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OpenVMS & DCL on Alpha & VAX

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Outline

- Introduction
- Logging On/Off
- Digital Command Language (DCL)
- Exercises
- Resources

Introduction

- Labs based on
 - 4 x AlphaServer 1000[A] [233|266] , OpenVMS 7.3-1
 - VAXStation 4000-60, VAX/VMS 5.5-2
 - HP Integrity BL 860c, OpenVMS 8.3-1H1

AlphaServer



- AlphaServer 1000 4/266 (`F$GETSYI ("hw_name")`)
- 64 Bit RISC Processor (Alpha AXP) (`SHOW CPU/FULL`)
 - CPU Type..... : EV45 (21064A), Pass 1.1
 - Speed.....: 266 Mhz
- 256 MB RAM (`SHOW MEMORY`)
- SCSI-Bus
 - CD-ROM (DKA**6**00:)
 - Floppy (DVA0:)
 - 4 Hard Disks (DKC[**0**|**100**|**200**|**300**]::)
- Node: AXP2

AlphaServer (cont.)

■ Software

- OpenVMS 7.3-1
- HP C-Compiler V6.5-001
- HP FORTRAN V7.5-1
- GNV 1.6-2
- HP TCP/IP Services 5.3
 - Telnet
 - FTP
- Zip/Unzip Tools (DISK\$TOOLS:[TOOLS])

Login/Logout

1. Login

- Protocol: SSH
- Port: TCP/22
- Host: `tb0.asg-platform.org.de` (141.89.226.2)

2. Login

- Protocol: Telnet
- Port: TCP/23
- Host: AXP1,2,3,4

■ Password

- Change the password at first login! (`SET PASSWORD`)
- Spaces are ignored
- 0-32 Alphanumeric characters, Dollar sign (\$) and Underscore (_)
- Lowercase characters are converted to uppercase
- At least 6 characters

Login/Logout (cont.)

- Home directory is `SYS$LOGIN`
- `SYS$LOGIN:LOGIN.COM` is executed at login
- Logout
 - `LOGOUT`
 - `LOGOUT/FULL` displays used Resources (Terminal must kept open!)

Digital Command Language

- DCL Interpreter is the default shell
 - \$, marks a DCL Command Line
 - - extents a Command across multiple lines
 - ! Commentary in DCL Command Lines
- English like commands
 - `command/qualifier parameter`
 - `command parameter/qualifier`
 - `SHOW, SET, COPY, TYPE, CREATE, EDIT`

Digital Command Language

- Smallest unique character sequences required
 - show -> sh (help show for options and qualifiers)
 - %DCL-W-ABKEYW, ambiguous qualifier or keyword - supply more characters
- Interactive help system
 - help command [options]
 - Context depended
 - Available within OpenVMS programs

Definitions

■ Symbol

- Can store information such as strings or integers
- `$ X = 4` , holds a value
- `$ PWD = "SHOW DEFAULT"` , holds a string
- `$ STR := Hello World!` , assigns a string, preserves Spaces
- Single `=`, current command level only
- Double `==` global symbol table
- `SHOW SYMBOL PWD`

Definitions (cont.)

■ Logicals

- `SYS$STARTUP:SYLOGICALS.COM`
- String to specify directory sets, abbreviations, and other stuff
- Interpreted by the DCL Interpreter
- Stored in Tables
 - Process
 - Job
 - Group
 - System
- `DEFINE/<TABLE>/<Access Mode> Logical Value`
- `DEFINE/JOB SYS$LOGIN USER:[HOME.FALKEN]`
- `DEFINE/SYSTEM USER:[TEMP.] SYS$TEMP`

Definitions (cont.)

■ Foreign Commands

- Run programs with command line arguments
- `vi*m:==$ VIM:VIM.EXE`
 - * indicates how much of the command must be typed for it to be recognized
 - \$ Denotes to run a program

Definitions (cont.)

- Delete Symbols, Logicals, Foreign Commands
- Symbol
 - `DELETE/SYMBOL <Symbolname> [/GLOBAL, /LOCAL, /ALL]`
- Logical
 - `DELETE/KEY <Logical> [/ALL]`
- Foreign Commands are Symbols

Strings

- `A := VAX VMS` , Symbol A has value “VAX VMS”
- String Reduction
 - `B = A - “VAX”` , Symbol B evaluates to VMS
- String Concatenation
 - `C = “Open” + B` , Symbol C has Value “OpenVMS”
- Evaluate Symbols
 - `D:=C`
 - `SHOW SYMBOL D`
 - `C`
 - `SHOW SYMBOL ‘D’`
 - `OpenVMS`
- `SET PROCESS/CASE=SENSITIVE/PARSE_STYLE=EXTENDED`

Lexicals

- F\$...
- F\$DIRECTORY() Current Directory
- F\$FAO(format,arguments,...) , sprintf equivalent
- F\$SEARCH(), get full path a file
- ...

Directories

- Directories have the extension DIR
 - 000000.DIR;1
 - 000000 is device/logical's root directory
 - Specification in Square Brackets [000000] without .DIR Extension
- Change Device & Directory
 - SET DEFAULT [device-name[:]][directory-spec]
 - SET DEFAULT SYS\$LOGIN
 - USER: [HOME.FALKEN] on AXP
- Show current Location
 - SHOW DEFAULT
 - USER: [HOME.FALKEN] on AXP

Directories (cont.)

- Directory separator is . (dot)
- Parent directory is - (hyphen)
- 3 Dots in directory selection means recursive
 - [USER...] Directory USER and all subdirectories
- Directory listing
 - DIRECTORY [filespec[,...]]
 - *.*;* by default
- Create Directories
 - CREATE/DIRECTORY [.DEMO], creates subdirectory DEMO
 - CREATE/DIRECTORY [HOME.FALKEN.DEMO], creates subdirectory DEMO in Directory HOME.FALKEN

Directories (cont.)

■ Delete Directory

- Directory must be empty
- `DELETE [.DEMO]*.*;*`
- `SET SECURITY/PROTECTION=(O:D) DEMO.DIR`
- `DELETE DEMO.DIR;1`

■ Version Limit

- `SET DIRECTORY/VERSION_LIMIT=xxx <DIR>`
- useful for Compiler Output ;)

Files

- A File must have a Name or an Type Extension
- A single Dot separates Name and Extension
- Files can have multiple Versions
 - Hello.c;1 Hello.c;2 Hello.c;5
 - Every write creates a new version up to /VERSION_LIMIT
 - Read without version number opens the highest version
 - type Hello.c => type Hello.c;5
 - PURGE [filespec[,...]]
 - deletes all but the highest numbered version
 - /KEEP=<number of versions to keep>
- Special Files
 - .COM Command Procedures, DCL scripts
 - .EXE Executables

File Security Settings

- SET FILE
- /PROTECTION, superseded by SET SECURITY/PROTECTION
 - =(System,Owner,Group,World)
 - Access: **R**ead,**W**rite,**E**xecute,**D**elete,**C**ontrol,...
 - SET SEC/PROT=(S:RWED,O:RWED,G:RE,W:RE) USER:[000000]000000.DIR
- /VERSION_LIMIT Version Limit (default is 0 => 32K)
 - works only if equal or less versions at SET time
 - otherwise the current number of versions is kept

DCL Procedures

- DCL Command Procedure
 - executable DCL Script, Extension .COM
 - @Scriptname[.COM]
 - Up to 8 command line arguments P1-P8

- DEMO SHOWARGS.COM

Programs

- Normally Extension .EXE
- Execution Methods
 - RUN <program>
 - No command line arguments
 - Call from DCL Procedure
 - Up to 8 Command line arguments
 - Foreign Command
 - Command Line Definition (CLD)
 - DCL\$PATH Logical

 - DEMO MAKE.COM

Editors

- CREATE [file]
 - Sequential file
 - Save with CTRL+Z
- APPEND
- EDIT
 - /TPU – *Eve* Screen Mode Editor (default)
 - /EDT Line Mode (*OpenVMS EDT Reference Manual*)
 - /TECO, Ed like Editor
 - /ACL , ACL Editor
- VIM 7.1
 - vi*m Logical

Other things

- Queues
- Cluster
- Shadow Sets
- Distributed Lock Manager
- ...

Exercises / Challenges

1. Create customized Login Actions

- LOGIN.COM
- PWD, CD, ... Symbols
- DCL\$PATH Logical

2. Unzip the ZIP File in your Home Directory

- DISK\$TOOLS:[TOOLS]UNZIP.EXE
- Execute demo_create.com in your Home Directory
- RMDIR DCL Script
 - Delete Directory [.USERNAME] completely

3. Execute a job on the cluster batch queue

- determine node name of job execution

Resources

- OpenVMS Systems Documentations
http://h71000.www7.hp.com/doc/os731_index.html
- OpenVMS DCL Directory (Part I & II)
<http://dcl.cpenvms.org>
- OpenVMS EDT Manual
http://h71000.www7.hp.com/doc/73final/documentation/pdf/OVMS_EDT_REF.pdf
- TECO Text Editor and Corrector
<http://h71000.www7.hp.com/doc/73final/documentation/pdf/teco.pdf>