux interface, product add-ons and mods, performance tools, and more

- Note: All tools are found on the VM downloads page unless stated.

System Programmer tool – TRACK for VM

- As it says on its web page "The one tool you can't live without!"
  - It is certainly a tool a VM system programmer shouldn't live without!
  - Find it at http://vm.marist.edu/track/

- It allows you to see what another virtual machine is doing
  - Spooled console
  - Recent commands
  - Virtual device details
  - Current state
  - Control blocks
  - Virtual and Real Storage

- Very handy to look at the console of a disconnected user
- Any screen can be put into auto-refresh mode
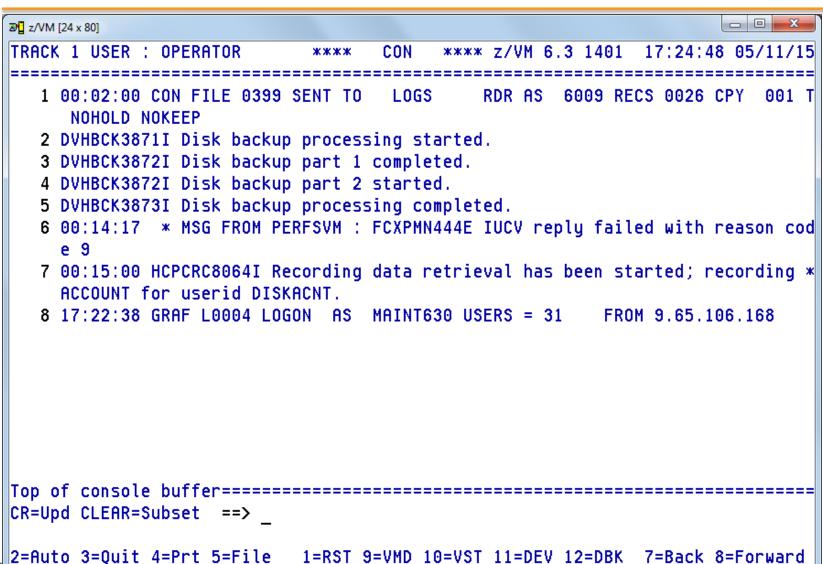
TRACK, default screen

```
z/VM [24 x 80]                                                        □ ▢ ✕

TRACK 1 USER : OPERATOR        ****   VMD    **** z/VM 6.3 1401  17:22:45 05/11/15
================================================================================
VMDBK @ 019D0000      Class  = ABCDEFG                       Share= 100     R
Logon= 02/25/15 10:44 Virtcpu = 000:00.00 Totcpu = 000:00.07    11    Devices
Storage=       32M       Account = IBMDFLT   Console= DISC
Last CP= CLOSE        Locked= 0              Resident= 144          WSS= 144
PSW= 030E0000 8105B158      CC = 0           Stat  = EC ENABLED  WAIT SUPR
CPUaddr= 00    #CPUs= 01    Mach= ESA        Amode= 31-bit     370accom= OFF
Sio= 30       Pr= 2178      Pun= 0           Read  = 0         Dist = OPERATOR
Rstat=                                  Last activity on 03/18/15 00:13:49
Qstat= IABIAS
Ostat= SYSOP IN-USERCT DISC
Com = DISC       Exec = PROFILE   Mod = IMMCMD    Tran= SYNONYM
Ipl = IPL CMS PARM AUTOCR
R0-7= 00000000 0000A094 C3D6D5F1 00001378 00000000 00000000 00000028 00000000
R8-F= 0000026C 000047A8 00000028 00004F50 0105B060 0000A668 81055BBA 0105B060
 disc | xautolog tools |



================================================================================
CR=Upd CLEAR=Subset  ==> _

2=Auto 3=Quit 4=Prt 5=File   1=RST 9=VMD 10=VST 11=DEV 12=DBK   7=Prev 8=Next
MA    E                                                              22/026
```

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TRACK, console display

```
z/VM [24 x 80]                                                    [_][□][x]

TRACK 1 USER : OPERATOR        ****    CON    **** z/VM 6.3 1401   17:24:48 05/11/15
================================================================================
   1 00:02:00 CON FILE 0399 SENT TO   LOGS      RDR AS  6009 RECS 0026 CPY  001 T
     NOHOLD NOKEEP
   2 DVHBCK3871I Disk backup processing started.
   3 DVHBCK3872I Disk backup part 1 completed.
   4 DVHBCK3872I Disk backup part 2 started.
   5 DVHBCK3873I Disk backup processing completed.
   6 00:14:17  * MSG FROM PERFSVM : FCXPMN444E IUCV reply failed with reason cod
     e 9
   7 00:15:00 HCPCRC8064I Recording data retrieval has been started; recording *
     ACCOUNT for userid DISKACNT.
   8 17:22:38 GRAF L0004 LOGON  AS  MAINT630 USERS = 31    FROM 9.65.106.168




Top of console buffer==========================================================
CR=Upd CLEAR=Subset  ==> _

2=Auto 3=Quit 4=Prt 5=File   1=RST 9=VMD 10=VST 11=DEV 12=DBK  7=Back 8=Forward
MA     E                                                             22/026
```

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System Programmer Tools

- Managing the spool and spool space
    - SPOOLPIG – Display the largest spool files and users of spool on a system
        - Basically CP QUERY of all spool files and sort the result. Written in Pipelines.
    - SPOOLCHN – System Programmer extended spool query commands
        - Digs though control blocks and diag output. Written in Assembler and may require privileges.
    - SPOOLAID – Full screen browser of spool file internals (included as an RSCS sample)
        - Shows contents of spool files, read using standard diagnose calls. Combination of Assembler and Rexx
    - SPFPACK – Determine which spool files have data on a particular spool pack
        - Very handy when migrating spool packs. Written in Rexx, also requires RXDASD package
    - Don't forget: SFPURGER – CMS utility to clean up spool files
        - Part of CMS, so supported and documented!

- Managing the directory
    - DRM – An XEDIT based interface to manage the CP Directory
        - An extensive set of tools. Written in Rexx, interfaces with other tools by the same author (Kris Buelens)
    - DR_DRCT – Directory fix-it tools. Move/expand DRCT space, find CMS minidisks and more
        - As it says, does many things. Written in Rexx
    - DIRENT – Extracts entries from the object directory (last updated for VM 5.2)
        - If you lost the source directory, it may help, but not updated recently. Written in Rexx, requires XASTOR MODULE also.
    - QDIR – A utility to replace the DIRMAINT GET command
        - Really more than this, including full screen displays. Rather old, written in Rexx, I don't know if all of it still works.

System Programmer Tools

- DASD and device tools
  - QDASD – Display information about DASD devices in table form
    - Uses CP commands to query information to output. Written in CMS pipelines.
  - EDEVPATH – FCP path management tool for EDEVs
    - Helps remove and restore channel paths from all EDEVs, and get a snapshot. Written in Rexx
  - QRYWWPNS – Find out which FCP and WWPNs can reach a given LUN
    - Processes SCSIDISC output to find the LUN. Written in Rexx
  - MDSK – A few Minidisk related tools and DEFINE MDISK aids
    - Mostly to assist with DEFINE MDISK, there is also a query. Written in Rexx and Pipelines
  - EDCKD – A tool to display and/or alter records on any CKD DASD
  - EDFBA – Displays and/or alters blocks on FBA DASD
    - Interesting tools, and you should be careful! Full screen, XEDIT based, self-creates its own program.
  - PIPEDDR – Dump/Restore a disk to a file, ftp server, or over TCP/IP to a remote system.
    - Can be used for backups, or for binary disk copy to a remote system. Written in Rexx and Pipelines

System Programmer Tools

- Managing your system
    - SESTOOLS – Tools to make working with VM/SES easier
        - Many tools to help you work with VMSES and service. Written in Rexx
    - VIR2REAL – Compute the Virtual to Real storage ratio of running users in z/VM
        - Shows the ratio of memory of all logged on users to the LPAR memory. Written in Rexx and Pipelines
    - CMDTABLE – Generate a table listing all defined CP commands and classes
        - Very helpful if you create new CP command classes. Written in CMS Pipelines

- Managing guests
    - SCIF – Easier "talking" to SCIFfed users (avoid the CP SEND command)

- Searching an unknown disk
    - QLABS – List volume and CMS labels found on a formatted disk
        - Find it at http://www.vmworkshop.org/node/230
    - WOMYD – "What's on my disk" – The function of QLABS plus more, showing CMS files and vtoc entries also
        - Find it at http://www.vmworkshop.org/sites/www.vmworkshop.org/files/womyd.vmarc

System Programmer Tools

- And many others
  - Tools to help you with SFS
    - SFSKTOOL – Various tools related to SFS management
    - SFSULIST – Lets you handle SFS users in a FILELIST like way
    - NONAMES – Avoid NAMEFIND lookup for SFS administrative commands
    - ERALIAS – An exec to remove ERASEd ALIASes from the SFS catalog
  - SFS tools that are already on the MAINT 193 disk:
    - WHO EXEC – sort and display users enrolled in SFS
    - TALLY EXEC – Show allocated and free space
    - SFSTRANS EXEC – Transfer ownership of files and directories from one user to another
    - REGRANT EXEC – Regrant file and directory auths if a user id is changed

  - Cloning and system changes
    - RENSSI – Rename a member of an SSI
    - CLONE620 – Create an IPLable copy (CLONE) of the running ZVM 6.2 system

Tools to help with Linux

- Tools from Sine Nomine Associates

- SWAPGEN – Format a Linux swap disk under CMS
  - Especially useful to format a VDISK
    - Find it at http://www.sinenomine.net/products/vm/swapgen
  - This tool is recommended by many people, redbooks, mailing list entries, and so on
  - Example of how to use it:
    - In a PROFILE EXEC run on a Linux user id before IPLing Linux itself, define a 512 MB swap disk
    - 'EXEC SWAPGEN 300 1048576'
    - Note that the block size is 512 bytes, so you need more than a million of them for 512 MB.

- LXFMT – Format and partition a Linux disk from CMS.
  - Recently updated to correctly handle large disks, included Extended Address Volumes (EAV)
  - Find it at http://download.sinenomine.net/lxfmt/
  - If you would like to give a Linux server a new disk that has already been formatted:
    - Format disk 150 fully (-F) and show progress messages (-M)
    - LXFMT 150 (-F -M

Service Virtual Machines (SVMs)

- Tools to help you build your own servers
  - VMSERVE – A disconnected virtual machine manager, handles timed events, files
    - Configurable for timed events, spool files, and messages. Based on WAKEUP
  - RXSERVER – A kernel to build REXX WAKEUP servers, such as VMUTIL
    - Other packages that support RXSERVER:
    - CHKSERV to manage RXSERVER servers, ADDON to add wakeup commands

- Tools for specific functions
  - VMLOGS – Create an automatic managed repository for Consoles and data files
    - WAKEUP based, also has configuration for SFPURGER
  - CONCLOSE – An exec to close all or selected consoles/prints at midnight
    - Doesn't wait for midnight on its own, but helps close all the consoles
  - YVETTE – Provide multiple sessions to dialed 3270s
    - You DIAL YVETTE, and it can create multiple logon sessions. Old, but still works
  - TOOLSRUN – Disk/Conference manager
    - Also packages TOOLS, TRSOURCE, and TOOLSDOC
    - Allows replication of updates to a local disk to remote systems via RSCS connections
  - SYSLOGD – daemon for CMS
    - Listens to port 514 and logs to a CMS file
  - CHUG – Script driven test tool with HTML output and near-total control of test UserID
    - Also CHUGDEMO. Used by VM system test, so a lot of function and many ways to configure it

Service Virtual Machines – IPGATE

- IPGATE means IP Gateway, providing CP resource sharing over IP links

    - Allows many (but not all) CMS applications that use APPC connections (like SFS and Performance Toolkit) to communicate between VM systems.
        - Otherwise, VTAM or CTC connections are required
    - Originally written by Holger Woller as part of a CMS multitasking Redbook:
        - *Exploiting Recent CMS Function: A User's Guide to CMS Application Multitasking*, November 1998
    - More recent updates by Dave Jones and available via vmworkshop.org
        - http://www.vmworkshop.org/node/368
        - http://www.vmworkshop.org/sites/www.vmworkshop.org/files/ipgate.vmarc

    - You'll need to read the chapter in the Redbook to set it up (Chapter 4)
        - http://www.redbooks.ibm.com/abstracts/sg245164.html?Open
        - You decide which resources are shared, which users have access, etc.

Programming tools

- These tools help you write your own programs
  - Utilities that help you use VM functions
    - TIMEBOMB – Set, snooze, or cancel the CP timebomb (diag 288) feature from CMS
    - SHUTTRAP – CMS program to detect and react to CP SHUTDOWN signals
    - DIAG00E4 – Diagnose E4 CSL routine. Get minidisk information, create an overlay
    - CPLINKPW – Avoid CP READ when linking to a minidisk
    - D26C – Interface to Diagnose 26C. Written in C, source code included.

  - Rexx function packages and Rexx interfaces
    - XMLPARSE – Parse XML document into a tree structure easily processed by Rexx
    - IOS3270 – Write full screen 3270 applications
    - REXXIUCV – IUCV interface for Rexx
    - CUA2001 – Allows development of Common User Access (CUA) panels for 3270 terminals
    - MTREXX – CMS MT ThreadCreate function for Rexx
    - RXDASD – Dasd I/O as a Rexx function
    - RXDISP – Rexx display utility
    - RXFLOW – Rexx function to reflow/justify text or to separate sentences
    - RXTAPE – API to issues commands to a tape device

Programming tools

- Pipelines interfaces
    - PUTFILES – Converse of the GETFILES Pipelines stage
    - EMAIL – Pipelines SMTP Protocol EMAIL stage
    - COMPUTE – REXX mathematics for each record in a pipeline
    - FTP – FTP client stage for Pipelines
        - This tool is found on the Pipelines Runtime Library page.
    - NETDPIPE – pipe stage to handle NETDATA stream; Pipeline SENDFILE/RECEIVE
    - Plus many more on the Pipelines page: http://vm.marist.edu/~pipeline/index.html
- Interface to FTP
    - VMFTP – a macro processor for the VM FTP client
        - Allows a Rexx program to issue FTP client commands and process the responses
        - Useful for automating FTP transfers
        - From the zvm.sru.edu page or vmworkshop.org
            - Note: VMFTPUPD is the updated VMFTP package that you will want.
            - http://zvm.sru.edu/~DOWNLOAD/VMFTPUPD.VMARC
            - ftp://www.vmworkshop.org/sru/VMFTPUPD.VMARC

Tools for CMS

- There are many tools that help you with your CMS environment, provide enhanced function, help you work with files, enhance XEDIT, etc.

- Working with files
  - COMPARE – Compare files with XEDIT, compare minidisks or filelists
  - LISTSG – A series of FILELIST like tools
  - FILELIST – Improvements to FILELIST, RDRLIST, and EXECUTE
  - SETDATE – Set the date of last update on CMS or SFS files
  - BFSLIST – List a BFS filespace in a FILELIST/DIRLIST like way

- Interfacing with TCP/IP functions and the Internet
  - CHARLOTT – Full screen text web browser for CMS
    - Note: SSL support in here is very old, so it is restricted to unencrypted connections
    - Useful for downloading packages to your VM system however!
  - MAILIT – A general purpose email sender program for CMS

Tools for CMS

- Editing files and working with XEDIT

  - LEXX – Live Parsing Editor. This is an extensive editor not based on XEDIT
  - PF10PF11 – XEDIT macros that move left or right based on the cursor position
  - GD-XEDIT – Various XEDIT goodies from Kris Buelens (79 files in the VMARC!)
  - XCOL – XEDIT column editing. Like a prefix area for columns instead of lines
  - SRCHLIST – A SEARCH XEDIT macro that searches files from FILELIST or MACLIST
  - COLSIMPL – Column insert and delete simple XEDIT macros
  - AA – XEDIT prefix macro which aligns comments in C, Rexx, etc. source files

More tools for CMS

- General CMS tools
  - OTTOSCR – Screen scroller for Fullscreen CMS
  - HISTORY – Display the CMS command history file (maintained by OTTOSCR)
  - RETBUF – Full screen CP retrieve buffer selection panel
  - VMMENU – Easy selection menu presentation for CMS
  - RECOVER – Recover a wrongly erased file or attempt to recover a corrupt disk
  - SHOW (or SHOWFILE) – Show CMS files or spool files read only.
    - Much more extensive than BROWSE and doesn't load the entire file like XEDIT
    - Available on the VM Workshop site: http://www.vmworkshop.org/node/250
    - Or from ftp://www.vmworkshop.org/sru/SHOW.VMARC

- Text processing tools
  - B2H – Convert files to HTML. Source can be Bookmaster/Script, GML or text files
  - H2S – Convert HTML to Script for printing with AFP or postscript
  - BOX2BMS – Draw box diagrams for Bookmaster documents
  - RRTGEN – Create text railroad track syntax diagrams from syntax files

Working with Performance data

- These tools work directly with raw monitor data (MONWRITE)
  - MONRIP – Extract time-range data from a monwrite file (recently updated)
  - CPUMF – Report on D5 R13 MRPRCMFC CPU measurement facility counters
  - MONCLEAN – Clean up MONWRITE disk of monitor files
  - MONVIEW – Helps you look at raw monitor data records or input to other programs
  - TSLAMON – Connect to monitor in real time and report on %CPU and %WAIT
  - SMTMET – Extract SMT Metrics from monitor records (new – for z13)

- Also, some tools that work with Perfkit
  - PTKTOOLS – Some simple execs and control files for Perfkit
  - PRFIT – Wrapper to invoke PERFKIT BATCH
  - FCXRENAM – Sample FCXRENAM EXEC to archive performance log files

And….?

- What tools did I miss?

- What are your favorite tools?

- Let me know for a future update!

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The End

Thank you for listening!

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