



# DCL in the 21<sup>st</sup> Century

## .... and few other utilities tidbits

3K01 Neuigkeiten in VMS DCL  
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John Covert / Guy Peleg  
OpenVMS Engineering  
covert@hp.com

*OpenVMS DCL*

*The original*

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## Agenda



- **V7.3-2 New features**
  - EDCL
  - B2B
  - New lexical functions
  - Performance enhancements
  - General enhancements
- **Post V8.2 suggested new features**

# Device errors.....



- Device errors may appear from time to time
  - Bad tapes
  - Bad disk

\$ show err

Device	Error Count
PEA0:	7
\$200\$DGA1: (NODEA)	1
\$200\$DGA100: (NODEA)	2
\$200\$MKB500: (NODEA)	31
\$200\$MKB603: (NODEA)	1

How can I make it go away?



Have no fear  
V7.3-2 is here

# Resetting Device counters



- Long time requested feature introduced in V7.3-2
- Allow resetting the error count or operation count of any device on the system
- Requires CMKRNL and DIAGNOSE privs
- A message is sent to the error log indicating device counter was reset
- \$SHOW DEVICE/FULL will display the time of last reset
- (V8.2: adds a \$SNDOPR)

# Resetting Device counters



```
$ sh er
Device          Error Count
PEA0:           3

$ set dev pea0/reset=error
$ show err
%SHOW-S-NOERRORS, no device errors found
$ show dev pea0/full
```

Device PEA0:, device type NI\_SCA, is online, shareable, error logging is enabled.

Error count	0	Operations completed	0
Owner process	****	Owner UIC	[SYSTEM]
Owner process ID	00000000	Dev Prot	S:RWPL,O:RWPL,G,W
Reference count	0	Default buffer size	0
Current preferred CPU Id	0	Fastpath	1

Device error count was last reset on: 7-SEP-2003 17:02:17.80

# Resetting Device counters



\*\*\*\* V3.4 \*\*\*\*\* ENTRY 657

Logging OS	1. OpenVMS
System Architecture	2. Alpha
OS version	X9YD-SSB
Event sequence number	97.
Timestamp of occurrence	07-SEP-2003 17:02:17
Time since reboot	0 Day(s) 4:21:21
Host name	BLUSKY
System Model	Digital Personal WorkStation
Entry Type	39. System Service Message
SWI Minor class	10. SNDERR Message
Message text	Error count of device PEA0 was reset to zero. Previous value was 3

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- **Command**

**\$ COPY SYS\$LOGIN:LOGIN.COM DOCD\$:[000000] /LOG**

- **Token**

**\$ COPY SYS\$LOGIN:LOGIN.COM DOCD\$:[000000] /LOG**

## Current CLI limitations

- **Interactive commands are limited to 255 bytes**
  - Can be extended to 1024 characters using the hyphen sign
- **Tokens are limited to 255 characters**
- **Symbols are limited to 1024 bytes**
  - Trying to display symbols exceeding 255 characters results in %DCL-I-SYMTRUNC
- **Logical names are limited to 255 characters**



# What is EDCL (Extended DCL)



- Project code name for removing old limitations
- In the age of eBusiness, eCommerce....eDCL
- EDCL project has two major phases
  - ✓Phase I – Remove the command line limitation
  - ✓Phase II – Remove the Token size limitation

# EDCL phase I – Command line length



- Command length increased to 4096 bytes
  - 8192 bytes using the hyphen sign
- Symbol size increased to 8192 bytes
  - Large symbols can now be displayed
- The Recall buffer was modified to support long commands
  - CLUE PROC/RECALL modified as well
- WRITE & READ buffers increased to support 8192 length records
- Supervisor stack increased to 128KB (was 32KB)
- Full support in command procedures/interactive commands/programs



# EDCL phase II – Extended Token support



- **Large tokens allow file specifications to exceed 255 characters**
  - Need to use NAML blocks instead of NAM blocks
- **DCL was modified to support long file names**
  - DCL OPEN
  - Command procedures
  - Redirection of SYS\$OUTPUT
  - RECALL/OUTPUT, RECALL/INPUT
  - F\$FILE
- **Every product/Utility/Runtime library accepting file name as input is potentially impacted by this change**
  - OpenVMS Guide for Supporting Extended DCL

# EDCL phase II...continued



- **Extended token support will be disabled by default**
  - Minimize effect on applications
- **System token size controlled by SYSGEN parameter DCL\_CTLFLAGS**
  - Bit 0 controls the spawn algorithm
  - Bit 1 controls large tokens, bit clear extended token support disabled
- **Process token size controlled by JPI\$\_TOKEN**
  - \$ SET PROCESS/TOKEN=EXTEND (or =TRADITIONAL)
- **Currently planned for V8.2**
- **EDCL can not be back ported – process and DCL structures changed**
  - Affected images: DCL, SHELL8K, IMAGE\_MANAGEMENT, PROCESS\_MANAGEMENT, SYS\$BASE\_IMAGE, RMS, LIBRTL and more



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## Blocks to Bytes (B2B)

- **Allow users to display size information in bytes instead of blocks**
- **`$SET PROC/UNITS=BYTES`**
- **JPI\$\_UNITS item code added to `$GETJPI` and `F$GETJPI`**
- **PPROP\$C\_UNITS item code added to `$SET_PROCESS_PROPERTIES`**
- **`LIB$CVT_BLOCKS_BYTES`**

# Blocks to Bytes (B2B)



- The following utilities currently support B2B

**COPY**

**DELETE**

**DIRECTORY \***

**PURGE**

**SHOW DEVICE \*** (V8.2: SHOW DEV/FULL \*)

**SHOW DEVICE/SERVED**

**SHOW MEMORY \***

**SHOW QUOTA**

(V8.2: SHOW WORKING\_SET)

\* Current process defaults may be overridden using the /UNITS qualifier

# Blocks to Bytes (B2B)



```
BLUSKY> copy scrshr.exe scrshr_test.exe /log
%COPY-S-COPIED, $1$DKB400:[KITS]SCRSHR.EXE;2 copied to
$1$DKB400:[KITS]SCRSHR_TEST.EXE;1 (65KB)
```

```
BLUSKY> del/log *.bck;
%DELETE-I-FILDEL, $1$DKB400:[KITS]IA64X9YC.BCK;1 deleted (714.10MB)
```

```
BLUSKY> dir *.bck/siz
```

```
Directory WORK1:[KITS.OPAL]
```

```
X9XD_OPAL_SSB_ALPHA.BCK;1 356.28MB
X9Y4_OPAL_SSB_ALPHA.BCK;1 356.89MB
X9YD_OPAL_SSB_ALPHA.BCK;1 357.66MB
```

```
Total of 3 files, 1.04GB
```

```
Note: TROPAR.TMP;1 0.50KB
$ disp f$file_att("tropar.tmp","ffb")
260
```

# Blocks to Bytes (B2B)



```
BLUSKY> sh mem/fil
```

```
System Memory Resources on 14-SEP-2003 13:26:33.67
```

Swap File Usage (bytes):	Index	Free	Size
DISK\$BLUSKY_X9YR:[SYS0.SYSEXEXE]SWAPFILE.SYS (MB)	1	12.81	13.31
Paging File Usage (bytes):	Index	Free	Size
DISK\$BLUSKY_X9YR:[000000]PAGEFILE1.SYS;1 (MB)	253	484.52	488.25
DISK\$BLUSKY_X9YR:[SYS0.SYSEXEXE]PAGEFILE.SYS (MB)	254	256.46	260.00
Total size of all paging files:	(MB)		748.25
Total committed paging file usage:	(MB)		71.12

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- Currently no way to get shadowing information from DCL/Program
- SETSHOSHADOW
- New shadowing item codes added to SYS\$GETDVI

```
QLEN, SHDW_COPIER_NODE, SHDW_DEVICE_COUNT, SHDW_GENERATION,  
SHDW_MASTER_MBR, SHDW_MBR_COPY_DONE, SHDW_MBR_COUNT,  
SHDW_MBR_MERGE_DONE, SHDW_MBR_MINIMERGE_CAPABLE,  
SHDW_MBR_READ_COST, SHDW_MINIMERGE_ENABLE,  
SHDW_READ_SOURCE, SHDW_START_DELAY, SHDW_TIMEOUT
```

```
$ sh dev dsa2
```

```
Device      Device      Error  Volume      Free Trans Mnt  
Name        Status      Count  Label       Space Count Cnt  
DSA2:       Mounted          0 BLUSKY_X9PO 187.76MB 364 1  
$4$DKA300: (BLUSKY) ShadowSetMember 0 (member of DSA2:)
```

```
$ write sys$output f$getdvi("dsa2", "shdw_mbr_count")  
1
```

- Generates 64bit identification guaranteed to be unique across the cluster
- Useful in conjunction with new /DISPOSITION qualifier in CLOSE for manipulating temporary files  
-SUBMIT, DELETE, PRINT, KEEP

```
$ write sys$output f$unique()  
594B53554C42B39F11D723C5021A85F6  
$ open/write temp 'f$unique()  
$ dir/sin  
Directory $1$DKC600:[PROJECTX]  
594B53554C42B49F11D723C511F94C1E.DAT;1  
Total of 1 file.
```

Sugg: \$ open/write 'f\$unique'.tmp

```
$ write temp "hello"  
$ close/disp=delete temp  
$ dir/sin  
%DIRECT-W-NOFILES, no files found
```

# F\$DELTA\_TIME



VAX & Alpha & IA64

- Returns the time difference between a given start and end time
- Highly useful when calculating “how much time did ....take”

```
$ start_time=f$time()
$ sh sym start_time
START_TIME = " 8-SEP-2003 08:25:56.48"
$ end_time=f$time()
$ sh sym end_time
END_TIME = " 8-SEP-2003 08:26:25.94"
$ write sys$output f$delta(start_time,end_time)
0 00:00:29.46
```



# F\$GETSYI – new item codes



- New item codes available only in DCL
- Pool related item codes

NPAGED\_TOTAL, NPAGED\_FREE, NPAGED\_INUSE, NPAGED\_LARGEST,  
PAGED\_TOTAL, PAGED\_FREE, PAGED\_INUSE, PAGED\_LARGEST.

Nonpaged Dynamic Memory (MB) 2.74 0.73 2.0 0.43

```
$ write sys$output f$getsyi("npaged_total")
2875392
```

- Memory usage item codes  
TOTAL\_PAGES, FREE\_PAGES, USED\_PAGES and MODIFIED\_PAGES
- Will be available in VMS731\_DCL-V0400

- **New item codes – to uniquely identify the file being processed (batch/print)**
  - Previous versions had FILE\_FID only
  - FILE\_DID
  - FILE\_DEVICE
- **“THIS\_JOB” – supported in batch job**
  - \$ disp f\$getqui("display\_job","entry\_number","this\_job")
  - 645

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# Performance improvements



- The COPY and SEARCH utilities have been modified to use 127 blocks buffers
- Improvement most noticeable for copying/searching large files
- Approx. 1:2.5 reduction in I/O for search
- Up to 50% reduction in CPU and I/O required to copy a file
- Multiple parallel I/O is currently being investigated

# Copying 800MB file from disk to disk



## V7.3-2 image

### Accounting information

Buffered I/O count:	61	Peak working set size:	2480
Direct I/O count:	26115	Peak virtual size:	168672
Page faults:	217	Mounted volumes:	0
Charged CPU time:	0 00:00:07.69	Elapsed time:	0 00:02:12.82

## V7.3-1 image

### Accounting information:

Buffered I/O count:	61	Peak working set size:	2352
Direct I/O count:	51758	Peak virtual size:	168672
Page faults:	206	Mounted volumes:	0
Charged CPU time:	0 00:00:11.22	Elapsed time:	0 00:03:23.67

- The linker was modified to use 127 blocks buffers  
-RDB link time reduced by half
- The size of code image sections increased from 32MB to 1GB
  - Larger images can now be installed resident
  - Less work for the image activator
  - Very useful in Oracle environments
  - Shipping with V7.3-2
    - VMS731\_LINKER-V0200 , VMS73\_LINKER-V0400

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# SHOW CLUSTER



Software version now 12 characters (was 8):

View of Cluster from system ID 19662 node: BILBO  
21-APR-2004 11:08:54

```
+-----+-----+
|          SYSTEMS          | MEMBERS |
+-----+-----+-----+
|  NODE  | SOFTWARE | STATUS |
+-----+-----+-----+
| BILBO  | VMS XA8L-T3Z | MEMBER |
| TREVOC | VMS X7.3-7FH | MEMBER |
| J      | VMS XA7V-BL1 | MEMBER |
| SAND41 | VMS XA7V-BL1 | MEMBER |
+-----+-----+-----+
```

# DIRECTORY/SELECT=SIZE=UNUSED



- INDEXED.DAT 15/500239
- /SELECT=SIZE=UNUSED=value  
-The default value is cluster size

\$ dir/sele=siz=unused=30/siz=all

Directory \$1\$DKB400:[KITS]

ACC.B32;1	178/216
CREATE.B32;1	70/108
PROCESS_MANAGEMENT_MON.EXE;1	3297/3330

# DIRECTORY/SELECT=VERSION



- DIR/SELECT=VERSION=MIN=xxx
- DIR/SELECT=VERSION=MAX=yyy

```
$ dir/sele=ver=(min=75,max=80)
Directory SYS$SYSROOT:[SYSMGR]
```

```
DECW$SERVER_0_ERROR.LOG;77      DECW$SERVER_0_ERROR.LOG;76
OPERATOR.LOG;75
```

Total of 3 files.

- Useful tool for detecting files approaching the maximum version limit

```
$ dir sys$sysdevice:[000000...]*.*
/sele=ver=min=32000
```

V8.2 feature

# Other....



```
$ sh system/inter/image
OpenVMS X9ZK-SSB on node CSG99 28-OCT-2003 03:45:32.18 Uptime 6 14:00:23
  Pid   Process Name   State Pri  I/O   CPU       Page flts Pages
21C00420 DTSESSION    LEF   5 130371 0 00:00:26.19 1369 757
      $3$DKA0:[SYS0.SYSCOMMON.CDE$DEFAULTS.SYSTEM.][BIN]DTSESSION.EXE;1
21C00441 SYSTEM$CDE001 LEF   6 1621 0 00:00:01.94 1085 919
      $3$DKA0:[SYS0.SYSCOMMON.CDE$DEFAULTS.SYSTEM.][BIN]DTFILE.EXE;1
21C00446 SYSTEM$CDE006 LEF   4 735 0 00:00:01.23 823 713
      $3$DKA0:[SYS0.SYSCOMMON.CDE$DEFAULTS.SYSTEM.][BIN]DTCALC.EXE;1
21C00449 _FTA1:      LEF   5 105 0 00:00:00.06 327 109
21C0044A _FTA2:      LEF   6 849 0 00:00:00.31 1487 105
21C0044B _FTA3:      LEF   6 311 0 00:00:00.17 764 110
21C0044C _FTA4:      LEF   4 4002 0 00:00:00.28 517 113
21C01130 SYSTEM      CUR   4 185 0 00:00:00.10 415 178
      $3$DKA0:[SYS0.SYSCOMMON.][SYSEXE]SHOW.EXE
$
```

V8.2 feature

- **OPEN** a file from DCL “no sharing”  
(Set FAB\$M\_NIL in FAB\$B\_SHR)  
**\$ OPEN/NOSHARE**

V8.2 feature

- **CREATE** and **DELETE /MAILBOX**

**\$ CREATE/MAILBOX FOO**

**/PERMANENT**

**/MESSAGE\_SIZE**

**/BUFFER\_SIZE**

**/PROTECTION**

**\$ Show Log FOO**

“FOO” = “MBAnn:”

**\$ OPEN/READ/WRITE**

**\$ WRITE/NOWAIT**

## General enhancements

- **VMSINSTAL** broadcasts a message to all users if HELPLIB is in use
  - Logical name **VMSINSTAL\_NOBROADCAST** will disable broadcasting
- **TYPE/TAIL** modified to support records exceeding 512 bytes
  - Prevent unnecessary **SS\$\_UNSUPPORTED** errors
- **SYS\$TIMEZONE\_DIFFERENTIAL** preserved across reboots
- **JPI\$\_ORG\_BYTLM** item code added

# RECALL/ALL – RECALL/SEARCH



```
$ recal/all dir
19 dir/sel=vers=min=30
45 dir/da/siz *a*.tmp;
46 dir/da/siz *.tmp;
47 dir/da/siz *.tmp
50 dir/da/siz
```

```
$ recall/search ex
20 help lex f$getq arg
32 help lex f$getqui examp
33 help lex f$getqui arg
34 help lex f$getqui
36 help lex f$getqui
```

# SEARCH wildcard



- **SEARCH /WILDCARD\_MATCHING**  
/LIMIT=n  
/SKIP=n

V8.2 feature

```
$ create x.tmp
```

```
first line
second line
third line
fourth line
fifth line
sixth line
```

```
$ sea x.tmp * /wild/skip=2/limit=1
third line
```

# SHOW FASTPATH



V8.2 feature

## \$ show fastpath

Fast Path preferred CPUs on BILBO 2 1-APR-2004 18:20:18.01  
HP rx2600 (900MHz/1.5MB) with 2 CPUs

Device:	Fastpath CPU:
PKA0	1
PEA0	0
PKB0	0
EIA0	0
EWA0	1

OpenVMS TCP/IP is currently running on CPU 1  
(also shows Lock Manager CPU if appropriate)  
Optional qualifier: /CPU=(a,b,c,...)

# More...



V8.2 feature

- **DELETE & PURGE / GRAND**  
(may be changed to /TOTAL)  
\$ purge x.tmp/grand  
%PURGE-I-TOTAL, 7 files deleted (3.98MB)
- **New lexical functions**
  - F\$LICENSE  
write sys\$output f\$license("vmscluster")  
TRUE
  - F\$FID\_TO\_NAME  
\$ write sys\$output f\$fid\_to\_name("sys\$sysdevice:", "(7966,1,0)")  
DISK\$XA8L\_T3Z\_BIS:[VMS\$COMMON.SYSMGR]SYLOGIN.COM;2

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# Post V8.2 suggested features



- **EDCL Phase II**
- **B2B Input**
  - Need to determine the input format
  - Probably introduce new routine **LIB\$CVT\_BYTES\_BLOCKS**
- **Multiple item codes support in Lexical functions**

```
$devchars = f$getdvi("_DKA0:", "device_type_name, cylinders, tracks, sectors")  
$sho sym devchars  
devchars = "COMPAQ BB01821AC3,7001,20,254"
```
- **User written lexical function**

```
$OUTPUT=F$USER("IMAGE_NAME", "PARAMETER_LIST")  
$OUTPUT=F$USER("JAVA_APPLET")
```

# Post V8.2 suggested new features



- **DCL WHILE**
- **DCL CASE**
- **64 bit symbols + Floating point math**
- **DCL interface to SYS\$GETRMI – F\$GETRMI**
- **SHOW PROCESS/CHANNEL**
- **PIPELESS PIPE**



i n v e n t