



Advanced Technical Skills (ATS) North America

Managing z/VM

Use the Free Utilities You Have Already!

Bruce Hayden
IBM Advanced Technical Skills
Endicott, NY



Agenda

- **Introduction to CMS Utilities**
- **ACCOUNT**
- **DIRMAP**
- **DCSSBKUP and DCSSRSAV**
- **QSYSOWN**
- **SFPURGER**
- **AUDITOR**

CMS Utilities Feature

- **Part of CMS since z/VM 4.1 (2001)**
- **Formally they were a separate product**
 - CMS Utilities Feature, a.k.a. “CUF”
- **Installed by default, found on:**
 - MAINT 190 (CMS System disk)
 - MAINT 193 (CMS Samples disk)
- **Documented in the z/VM Library**
 - z/VM CMS Commands and Utilities Reference

Command line tools

- **Many of the utilities now documented as general use CMS commands**
- **Many have outlived their usefulness**
 - Created for EXEC1 and EXEC2 writers
 - Rexx and CMS Pipelines provide better function
 - CMS or CP commands have been enhanced
 - Still there for old execs to use
- **Examples**
 - FILESTCK, USERID, DEVTYPE, STAG, XRDR, etc.

Command line tools, continued

- **However, many are still very useful**
- **FLIST and BROWSE**
 - An alternative to FILELIST and XEDIT
- **CLRSCRN**
 - Clear the screen – also VMFCLEAR
- **WAKEUP**
 - Useful for creating service machines
 - Used to drive DIRMAINT and DATAMOVE
- **GETFMADR**
 - Find a free virtual device number and filemode

CMS Utilities

- **Chapter 3 of the *z/VM: CMS Commands and Utilities Reference***
- **Describes utilities not typically used by general CMS users**
 - Uses a dedicated Service machine
 - Elevated CP privileges are required
 - Uses system files not available to general users
- **I'll describe most of them here**
 - IMAGEMOD and SYSWATCH are not described in this presentation

ACCOUNT

- **Reads the system accounting data file**
 - Produced by CP
 - A mix of binary, text, and numeric data
 - Retrieved from CP by the DISKACNT user id (default)
 - Files written to the 191 disk
- **ACCOUNT command produces a report**
 - Example on next page
- **Options for date ranges, certain user ids, certain time periods**
- **Output written to your virtual printer**

ACCOUNT – Sample output

Using defaults (no options)

VM SYSTEM USAGE OVER THE PERIOD															
02/04/09 TO 02/04/09 ALL SHIFTS USER ALL ACCT ALL															
USERID	SESS	CONNECT	RATIO	REAL-CPU	VIRT-CPU	PG READ	PG WRITE	SIO	PUNCH	PRINT	READ	CYL/BLK	TDSK	TAPE	DISK
DATAMOVE	24	000023:59	*****	0000:00:00	0000:00:00	0	74	13999	0	2004	0	0	0	0	0
DIRMAINT	24	000023:59	*****	0000:00:00	0000:00:00	0	84	8208	32	1933	0	0	0	0	0
DISKACNT	24	000023:59	*****	0000:00:00	0000:00:00	0	6	371	0	14	0	0	0	0	0
DTCVSW1	24	000023:59	*****	0000:00:00	0000:00:00	0	3	24	0	27	0	0	0	0	0
DTCVSW2	24	000023:59	*****	0000:00:00	0000:00:00	0	3	192	0	6	0	0	0	0	0
EREP	24	000023:59	*****	0000:00:00	0000:00:00	0	0	0	0	0	0	0	0	0	0
FTPSERVE	24	000023:59	*****	0000:00:00	0000:00:00	0	3	0	0	5	0	0	0	0	0
GCS	24	000023:59	*****	0000:00:00	0000:00:00	0	0	0	0	0	0	0	0	0	0
MAINT	24	000023:59	*****	0000:00:00	0000:00:00	79	80	4587	593	774	605	0	0	0	0
OPERATOR	24	000023:59	*****	0000:00:00	0000:00:00	0	3	0	0	16	0	0	0	0	0
OPERSYMP	24	000023:59	*****	0000:00:00	0000:00:00	0	0	0	0	0	0	0	0	0	0
PERFSVM	24	000023:59	03599	0000:00:24	0000:00:24	1	1639	3	0	47769	0	0	0	0	0
RACFVM	24	000023:59	*****	0000:00:00	0000:00:00	0	3	759	0	6	0	0	0	0	0
RHEL5C	62	000061:51	00248	0000:14:55	0000:14:28	61109563	61109510	61079800	61109568	61107722	61109568	0	0	0	0
RSCS	24	000023:59	*****	0000:00:00	0000:00:00	0	3	0	0	5	0	0	0	0	0
SLES10D	24	000023:59	02978	0000:00:29	0000:00:29	0	3	6000	0	0	0	0	0	0	0
SLES10E	48	000047:59	06398	0000:00:27	0000:00:27	0	3	19932	0	0	0	0	0	0	0
SLES11A	72	000071:59	*****	0000:00:00	0000:00:00	101058048	101058119	101064303	01058048	01058749	01058048	0	0	0	0
SYSTEM	107	000023:59	00223	0000:06:26	0000:00:00	45	79	0	0	0	0	0	0	0	0
TCPIP	24	000023:59	*****	0000:00:00	0000:00:00	0	3	0	0	6	0	0	0	0	0
TOTALS	1287	001202:41	02215	0000:32:34	0000:24:59	960050656	960049190	959541699	60050637	59996098	60034328	0	0	0	0

Alternatives for processing accounting data files

- **Commercial software**
- **CMS Pipelines**
- **User written Rexx execs**
 - Account record format well documented
 - See “Accounting Record Formats in *CP Planning and Administration*”

DIRMAP

- **What is it?**

- “The DIRMAP utility is a fast, efficient and flexible MDISK/LINK mapping program for the user directory.”

- **Alternative to the DISKMAP EXEC**

- And much better, in my opinion

- **Many more options**

- Sort by device type (DEVSORT option)
- Volume INCLUDE / EXCLUDE options
- Create file of just gaps (GAPFILE option)
- Create file of links (LINKS option)

DIRMAP, sample output

Using defaults (no options)

USER WITHPASS Map of Minidisks 16:28:42 05Feb2009 Page 1

Volser	Devtype	Ownerid	Vaddr	Mode	Start	End	Len	Flags
RSKNT3	3390	\$DASD\$	6E70	MWV	000	3338	3339	
		MAINT	0123	MR	000	3338	3339	
		\$ALLOC\$	6E70	RR	000	000	001	
		\$DIRECT\$	6E70	RR	001	020	020	
		\$SYSCKP\$	6E70	RR	021	029	009	
		\$SYSWRM\$	6E70	RR	030	038	009	
		\$PARM\$	3CF1	RR	039	158	120	
		MAINT	0CF1	RR	039	158	120	Overlap
		\$PARM\$	3CF2	RR	159	278	120	
		MAINT	0CF2	RR	159	278	120	Overlap
					279	279	001	Gap
		\$\$CMS23	0190	MR	280	479	200	
		\$MAINT	C19E	MR	480	979	500	
		\$\$CMS23	019D	MR	980	1219	240	
		\$\$CMS23	0193	MR	1220	1469	250	
		\$MAINT	C402	MR	1470	1719	250	
					1720	1794	075	Gap
		AUDITOR	0191	MR	1795	1799	005	
		AUTOLOG1	0191	MR	1800	1800	001	
		AUTOLOG2	0191	MR	1801	1805	005	

DIRMAP, sample output

Using the GAPPFILE option

```
RSKNT3  3390      0000000279  0000000279  0000000001
RSKNT3  3390      0000001720  0000001794  0000000075
RSKNT3  3390      0000001929  0000001943  0000000015
RSKNT3  3390      0000002543  0000002694  0000000152
RSKNT3  3390      0000003155  0000003164  0000000010
RSKNT3  3390      0000003338  0000003338  0000000001
RSKNT4  3390      0000000279  0000000279  0000000001
RSKNT4  3390      0000001929  0000001943  0000000015
RSKNT4  3390      0000002543  0000002694  0000000152
RSKNT4  3390      0000003155  0000003164  0000000010
RSKNT4  3390      0000003338  0000003338  0000000001
RSKNW1  3390      0000000001  0000003338  0000003338
RSKN01  3390      0000000021  0000000030  0000000010
RSKN01  3390      0000000035  0000000499  0000000465
RSKN01  3390      0000000600  0000000649  0000000050
RSKN01  3390      0000000750  0000003338  0000002589
RSKN02  3390      0000001141  0000001154  0000000014
RSKN02  3390      0000001275  0000003338  0000002064
```

DIRMAP, sample output

LINKS option

USER WITHPASS Map of Links 10:10:58 06Feb2009 Page 4

Ownerid	Vaddr	Linkid	Vaddr	Mode	Volser	Devtype	Start	End	Len
MAINT	0190	5VMRSC40	0190	RR	3HRS54	3390	399	505	107
MAINT	0191	SYSMaint	0192	RR	3HRS54	3390	511	685	175
MAINT	0193	AUDITOR	0193	RR	3HUS01	3390	001	167	167
		AVSVM	0193	RR					
		CBDIODSP	0193	RR					
		OPERATNS	0193	RR					
		RSCS	0193	RR					
		SYSMON	0193	RR					
		TSAFVM	0193	RR					
		VMRMADMN	0193	RR					
		VMRMSVM	0193	RR					
MAINT	0194	LGLOPR	0194	RR	*** Minidisk does not exist ***				
MAINT	0201	EREP	0201	RR	3HRS54	3390	686	707	022
MAINT	0401	:TCPMSU	0401	RR	3HUS01	3390	564	709	146
		:TCPGCSU	0401	RR					
MAINT	049E	5VMTCP40	049E	RR	3HRS54	3390	2743	2992	250
MAINT	0490	BLDNUC	0190	MW	3HRS54	3390	792	898	107
MAINT	0493	5VMHCD40	0493	RR	3HUS01	3390	1012	1178	167
		5VMTCP40	493C	RR					
MAINT	05E5	BLDSEG	05E5	RR	3HRS54	3390	2993	3001	009
		MIGMAINT	05E5	RR					
		4OSASF40	05E5	RR					
		5VMDIR40	05E5	RR					
		5VMHCD40	05E5	RR					
		5VMPTK40	05E5	RR					

DCSSBKUP and DCSSRSAV

- **Back up and restore a segment to/from CMS file**
- **Only segments addressable by CMS (below 2 GB) are supported**
- **The segment name and location are saved in the file**
 - On restore, a new name or location is possible
 - Use the option NEWNAME to use a new segment name
 - Use the option NEWADDR to put in a different place

Usage examples

■ DCSSBKUP

q nss name cmsfiles map

FILE	FILENAME	FILETYPE	MINSIZE	BEGPAG	ENDPAG	TYPE	CL	#USERS	PARMREGS	VMGROUP
0009	CMSFILES	DCSS	N/A	01900	01BFF	SR	A	00004	N/A	N/A

Ready;

dcssbkup cmsfiles

Ready;

listfile cmsfiles dcssbkup a (alloc

FILENAME	FILETYPE	FM	FORMAT	LRECL	RECS	BLOCKS
CMSFILES	DCSSBKUP	A1	F	4096	770	534

Ready;

■ DCSSRSAV

defseg cmsfiles 1900-1bff sr

HCPNSD440I Saved segment CMSFILES was successfully defined in fileid 0082.

Ready;

dcssrsav cmsfiles

HCPNSS440I Saved segment CMSFILES was successfully saved in fileid 0082.

DMSCYJ2160I - From DCSSBKUP file dated 02/06/09 10:36:09 .

Ready;

q nss name cmsfiles map

FILE	FILENAME	FILETYPE	MINSIZE	BEGPAG	ENDPAG	TYPE	CL	#USERS	PARMREGS	VMGROUP
0009	CMSFILES	DCSS	N/A	01900	01BFF	SR	P	00004	N/A	N/A
0082	CMSFILES	DCSS	N/A	01900	01BFF	SR	A	00000	N/A	N/A

Ready;

QSYSOWN

- **Shows allocation of system disk space**
 - Paging (PAGE) and spooling (SPOOL)
- **Options for summary, detail, and specific volumes**
- **Output to screen, file, and program stack**
- **Could be useful for automation**
 - See options SUMMARY, NOHEADER, NOTZERO
- **Predates the enhanced CP Q ALLOC output**

Back in the days of VM/XA..

- **Q ALLOC output was pretty ugly**

```
DASD 6E8E RSKN01 3390 CKD-ECKD (UNITS IN CYLINDERS)
  TDISK TOTAL=00000000000 INUSE=00000000000 AVAIL=00000000000
  PAGE  TOTAL=00000000000 INUSE=00000000000 AVAIL=00000000000
  SPOOL TOTAL=00000000000 INUSE=00000000000 AVAIL=00000000000
  DRCT  TOTAL=00000000020 INUSE=00000000003 AVAIL=00000000017, ACTIVE
DASD 6E8D SPKN01 3390 CKD-ECKD (UNITS IN CYLINDERS)
  TDISK TOTAL=00000000000 INUSE=00000000000 AVAIL=00000000000
  PAGE  TOTAL=00000000000 INUSE=00000000000 AVAIL=00000000000
  SPOOL TOTAL=00000003338 INUSE=00000002212 AVAIL=00000001126
  DRCT  TOTAL=00000000000 INUSE=00000000000 AVAIL=00000000000
```

- **QSYSOWN made this old format more readable**

- Also includes a summary

- **VM/ESA added options to Q ALLOC**

- Q ALLOC MAP
- Q ALLOC PAGE
- Q ALLOC SPOOL

Examples of using QSYSOWN

qsysown (nozero

** Summary Information:

Type	Total-Pages		
	Allocd	In-Use	%-Used
SPOL	600840	163331	27.2
PAGE	1201680	263751	21.9

** Detail Information:

Volser	Addr	Device	Type	Total-Pages		
				Allocd	In-Use	%-Used
SPKN01	6E8D	3390	SPOL	600840	163331	27.2
PGKN01	6C88	3390	PAGE	600840	131243	21.8
PGKN02	6989	3390	PAGE	600840	132508	22.1

Ready;

qsysown summary (noheader

SPOL	600840	163331	27.2
PAGE	1201680	263751	21.9

Ready;

qsysown detail (noheader

RSKN01	6E8E	3390	SPOL	0	0	0.0
			PAGE	0	0	0.0
SPKN01	6E8D	3390	SPOL	600840	163331	27.2
			PAGE	0	0	0.0
PGKN01	6C88	3390	SPOL	0	0	0.0
			PAGE	600840	131243	21.8
PGKN02	6989	3390	SPOL	0	0	0.0
			PAGE	600840	132508	22.1
TDKN01	6E8F	3390	SPOL	0	0	0.0
			PAGE	0	0	0.0

SFPURGER

- **A Utility to manage your system spool space**
 - Spooling all user's consoles creates spool files
 - Large systems accumulate thousands of spool files
 - Spool space is a limited resource
 - How do you keep it cleaned up?
- **Other products and tools exist to find the largest spool files**
 - Run as CMS commands or as service machines
 - Useful for a snapshot of spool usage
 - Manual effort to clean up

Using SFPURGER

- **Normally runs in a service machine**
 - One that can be programmed or started with a timed event
 - Operations Manager for z/VM
 - WAKEUP based machine
 - Or even PROP, triggered by the “midnight message”
- **2 files define options and define control statements**
 - SFPURGER OPTIONS
 - SFPURGER CONTROL
- **Default run option is TEST**
 - Tests your setup, produces output
 - No spool file maintenance is performed

SFPURGER OPTIONS

- **Optional file**
 - Not needed if you are satisfied with the defaults
- **Options you can define**
 - What hours are “prime shift”
 - Message format - MSG vs. MSGNOH (message noheader)
 - Specify your own control file name
 - Specify who receives LOG files

SFPURGER OPTIONS file example

```
*****
*
*           Sample SFPURGER OPTIONS File
*
*
*****

* Send console log to user ID LOGS on this node
CONSOLE  LOGS

* Erase LOG and RUN files that are more than 14 days old
KEEPDAY  14

* Set prime shift start and end times
PRIMSHFT 07:30:00 16:30:00

* Use defaults for the following:
*   MSGTYPE  SORTMOD  SFPCNTL  SOSCNTL  SFPMOD  APPEND
```

SFPURGER CONTROL

- **You may have more than one control file**
 - One for normal processing
 - One for emergency spool file processing (“SOS” argument)
 - A *nodeid* CONTROL file for node specific options
 - Must be enabled in the OPTIONS file
- **The default file names can be modified**
 - Specified in the OPTIONS file
- **The control file is used for actual spool file processing**
 - Spool file selection and action specifications

CONTROL file details

- **Each line must be 132 characters or less**
- **Blank lines are ignored**
- **An asterisk (*) in column 1 starts a comment line**
- **Only 1 spool file action allowed on each line**
 - Any words on the line after the action are ignored
- **Put the most likely spool file matches first**
 - File is processed top to bottom per spool file

Actions on spool files

These keywords can be specified for the ACTION

IGNore	Ignore the file
PURge	Purge the file
USERHold	Change to User hold
SYSHold	Change to System hold
USYSHold	Change to User & System hold
UNOHold	Change to not User hold
SNOHold	Change to not System hold
NOHold	Change to no hold (any kind)
User written	Invoke EXEC or MODULE

User written spool file actions

- **Named SPFXcccc**
 - First 4 characters must be SPFX
 - Last 4 are any valid file name 1 to 4 characters
- **Can be a file type EXEC or MODULE**
 - Standard CMS search order is used
- **Arguments passed to the routine:**
 - **SPFX owner queue spoolid*
- **Non zero return code causes error message in the log**
- **Uses:**
 - Transfer file to another user
 - Notification, such as an unprocessed system dump
 - Send a reminder to a user

Spool file selection keywords

- **USERid**

- Selected by VM User id
- Wildcards allowed

- **ORIGINid**

- Selected by originator user id
- Wildcards allowed

- **QUEue**

- Selected by spool queue the file is in
- RDR, PRT, PUN, NSS, IMG, TRF, UCR

- **Type**

- Selected by spool file type
- RDR, PRT, PUN, CON, DMP, NSS, IMG, TRF, UCR

Spool file selection keywords, continued

- **DAYs**
 - Selected by the number of days old
- **CLass**
 - Selected by the single letter spool file class. Valid classes A-Z, 0-9
- **FName or Ftype**
 - Selected by spool File name or File type
 - Wildcards allowed
- **Hold**
 - Selected by type of hold
 - USER, SYS, USYS (User and system), NONE
- **RECORDs**
 - Selected by the minimum number of records (1 to 12 digit number)

Using Wildcards

- *** (asterisk) represents any 0-7 characters**
- **% (percent) represents any single character**
- **Examples**
 - abc* All things that start with “abc”
 - %abc% All things that are 5 chars with “abc” in the middle
 - %abc* All things with “abc” as characters 2-4

Spool file processing

- **Every spool file is checked against each of the statements in the control file**
 - Starting at the top
- **First match defines the action for that file**
 - Rest of the control file skipped for that spool file
- **If no match found, the file is ignored**
 - Via an implied “catch-all” entry at the end of the control file that ignores any unmatched entries

Example control file, SFPURGER CONTROL

```

* Ignore any system data files (privilege class E)
QUEUE NSS ACTION IGNORE
* Keep spool files owned by maintenance user IDs
USERID *MAINT* ACTION IGNORE
USERID OPERATNS ACTION IGNORE
* Purge dump files after 2 weeks. Ignore the rest
TYPE DMP DAYS 14 ACTION PURGE
TYPE DMP ACTION IGNORE
* Purge files awaiting transmission after 2 months. Ignore the rest
QUEUE RDR USERID RSCS DAYS 60 ACTION PURGE
QUEUE RDR USERID RSCS ACTION IGNORE
* Move console logs to the LOGS machine
TYPE CON DAYS 1 ACTION SFPXLOGS
* Purge any reader files in USERHOLD after 2 weeks.
QUEUE RDR DAYS 14 HOLD USER ACTION PURGE
* Let users read files from DIRMAINT for 5 days
QUEUE RDR FNAME DIRMAINT FTYPE NEWMAIL DAYS 5 ACTION PURGE
QUEUE RDR ORIGINID DIRMAINT CLASS A DAYS 5 ACTION SFPXDIRM
QUEUE RDR ACTION IGNORE
* Purge listing output with 10000 or more records
RECORDS 10000 FTYPE LISTING ACTION PURGE
* Purge any other print files after 2 weeks. Make the rest USER hold
QUEUE PRT DAYS 15 ACTION PURGE
QUEUE PRT ACTION USERHOLD
* Purge any other punch files after 1 week. Ignore the rest
QUEUE PUN DAYS 8 ACTION PURGE
QUEUE PUN ACTION IGNORE

```

Output files

Note: “*yynnn*” is a Julian date

- **SFPURGER LOG***yynnn*
 - The console and processing messages
 - Includes a summary of actions
- **SFPURGER RUN***yynnn*
 - Option RUN, FORCE, or SOS specified
 - Describes the actions on each spool file
- **SFPURGER TST***yynnn*
 - Option TEST or TESTSOS specified
 - Describes the proposed actions on each file

Example output file – the Run file

```

**                               SFPURGER Run File                               **
**          Created by z/VM 5741-A05          7 Mar 2009   00:15:07          **
**                               OPMGRS4 at BRUCEZ10                               **

```

```

Reason code 1 QUEUE NSS ACTION IGNORE.
Reason code 4 USERID *MAINT* ACTION IGNORE.
Reason code 5 USERID OPERATNS ACTION IGNORE.
Reason code 12 TYPE CON DAYS 1 ACTION SFPXLOGS.
Reason code 13 QUEUE RDR DAYS 14 HOLD USER ACTION PURGE.
Reason code 14 QUEUE RDR FNAME DIRMAINT FTYPE NEWMAIL DAYS 5 ACTION PURGE.
Reason code 15 QUEUE RDR ORIGINID DIRMAINT CLASS A DAYS 5 ACTION SFPXDIRM.
Reason code 16 QUEUE RDR ACTION IGNORE.
Reason code 17 QUEUE PRT USERID PERFSVM DAYS 14 ACTION PURGE.
Reason code 18 QUEUE PRT USERID PERFSVM ACTION IGNORE.
Reason code 24 Queue *** Action Ignore.

```

	Action	Owner	Queue	Spool ID	Reason Code No.	File name	File type
SFP100I	IGNORE	*NSS	NSS	0005	Reason 001	INSTSEG	DCSS
SFP100I	IGNORE	*NSS	NSS	0007	Reason 001	CMSPIPES	DCSS
SFP100I	IGNORE	HAYDEN	RDR	0003	Reason 016	TOOLSRUN	NOTIFY
SFP100I	IGNORE	HAYDEN	RDR	0004	Reason 016	HAYDEN	BRUCEZ10
SFP100I	IGNORE	MAINT	PRT	0106	Reason 004		
SFP100I	IGNORE	MAINT	PRT	0141	Reason 004		
SFP100I	IGNORE	OPERATNS	RDR	0002	Reason 005	CPDUMP	CPDUMP
SFP100I	IGNORE	PERFSVM	PRT	0140	Reason 018	FCONMON	LISTING
SFP100I	PURGE	HAYDEN	RDR	0002	Reason 013	TOOLSRUN	ABEND
SFP100I	PURGE	PERFSVM	PRT	0139	Reason 017	FCONMON	LISTING
SFP100I	PURGE	VSMWORK1	RDR	0001	Reason 014	DIRMAINT	NEWMAIL
SFP100I	SFPXDIRM	SLES10D	RDR	0006	Reason 015	SLES10D	BRUCEZ10
SFP100I	SFPXLOGS	BLDSEG	RDR	0007	Reason 012		

Example output file – the Log file

```
**                               SFPURGER Console Log                               **
**          Created by z/VM 5741-A05      7 Mar 2009   00:15:12          **
**                               OPMGRS4 at BRUCEZ10                               **

DMSCYS2469I SFPURGER OPTIONS file processed ...
DMSCYS2452I SFPURGER starting at 00:15:11 on 7 Mar 2009.
DMSCYS2453I Running in RUN mode - RUN09066.
DMSCYS2470I Using SFPURGER MODULE with SFPURGER CONTROL file.
DMSCYS2456I Erasing old output files till 2009052.

DMSCYS2496I Control card scan complete.

DMSCYS2459I Examining output file ...
DMSCYS2462I Spool file scanning begins ...
DMSCYS2482I Executing: CP PURGE HAYDEN RDR 0002
0000001 FILE PURGED
DMSCYS2482I Executing: CP PURGE PERFSVM PRT 0139
0000001 FILE PURGED
DMSCYS2482I Executing: CP PURGE VSMWORK1 RDR 0001
0000001 FILE PURGED
DMSCYS2482I Executing: SFPXDIRM *SFPX SLES10D RDR 0006
0000001 FILE PURGED
DMSCYS2482I Executing: SFPXLOGS *SFPX BLDSEG RDR 0007
0000001 FILE CHANGED
RDR FILE 0007 SENT TO LOGS      RDR AS 4855 RECS 0045 CPY 001 T NOHOLD NOKEEP
0000001 FILE TRANSFERRED
DMSCYS2463I 144 of the 227 spool files HAVE been purged.
DMSCYS2485I 0 of the 227 spool files HAVE been changed.
DMSCYS2486I 8 of the 227 spool files HAVE been handled by user exits.
```

Example control file, SOS CONTROL

```

* Ignore any system data files (privilege class E)
QUEUE NSS ACTION IGNORE
* Keep spool files owned by maintenance user IDs
USERID *MAINT* ACTION IGNORE
USERID OPERATNS ACTION IGNORE
* Purge dump files after 1 day. Ignore the rest
TYPE DMP DAYS 1 ACTION PURGE
TYPE DMP ACTION IGNORE
* Purge files awaiting transmission after 5 days. Ignore the rest
QUEUE RDR USERID RSCS DAYS 5 ACTION PURGE
QUEUE RDR USERID RSCS ACTION IGNORE
* Move console logs to the LOGS machine
TYPE CON DAYS 1 ACTION SFPXLOGS
* Purge any reader files in USERHOLD now.
QUEUE RDR DAYS 14 HOLD USER ACTION PURGE
* Let users read files from DIRMAINT for 5 days
QUEUE RDR FNAME DIRMAINT FTYPE NEWMAIL DAYS 5 ACTION PURGE
QUEUE RDR ORIGINID DIRMAINT CLASS A DAYS 5 ACTION SFPXDIRM
QUEUE RDR ACTION IGNORE
* Purge listing output with 10000 or more records
RECORDS 10000 FTYPE LISTING ACTION PURGE
* Purge any other print files after 3 days. Make the rest USER hold
QUEUE PRT DAYS 3 ACTION PURGE
QUEUE PRT ACTION USERHOLD
* Purge any other punch files after 3 days. Ignore the rest
QUEUE PUN DAYS 3 ACTION PURGE
QUEUE PUN ACTION IGNORE

```

Scheduling SFPURGER execution

- **Operators could run it manually**
 - But, not everyone has an operator!
- **Find or write a simple scheduling SVM**
 - Maybe autolog a user named SFPURGER
 - Some packages exist on the VM downloads page
- **Use operations manager software**
 - Such as Operations Manager for z/VM
 - Run on a schedule and when spool space is filling up
 - Usage examples on the next page

Scheduling using Operations Manager for z/VM

– In my command file:

- DEFSCHD NAME(SFPURGER),WHEN(00:15),ACTION(EXEC),+
PARM(RUNSFPRG RUN)
- DEFMON NAME(SPOOLMON),USAGE(093-100),INTERVAL(5),+
ACTION(EXEC),PARM(RUNSFPRG SOS)
- DEFACN NAME(EXEC),COMMAND(EXEC &P),OUTPUT(LOG),+
ENV(SVM)

– The RUNSFPRG EXEC:

- ```
/* RUNSFPRG EXEC - Run SFPURGER via Operations Manager */
Address Command
arg sfpurgopts
 /* Get disk with SFPURGER code */
 'EXEC VMLINK MAINT 193 (NONAMES PUSH'
 /* Make output directory my A disk and run SFPURGER */
 'EXEC VMLINK .DIR ATS:OPMGRM1.SFPURGER <* A>',
 '(NONAMES WRITE INVOKE EXEC SFPURGER' sfpurgopts
erc=RC
 /* Release any disks we may have accessed */
 'EXEC VMLINK MAINT 193 (NONAMES POP'
Exit erc
```

## Other helpful spool space tools

- **Found on the VM downloads library**
  - <http://www.vm.ibm.com/download/packages/>
- **SPOOLPIG EXEC**
  - Shows the largest files and largest users
- **PIGS EXEC**
  - Similar, but examines CP control blocks directly (caution!)
- **SPOOLCHN MODULE**
  - Shows spool information with enhanced query capabilities

# AUDITOR

- **A tool for monitoring service machines**
  - Which ones are running properly?
  - Which ones are logged off?
  - Which ones are in a disabled wait?
  - Which ones have failed user written tests?
- **Runs unattended from its own service machine**
  - User id AUDITOR is part of the default z/VM install
- **Subcommand interface**
  - Only allowed for authorized users
  - Via CP message or via RSCS message for remote systems

# AUDITOR required PTF

- **AUDITOR requires a PTF to work on z/VM 5.4.0**
  - APAR is VM64564, PTF UM32663
  - Not available on an RSU
- **Without the fix, AUDITOR will not start**
  - Message that is displayed:
    - DMSCYA2301S Insufficient privilege class for command: DCP.
  - z/VM 5.4 removed old “dummy” VM/SP commands
    - Entering DCP now gives return code 1 (invalid command) instead of 6004 (message HCPNOS6004E)
    - APAR changes AUDITOR to use Q COMMANDS instead
- **The fix is included in the z/VM 6.1.0 base install**
  - No service is required

# AUDITOR Subcommands

- **STATE**
  - Return the status of the monitored user ids
    - UP, DOWN, IGNORED, FAILURE, ...
- **IGNORE** *userid*
  - Stop monitoring the user id
- **RESET** *userid*
  - Resume monitoring of the user id

# AUDITOR Subcommands, continued

- **RESTART**
  - Restart the AUDITOR program
- **STOP**
  - Stops the AUDITOR program
- **CP** *command* or **CMS** *command*
  - Issue a CP or CMS command on the AUDITOR machine
  - Can only be issued on the AUDITOR console
- **HELP**
  - Provide help for AUDITOR commands

# Configuration files

## ■ **AUDITOR OPTIONS**

- Describes how AUDITOR runs
- Defines the administrator and authorized users
- Defines exits
  - An autolog exit is required to autolog a failed machine

## ■ **AUDITOR CONTROL**

- Defines user ids to monitor
- Defines how each id is monitored
- Each line defines 1 user id

# Sample AUDITOR OPTIONS file

```

* AUDITOR Options File *
* Record Types: ADMIN userid (at nodeid) - AUDITOR Administrator *
* AUTH userid nodeid - Authorized User *
* EXIT type execname - User Exit *
* DISKMAX n - Maximum A-Disk percent full *

* Assign userid MAINT as the AUDITOR administrator
ADMIN MAINT
*
* Assign some local userids as authorized AUDITOR users
AUTH OPERATOR *
AUTH MAINT *
*
* Use the AUDALOG exec for logging on SVMs
EXIT AUTOLOG AUDALOG
*
* Use a locally-written exec, NEWDAY, for handling daily console and
* log cleanup
* EXIT NEWDAY NEWDAY
*
* Use a locally-written exec, INITIAL, for reaccessing disks on IPL and
* recycle
* EXIT RESTART INITIAL
*
* Tell AUDITOR to stop running when its A-disk is 85% full
DISKMAX 85
*
* Tell AUDITOR to reset all SVM error counters, including those
* for SVMs that have exceeded their max_errors value
RESETTIME 01:00:00

```

# Sample AUDITOR CONTROL file

```

* AUDITOR CONTROL
* CMS UTILITIES @VRA8AWY

* MACHINE TEST AUTO FORCE TEST MAX NOTIFY
* ID INTERVAL LOG &AUTO EXIT ERRS USERID

VMSERV 00:01:00 1 1 NONE 10 OPERATOR
VMSERVS 00:01:00 1 1 NONE 10 OPERATOR
VMSERVU 00:01:00 1 1 NONE 10 OPERATOR
TCPPIP 00:01:00 1 1 NONE 10 OPERATOR
PERFSVM 00:01:00 1 1 PERFMON 10 OPERATOR
DTCVSW1 00:01:00 1 1 DTCVSW1 10 OPERATOR
DTCVSW2 00:01:00 1 1 DTCVSW2 10 OPERATOR
VSMWORK1 00:01:00 1 1 NONE 10 OPERATOR
VSMWORK2 00:01:00 1 1 NONE 10 OPERATOR
VSMWORK3 00:01:00 1 1 NONE 10 OPERATOR
VSMPROXY 00:01:00 1 1 NONE 10 OPERATOR
VSMREQUIU 00:01:00 1 1 NONE 10 OPERATOR
VSMREQIN 00:01:00 1 1 NONE 10 OPERATOR

```

# Sample Exit execs

## ■ AUDALOG EXEC – Autolog a failed server

- The included sample exec on MAINT 193 requires an SVMLIST file
  - For the old AUTOLOG command which also required the server's password
- I just replaced it with a very simple one:

```
/* Simple exit to XAUTOLOG server machines */
Address Command
arg userid .
'CP XAUTOLOG' userid
Exit RC
```

## ■ Sample test exit exec

- Monitor a vswitch controller

```
/* Monitor VSWITCH controller machine via AUDITOR exit */
Parse upper source . . execn .

Parse upper value diagrc(8,'QUERY CONTROLLER NAME' execn) with rc .,
'AVAILABLE:' avail .
If RC<>0 | avail<>'YES' then
Exit 1
Exit 0
```

# Running AUDITOR

## ■ Start it automatically: XAUTOLOG AUDITOR

- Usually via AUTOLOG1 – make sure it is the last SVM it starts
- Startup messages displayed on the console:
  - DMSWSP100W Shared Y-STAT not available
  - DMSVML2060I MAINT 193 linked as 0193 file mode B
  - DMSCYA2300I AUDITOR running on userid AUDITOR at BRUCEZ10.

## ■ Manual start via logged in console

- Additional output is displayed on the console

```
DMSCYA2300I AUDITOR running on userid AUDITOR at BRUCEZ10.
DMSCYA2310I Next SVM to be tested is VMSERVR at 14:12:21 in 60 seconds.
DMSCYA2310I Next SVM to be tested is VMSERVS at 14:12:21 in 0 seconds.
DMSCYA2310I Next SVM to be tested is VMSERVU at 14:12:21 in 0 seconds.
DMSCYA2310I Next SVM to be tested is TCPIP at 14:12:21 in 0 seconds.
```

# Running AUDITOR, continued

## ■ Test the monitoring:

### – LOGON OPERATOR

### – FORCE DTCVSW1

```
14:26:54 USER DSC LOGOFF AS DTCVSW1 USERS = 41 FORCED BY OPERATOR
```

```
14:27:35 * MSG FROM AUDITOR : SVM DTCVSW1 was not logged on BRUCEZ10.
```

```
It has been restarted.
```

```
14:27:35 AUTO LOGON *** DTCVSW1 USERS = 42 BY AUDITOR
```

```
14:28:35 * MSG FROM AUDITOR : DTCVSW1 is now logged on at 14:28:35.
```

### – On the console of AUDITOR:

```
DMSCYA2315W DTCVSW1 is not logged on at 14:27:35.
```

```
Command accepted
```

```
AUTO LOGON *** DTCVSW1 USERS = 42
```

```
DMSCYA2314I DTCVSW1 is now logged on at 14:28:35.
```

# AUDITOR Limitations

- **AUDITOR does not use new z/VM facilities**
  - Such as: \*VMEVENT system service
  - Checks only once a minute
  - Examines CP memory for disabled wait
- **Very limited on the events it can monitor**
- **Complex actions are difficult to perform**
  - Long running or multiple step actions can interrupt monitoring
- **Commercial software can do so much more**
  - May I suggest Operations Manager for z/VM?

# Web References

- **VM home page**
  - <http://www.vm.ibm.com/>
- **CMS Utilities page**
  - <http://www.vm.ibm.com/related/CUF/>
- **VM downloads page**
  - <http://www.vm.ibm.com/download/packages/>
- **VM documentation center**
  - <http://publib.boulder.ibm.com/infocenter/zvm/v6r1/index.jsp>

## The End

- **Thank you for listening!**
- **Contact information**



**Bruce Hayden**  
**[bjhayden@us.ibm.com](mailto:bjhayden@us.ibm.com)**

IBM System z Advanced Technical Skills  
Washington Systems Center  
Endicott, NY



# Trademarks

**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.

Those trademarks followed by ® are registered trademarks of IBM in the United States; all others are trademarks or common law marks of IBM in the United States.

For a complete list of IBM Trademarks, see [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml):

\*, AS/400®, e business (logo)®, DBE, ESCO, eServer, FICON, IBM®, IBM (logo)®, iSeries®, MVS, OS/390®, pSeries®, RS/6000®, S/30, VMESA®, VSE/ESA, WebSphere®, xSeries®, z/OS®, zSeries®, z/VM®, System i, System i5, System p, System p5, System x, System z, System z9®, System z10®, BladeCenter®

**The following are trademarks or registered trademarks of other companies.**

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

\* IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

All other products may be trademarks or registered trademarks of their respective companies.

## Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.