GNV / bash für OpenVMS

3D06

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Topics

- UNIX Portability
- File System Enhancements
- CRTL
- GNV
- Futures

UNIX Portability (UP) - Rationale

- Many ISVs develop applications for both OpenVMS and UNIX/Linux platforms
- Applications are (or can be) ported from UNIX/Linux platforms to OpenVMS
- Operators, programmers, users may be more familiar with *NIX-style interfaces, commands, utilities and tools

UNIX Portability - Goal

Provide a full set of UNIX interfaces and tools within OpenVMS

- In native, integrated fashion
- No layered emulator (e.g. old “POSIX for OpenVMS” product)
  - No performance issues
  - No interoperability issues

UNIX Portability - Benefits

- Easy portability of UNIX applications to OpenVMS
- Easy development of applications intended to run on both UNIX and OpenVMS
- No need to train UNIX-skilled personnel on OpenVMS
- OpenVMS will optionally be like a “UNIX flavor”
  - Cost of porting from UNIX to OpenVMS equal or comparable to porting from one “UNIX flavor” to another (e.g. from Solaris to Tru64)

But – I like VMS the way it is!!!

- Current VMS behavior is preserved
  - New UNIX Portability features typically need to be enabled
  - Defaults preserve existing behavior
- C Run Time Library: UNIX features are enabled via logical name switches
  - Old behavior is the default
    - Legacy behavior is preserved
  - Can also enable features via an API

Tentative Schedule

V7.3-1

- Delivers first set of UNIX “enabling technologies” (CRTL, Commands & Utilities, File system)

V7.3-2

- New commands and utilities
- Continues delivery of UNIX “enabling technologies”

Following releases

- New commands and utilities
- New features in CRTL and base O.S. (e.g. fork())

Final goal

- Complete UNIX compliance (e.g. UNIX 98) in OpenVMS

V7.3-x Contents

- File System Enhancements
- CRTL
- GNV

V7.3-1 – File System

New Filesystem Features: ODS-5 only

- ODS-5 system disk
- Hard links (ODS-5 only)
- Time of last file access
- UNIX Style File Names
  - **`$ SET PROCESS/CASE_LOOKUP={SENSITIVE,BLIND}`**
- “Root Directory”
  - Problem: Code references a “root directory” **`/`**
  - Solution: Virtual root directory in CRTL (**`SYS$POSIX_ROOT`** logical name)
- Mount Points

V7.3-1 – C RTL

- Large file support
- 32-bit UID/GID (applications)
- TCP/IP enhancements
- New / Changed C RTL Functions
  - scanf
  - fseeko
  - ftello
  - ...
- UNIX features enabled via logical name switches

V7.3-2 – C RTL

- POSIX Style Identifiers
- Socket Enhancements
- Set Default Directory for Child Processes
- Additional Feature Logicals
- Extended Command Line Length
- More new C RTL Functions
  - File R/W, Print, Signal, Time, Password, Security
- Performance

GNV

GNV: GNU's Not VMS

- GNU-based, UNIX® environment for OpenVMS
- Open source, freeware product
  - http://gnv.sourceforge.net/
- Updated version included with OpenVMS™ or at:
  - http://h71000.www7.hp.com/opensource/opensource.html
- Changes from sourceforge
  - ODS-5 file system support
  - Additional utilities ported and included
  - Packaged as a HP-branded PCSI kit

GNV Release for V7.3-1

Provides an environment for porting and running UNIX tools and software on OpenVMS

- Implementation of the UNIX shell BASH (Bourne Again Shell)
- Many UNIX-shell utilities
  - General purpose
  - Command manipulation
  - Program creation
  - User- and system-level administration
  - File manipulation
  - Text processing
  - Printing
  - Networking

GNV Release for V7.3-2

- New Utilities
  - bbzip2
  - gawk
  - man
  - Improved complier interfaces (cc,gcc)
- Working towards getting “configure” to work for any arbitrary Open Source package.
- IPF Port complete – Negligible effort!
  - Available in E8.1 time frame
  - Native compiler support may lag behind

GNV

- GNV V1.5-5 Kit on Open Source Tools CD V7.3-2
- GNV V1.5-6 Kit at:
  http://h71000.www7.hp.com/opensource/opensource.html
- Documentation
  - GNV Readme First
  - Bash Reference Manual

GNV Installation

- Installation on ODS-5 disk strongly recommended
- OpenVMS V7.3-1 or higher

- $ PRODUCT INSTALL GNV /SOURCE= location
- Installation other than system disk
  - $ PROD INSTALL ... /DESTINATION= dev
  - Another move after installation, modify
    dev:[SYS$STARTUP]GNV_DESTINATION.COM

GNV Setup

- Systemwide include in SYSTARTUP_VMS.COM
  - $ @SYS$STARTUP:GNV$STARTUP.COM or
  - $ @dev:[SYS$STARTUP]GNV$STARTUP.COM
- Each User
  - $ @GNU:[LIB]GNV_SETUP.COM

GNV Tip

- Define DECC$PIPE_BUFFER_SIZE 65535 to maximize pipe capabilities
- New feature/parameter DECC$PIPE_BUFFER_QUOTA
  - Exploits VMS 7.3-1 change that increases mailbox buffer quotas ($crembx:bufquo)
  - Be careful – given enough BYTLM, processes can quickly eat up virtual memory

Using GNV

- Starting and leaving shell

```
$ bash
bash$
bash$ logout
$
```

- Single bash command

```
$ bash -c bash-command

$ bash -c ls
$ bash -c "ls  -al"
$
```


bash - Beispiel

```
bash$ ls -l
total 1
-rwxr-x---   1 AMMER  17       72 Apr  5 14:04 hello.c
-rwxr-x---   1 AMMER  17       82 Apr  5 14:04 makefile
bash$
bash$ cat makefile
hello : hello.c
        gcc -o hello.exe hello.c
clean :
        rm -f hello.exe hello.o
bash$ make
gcc -o hello.exe hello.c
bash$
```

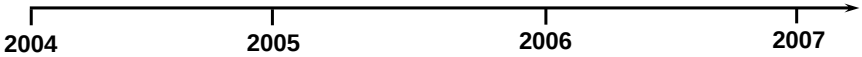
bash - Beispiel...

```
bash$ hello
Hello There!
bash$
bash$ dcl dir /date

Directory STP:[TEST.TEST]

HELLO.C;1              5-APR-2004 13:45:56.46
HELLO.EXE;1            5-APR-2004 14:05:20.67
HELLO.O;1              5-APR-2004 14:05:18.35
MAKEFILE.;2            5-APR-2004 14:04:58.85
MAKEFILE.;1            5-APR-2004 13:59:33.72
```


UNIX Portability Roadmap



OpenVMS V8.2
Symbolic Links
- CRTL APIs
- DCL support
- NFS support

CRTL
- File Lock APIs
- statvfs/fstatvfs
- Stnd stat struct

GNV 1.6
- VI
- gnuTAR
- Continued configure and Make improvements

OpenVMS V8.3
- Byte range locking
- Semaphores
- Asynch I/O APIs
- GNV update

OpenVMS V8.x
- Binary Tree
- ioctl()
- UNIX Compliant Signals
- GNV update

OpenVMS UP future investigations
- Full function select()
- fork ()
- Shared memory APIs
- Unix 98 compliance

Note: Investigations are provided solely to inform what is being considered and should not be used as a deliverable commitment.

Porting Experiences

- Some partners already using UP features (since V7.3-1) to port their applications to OpenVMS
- Experience #1
  - HP and a partner worked in HP lab to determine level of effort needed to port partner's application
  - Summary of that effort follows on next slides

Porting Experiences

- Application architected to isolate OS specific features
  - An OS interface layer
  - A Network layer
- Source files maintained on partner's Linux system
  - NFS served to OpenVMS system
- Team made extensive use of BASH
  - make and sed used extensively
  - Some minor changes to partner's make files, especially in the area of recursive make
  - Successfully compiled and linked all modules, except missing semaphore routines
  - ar used to populate object libraries
  - Some difficulty with GNV linker, successfully used OpenVMS linker

Porting Experiences (cont.)

- Successfully passed all tests
  - Developer couldn't believe it - rewrote tests to add verification that it was actually executing properly
- Some things were missing, some hiccups
  - Semaphore support
    - Planned for V8.3
  - poll(), vsnprintf()
    - Both implemented in V7.3-2
  - Some trouble with periods in directory names
  - file and lex utilities not yet implemented in bash (planned)
- Overall, a positive experience
  - Partner feels effort to port will be similar to other UNIX® ports

Porting Experiences #2

- Customer needed a solution for printing barcode labels
  - Simple application, just print the barcode
  - Very expensive to purchase
    - products included more than customer needed
  - Found simple, UNIX Open Source application
  - Downloaded to OpenVMS 7.3-1 with BASH
    - Ran build scripts
    - Everything worked
    - Minimal effort
  - Not all will be this easy, but, this demonstrates the goal

More Porting Experiences

- From the GNV developers list (July 2003):
  - "GNV is working better and better. I could "./configure" and "make install" the following packages (sometimes with little hacks):
    - mktemp 1.5
    - hostinfo 2.2
    - patch 2.5.4
    - yacc 1.9.1
    - flex 2.5.4
    - bison 1.35 "

Contacts

- OpenVMS C RTL Project Leader:
  - Brad.McCusker@hp.com
- UNIX Portability Web Site:
  - http://h71000.www7.hp.com/portability/index.html

Questions?