Managing z/VM
Use the Free Utilities You Have Already!

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Agenda

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

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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

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Command line tools

- **Many of the utilities now documented as general use CMS commands**
- **Many have outlived their usefulness**
  - Utilities for EXEC1 and EXEC2 programs
  - 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.

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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**
  - Very useful for creating service machines
  - Used to drive DIRMAINT and DATAMOVE
- **GETFMADR**
  - Find a free virtual device number and filemode

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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

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ACCOUNT

- **Reads the system accounting data file**
  - Produced by CP from the *ACCOUNT system service
  - A mix of binary, text, and numeric data
  - Retrieved from CP by the DISKACNT user id (default)
  - Data written to the files on 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**

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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

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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

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

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DIRMAP, sample output

Using defaults (no options)

```
USER      DIRECT      Map of Minidisks    13:03:08    03Apr2012 Page    1
Volser Devtype  Ownerid  Vaddr Mode     Start        End         Len     Flags    Subconfig Member

-------------------------------------------------------------------------------------------------
M01RES 3390     MAINT    0123 MR         000      10016      10017               MAINT-1   VM01
                $ALLOC$  0A02 R          000        000        001                         *
                $DIRECT$ 0A01 R          001        020        020                         *
                $SYSCKP$ 0A01 R          021        029        009                         *
                $SYSWRM$ 0A01 R          030        038        009                         *
                $PARM$   0CF1 RR         039        158        120                         *
                MAINT    0CF1 RR         039        158        120     Overlap  MAINT-1   VM01
                MAINT    0CFD RR         159        159        001              MAINT-1   VM01
                $PARM$   0CF3 RR         160        279        120                         *
                MAINT    0CF3 RR         160        279        120     Overlap  MAINT-1   VM01
                MAINT    0190 MR         280        493        214              MAINT-1   VM01
                MAINT    0191 MR         494        668        175              MAINT-1   VM01
                MAINT    0193 MR         669       1168        500              MAINT-1   VM01
                MAINT    019D MR        1169       1460        292              MAINT-1   VM01
                                        1461       1960        500     Gap
                MAINT    0401 MR        1961       2252        292              MAINT-1   VM01
                MAINT    0402 MR        2253       2544        292              MAINT-1   VM01
                MAINT    0990 MR        2545       2604        060              MAINT-1   VM01
                AUDITOR  0191 MR        2605       2609        005              MAINT-1   VM01
                AUTOLOG1 0191 MR        2610       2614        005              AUTLG1-1  VM01
                DISKACNT 0191 MR        2615       2615        001              DSKACT-1  VM01
                EREP     0191 MR        2616       2617        002              EREP-1    VM01
                LGLOPR   0191 MR        2618       2618        001              LGLOPR-1  VM01
                MONWRITE 0191 MR        2619       2918        300              MONWRT-1  VM01
```


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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
```


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DIRMAP, sample output

LINKS option

```
USER     DIRECT      Map of Links        13:23:59   03Apr2012 Page    4
Ownerid Vaddr Linkid  Vaddr Mode Volser Devtype    Start        End        Len

--------------------------------------------------------------------------------
MAINT    0191 SYSMAINT 0192  RR  M01RES 3390         494        668        175
--------------------------------------------------------------------------------
MAINT    0193 AUDITR-1 0193  RR  M01RES 3390         669       1168        500
              AUTLG1-1 0193  RR
              AUTLG2-1 0193  RR
              AVSVM-1  0193  RR
              CBDIOD-1 0193  RR
              DTCSMA-1 0193  RR
              MAINT620 0193  RR
              OPRATN-1 0193  RR
              PERSMA-1 0193  RR
              PMAINT   0193  RR
              RSCS-1   0193  RR
              SYSMON-1 0193  RR
              TSAFVM-1 0193  RR
              VMRMAD-1 0193  RR
              VMSERVP  0193  RR
--------------------------------------------------------------------------------
MAINT    0194 BLDSEG   0194  MR  *** Linked to MAINT620 0194 ***
--------------------------------------------------------------------------------
MAINT    02A2 BLDSEG   02A2  MR  *** Linked to MAINT620 02A2 ***
--------------------------------------------------------------------------------
MAINT    02A4 BLDSEG   02A4  MR  *** Linked to MAINT620 02A4 ***
--------------------------------------------------------------------------------
MAINT    02A6 BLDSEG   02A6  MR  *** Linked to MAINT620 02A6 ***
--------------------------------------------------------------------------------
MAINT    02C4 BLDSEG   02C4  MR  *** Linked to MAINT620 02C4 ***
--------------------------------------------------------------------------------
MAINT    02D2 BLDSEG   02D2  MR  *** Linked to MAINT620 02D2 ***
--------------------------------------------------------------------------------
MAINT    0201 EREP-1   0201  RR  *** Linked to MAINT620 0201 ***
--------------------------------------------------------------------------------
MAINT    0401 MAINT620 0401  RR  M01RES 3390        1961       2252        292
              PMAINT   0401  RR
```


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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

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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;
```


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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**

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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

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Examples of using QSYSOWN

qsysown (nozero

```
** Summary Information:

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

** Detail Information:
                                        Total-Pages
Volser  Addr  Device  Type        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
```


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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

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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

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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

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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
```


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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

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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

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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

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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

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Spool file selection keywords

- **USERid**
  - Selected by VM User id that owns the spool file
  - 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

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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 digits)

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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

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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
- **Be careful with date matching on dump files**
  - Creation date may be the last IPL date of your system!
    - Recommendation: Skip processing of any file with an originid of SYSTEM

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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
TYPE DMP     ORIGINID SYSTEM                           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 wtih 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
```


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Output files

Note: "*yynnn*" is a Julian date

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

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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 TYPE DMP ORIGINID SYSTEM 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
```


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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.
```


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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
TYPE DMP      ORIGINID SYSTEM                          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
```


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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

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Scheduling using Operations Manager for z/VM

- **In my command file:**
  - DEFSCHD NAME(SFPURGER),WHEN(00:15),ACTION(EXEC),+ PARM(RUNSFPRG RUN)
  - DEFSMON NAME(SPOOLMON),USAGE(093-100),INTERVAL(5),+ ACTION(EXEC),PARM(RUNSFPRG SOS)
  - DEFACTN 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
```


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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
- Also using Operations Manager for z/VM
  - GOMCMD OPMGRM1 STATUS DETAIL(SPOOLUSR)
    - Shows 10 largest files and 10 users with the most files

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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

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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 and later base install**
  - No service is required

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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

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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

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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

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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
```


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Sample AUDITOR CONTROL file

```
********************************************************************************
* AUDITOR CONTROL
* CMS UTILITIES                                                    @VRA8AWY
********************************************************************************

********************************************************************************
* MACHINE      TEST     AUTO  FORCE  TEST      MAX    NOTIFY
*    ID       INTERVAL   LOG   &AUTO  EXIT      ERRS   USERID
********************************************************************************
 VMSERVR     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
 TCPIP       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
 VSMREQIU    00:01:00    1      1    NONE       10    OPERATOR
 VSMREQIN    00:01:00    1      1    NONE       10    OPERATOR
```


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Sample Exit execs

- **AUDALOG EXEC – Autolog a failed server**
  - The included sample exec on MAINT 193 requires an SVMLIST file
    - The old AUTOLOG command 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
```


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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.
```


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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.
```


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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?

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The End

- **Thank you for listening!**

- **Contact information**

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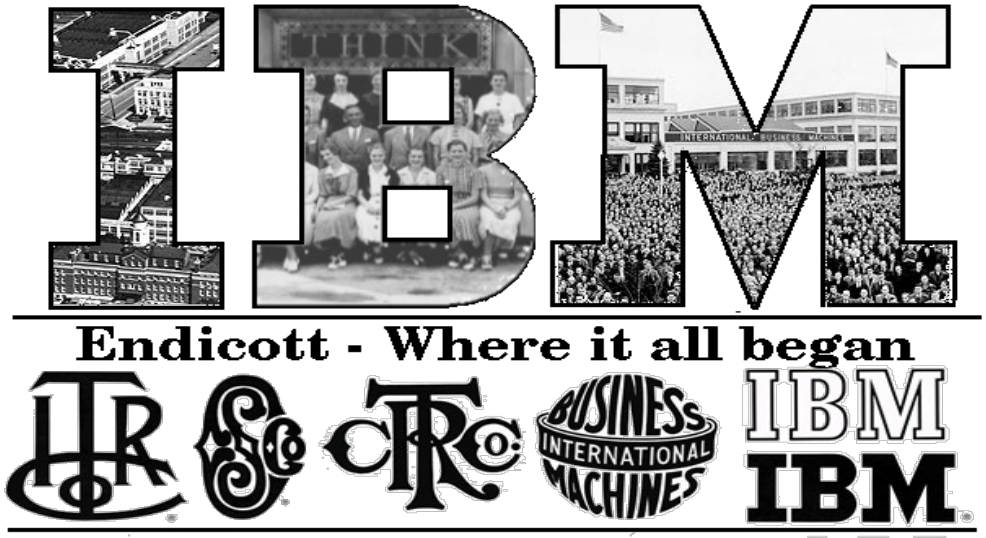

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Web References

- **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/v6r2/index.jsp

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