

# Unix Portability Updates



Mandar Chitale  
Hewlett Packard

# Agenda

- Overview of Unix Portability Initiative
- Shared Memory
- Unix Domain Sockets
- Semaphores
- Symbolic Links
- UTF-8 support
- Q & A

# Unix Portability - Overview



# Unix Portability Initiative

## Goals

- Ease porting of applications to OpenVMS from Unix/Linux
- Make cost/effort of porting to OpenVMS comparable to Unix/Linux

## Benefits

- Enhanced application portfolio
- Familiar Unix-style development environment

# Recent Developments & **V8.4**

Byte Range Locking

File Lock APIs

Standard Stat Structure

Shared Memory

Semaphores

Symbolic Links

POSIX style pathnames

GNV Updates

statvfs/fstatvfs

Encryption Routines

Pthreads Shared Objects

UTF-8 SUPPORT

Unix Domain Sockets

# Shared Memory (Beta)



# Shared Memory in OpenVMS V8.4

Shared Memory - Inter Process Communication mechanism for sharing data between multiple processes.

- System V Shared Memory API implemented
- Beta version available for OpenVMS V8.4
- Requires Update 500 to be installed

Send a mail to [OpenVMS.Programs@hp.com](mailto:OpenVMS.Programs@hp.com) if you want the beta kit

# System V Shared Memory API

<b>shmget()</b>	<b>Gets a shared memory segment</b>
<b>shmctl()</b>	<b>Shared memory control operations</b>
<b>shmat()</b>	<b>Shared Memory attach operation</b>
<b>shmdt()</b>	<b>Shared memory detach operation</b>

# Considerations

- System V Shared Memory:
  - Maximum number (SHMMNI) of System V Shared Memory segments allowed in a system is 1024
  - Maximum size (SHMMAX) of a shared memory segment allowed is 1 MB.
  - Minimum size (SHMMIN) of a shared memory segment is 1 byte.

# Unix Domain Sockets



# Unix Domain Sockets in OpenVMS V8.4

Unix Domain Sockets - Inter Process Communication mechanism for exchanging data between multiple processes within the same host

- Available with TCP/IP 5.7 ECO 2
- Requires Update 500 to be installed

# Semaphores



# Semaphores on OpenVMS

Semaphores - Inter Process Communication mechanism for synchronization across multiple processes.

- System V Semaphores implemented in V8.4
- POSIX Semaphores

# System V Semaphore API

<code>ftok()</code>	Generates a standard inter process communication key
<b><code>semget()</code></b>	<b>Gets a set of semaphores</b>
<b><code>semop()</code></b>	<b>Performs operations on semaphores in a semaphore set</b>
<b><code>semctl()</code></b>	<b>Semaphore control operations</b>

# POSIX Semaphore API

<code>sem_open()</code>	<b>Opens/creates a named semaphore for use by a process.</b>
<code>sem_init()</code>	<b>Initializes an unnamed semaphore</b>
<code>sem_getvalue()</code>	<b>Gets the value of a specified semaphore.</b>
<code>sem_wait()</code>	<b>Performs a semaphore lock.</b>
<code>sem_trywait()</code>	<b>Conditionally performs a semaphore lock</b>
<code>sem_timedwait()</code>	<b>Performs a semaphore lock by waiting for a specified time.</b>
<code>sem_post()</code>	<b>Unlocks a semaphore.</b>
<code>sem_unlink()</code>	<b>Removes the specified named semaphore.</b>
<code>sem_destroy()</code>	<b>Destroys an unnamed semaphore.</b>
<code>sem_close()</code>	<b>De-allocates the specified named semaphore.</b>

# Using Semaphore API

Application programs need to include the following header files

- POSIX SEMAPHORE:  
`#include <semaphore.h>`
- System V SEMAPHORE:  
`#include <sys/ipc.h>`  
`#include <sys/sem.h>`

# Considerations

## System V Semaphores:

- Maximum number of semaphore sets allowed on a system is 1024
- Maximum value of a semaphore is 32767
- Maximum number of SEM\_UNDO operations allowed for a process is 1024.
- No support for IPC\_PRIVATE

## POSIX Semaphores:

- Unnamed semaphores not supported across processes

# Symbolic Links



## **Symbolic Links: what's new in V8.4**

- Interface and metadata changes
- RMS enhancements
  - Fuller support for POSIX pathnames
  - Fuller support for Logical Names in POSIX paths
  - Search List support
  - Wildcards
- Symlink compatibility between V8.3 and V8.4
  - Converting VMS 8.3 Symlinks to VMS 8.4 Symlinks

# UTF-8 Support



## Introduction –UTF-8

- UTF-8 (8-bit Unicode Transformation Format) is a variable-length character encoding for Unicode.
- UTF-8 can represent any character in the Unicode standard.
- UTF-8 is becoming the preferred encoding for e-mail, web pages.

# CRTL APIs Supporting UTF-8

**mkdir()**

**opendir()**

**rmdir()**

**creat()**

**open()**

**rename()**

**link()**

**stat()**

**chdir()**

**chmod()**

**chown()**

**readdir()**

**fopen()**

# Using UTF-8 Support

- \$DEFINE / SYSTEM -  
\$ **\_ DECC\$FILENAME\_ENCODING\_UTF8** "ENABLE"
- \$DEFINE / SYSTEM DECC\$EFS\_CHARSET "ENABLE"
- Requirement: ODS-5 disk

## Example Usage Of UTF-8 Support

```
$  
$ dir $1$dka100:[tmp].txt  
  
Directory $1$DKA100:[TMP]  
  
T.TXT;1          TEMP.TXT;1          ^U65E5^U672C^U8A9E.txt;1  
  
Total of 3 files.  
$ mcr jsy$control set rms/file=sdec  
$ dir $1$dka100:[tmp].txt  
  
Directory $1$DKA100:[TMP]  
  
T.TXT;1          TEMP.TXT;1          日本語.txt;1  
  
Total of 3 files.  
$
```

# Q&A



# Open Source with OpenVMS

Mandar Chitale  
Hewlett Packard

# Agenda

- Overview of Open Source
- Problem Areas and Benefits
- Plans
- Achievements
- Discussion
- Summary
- Q&A



# WHY OPEN SOURCE



# WHO USES OPEN SOURCE ?



# AND MANY OTHERS...



UNITED



# WHY OPEN SOURCE ?

Force Multiplier Effect – Created a new economic Paradigm

- Open Source is reshaping the services market

Large Portfolio of Robust Applications/Libraries/Tools

- Emerging Technologies are coming from Open Source

Primarily used in infrastructure software and building blocks for solutions

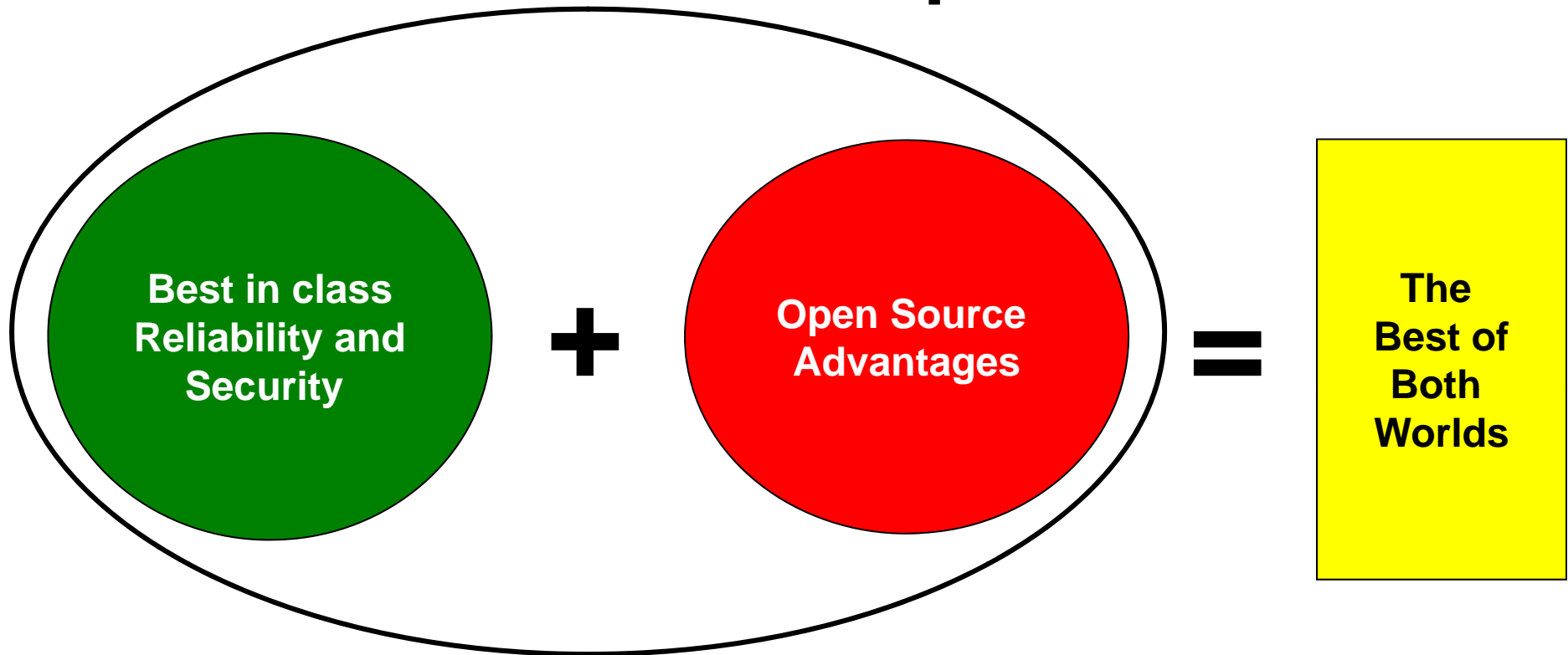
Adoption rates are increasing significantly every year

- Over 80% of commercial software will use Open Source by 2012

Helps reduce operational costs



# WHY OPEN SOURCE ON OpenVMS ?



- ✓ **Improved agility without compromising on solidity**
- ✓ **Leverage and modernize “proven gems”**

# PROBLEM AREAS AND BENEFITS



# OPEN SOURCE ON OpenVMS – PROBLEM AREAS



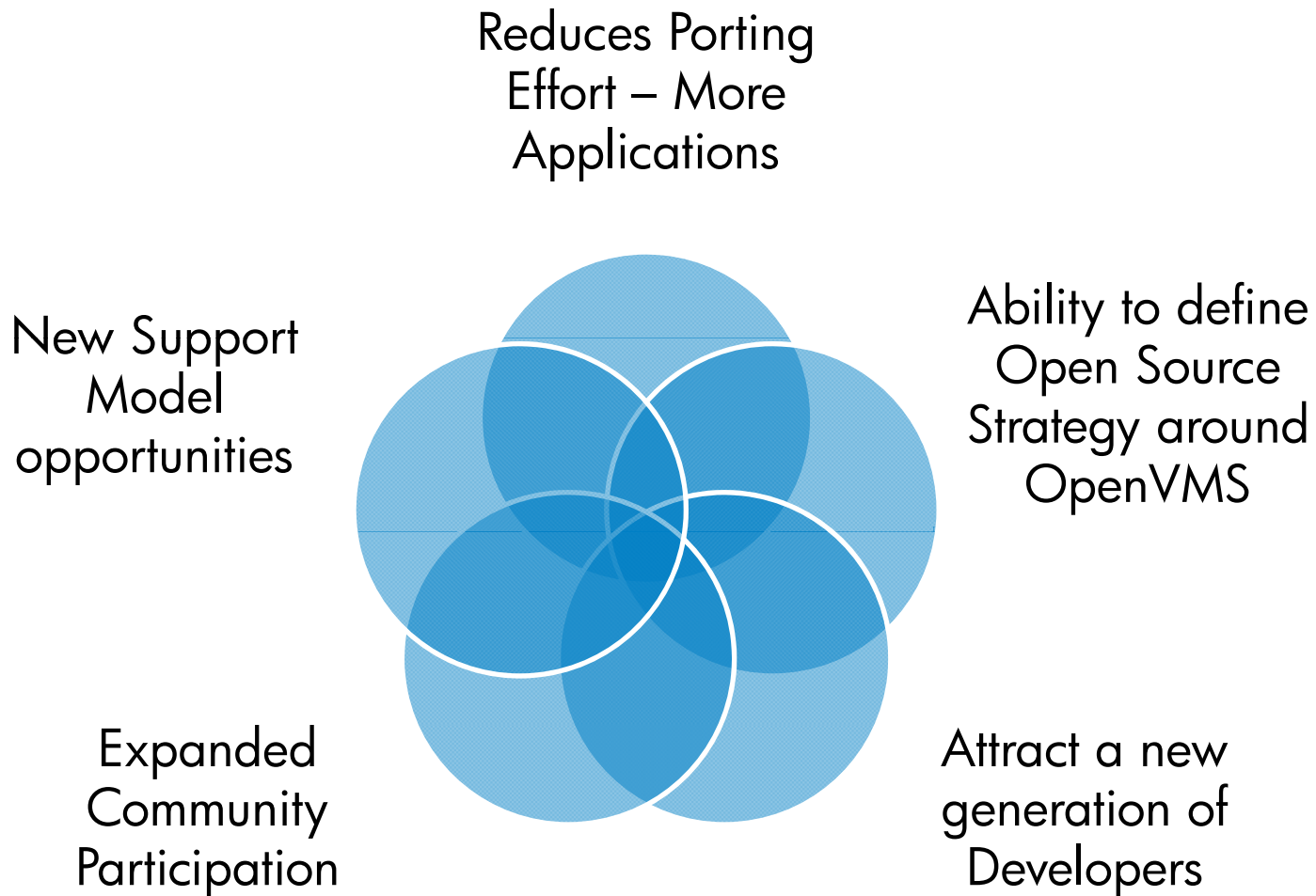
**Issues with Framework – GNV,  
Other frameworks**

**Long porting cycles resulting in  
version lag**

**Not a supported platform in many  
Open Source Projects**



# ROBUST ECOSYSTEM – OpenVMS BENEFITS



# PLANS



# OUR STRATEGY

## Fix and Update the framework

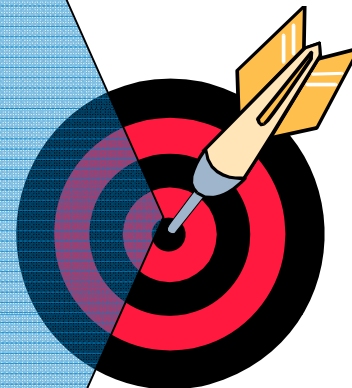
- GNV
- Unix Portability

## Provide resources and support

- Hardware Enablement
- Easy uploads/downloads

## Work with Open Source foundations/teams

- Support OpenVMS as a Platform
- Accept changes to mainline



# ACTION PLAN FOR FIXING FRAMEWORK (1 of 2)

Time Horizon	Activities
<b>Short Term</b>	<b>GNV</b> <ul style="list-style-type: none"><li>• Updates to existing components</li><li>• New components</li></ul> <b>Unix Portability</b> <ul style="list-style-type: none"><li>• Implementation on Unix Domain sockets</li><li>• Implementation of Shared Memory</li><li>• Initiate Studies (Fork/SSIO)</li></ul> <b>New Products/components</b> <ul style="list-style-type: none"><li>• Ruby on Rails</li><li>• KSH</li></ul>



# ACTION PLAN FOR FIXING FRAMEWORK (2 of 2)

Time Horizon	Activities
<b>Medium Term</b>	<b>Unix Portability</b> <ul style="list-style-type: none"><li>• <b>Shared memory</b></li><li>• <b>Complete studies</b></li></ul> <b>New Products/components</b> <ul style="list-style-type: none"><li>• Qt</li><li>• gtk+</li></ul> <b>Service Offerings</b>
<b>Long Term</b>	<b>Unix Portability</b> <ul style="list-style-type: none"><li>• Pipes, Fork, SSIO</li><li>• Resource Management</li><li>• <b>Unix Domain Sockets</b></li></ul> <b>New Products</b> <ul style="list-style-type: none"><li>• PostGres SQL</li></ul>



# RESOURCE ENABLEMENT AND SUPPORT

## Resource Enablement

- Integrity and Alpha systems made available for porting
- Many community members using the systems
- Porting Guidelines document released to community

## Freeware Hosting Environment

- Individual Open Source/Freeware applications available
- Simplified mechanism to host ported applications
- <http://h71000.www7.hp.com/openvms/freeware/>

## Support/Service Offerings

- Supported customers/partners for Open Source
- Service offerings for Open Source support
- Send a mail to [Opensource.OpenVMS@hp.com](mailto:Opensource.OpenVMS@hp.com)



# ACHIEVEMENTS



# ACHIEVEMENTS IN LAST 6 MONTHS (1 of 2)

## GNV – Updates to existing Components

- 83 GNV components upgraded to the latest GNU versions

<b>awk</b>	<b>basename</b>	<b>bzcat</b>	<b>bzip2</b>	<b>bzip2recover</b>	<b>cat</b>	<b>chgrp</b>
<b>chmod</b>	<b>chown</b>	<b>cksum</b>	<b>cmp</b>	<b>comm</b>	<b>cp</b>	<b>csplit</b>
<b>cut</b>	<b>date</b>	<b>dd</b>	<b>df</b>	<b>diff</b>	<b>dirname</b>	<b>du</b>
<b>egrep</b>	<b>env</b>	<b>expand</b>	<b>expr</b>	<b>false</b>	<b>fgrep</b>	<b>file</b>
<b>find</b>	<b>fmt</b>	<b>fold</b>	<b>gawk</b>	<b>gnutar</b>	<b>grep</b>	<b>gunzip</b>
<b>gzip</b>	<b>head</b>	<b>hostname</b>	<b>id</b>	<b>ifnames</b>	<b>install</b>	<b>join</b>
<b>less</b>	<b>ln</b>	<b>ls</b>	<b>man</b>	<b>manpath</b>	<b>mkdir</b>	<b>more</b>
<b>mv</b>	<b>nl</b>	<b>od</b>	<b>paste</b>	<b>patch</b>	<b>printenv</b>	<b>ps</b>
<b>pwd</b>	<b>rm</b>	<b>rmdir</b>	<b>sh</b>	<b>sleep</b>	<b>sort</b>	<b>split</b>
<b>sum</b>	<b>tac</b>	<b>tail</b>	<b>tar</b>	<b>tee</b>	<b>touch</b>	<b>tr</b>
<b>True</b>	<b>Uname</b>	<b>Unexpand</b>	<b>Uniq</b>	<b>Unzip</b>	<b>Unzipsfx</b>	<b>Wc</b>
<b>Which</b>	<b>Whoami</b>	<b>Xargs</b>	<b>Xxd</b>	<b>Zcat</b>	<b>Zip</b>	



# ACHIEVEMENTS IN LAST 6 MONTHS (2 of 2)

## GNV- New Components

- Added 25 new components to GNV

<b>base64</b>	<b>diff3</b>	<b>dir</b>	<b>factor</b>	<b>kill</b>
<b>locate</b>	<b>logname</b>	<b>md5sum</b>	<b>mktemp</b>	<b>pathchk</b>
<b>pr</b>	<b>ptx</b>	<b>sdiff</b>	<b>seq</b>	<b>sha1sum</b>
<b>sha224sum</b>	<b>sha256sum</b>	<b>sha384sum</b>	<b>sha512sum</b>	<b>shuf</b>
<b>stat</b>	<b>test</b>	<b>timeout</b>	<b>truncate</b>	<b>vdir</b>

## Unix Portability

- Shared Memory beta kit available
- Unix Domain Sockets available
- Fork/SSIO studies completed

## Other Products

- M4, autoconf, Ruby 1.8.7 and 1.9.1, Electric Fence, Splint, Wget ported to OpenVMS



# DISCUSSION



# DISCUSSION ITEMS

- Suggestions
- Experiences



# SUMMARY

HP is investing on Open Source with OpenVMS

Helps Customers, Partners and HP

Community Participation is key



# Contacts

For Additional Details contact

☐ Product Manager

☐ Rohini Madhavan ([Rohini.Madhavan@hp.com](mailto:Rohini.Madhavan@hp.com))

Or

☐ [OpenSource.OpenVMS@hp.com](mailto:OpenSource.OpenVMS@hp.com)

☐ Office of OpenVMS Programs

([Openvms.programs@hp.com](mailto:Openvms.programs@hp.com))



# Q&A



# Thank You

