Managing z/VM

Use the Free Utilities You Have Already!

Bruce Hayden
IBM Advanced Technical Skills
Endicott, NY

Advanced Technical Skills
TECHNICAL SALES
NORTH AMERICA

© 2011 IBM Corporation

Agenda

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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.

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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)

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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 :TCPCMSU 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
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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;
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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)

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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.
```


© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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

© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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
```


© 2011 IBM Corporation

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.
```


© 2011 IBM Corporation

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.
```


© 2011 IBM Corporation

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?

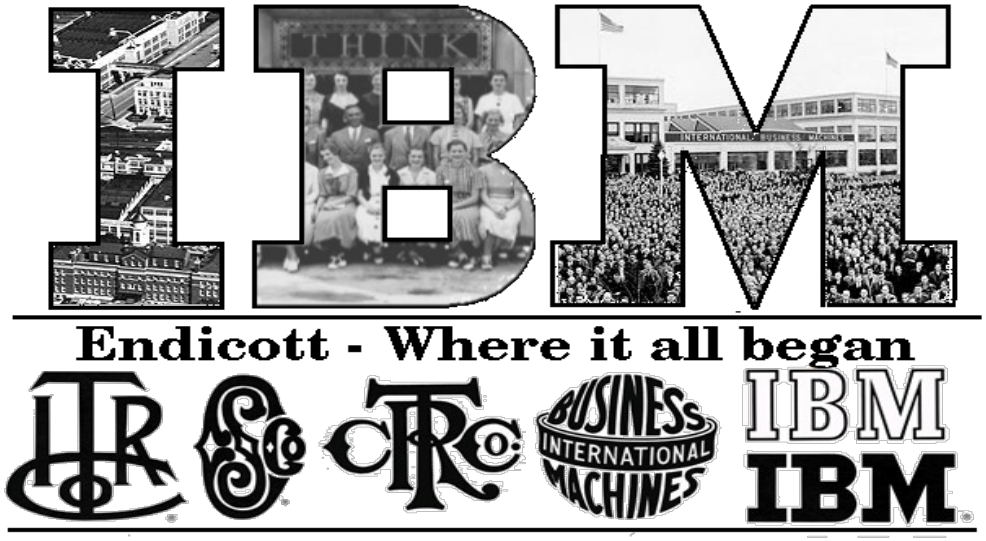
© 2011 IBM Corporation

The End

- **Thank you for listening!**

- **Contact information**

Bruce Hayden
bjhayden@us.ibm.com



© 2011 IBM Corporation

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

© 2011 IBM Corporation

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:

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

© 2011 IBM Corporation