Unix Portability Updates

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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 <u>OpenVMS.Programs@hp.com</u> if you want the beta kit

System V Shared Memory API

shmget()	**Gets a shared memory segment**
shmctl()	**Shared memory control operations**
shmat()	**Shared Memory attach operation**
shmdt()	**Shared memory detach operation**

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

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

POSIX Semaphore API

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

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

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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...

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
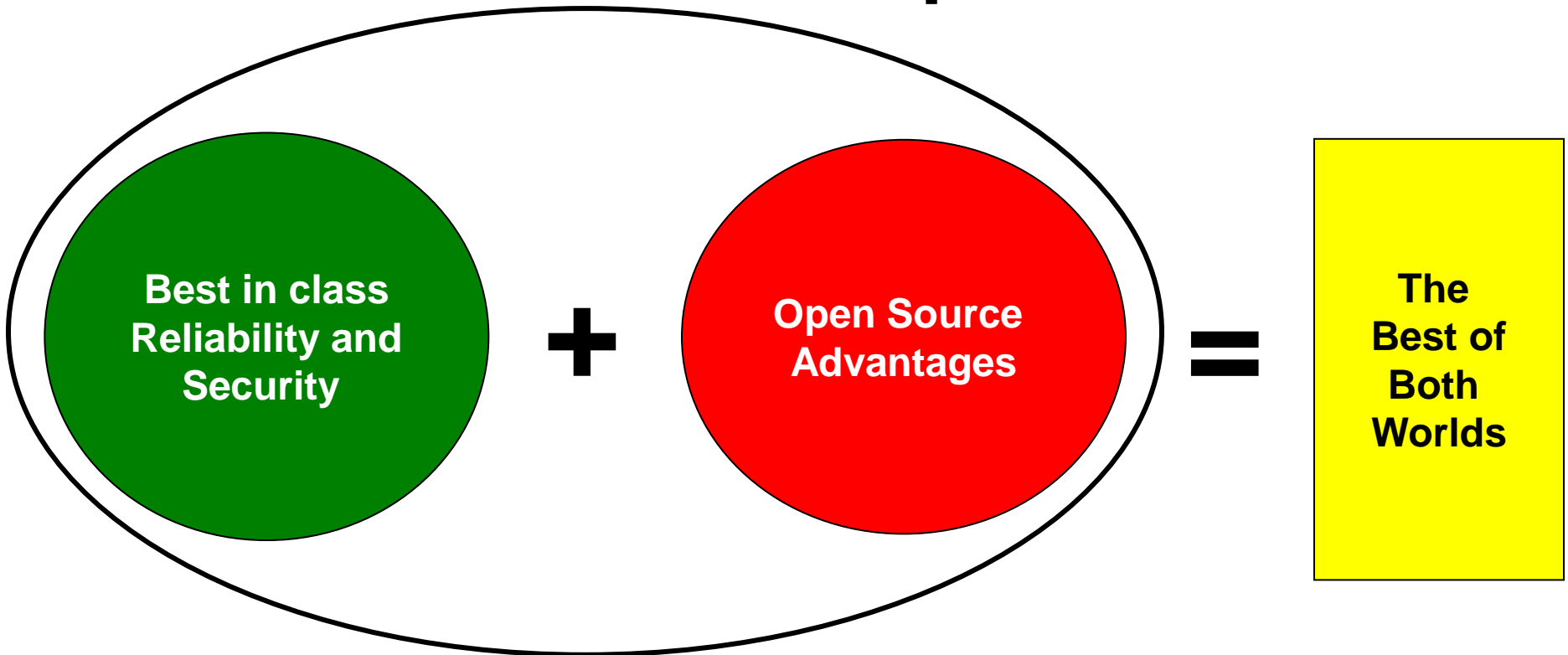
Adoption rates are increasing significantly every year

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

Helps reduce operational costs

WHY OPEN SOURCE ON OpenVMS ?

Best in class Reliability and Security

+

Open Source Advantages

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The Best of Both Worlds

✓ **Improved agility without compromising on solidity**

✓ **Leverage and modernize "proven gems"**

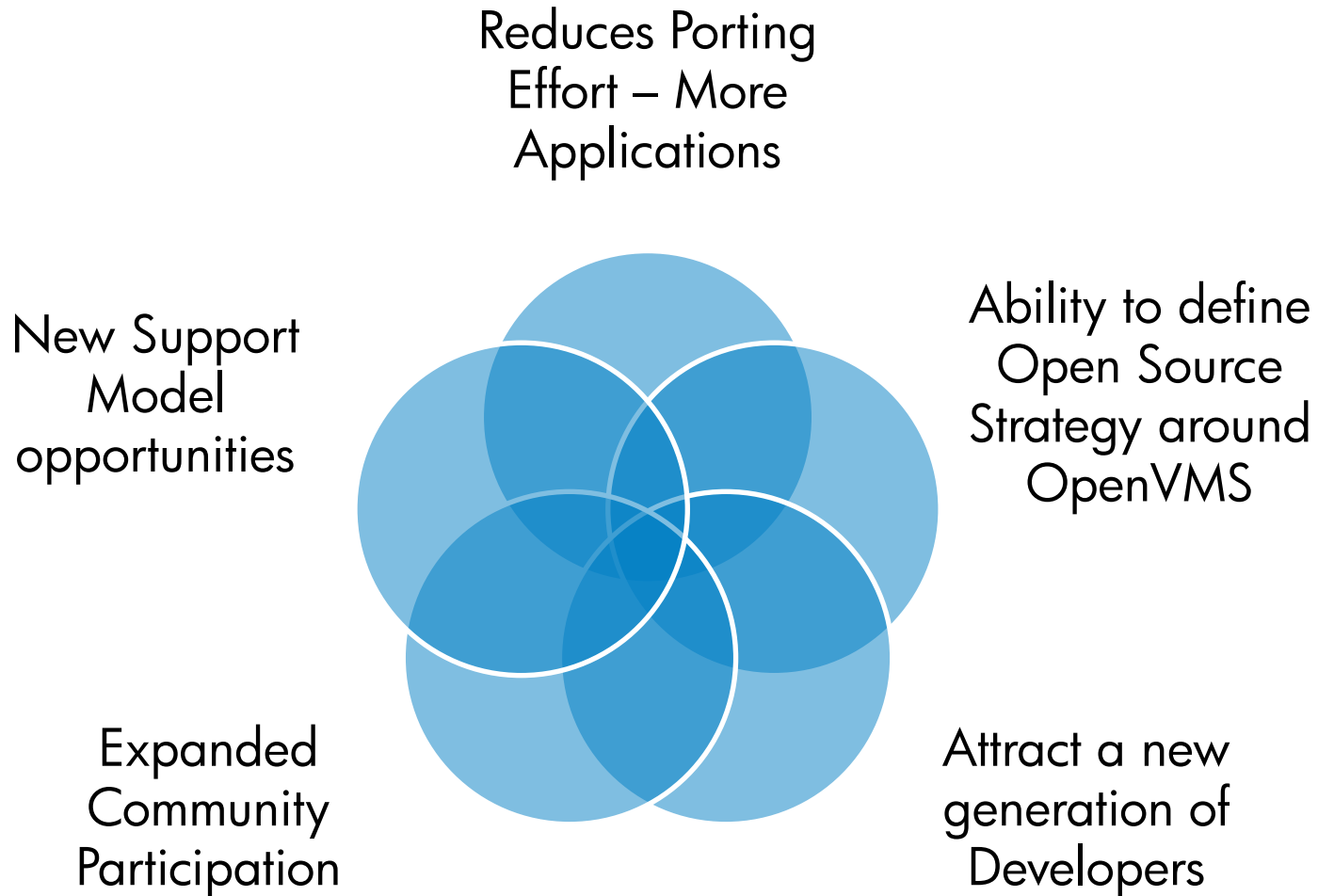# PROBLEM AREAS AND BENEFITS

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

Reduces Porting Effort – More Applications

New Support Model opportunities

Ability to define Open Source Strategy around OpenVMS

Expanded Community Participation

Attract a new generation of Developers

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

Time Horizon	Activities
Short Term	**GNV** • **Updates to existing components** • **New components** **Unix Portability** • **Implementation on Unix Domain sockets** • **Implementation of Shared Memory** • **Initiate Studies (Fork/SSIO)** **New Products/components** • Ruby on Rails • KSH
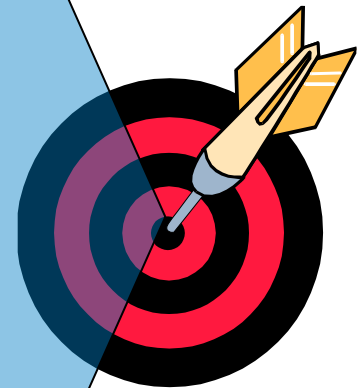
ACTION PLAN FOR FIXING FRAMEWORK (2 of 2)

Time Horizon	Activities
Medium Term	**Unix Portability** • **Shared memory** • **Complete studies** **New Products/components** • Qt • gtk+ **Service Offerings**
Long Term	**Unix Portability** • Pipes, Fork, SSIO • Resource Management • **Unix Domain Sockets** **New Products** • PostGres SQL

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

ACHIEVEMENTS

GNV – Updates to existing Components

- 83 GNV components upgraded to the latest GNU versions

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

ACHIEVEMENTS IN LAST 6 MONTHS (2 of 2)

GNV- New Components

- Added 25 new components to GNV

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

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)

  Or

❑OpenSource.OpenVMS@hp.com

❑Office of OpenVMS Programs

(Openvms.programs@hp.com)

Q&A

Thank You