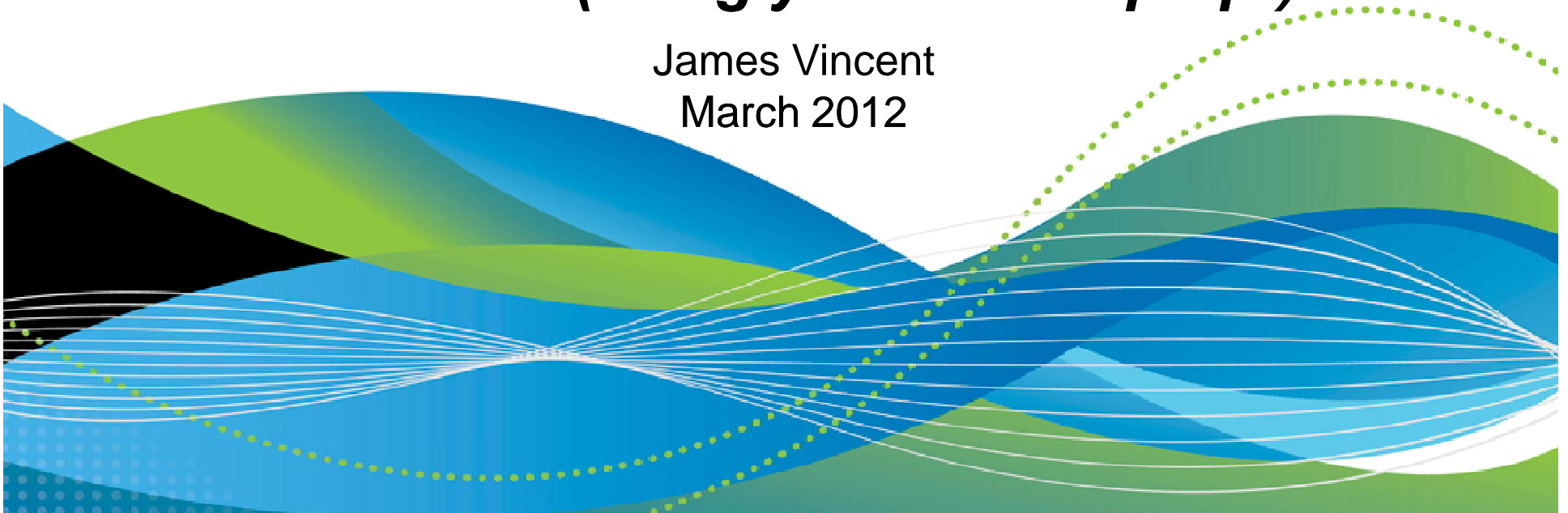




TRACK for VM

What's happening
in *your* Virtual Machine?
BYOL Lab (Bring your own Laptop!)

James Vincent
March 2012



Topics



- What is TRACK?
- A tiny bit of history
- A few details for your reference
 - Documentation, installing, usage
- HANDS ON – 90% of session



What is TRACK?



- TRACK examines one or more virtual machines as they execute. It is a full screen program that is PF key driven and displays information in a number of different panels. It shows selected information from the TRACKed user's VMDBK, real and virtual storage, all of a user's devices, details about one device, open console page along with certain information about a CMS user's virtual machine, such as accessed disks, open files, filedefs, etc.
- There are many other panels and commands available!



A little history of TRACK



- Developed by Serge Goldstein from Princeton University's Computing Center (PUCC)
 - Around the mid 1980's
- Picked up by Ross Fried at City University of New York (CUNY)
- Other contributor(s)...
 - Perry Ruitter (then with BC Systems, now with IBM Canada)
 - Dave Jones from Sine Nomine Associates
 - Dan Martin now with Rocket Software
- Currently maintained by Jim Vincent. (See last page for contact info)



Where to find TRACK



- The *new* TRACK for VM web site!
 - <http://vm.marist.edu/track/>
Graciously hosted by Marist College
- Currently “**TRACK for z/VM 6.2**” is available.
 - This will support all VM versions from XA through z/VM 6.2.0
 - The web site will be the location to find new updates, news, babblings, etc, about TRACK
- Postings to the VMESA-L listserv will also be used



TRACK documentation



- TRACK has very well documented commands and functions
 - README FIRST and TRACK MEMO will get you started
 - Includes the install instructions and other notes of interest
 - 34 CMS HELP files included in the package
 - A TRACK MENU helps navigate them
 - What about a MANUAL?
 - Got one! PDF is on the web site



Pre-built TRACK modules available



- There are **unsupported**, pre-built TRACK modules in the download VMARC package
 - I highly recommend Assembling your own TRACK modules if you can
 - Stuff happens... CP data areas change
 - Assembling your own will ensure TRACK will work correctly for your system
- The pre-built modules are **NOT** supported!



Installing TRACK



- Start with the README FIRST and TRACK MEMO file
- Installation will depend on your current level of VM
- TRACK is mostly assembler and very dependent on CP source code (MACLIBs)
- Installed and maintained using the standard VM update scheme
 - Xedit Update files, AUX files, etc.



Installing TRACK (more...)



- CNTRL files help you manage which version of TRACK is built
 - One for each level of VM supported
 - TRACKV62 z/VM 6.2.0 systems
 - TRACKV54 z/VM 5.4.0 and 6.1.0 systems
 - TRACKV53 z/VM 5.3.0 64-bit systems
 - ...etc...



Installing TRACK (more...)



- Select the right CNTRL file for the release of VM you have
- Verify your current CP control file entry, TEXT MACS to the TRACKV_{xx} CNTRL file you are going to use (HCPVM or HCPVME)
 - Be sure TRAMAC is prefixed on the MACLIB list
 - Not using the right MACLIBs will cause bad things to happen to good people



Installing TRACK (more...)



- You may need to modify some of the AUX files
 - Generally for a current VM, what is there is fine
 - Most updates were for older releases that fixed some things before they were included in the base CP code
 - Be sure to review the TRACK MEMO in the “Modifications” section for updates you may want to include
- Build TRAMAC MACLIB
 - VMFMAC TRAMAC TRACKV_{xx}
 - TRACKV_{xx} is the name of the CNTRL file you will be using



Installing TRACK (more...)



- Assemble all the parts!
 - Nice little EXEC provided to help you do that
 - TRKASM EXEC VMFHLASM TRACKV_{xx}
 - TRACKV_{xx} is the name of the CNTRL file you will be using
- Modify the load list if you want
 - Handy if you want a ‘lite’ version of TRACK but these days, storage is cheap so build the whole thing!
- Build the TRACK module
 - TRKGEN TRACK TRACKV_{xx}
 - TRACKV_{xx} is the name of the CNTRL file you will be using
 - You can change the name of the module if you want
 - TRKGEN *modulename* TRACKV_{xx}



Installing TRACK (almost done!)



- Copy the TRACK MODULE and all HELP files to a tools disk
- Keep all the files somewhere – you will be updating them as your VM level changes or more updates are made available



Using TRACK - requirements



- Required CLASSes
 - You will need CLASS E to use Diag 004 (read CP real storage) and CP LOCATE
 - You will need CLASS D for Diag 290 for view open spool data (optional; z/VM 5.2+ only)
 - You will need CLASS A for the CP LOCK/UNLOCK commands (optional)
 - If you moved these commands to different privileges, adjust accordingly...
- Note – although you need high privileges, TRACK never modifies storage in any way
 - It will only LOCK virtual pages as needed and UNLOCK them immediately if they were not locked in the first place



Using TRACK – a little help



- Nifty front-end routine ZTRACK EXEC included in VMARC
 - Checks for the required privilege classes
 - Executes the correct TRACK module based on the level of z/VM you are running
 - Handy if you have both a 32 and 64 bit system you want to use TRACK on or sharing a tools disk on multiple VM systems with different levels of CP
 - Modify the code to fit your needs



Using TRACK - notes



- 64 bit support in TRACK needed some panel changes/rearrangements
- Some of the panels will look a bit different depending on what mode you are in (32 vs 64 bit)
 - Registers and data locations expand to 16 bytes for 64 bit
 - Some data condensed to allow room (see VST/RST panels for example)
 - Offset field is only 7 bytes, yet offset could be much more than that



Using TRACK - notes



- z/VM 5.2 required a new switch for CP storage
 - Default mode is Host Logical
 - New command:
 - HOSTREAL ON|OFF|?
 - ON makes TRACK look at Host REAL storage
 - OFF looks at Host Logical storage
 - ? Displays the current setting
 - RST will show [LOGICAL] or [REAL] above the addresses
 - Watch for possible storage errors; if you are set to Logical, Diag 4 may not get what you expect
 - FORMAT, DBK, etc...



Really Using TRACK!



- The simplest invocation: TRACK userid
 - Example: TRACK OPERATOR
- Tap ENTER on any panel to update/refresh the contents
 - Or use the AUTO command to set an automatic update time and limit of updates, then use PF2 (AUTO)
 - Use “AUTO .5” for half-second, almost real-time updates
 - Sit back and watch!
 - Popcorn and ‘adult foamy beverage’ optional



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
=====
TRACK 1 USER : OPERATOR      ****   VMD   ****   z64 V4.3++ 14:07:59   02/21/06
=====
VMDBK @ 0D51E000             Class   = ABCDEGMR5             Share= 10000 R
Logon= 02/18/06 21:12 Virtcpu = 000:15.12 Totcpu = 000:20.39   26   Devices
Storage=          32M      Account = *SERVC      Console= DISC
Last CP= SET              Locked= 0             Resident= 311       WSS= 408
PSW= 030E0000 00F35500      CC = 0             Stat   = EC ENABLED WAIT SUPR
CPUaddr= 00      #CPUs= 01      Mach= XA          Amode= 31-bit      370accom= ON
Sio= 102141      Pr= 44062      Pun= 0            Read   = 0          Dist = 3-25-02
Rstat=
Qstat=
Ostat= SYSOP IN-USERCT DISC
Com = EXEC          Exec = LDEV          Mod = DMSURS      Tran= EXECDROP
Ipl = IPL 190 PARM AUTOCR
R0-7= 00000001 FF1A49D8 00000001 00000003 80E5B63C 00E5B628 00E5C8BC 00E5B528
R8-F= 00E5D538 00F363B8 0000A000 00007A50 00F353B8 00003108 00F127EC 00F35532

=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 7=Prev 8=Next
MR 0.2 02/21/06.052 02:08PM vmb.ent.nwie.net ^ a 30,26

```

VMD Panel – 32 bit guest



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 2 USERS: VMTEST          ****   VMD   ****   z64 V4.3++ 14:08:43   02/21/06
=====
VMDBK @ 05B43000 MP01 Class   = ABCDEFG                      Share= 1500   R
Logon= 02/18/06 21:25 Virtcpu = 066:52.60 Totcpu = 104:07.44 Lastio= D30A
Storage= 256M Account = *SERVC Console= DISC
Last CP= LINK Locked= 165 Resident= 22532 WSS= 36401
PSW= 0706400000000000 0000000000000000 Stat = EC ENABLED WAIT SUPR DAT
CPUaddr= 00 #CPUs= 02 Mach= ESAME Amode= 64-bit 370accom= OFF
Sio= 55941007 Pr= 146 Pun= 0 Read = 0 Dist = 03-25-02
Rstat= Slist: 37 - Dispatch List
Qstat=
Ostat= IN-USERCT DISC
Com = ?????????? Exec = ?????????? Mod = ?????????? Tran= ??????????
Ipl = IPL D309 CLEAR LOADPARM 001F
R0-3= CC23000500000000 0000000060000000 0000000000000000 0000000000000000
4-7= 0000000000000000 0000000000127254 0000000000126D7C 0000000000D799F0
8-B= 000000000000E000 00000000002B7830 000000000003000 000000000002000
C-F= 000000000042C9D0 000000000000E000 00000000002B7990 00000000003B3A00

=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 7=Prev 8=Next
MR 0.5 02/21/06.052 02:08PM vmb.ent.nwie.net a 30,26

```

VMD Panel – 64 bit guest



Using TRACK



- Let's look at the CMS settings
 - Type CMS on the command line
 - CMS panel can be customized to show any or all of the sections – in any order!
 - Handy to see DISKS and SFS directories accessed
 - CMS XEDIT will show the current Xedit data
 - CMS STACK shows what data is currently stacked by buffer number



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 2 USERS: OPERATOR      ****   CMS   ****   z64 V4.3++ 14:09:27 02/21/06
=====
LASTVIRT= 0.0      CURRVIRT= 0.16535   Last
LASTCMND= EXEC    PREVCMD= EXEC    LASTCPUT= 0.0      CURRCPUT= 0.285193
LASTLMOD= DMSURS  LASTTMOD= EXECDROP  LASTEXEC= SYSID   PREVEXEC= NAMECHG
CMNDLINE= EXEC PROPST CENTRAL DISC

=====   SVC202   =====
SVC 202 Depth= 4
SVC 202 Chain= SVC 1 PROP      DMSRTPRC EXEC

SVC 202 Plist= SVC 1

SVC 202 Elist= None
SVC 202 Regs = 00000001 FF1A49D8 00E5B528 00E5BD48 00E5B528 00E5B5A5 00F126D0
               00E5B528 00E5D538 00000031 00E5DD11 00E5D070 00E5C070 00E5D5F4
               00E5C8A8 00000000
SVC 202 OPSW = 03EC1000 00E5C8BC

=====   Storage   =====
MAINSTRT= 00000000 MAINHIGH= 00000000 FREELWE= 00000000 FREELWR= 00000000
STRTADDR= 01F57000 FRSTLOC = 01F57000 LASTLOC = 01F5A868 LOCCNT = 00E3C010

=====   Flags   =====
MSGFLAGS=
=====
CR=Upd CLEAR=Subset ==> _

2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Nxt 7=bak 8=for
MR 0.0 02/21/06.052 02:09PM vmb.ent.nwie.net ^ a 30,26

```

CMS Panel (default)



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 3 USERS: VINCENJ      ****   CMS   ****   z64 V4.3++ 14:10:02   02/21/06
=====
Label  Vdev M  Stat  Cyl  Type  Blksz  Files  Blks Used-(%)  Blks Left  Blk Total
-----
JSV191 0191 A  R/W   50 3390 4096   2571  6189-69  2811  9000
-----
DIR    B  R/W   -   SFS (4096)  145  n/a -  n/a  n/a
-----
DIR    C  R/W   -   SFS (4096)  27  n/a -  n/a  n/a
VMT00L 0192 D  R/O   25 3390 4096   984  3247-72  1253  4500
BEXECS 0100 E  R/O    5 3390 4096   291  625-69  275  900
-----
DIR    F  R/W   -   SFS (4096)  616  n/a -  n/a  n/a
-----
DIR    G  R/W   -   SFS (4096)  130  n/a -  n/a  n/a
MNT31A 031A L  R/O   45 3390 4096  1949  6123-76  1977  8100
MNT319 0319 P  R/O  120 3390 4096   658 11415-53 10185 21600
MNT190 0190 S  R/O  100 3390 4096   694 14668-81  3332  18000
MNT19E 019E Y/S R/O  200 3390 4096   663  25127-70 10873  36000
MNT193 0310 Z  R/O  133 3390 4096   878 15798-66  8142  23940
=====
                                End
=====
                                === SFS Directories ===
FM Pool:Ownerid.Directory
B  VMBSYS:VINCENJ.PERSONAL.NOTELOGS
C  VMBSYS:SOFTWARE.UTILITY.TRACKXA.NEWCODING
F  VMBSYS:SOFTWARE.UTILITY.TRACKXA
G  VMBSYS:SOFTWARE.UTILITY.TRACKXA.BUILD
=====
                                End
=====

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

2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Nxt 7=bak 8=for

MR 0.1 02/21/06.052 02:10PM vmb.ent.nwie.net  a 30,26

```

CMS Panel (custom: TRACK user CMS DISKS SFS)



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 3 USERS: VINCENJ      ****   CMS   ****   z64 V4.3++ 14:10:54 02/21/06
=====
          ===== Xedit =====
README  FIRST   F1  F 80  Trunc=80 Size=470 Line=0 Col=1 Alt=0
|...+...1...+...2...+...3...+...4...+...5...+...6...+...7...
* * * Top of File * * *

          TRACK for VM 64-bit support
          Feb 25, 2005

          ***   VERSION 4, RELEASE 2   ***

          -----
          COPYRIGHT (C) CUNY AND PUCC
          ALL RIGHTS RESERVED
          -----

This memo contains the INSTALLATION INSTRUCTIONS for TRACK z64 Version
4.0, Additional information (and a good-read!) can be found in the
TRACK MEMO file. I recommend you read that file too.

Do not attempt to INSTALL or USE TRACK before reading this memo. If you
have never used TRACK before, you should scan the TRACK HELPCMS file to
get a feel for what TRACK does and read the TRACK MEMO. The
installation procedures below use terms that are defined in the TRACK
HELPCMS file. After scanning the TRACK HELPCMS file, you should come
=====
CR=Upd CLEAR=Subset ==> _

2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Nxt 7=bak 8=for
MR 0.0 02/21/06.052 02:10PM vmb.ent.nwie.net ^ a 30,26

```

CMS Panel (custom: TRACK user CMS XEDIT)




```
Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 3 USERS: VINCENJ      ****   CMS   ****   z64 V4.3++ 14:15:41 02/21/06
=====
*** Makebuf 0      ***
A queued line
=====
Stack
=====
End
=====

=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Nxt 7=bak 8=for
MR 0.0 02/21/06.052 02:15PM vmb.ent.nwie.net ^ a 30,26
```

CMS Panel (custom: TRACK user CMS STACK)



Using TRACK



- For examples, I will cycle through the following in order:
 - CONS (open console)
 - DEV (via PF11 – virtual devices)
 - NAM (‘query names’)
 - PFX (prefix page)
 - RST (real storage) and VST (virtual storage)
 - Both with “Disassembly mode” and ASCII display toggle
- Note that these are only a sampling of what TRACK can do!



```
Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 4 USERS: HTTPD      ****  CON  ****  z64 V4.3++ 14:16:25  02/21/06
=====
  www.vmb.ent.nwie.net/callup' 'Mozilla/4.0 (compatible; M.
20 14:16:20 HTTPD      99 VIWLOG0773I 29351 .SIE 6.0; Windows NT 5.1; .NET CLR 1
   .1.4322)'.
21 14:16:20 HTTPD      6F VIWHTP0871I Connection 13914 closed, connection wait t
   imed out.
22 14:16:20 HTTPD      99 VIWHTT0800I 29352 172.29.47.49:10542::192.168.122.8:80
   GET /images/workgrp.gif HTTP/1.1.
23 14:16:20 HTTPD      99 VIWLOG0771I 29352 .172.29.47.49 - - [21/Feb/2006:19:16
   :20] 'GET /images/workgrp.gif HTTP/1.1' 304 95 'http://w.
24 14:16:20 HTTPD      99 VIWLOG0772I 29352 .ww.vmb.ent.nwie.net/callupd?id=ROFM
   +DIRECTORY+C6+06000&caller=callup.html' 'Mozilla/4.0 (com.
25 14:16:20 HTTPD      99 VIWLOG0773I 29352 .patible; MSIE 6.0; Windows NT 5.1;
   .NET CLR 1.1.4322)'.
26 14:16:20 HTTPD      99 VIWHTP0871I Connection 13956 closed, client closed soc
   ket.
27 14:16:23 HTTPD      92 VIWHTP0871I Connection 13949 closed, client closed soc
   ket.
28 14:16:24 HTTPD      96 VIWHTT0800I 29353 10.197.20.133:3445::192.168.122.8:80
   GET /callupd?id=NATIONUS+DIRECTORY+C6+12209&caller=callup
29 .html HTTP/1.1.
30 DMSACP723I C (310) R/O
31 14:16:24 HTTPD      96 VIWLOG0771I 29353 .10.197.20.133 - - [21/Feb/2006:19:1
   6:24] 'GET /callupd?id=NATIONUS+DIRECTORY+C6+12209&caller.
32 14:16:24 HTTPD      96 VIWLOG0772I 29353 .=callup.html HTTP/1.1' 200 4315 'ht
   tp://www.vmb.ent.nwie.net/callup' 'Mozilla/4.0 (compatib.
33 14:16:24 HTTPD      96 VIWLOG0773I 29353 .le; MSIE 6.0; Windows NT 5.0)'.
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 7=Back 8=Forward
MR 0.0 02/21/06.052 02:16PM vmb.ent.nwie.net a 30,26
```

CONS Panel – last active open console block



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 4 USERS: HTTPD          ****  DEV  ****  z64 V4.3++ 14:17:06  02/21/06
-----
TERM 0009 3215      SPOL 000C 2540R      SPOL 000D 2540P      SPOL 000E 3800
DASD 0119 3390      DASD 011A 3390      DASD 0181 3390      DASD 0190 3390
DASD 0191 3390      DASD 0193 3390      DASD 019D 3390      DASD 019E 3390
DASD 01B0 3390      DASD C191 3390      DASD F191 3390

(Chan= 4  Ctls= 7  Devs= 15  )=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=ByC 7=ByA 8=ByT
MR 0.0 02/21/06.052 02:17PM vmb.ent.nwie.net  a 30,26

```

DEV Panel – all virtual devices for the user.



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 4 USERS: HTTPD      ****  NAM  ****  z64 V4.3++ 14:17:30 02/21/06
-----
ADAMSJ9 3C187000  ADSMSERV 1C718000  AFRINA   6F3B2000  AIENDLS  037FA000
ANDERSG 462BC000  ANDERSM  57CC5000  AOLASSUR 6DEFE000  ARATAJ   512E8000
ASDSINK 24732000  ASHBYG   53A96000  AUTREYD  450D2000  BARLOWR  6EF10000
BARLOWRT 73602000  BATHINB  57F60000  BAUMGAJ1 7B99B000  BEERYR   77180000
BERRYJ4 4D705000  BHARGAP  047C1000  BLUMBEB  65C6B000  BOLLISH  4A821000
BOTCHAK 1C8A5000  BOYSELS  64506000  BRASCHJ  4AF3D000  BROWNE2  2B8F1000
BUSHL4 46BD3000  CALDWEB  6C96F000  CALLUP   2F269000  CAMELA3  4AB52000
CFCC1 1E486000  CFCC2    1DEC1000  CFCONSOL 1BB3B000  CHANDRD1 3ADC9000
CHATMAL2 1852A000  CHILAKS  4A016000  CHILAMS  56D4E000  CHILSOR1 7F83B000
CHINTAM 2A988000  CHODISS  412B8000  CLARKJ46 75176000  COOKD1   45477000
COYNEC1 08D81000  CPRSINK  24785000  CRUMR1   64F2B000  DAIJ     6E01C000
DASARIV1 70267000  DATASYNC 1C73E000  DAVISD42 45AEA000  DHULIPR  144B2000
DISKACHT 0DB3F000  DORAISS  34F83000  DUGGANE  6D842000  EDWARDR1 029AF000
EDWINM 18D7C000  EREP     10ED7000  ESAMBAY  6D840000  ESASERVE 1BB36000
ESATCP 1BB33000  ESAWRITE 1D052000  ESPLANJ  09D9A000  ESTEPC   41A10000
EYREY1 716DE000  FARLERP  7076B000  FARRIES  50BD1000  FENDRUA  20E90000
FIROBEC 04953000  FISHERK  4874E000  FOLMARS1 3DACD000  FPTRSNK1 1C6F5000
FTPSEVE 1D1ED000  F000SNK1 1C6E0000  F330SNK1 44DBE000  F370SNK4 247BC000
F690SNK1 64A75000  GALLAGB  013F6000  GARRARC  50AF2000  GATTINA1 4E5D4000
GENSURT1 71899000  GOGINEA1 41E5C000  GRABERS  52B8B000  GRACED1  4D755000
GROSSMC 43C1C000  GRUEVSV  69340000  GUSTINK  31970000  HARDEND3 38B46000
HARIKRT 25274000  HARPERC  74DEE000  HELDR    065CC000  HIDRO    1C572000
HOGUEM4 6A1B2000  HOLTK    69BBF000  HOUSEHK  6685B000  HOWIEJ   2B7FF000
HOWILES 49ACF000  HTTPD    42033000  HTTPDNDC 1DE62000  HTTPDTAS 1DC39000
HTTPDTTL 1DB3A000  HTTPDTW2 48D18000  HTTPDTW3 09865000  HTTPDW5  2C83F000
HTTPD2 1D868000  HTTPD2W4 4F757000  HTTPD4   1D96A000  HTTPD6   1C683000
*** MORE ***=Users= 300
CR=Upd CLEAR=Subset ==> _

2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=ByN 7=ByA 8=Trk
MA 0.0 02/21/06.052 02:17PM vmb.ent.nwie.net a 30,26

```

NAMES Panel – lists all logged on userids.



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 4 USERS: HTTPD      **** PFX      **** z64 V4.3++ 14:17:50 02/21/06
=====
Address  Offset  +-----PFXILPSW-----+
00000000      0 |          00FC3000 80304500 |
+-----PFXICCW1-----+
00000008      8 |          FFFFFFFF FFFFFFFF |
+-----PFXICCW2-----+
00000010     10 |          FFFFFFFF FFFFFFFF |
+-----PFXEXTOP-----+
00000018     18 |          00000000 00000000 |
+-----PFXSVCOP-----+
00000020     20 |          00000000 00000000 |
+-----PFXPRGOP-----+
00000028     28 |          00000000 00000000 |
+-----PFXMCHOP-----+
00000030     30 |          00000000 00000000 |
+-----PFXIPOP-----+
00000038     38 |          00000000 00000000 |
+-----PFXEXTNP-----+
00000040     40 |          00000000 |          00000000 |
+-----PFXSVCNP-----+
00000048     48 |          00000000 |          00000000 |
+-----PFXSVCNP-----+
00000050     50 |          00000000 |          00000000 |
+-----PFXSVCNP-----+
00000058     58 |          000C0000 801478A8 |
+-----PFXSVCNP-----+
00000060     60 |          000C0000 803043D8 |
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Nxt 7=bak 8=for
MR 0.0 02/21/06.052 02:17PM vmb.ent.nwie.net  a 30,26

```

PFX Panel – prefix page storage mapping



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 4 USERS: HTTPD      ****   RST   ****   z64 V4.3++ 14:30:20 02/21/06
=====
Base address = 000000000A75B80      3G Real Storage
[ LOGICAL ]      Offset      Hex      Ebcidic
000000000A75B80  000000  00E5E5E5  00000000  00000000  C8C3D7C7  * VVV      HCPG*
000000000A75B90  +000010  C6E24040  017AC5D4  C5F2F0F5  0000F0F5  *FS      :EME205 05*
000000000A75BA0  +000020  61F1F961  F0F57AF1  F84BF5F6  D9C50000  */19/05:18.56RE *
000000000A75BB0  +000030  00000000  0032A361  003F8C78  802E6EC8  *      t/      >H*
000000000A75BC0  +000040  00000020  80155438  80156DE0  00A7AC90  *      -      x      *
000000000A75BD0  +000050  002EDA80  00ADEBA0  002EEA90  00000010  *      *      *
000000000A75BE0  +000060  80A7DAA0  80A7DB18  00B2EF70  00A7DCE8  * x      x      x Y*
000000000A75BF0  +000070  803A3030  803A3178  003A1FF8  000000C0  *      *      8      *
000000000A75C00  +000080  00A7ABC0  00ADEC10  8016A668  800CC7A8  * x      w      Gy*
000000000A75C10  +000090  000CB1B8  8016A6B8  00156040  40000000  *      w      -      *
000000000A75C20  +0000A0  00E5C3C4  00317E60  C0C0FFFF  FFACBFEF  * VCD      =-      *
000000000A75C30  +0000B0  81304780  C0D49140  80004780  C17258B0  * a      Mj      A      *
000000000A75C40  +0000C0  80045820  C03858F0  C03C0CEF  58B0D044  *      0      *
000000000A75C50  +0000D0  47F0C172  91308001  4770C172  91038067  * 0A j      A j      *
000000000A75C60  +0000E0  4780C172  91108013  4710C172  41000000  * A j      A      *
000000000A75C70  +0000F0  5810C040  58FB0858  50F00AF8  58F0C044  *      &0 8 0      *
000000000A75C80  +000100  0CEF58F0  C0480CEF  1861D203  6018B858  *      0      /K -      *
000000000A75C90  +000110  40006006  96806010  96FE6011  96026004  * - o - o - o -      *
000000000A75CA0  +000120  50B0600C  5840801C  50406000  5060801C  * & -      & - &-      *
000000000A75CB0  +000130  5820C04C  58B08004  58F0098C  0CEF9610  *      <      0      o      *
000000000A75CC0  +000140  80679640  806894FC  806794F7  80194530  * o      m      m7      *
000000000A75CD0  +000150  C96EBF1F  80084780  C17294BF  101D9180  * I>      A m      j      *
000000000A75CE0  +000160  101D4710  C16E9540  10124770  C1729608  *      A>n      A o      *
000000000A75CF0  +000170  806858FD  00140DEF  00E5C3C4  00317E60  *      VCD      =-*
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=dis 7=bak 8=for
MR 0.0 02/21/06.052 02:30PM vmb.ent.nwie.net ^ a 30,26

```

RST Panel – real storage display



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 4 USERS: HTTPD      ****  RST  ****  z64 V4.3++ 14:31:41  02/21/06
=====
Base address = 000000000A75C2E      3G Real Storage
[ LOGICAL ]      Hex data      Ins      Operands (in hex)      Ebcidic      E
000000000A75C2E  BFEF8130      ICM      R14,B'1111',304(R8)    * a *
000000000A75C32  4780C0D4      BZ       212(,R12)             * M *
000000000A75C36  91408000      TM      0(R8),X'40'           * j *
000000000A75C3A  4780C172      BZ       370(,R12)             * A *
000000000A75C3E  58B08004      L       R11,4(,R8)            * *
000000000A75C42  5820C038      L       R2,56(,R12)           * *
000000000A75C46  58F0C03C      L       R15,60(,R12)          * 0 *
000000000A75C4A  0CEF          BASSM    R14,R15                * *
000000000A75C4C  58B0D044      L       R11,68(,R13)          * *
000000000A75C50  47F0C172      B       370(,R12)             * 0A *
000000000A75C54  91308001      TM      1(R8),X'30'           * j *
000000000A75C58  4770C172      BNZ     370(,R12)             * A *
000000000A75C5C  91038067      TM     103(R8),X'03'         * j *
000000000A75C60  4780C172      BZ       370(,R12)             * A *
000000000A75C64  91108013      TM     19(R8),X'10'          * j *
000000000A75C68  4710C172      BO      370(,R12)             * A *
000000000A75C6C  4100000D      LA      R0,13                  * *
000000000A75C70  5810C040      L       R1,64(,R12)           * *
000000000A75C74  58FB0858      L     R15,2136(R11)          * *
000000000A75C78  50F00AF8      ST     R15,2808              * &0 8 *
000000000A75C7C  58F0C044      L     R15,68(,R12)          * 0 *
000000000A75C80  0CEF          BASSM    R14,R15                * *
000000000A75C82  58F0C048      L     R15,72(,R12)          * 0 *
000000000A75C86  0CEF          BASSM    R14,R15                * *
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=dis 7=bak 8=for
MR 0.0 02/21/06.052 02:31PM vmb.ent.nwie.net  a 30,26

```

RST Panel – real storage disassembled




```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 5 USERS: VINCENJT      ****   VST   ****   z64 V4.3++ 14:32:20   02/21/06
=====
Base= 000000000020000   Real address= 00000000B6955000
Vaddr      Offset      Hex
000000000020000  000000  47F0F00C E3D9D2E4 E2D94040 90ECD00C * 00 TRKUSR *
000000000020010  +000010  45F0F05C FFFFFFFF 0000A6D0 80026D1C * 00*      w  *
000000000020020  +000020  4002070C 00026D08 00000400 00065000 *          -  &  *
000000000020030  +000030  00066000 00000000 00E70EC0 00000000 *          -  X  *
000000000020040  +000040  00023D40 00022D40 90020B90 00022014 *          -  *
000000000020050  +000050  00021014 00EE1548 00E70EC0 50F0D008 *          X  &0 *
000000000020060  +000060  50D0F004 18DF41AD 080041AA 0800419A * & 0      *
000000000020070  +000070  08004199 08009101 93C047E0 D07841F0 *      r  j  l      0 *
000000000020080  +000080  000211FF 50F0AFC8 47F0AF1C D5071008 *      &0 H 0  N  *
000000000020090  +000090  93CC4780 D0F4D507 10089074 4770D178 * l      4N      J  *
0000000000200A0  +0000A0  47F0D0F4 4510D0BC E3E8D7D3 C9D54040 * 0 4      TYPLIN *
0000000000200B0  +0000B0  010200B8 C2000017 E4C9C440 8885A740 *      B      UID hex *
0000000000200C0  +0000C0  8481A381 4089A240 8995A581 93898400 *data is invalid *
0000000000200D0  +0000D0  0ACA0002 00D647F0 D0F40700 4510D0EC *      0 0 4      *
0000000000200E0  +0000E0  E3E8D7D3 C9D54040 010200F0 C200000F *TYPLIN      0B *
0000000000200F0  +0000F0  E4C9C440 89A240A3 96964093 96958700 *UID is too long *
000000000020100  +000100  0ACA0002 01060700 4510D12E E3E8D7D3 *          J TYPL *
000000000020110  +000110  C9D54040 0102011C C2000025 E2A895A3 *IN      B      Synt *
000000000020120  +000120  81A74089 A27A40E3 D9C1C3D2 40A48984 *ax is: TRACK uid *
000000000020130  +000130  404CA283 99858595 6E404C4D 9697A3A2 * <screen> <(opts *
000000000020140  +000140  6E000ACA 00020148 4510D166 E3E8D7D3 *          J TYPL *
000000000020150  +000150  C9D54040 0102015C C200001E C6969940 *IN      *B      For *
000000000020160  +000160  8485A381 8993A26B 4089A2A2 A4857A40 *details, issue: *
000000000020170  +000170  C8C5D3D7 40E3D9C1 C3D20ACA 00020180 *HELP TRACK      *
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=dis 7=bak 8=for
MR 0.0 02/21/06.052 02:32PM vmb.ent.nwie.net ^ a 30,26

```

VST Panel – virtual storage display



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 5 USERS: VINCENJT      ****      VST      ****      z64 V4.3++ 14:46:56      02/21/06
-----
Base= 00000000002005C      Real address= 00000000B69505C
Vaddr      Hex data      Ins      Operands (in hex)      Ebcidic
00000000002005C      50F0D008      ST      R15,8(,R13)      * &0      *
000000000020060      50D0F004      ST      R13,4(,R15)      * & 0      *
000000000020064      18DF      LR      R13,R15      *      *
000000000020066      41AD0800      LA      R10,2048(R13)      *      *
00000000002006A      41AA0800      LA      R10,2048(R10)      *      *
00000000002006E      419A0800      LA      R9,2048(R10)      *      *
000000000020072      41990800      LA      R9,2048(R9)      *      *
000000000020076      910193C0      TM      960(R9),X'01'      * j l      *
00000000002007A      47E0D078      BNO      120(,R13)      *      *
00000000002007E      41F00002      LA      R15,2      * 0      *
000000000020082      11FF      LNR      R15,R15      *      *
000000000020084      50F0AF08      ST      R15,4040(,R10)      * &0 H      *
000000000020088      47F0AF1C      B      3868(,R10)      * 0      *
00000000002008C      D507100893CC      CLC      8(8,R1),972(R9)      * N l      *
000000000020092      4780D0F4      BE      244(,R13)      *      4      *
000000000020096      D50710089074      CLC      8(8,R1),116(R9)      * N      *
00000000002009C      4770D178      BNE      376(,R13)      *      J      *
0000000000200A0      47F0D0F4      B      244(,R13)      * 0 4      *
0000000000200A4      4510D0BC      BAL      R1,188(,R13)      *      *
0000000000200A8      E3E8      DC      X'E3E8'      * TY      *
0000000000200AA      D7D3C9D54040      XC      2517(212,R12),64(R4)      * PLIN      *
0000000000200B0      0102      UPT      *      *
0000000000200B2      00B8C2000017      DC      X'00B8C2000017'      *      B      *
0000000000200B8      E4C9C440      DC      X'E4C9C440'      * UID      *
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=dis 7=bak 8=for
MR 0.0 02/21/06.052 02:47PM vmb.ent.nwie.net a 30,26

```

VST Panel – virtual storage disassembled



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 6 USERS: LINRHT04      **** VST ****      z64 V4.3++ 14:49:09 02/21/06
-----
Base= 0000000011FFFCB0 Real address= 00000000109BDCB0
-----
Vaddr      Offset      Hex
0000000011FFFCB0 000000 20303B0A 7D0A0A2F 2A3D3D3D 3D3D3D3D * 0; /*-----*
0000000011FFFCB0 +000010 3D3D3D3D 3D3D3D3D 3D3D3D3D 3D3D3D3D *-----*
0000000011FFFCB0 +000020 3D3D3D3D 3D3D3D3D 3D3D3D3D 3D3D3D3D *-----*
0000000011FFFCB0 +000030 3D3D3D3D 3D3D3D3D 3D3D3D3D 3D3D3D3D *-----*
0000000011FFFCB0 +000040 3D3D3D3D 3D2A2F0A 0A737461 74696320 *-----*/ static *
0000000011FFFCB0 +000050 696E7420 68735F73 65745F69 6F5F6D61 *int hs_set_io_ma*
0000000011FFFCB0 +000060 7028756E 7369676E 65642069 6E742073 *p(unsigned int s*
0000000011FFFCB0 +000070 6F636B2C 20737472 75637420 70636361 *ock, struct pcca*
0000000011FFFCB0 +000080 72645F69 6F5F6D61 70202A69 6F290A7B *rd_io_map *io) *
0000000011FFFCB0 +000090 0A202020 20096873 5F736F63 6B65745F * hs_socket *
0000000011FFFCB0 +0000A0 74202A73 70203D20 2668735F 736F636B *t *sp = &hs_sock*
0000000011FFFCB0 +0000B0 6574735B 736F636B 5D3B0A09 696E7420 *ets sock; int *
0000000011FFFCB0 +0000C0 6D617020 3D20696F 2D3E6D61 703B0A09 *map = io->map; *
0000000011FFFCB0 +0000D0 73747275 63742070 63636172 645F696F *struct pccard_io*
0000000011FFFCB0 +0000E0 5F6D6170 202A7369 6F3B0A09 70677072 *_map *sio; pgpr*
0000000011FFFCB0 +0000F0 6F745F74 2070726F 743B0A0A 20202020 *ot_t prot; *
0000000011FFFCB0 +000100 09445052 494E544B 28226873 5F736574 * DPRINTF("hs_set*
0000000011FFFCB0 +000110 5F696F5F 6D617028 736F636B 3D25642C *_io_map(sock=%d,*
0000000011FFFCB0 +000120 206D6170 3D25642C 20666C61 67733D30 * map=%d, flags=0*
0000000011FFFCB0 +000130 7825782C 20737065 65643D25 646E732C *xXx, speed=%dns,*
0000000011FFFCB0 +000140 20737461 72743D30 78253034 782C2073 * start=0x%04x, s*
0000000011FFFCB0 +000150 746F703D 30782530 3478295C 6E222C0A *top=0x%04x) n", *
0000000011FFFCB0 +000160 09202020 20736F63 6B2C206D 61702C20 * sock, map, *
0000000011FFFCB0 +000170 696F2D3E 666C6167 732C2069 6F2D3E73 *io->flags, io->s*
ASCII display is ON =====
CR=Upd CLEAR=Subset ==> _

2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=dis 7=bak 8=for
MR 0.0 02/21/06.052 02:49PM vmb.ent.nwie.net ^ a 30,26

```

VST Panel – virtual storage in ASCII



Using TRACK

- Internal TRACK command
 - Track userid <command> <(<NEW> <DUMP fn>>
 - For example,
 - Track operator
 - Track pvm (new
 - Track pvm format nucon v0
 - Track pvm format nucon v0 (new
 - Track pvm con (new
 - Track pvm ret off
 - T pvm track rscs
 - Track pvm t rscs c
 - Track pvm aup
 - Track * (new
 - Track = VMD



Using TRACK



- The internal TRACK command adds the userid to TRACK along with the one(s) you are already TRACKing
 - The “new” option starts a new instance of the tracked user so you can toggle between two different panels for the same userid
 - Enter **TRACK** on the command line by itself to toggle through them all one-by-one
- **FORMAT** – another of many cool commands and very powerful/helpful
 - Allows you to display storage (real, virtual) as mapped by a DSECT



Using TRACK - FORMAT



- Read the FORMAT HELP for all the details!
- FORMAT with CP DSECTs
 - You need to have access to MAINT's 193 disk for the MACLIBs
 - Usually best to specify the MACLIB explicitly
 - `FORMAT VMDBK 0E8F0000 HCPOM1`
- A couple of specific examples...
 - `TRACK OPERATOR FORMAT NUCON V0`
 - `TRACK * FORMAT VMDBK 00002000 HCPOM1`
- FORMAT allows a “point and shoot” option (V4.2)
 - Type the FORMAT command you need using a * as the address
 - Place your cursor on the address you want to use that is displayed on the panel
 - Tap Enter

Ex: `FORMAT VMDBK * HCPOM1 MACLIB`



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 7 USERS: PVM      ****   FRM   ****   z64 V4.3++ 14:50:18   02/21/06
-----
[ LOGICAL ]   Off  NUCON   DSECT
                &T      SETC 'V'
                &T      SETC 'A'
000000005682C000 000 IPLPSW   D 03EC000000045AE0 Initial program loading PSW
000000005682C008 008 IPLCCW1  D 00EED898B0045ABC Initial program loading CCW1
000000005682C010 010 IPLCCW2  D 00007AE800000600 Initial program loading CCW2
                ORG IPLPSW
000000005682C000 000 RSTNPSW  D 03EC000000045AE0 Restart new PSW
000000005682C008 008 RSTOPSW  D 00EED898B0045ABC Restart old PSW
000000005682C010 010 ACMSCVT  F 00007AE8      Address of simulated OS CVT
000000005682C014 014 ASYSREF  F 00000600      Address of nucleus address tab
000000005682C018 018 EXTOPSW  D FF06100400023668 External old PSW
000000005682C020 020 SVCOPSW  D FFE400B850045B0A Supervisor call old PSW
000000005682C028 028 PGMOPSW  D 0000000000000000 Program old PSW
000000005682C030 030 MCKOPSW  D 030C30000003842E Machine-check old PSW
000000005682C038 038 IOOPSW   D FFE4000900045D4E Input/output old PSW
000000005682C040 040 CSW      D 00001AF00C000000 Channel Status Word
000000005682C048 048 CAW      F E0E01000      Channel Address Word
000000005682C04C 04C NUCRSV1  F 00000000      Reserved for hardware use
000000005682C050 050 TIMER    F FFFF7600      Interval timer
000000005682C054 054 NUCRSV2  F 00000000      Reserved for hardware use
000000005682C058 058 EXTNPSW  D 0004000000022918 External new PSW
000000005682C060 060 SVCNPSW  D 00040000000227F0 Supervisor call new PSW
000000005682C068 068 PGMNPSW  D 0004000000024A00 Program new PSW
000000005682C070 070 MCKNPSW  D 0008000080F3ED70 Machine-check new PSW
000000005682C078 078 IONPSW   D 0004000000023280 Input/output new PSW
Block display is incomplete ... un-parsable statement found in DMSGPI  MACLIB
CR=Upd CLEAR=Subset ==> _

2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Fnd 7=bak 8=for
MR 0.1 02/21/06.052 02:50PM vmb.ent.nwie.net a 30,26

```

FORMAT Panel – TRACK PVM FORMAT NUCON V0



```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 1 USER : VINCENJT      ****   FRM   ****   z64 V4.3++ 14:51:39   02/21/06
=====
0000000000002200 200 VMDUSER C SYSTEM USER LOGON IDENTIFICATION
0000000000002208 208 VMDACTID C SYSTEM ACCOUNTING USER IDENTIFICATION
0000000000002210 210 VMDALGID C USERID CAUSING THIS USER'S LOG
0000000000002218 218 VMDACTNO C SYSTEM USER ACCOUNTING NUMBER
0000000000002220 220 VMDDIST C USER DISTRIBUTION CODE
0000000000002228 228 VMDGRPN C RACF ACI GROUP NAME
0000000000002230 230 VMDTODON F 00000000 SESSION LOGON TOD, BITS 0-31
0000000000002234 234 VMDATODN F BE65D08F VALUE OF VMDTODON AT LAST 'ACN
0000000000002238 238 VMDATTIM F 7FFFFBCD VALUE OF VMDTTIME AT LAST 'ACN
0000000000002240 240 VMDAVTIM F 00000000 VALUE OF VMDVTIME AT LAST 'ACN
0000000000002248 248 VMDADIST C Accounting DISTRIBUTION field
0000000000002250 250 VMDSIGCT F 00000000 Count of SIGA instructions
0000000000002254 254 VMDCCSIO F 00000000 Count of completed virtual I/O
0000000000002258 258 VMDACPGW F 000172D6 TOTAL NUMBER OF PAGE/SPOOL WRI
000000000000225C 25C VMDACPGR F 000101E7 TOTAL NUMBER OF PAGE/SPOOL REA
0000000000002260 260 :L1 D 0000000000000000 RESERVED FOR IBM USE
0000000000002268 268 :L2 D 0000000000000000 RESERVED FOR IBM USE
0000000000002270 270 VMDLACTM F 00000000 Last time active, for IND ACT
0000000000002278 278 VMDDIAST X 00 DIAGNOSE STATUS BYTE
* BITS DEFINED IN VMDDIAST
VMDDIA4C EQU X'80' DIAG4C WAS LAST ACCOUNT RECORD
VMDUDST EQU X'40' Indicate user spool distributi
0000000000002279 279 VMDACFL X 00 Accounting Flag byte.
* BITS DEFINED IN VMDACFL
VMDNETA EQU X'80' This indicates Network
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Fnd 7=bak 8=for
MR 0.0 02/21/06.052 02:51PM vmb.ent.nwie.net a 30,26

```

FORMAT Panel – TRACK * FORMAT VMDBK 00002000.HCPOM1




```

Q - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 2 USERS: VINCENJ      ****   FRM   ****   z64 V4.3++ 14:56:12 02/21/06
=====
000000004E4A22EC 2EC VMDTRQDL F 00000000 DELAYED SLEEP OR LOGOFF TRQDK
000000004E4A22F0 2F0 VMDCTPWD X 00      DIAGNOSE LINK PASSWORD COUNT
000000004E4A22F1 2F1 VMDMLVL  X F4      MESSAGE RECEIVING LEVEL
* BITS DEFINED IN VMDMLVL
      VMDMSGON EQU X'80'      ON CONTROLS WHETHER MESSAGES SENT
      VMDWNGON EQU X'40'      ON CONTROLS WHETHER MESSAGES SENT
      VMDMCOE EQU X'20'      ON CONTROLS ERROR MESSAGE DISPLAY
      VMDMTEX EQU X'10'      ON CONTROLS ERROR MESSAGE DISPLAY
      VMDSPMSG EQU X'08'      CONTROLS WHETHER SPECIAL
      VMDMIMSG EQU X'04'      ON CONTROLS THE DISPLAY OF SELECT
      VMDMCHFG EQU X'01'      Message level set from system
                                'SET' command IUCV flags
000000004E4A22F2 2F2 VMDMIUCV X 00
* BITS DEFINED IN VMDMIUCV
      VMDMSGIU EQU X'80'      Indicates that MSG is set to
      VMDWNGIU EQU X'40'      Indicates that WNG is set to
      VMDEMSGI EQU X'20'      Indicates that EMSG is set to
      VMDSMSGI EQU X'08'      Indicates that SMSG is set to
      VMDIMSGI EQU X'04'      Indicates that IMSG is set to
      VMDPCCOI EQU X'02'      Indicates that CPCONIO is set
      VMDVMCOI EQU X'01'      Indicates that VMCONIO is set
000000004E4A22F3 2F3 VMDMSSFL X 00      Message System Service flags
* BITS DEFINED IN VMDMSSFL
      VMDMSSVP EQU X'80'      Indicates there is a valid pat
      VMDMSSCS EQU X'40'      Indicates that an IUCV "connec
      VMDMSAVP EQU X'20'      Indicates there is a valid pat
      VMDMSACS EQU X'10'      Indicates that connection
=====
CR=Upd CLEAR=Subset ==> _
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=Fnd 7=bak 8=for
MR 0.0 02/21/06.052 02:56PM vmb.ent.nwie.net ^ a 30,26

```

FORMAT Panel – FORMAT mapping of flags



Using TRACK



- There is so much more to TRACK
 - Most commands have a ton of options!
- Okay okay... just ONE more then you have to go to bed!
 - DEV – you can check on IO pendings or active
 - track tcpip dev class * io pending
 - track tcpip dev class * io active



```

J - VMB
File Edit Font Transfer Macro Options Window Help
TRACK 1 USER : TCPIP          ****  DEV  ****          z64 V4.0 12:38:55  07/17/03
=====
SPEC 06B5 CTCA          LDEV L003 3278          LDEV L004 3278          LDEV L005 3278
LDEV L006 3278          LDEV L007 3278          LDEV L008 3278          LDEV L009 3278
LDEV L00A 3278          LDEV L00B 3278          LDEV L00C 3278          LDEV L00D 3278
LDEV L00E 3278          LDEV L00F 3278          LDEV L010 3278          LDEV L011 3278
LDEV L012 3278          LDEV L013 3278          LDEV L014 3278          LDEV L015 3278
LDEV L016 3278          LDEV L017 3278          LDEV L018 3278          LDEV L019 3278
LDEV L01A 3278          LDEV L01B 3278          LDEV L01C 3278          LDEV L01D 3278
LDEV L01E 3278          LDEV L01F 3278          LDEV L020 3278          LDEV L021 3278
LDEV L022 3278          LDEV L023 3278          LDEV L024 3278          LDEV L025 3278
LDEV L026 3278          LDEV L027 3278          LDEV L028 3278          LDEV L029 3278
LDEV L02A 3278          LDEV L02B 3278          LDEV L02C 3278          LDEV L02D 3278
LDEV L02E 3278          LDEV L02F 3278          LDEV L030 3278          LDEV L031 3278
LDEV L032 3278          LDEV L033 3278          LDEV L034 3278          LDEV L035 3278
LDEV L036 3278          LDEV L037 3278          LDEV L038 3278          LDEV L039 3278
LDEV L03A 3278          LDEV L03B 3278          LDEV L03C 3278          LDEV L03D 3278
LDEV L03E 3278          LDEV L03F 3278          LDEV L040 3278          LDEV L041 3278
LDEV L042 3278          LDEV L043 3278          LDEV L044 3278          LDEV L045 3278
LDEV L046 3278          LDEV L047 3278          LDEV L048 3278          LDEV L049 3278
LDEV L04A 3278          LDEV L04B 3278          LDEV L04C 3278          LDEV L04D 3278
LDEV L04E 3278          LDEV L04F 3278          LDEV L050 3278          LDEV L051 3278
LDEV L052 3278          LDEV L053 3278          LDEV L054 3278          LDEV L055 3278
LDEV L056 3278          LDEV L057 3278          LDEV L058 3278          LDEV L059 3278
LDEV L05A 3278          LDEV L05B 3278          LDEV L05D 3278          LDEV L05E 3278
LDEV L05F 3278          LDEV L060 3278          LDEV L061 3278          LDEV L062 3278
LDEV L063 3278          LDEV L064 3278          LDEV L065 3278          LDEV L066 3278
LDEV L067 3278          LDEV L068 3278          LDEV L069 3278          LDEV L06A 3278
* MORE *=Pending interrupts on hilghted devices=(Chan= 1  Ctls= 1  Devs= 1
CR=Upd CLEAR=Subset ==> -
2=Auto 3=Quit 4=Prt 5=File 1=RST 9=VMD 10=VST 11=DEV 12=DBK 6=ByC 7=ByA 8=ByT
MB Thursday 07/17/2003.198 12:39PM vmb.ent.nwie.net a 30,26

```

DEV Panel – showing pending interrupt device(s)



Advanced TRACK features - Macros



- TRACK Macros
 - You can design your own macros to enhance how TRACK functions
 - Build your own “panels”
- Some of the included TRACK macros:
 - QIUCV displays IUCV paths for user, CP, or a specific CP system service – but this is now an internal panel!
 - STORMAP maps all virtual storage and shows allocated subpools
 - NUCXMAP lists all nucleus loaded extensions



Advanced TRACK features - Macros



- TRACK Macro sub-commands:
 - **READSTRG** <H>address <flag> <length> <(VAR <var>>>
Read virtual or real storage
 - **TRACKEE** <USER|VMDBK> <(VAR <var>>>
Get the userid or VMDBK of the TRACKEd user
 - **REGS** <Gn|Rn Cn An Fn> <(VAR <var>>>
Return the TRACKEd user's registers
 - **CMSG** string
Write contents of string to TRACK command line
 - **NOTE** string
Write contents of string to the console
(use REXX Say instead)



Advanced TRACK features - Macros



- A TRACK MACRO: MYVMD

```
/* Test the TRACK macro facility */
```

```
Numeric Digits 16
```

```
'TRACKEE VMDBK'
```

```
Say 'TRACKEE returned:' result
```

```
Parse Value Diag(8,'Q CPLEVEL') with system .
```

```
If system = 'z/VM'
```

```
Then vmduseroff = '200'
```

```
Else vmduseroff = '080'
```

```
me = d2x(x2d(result) + x2d(vmduseroff))
```

```
Say '... VMDUSER is located at:' me
```

```
'READSTRG H'me '8 (VAR VMDUSER'
```

```
Say 'VMDUSER is:' vmduser
```

```
vmduser = x2c(vmduser)
```

```
Say 'VMDUSER field for this VMDBK is "'vmduser'"'
```

```
Exit
```



Advanced TRACK features - Macros



- Two ways to execute
 - TRACK * MACRO MYVMD
 - Inits TRACK environment, calls MYVMD and exits TRACK – no panel is displayed
 - TRACK * MYVMD
 - Inits TRACK, calls MYVMD and remains in TRACK panel
- Either MACRO MYVMD or just MYVMD can also be entered on the TRACK command line. The same actions will occur as above except for MACRO: If more than one userid is being TRACKed, only the current userid is dropped and you remain in the TRACK panel for the other userids.



Advanced TRACK features - Macros



- Running MYVMD TRACK on my userid produces:

```
TRACKEE returned: 6CA00000
```

```
... VMDUSER is located at: 6CA00200
```

```
VMDUSER is: E5C9D5C3C5D5D140
```

```
VMDUSER field for this VMDBK is "VINCENJ "
```



Advanced TRACK features – FILE opt



- New FILE option in TRACK z64 V4.2
TRACK userid track-parms (FILE
 - Saves the contents of the screen into a file on the A disk called “userid TRACKFIL” and then exits TRACK
 - No TRACK panel(s) are displayed
 - Data written is 60 lines by 80 LRECL and contains the 3270 data stream used to display the panel; **no** non-display character translations are done
 - Data is appended to the file if the file exists already
 - File is automatically CLOSED when TRACK exits



Advanced TRACK features – FILE opt



- New FILE option – why?
 - What could you possibly do with this file?
 - Just imagine the possibilities...



http://zservices.nwie.net:84/~vincenj/track.wrkexec?cmd=operator - Web

File Edit View Favorites Tools Help Google

Address http://zservices.nwie.net:84/~vincenj/track.wrkexec?cmd=operator

TrackWeb! Cmd: 3270?

Complete RC 0

```

TRACK 1 USER : OPERATOR          **** VMD **** z64 V4.2 10:26:27 02/02/05
-----
VMDBK @ 7814A000      Class = ABCDEGMRS      Share= 10000 R
Logon= 12/09/04 22:14 Virtcpu = 012:27.15 Totcpu = 015:42.57 25 Devices
Storage= 32M      Account = *SERVC      Console= DISC
Last CP= SET      Locked= 1      Resident= 263      WSS= 263
PSW= 030E0000 00F35500      CC = 0      Stat = EC ENABLED WAIT SUPR
CPUaddr= 00      #CPUs= 01      Mach= XA      Amode= 31-bit      370accom= ON
Sio= 3694521      Pr= 870336      Pun= 11737      Read = 0      Dist = 3-25-02
Rstat=
Qstat=
Ostat= SYSOP IN-USERCT DISC
Com = XEDIT      Exec = LDEV      Mod = DMSWRS      Tran= EXECDROP
Ipl = IPL 190 PARM AUTOCR
R0-7= 00000001 FF1989D8 00000001 00000003 80E6763C 00E67628 00E688BC 00E67528
R8-F= 00E69538 00F363B8 0000A000 00007A50 00F353B8 00003108 00F127EC 00F35532
-----

```

Done Local intranet

Make TRACK available via the Web!



Keeping VM on TRACK!



- TRACK is a very powerful tool for the VM Systems Programmer
- Extremely handy for debugging virtual machine or system problems
- Makes displaying virtual and real storage/devices a snap
- Once you get used to it, navigating through and checking key areas in a userid or storage area for problems will become second nature
- Use it!



Contact Info

Light travels faster than sound, that's why people seem bright until you hear them...



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