

Bringing Linux apps to HP-UX11i: It's easier than you think

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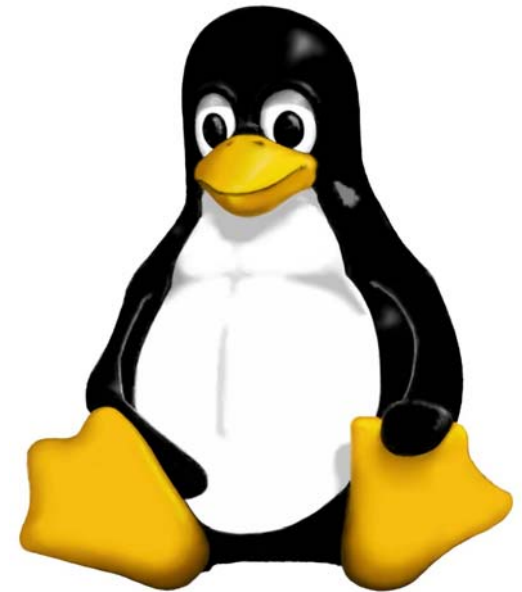
Agenda

- Provide Linux app development benefits
- How to bring Linux apps to hp-ux 11i
- Share hp-ux 11i insights
- References and Q&A

The Linux S-curve

- you & Linux now
 - using Linux today?
 - using both Linux & hp-ux today?
 - using Linux for application development?

- you & Linux soon
 - planning to use Linux soon?
 - planning to use Linux for application development?



Developing applications today

production
platforms



Tru64 UNIX®

Solaris

AIX



application
development
OS



Tru64 UNIX®

Solaris

AIX



application
development
environment

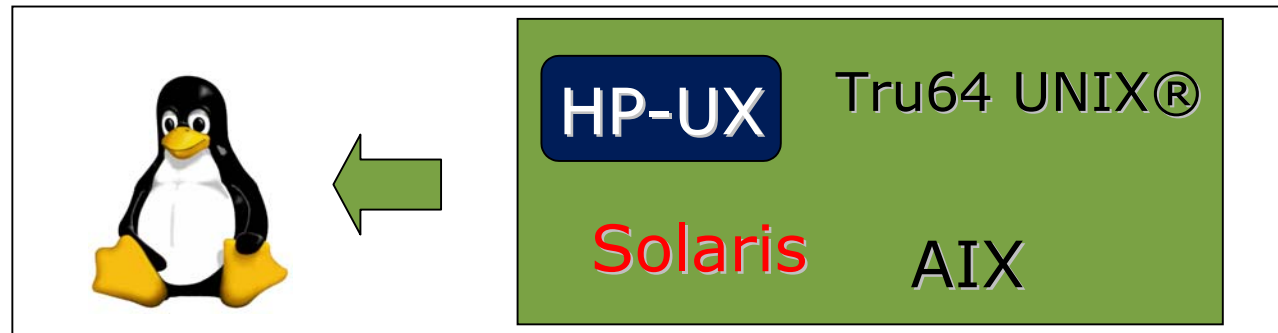


Linux application development trend

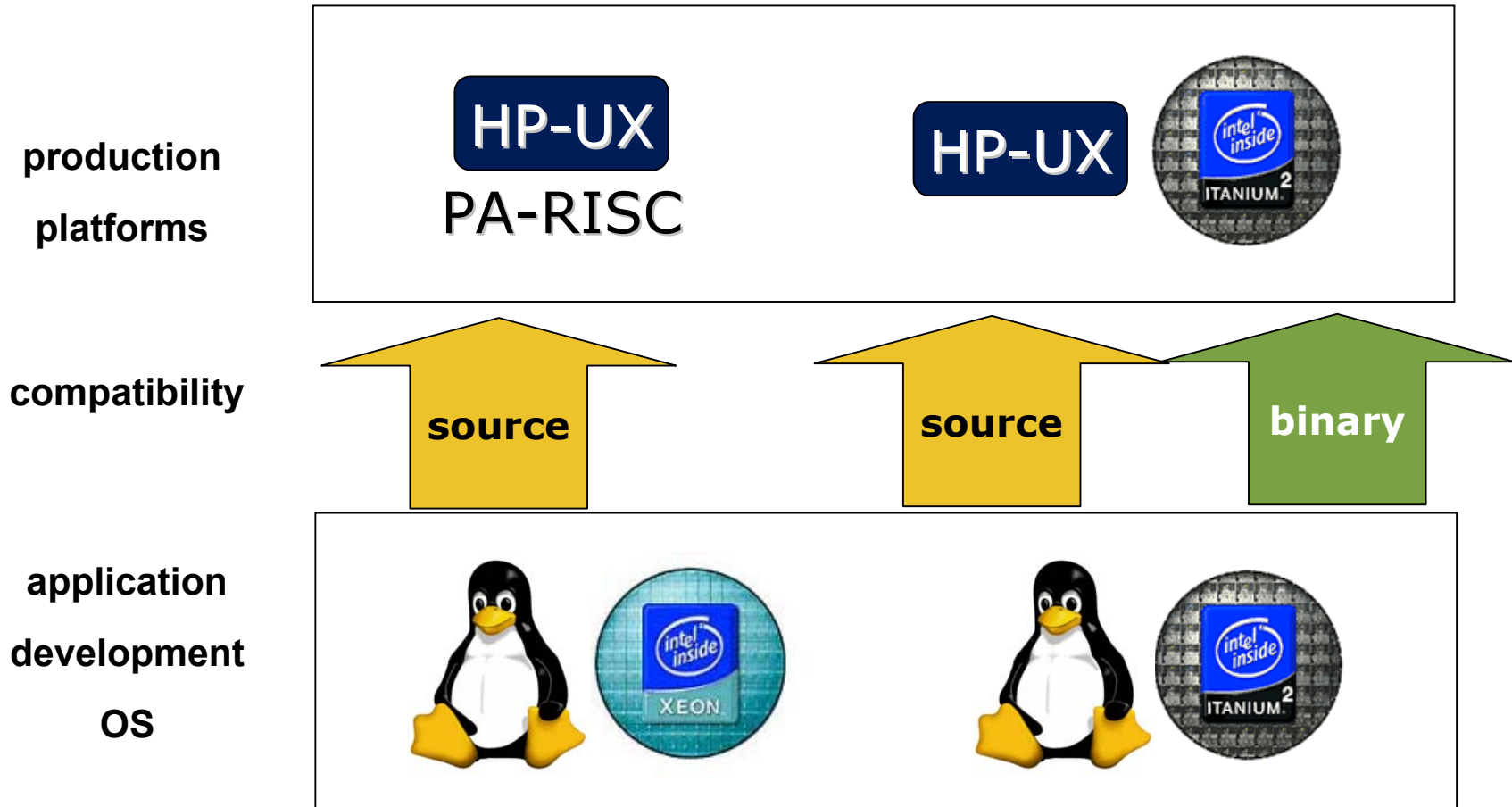
production
platforms



application
development
OS



This session's focus



Benefits of Linux for application development

- App Dev consolidation
 - simplify
 - lower cost
 - faster time to deployment
- Open Source & neutral
 - extensive toolsets (freely available)
 - great degree of knowledge in community
- Popular with developers



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Linux source compatibility for HP-UX 11i

production
platforms



compatibility

Linux
Porting
Kit

Linux
Porting
Kit

application
development
OS



How to bring Linux apps into HP-UX 11i – source compatibility

Linux Porting Kit

Open Source Developer's Toolkit

- a collection of 50+ popular Open Source tools

Linux-Compatible APIs

- work concurrently with existing hp-ux libraries to make available 96% of Linux core APIs

Linux Software Transition Kit

- scanner tools to identify porting issues and suggest recommendation for changes

Linux Porting Guide & Support Services

- extensive, easy-to-use documentation showing porting steps and issues

Benefits

- reduce porting efforts with over 50 Open Source tools and 96% of Linux core APIs
- improve productivity with scanner tools to find porting issues
- simplify developer's experience with this out-of-the-box porting kit
- free download and CD at www.hp.com/go/LPK

Open Source Developer's Toolkit

Product Contents



Compiler Toolchain/Debuggers

RedHat GNUPro

32-bit GCC

64-bit GCC

gmake 3.78.1

imake R6.3 (4)

g++

gdb 4.18 (3)

ddd 3.2

Languages

Perl 5.005_03
(32 and 64-bit)

Python 1.5.2

Tk 8.2.3

TCL 8.2.3

m4 1.4

Libraries

libgd 1.7.3

libpng 1.0.5

GDBM 1.8.2

glib 1.2.6

libstdc++

libjpeg

GTK+ 1.2.6

libtiff 3.5.4

zlib 1.1.3

Xaw3d 1.5

Packaging Tools

bzip2 0.9.5d

gzip 1.2.4a

zip 2.3

unzip 5.40

tar 1.13

autoconf 2.13

jpeg 6b

Shells

bash 2.03

tcsh 6.09

Editors/Viewers

Xemacs 21.1.8

vim 5.6

GNU emacs 20.5a

sed 3.02

less 340

GhostScript 5.10

gv 3.5.8

Misc.

Berkeley DB 2.77

diffutils 2.7

fileutils 4.0

libtool

automake

Bison 1.28

Flex 2.5.4a

gawk 3.0.4

texinfo 4.0

patch 2.5.4

xpm 3.4

Apache

MySQL

Gnome

Gimp

CVS

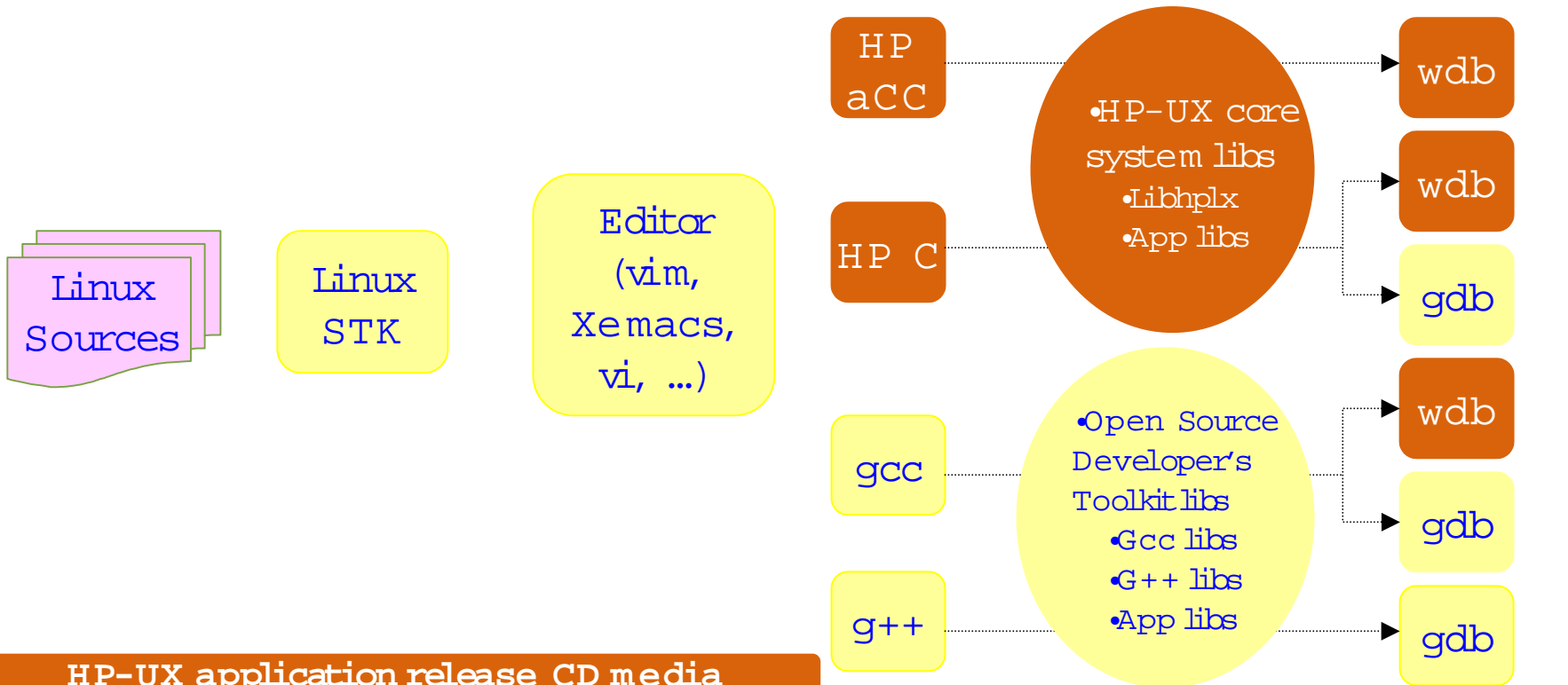
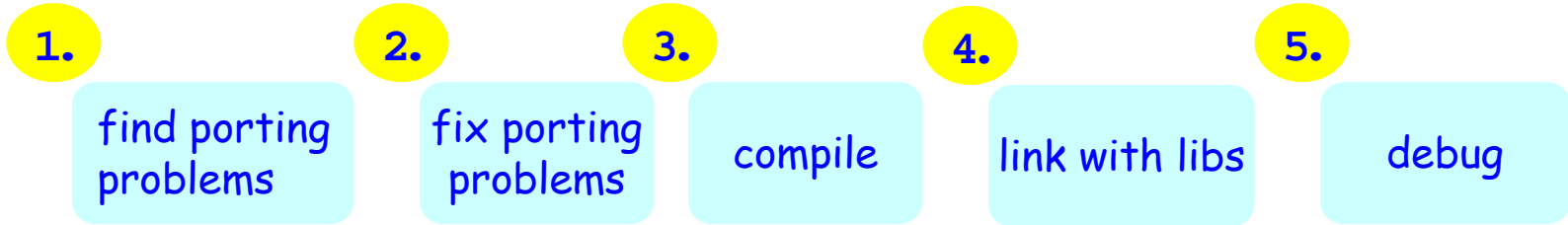
Enhydra

~200 glibc APIs ported to HP-UX 11.x



- Environment & args - `argz*()`, `envz*()`, `getopt*()`, `setenv()`
- Msg cat extensions - `*gettext()`, `setcat()`, `[bind]textdomain()`
- `malloc()` extensions - `malloc*()`, `mcheck()`, `mprobe()`, `m*trace()`
- Object stack - `obstack*()`
- Math - `qf*()`, `finitel`, `frexp*()`, `is*()`, `ldexp*()`, `ll*()`, `mod*()`, `scal*()`
- String/memory extensions - `st[p|r]*()`, `*mem*()`
- Print & error - `*print*()`, `*err*()`, `*warn*()`, `psignal()`
- Filesystem - `fts*()`, `dirfd()`, `fopencookie()`, `get_current*dir_name()`
- I/O - `getline()`, `pselect()`, `hton*()`, `*tty*()`,
- Misc - `set*id()`, `*wtmp()`, `re_*()`

Developer's experience with Linux porting kit



HP-UX application release CD media

Linux porting kit for hp-ux CD media

Linux binary compatibility for HP-UX 11i

production
platforms



compatibility

Linux
Runtime
Environment

application
development
OS



How to bring Linux apps into HP-UX 11i – binary compatibility

Linux Runtime Environment Toolkit

Linux LE Itanium Runtime Environment

- a collection of libraries and tools, including commands, utilities, packages, and marshalling layers

Linux Software Transition Kit

- scanner tools to identify porting issues and suggest recommendation for changes

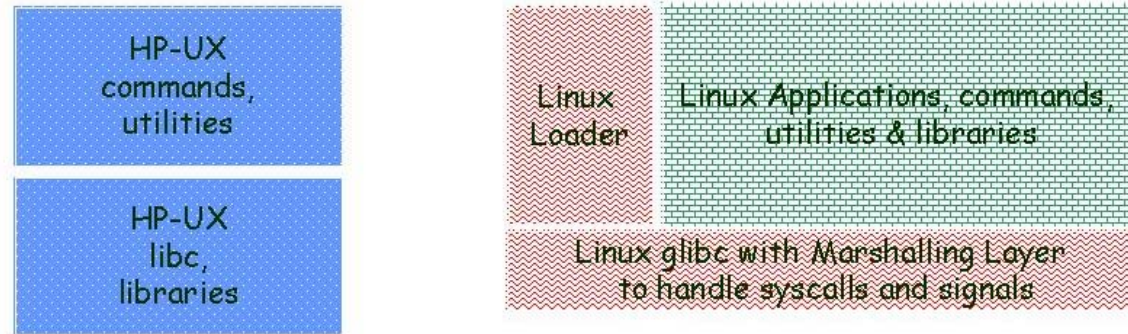
Linux Runtime Environment White Paper

- extensive, easy-to-use paper documenting binary compatibility processes between Linux and HP-UX

Benefits

- develop on Linux, deploy to HP-UX
- run “Linux” applications on HP-UX with mission critical & security features
- reduce build and support costs for multi-OS opportunities

Overview of Linux Runtime Environment



User space

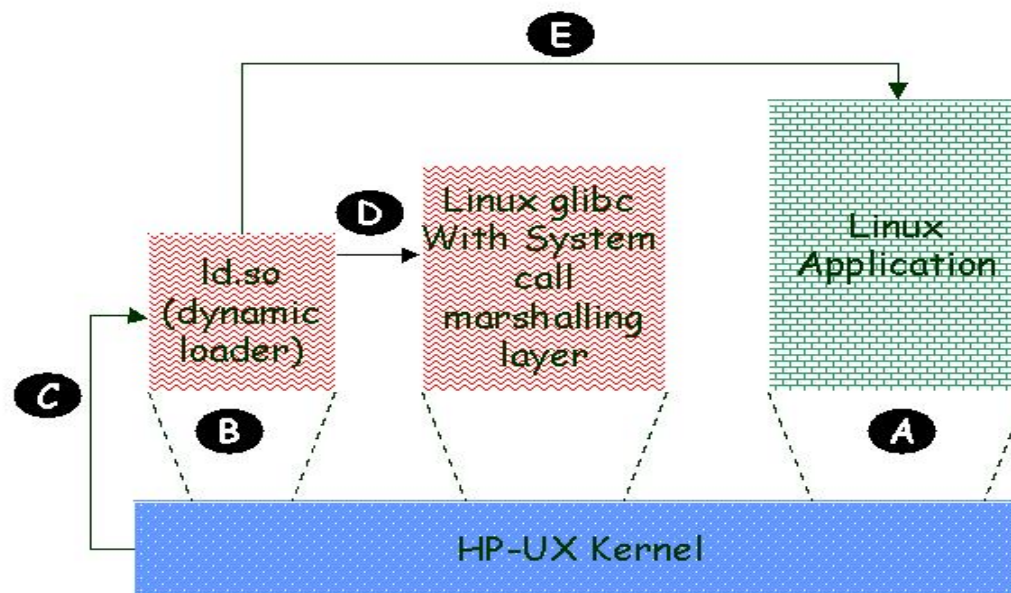
Kernel space

HP-UX Kernel for Itanium® Processor Family

Key

-  Unmodified Linux Components
-  Modified Linux Components
-  HP-UX Components

Program startup for Linux apps

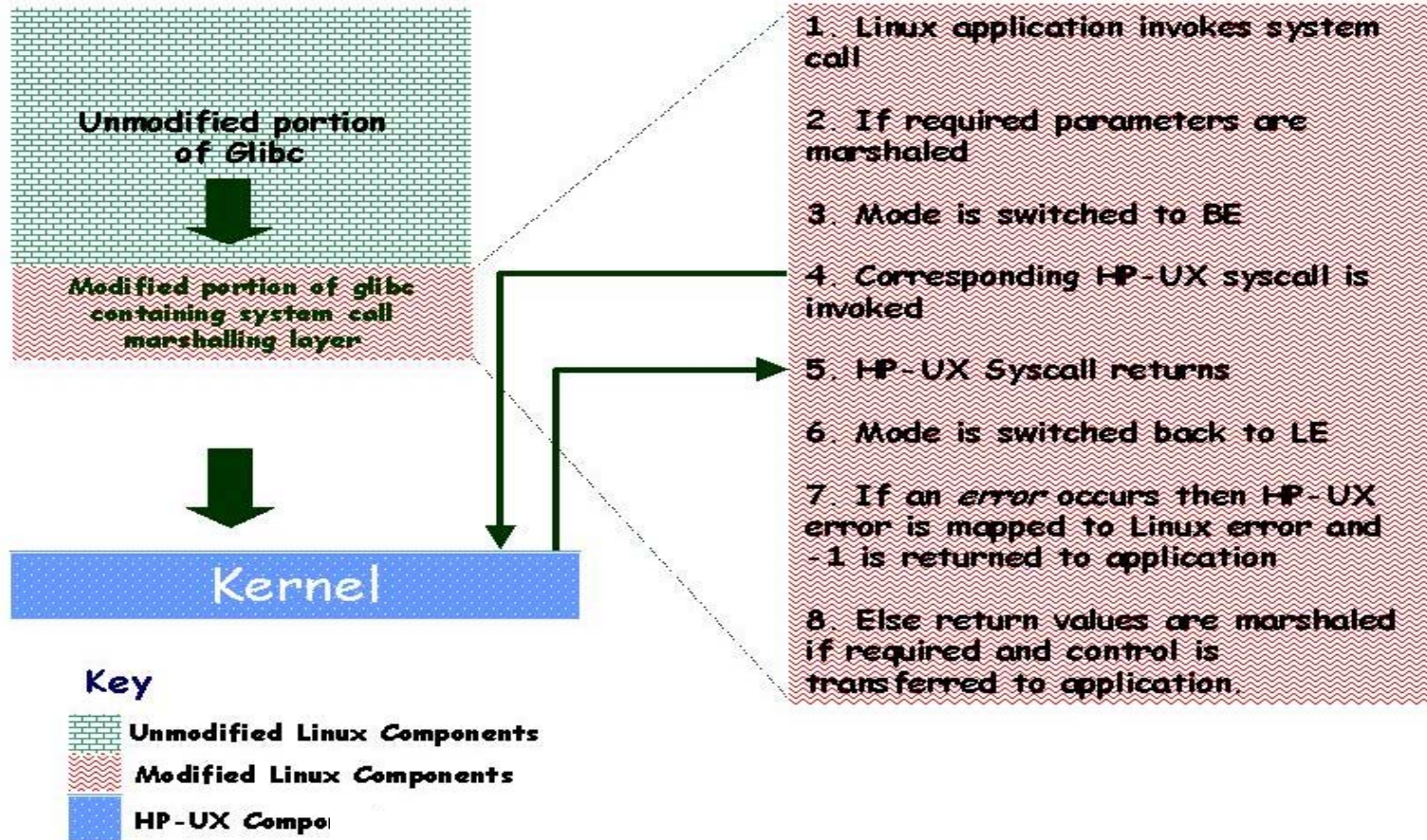


Key

-  Unmodified
-  Modified Linux Components
-  HP-UX Components

- A** Kernel recognizes Linux app and maps it into memory (start of text)
- B** Kernel maps dynamic loader into memory
- C** Kernel switches to little-endian mode and transfers control to dynamic loader
- D** Dynamic loader relocates the application. Then it loads and relocates dependent libraries into the HP-UX address space
- E** Dynamic loader transfers control to main program entry point

System calls



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HP-UX momentum continues

The HP-UX ecosystem

- A \$20B business
- Over 2 million units active
- #1 UNIX® market share by revenue last two quarters

More than 10 years proven expertise in mission-critical and resource partitioning management

- More than 70,000 Serviceguard licenses
- Over 65,000 resource partitioning licenses

Aggressive investment in HP-UX

- Major component of HP's overall R&D budget
- Over 2000 software engineers focused on the HP-UX ecosystem
 - Over 1300 HP-UX patents filed in 2002



HP-UX 11i recognized leadership



2002 UNIX Function
Review Report

- #1 Scalability
- #1 Reliability, availability, and serviceability
- #1 Systems management
- #1 Internet and Web application services
- #1 Directory and security services



Server Operating Systems Report: Winners and losers in the open/proprietary OS market



HP Superdome listed as top UNIX® server platform in Gartner, Inc.'s OLTP Server Evaluation Model report, 2002 and Data Warehousing Server Evaluation Model, 2002



"HP climbs to the top of the enterprise operating system market"
"2002 VARBusiness Annual Report Card . . . voted it to the top . . . in the enterprise operating platforms category."

hp-ux 11i insights for Linux apps deployment

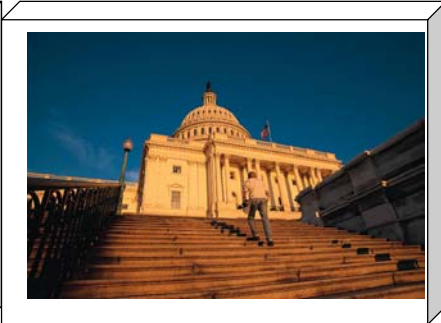
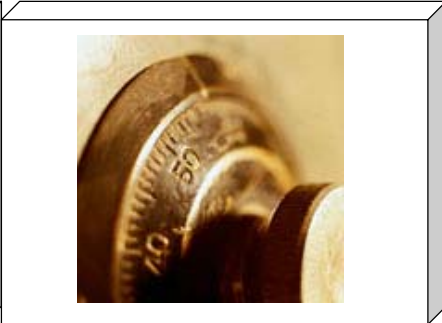
- better reliability and system management
- stronger directory & security features
- world-class high availability



Comprehensive, integrated, supported HP-UX security provides maximum protection

Physical analogy: bank security

**Continuous and secure
operation**



**Network
security**

**Intrusion
prevention**

**Intrusion detection
and analysis**

Mitigation

- IPsec
- Secure Shell
- Kerberos
- LDAP-UX integration
- Bind 9.2
- AAA Server*

- IPFilter
- Bastille
- Install-time security
- Pluggable authentication
- True random number generation (/dev/random)

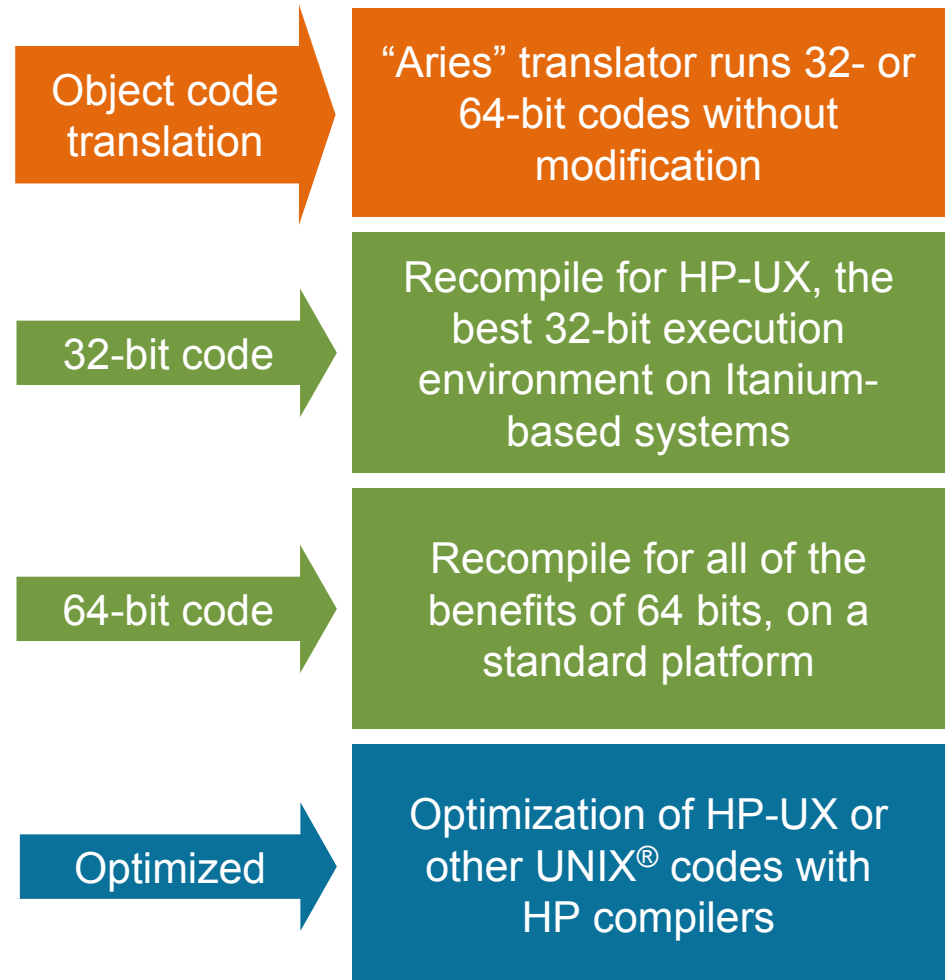
- Host-based intrusion detection
- Audit

- Role-based access control (SCM)

HP-UX 11i compatibility

Key benefits

- Binary compatibility through Aries dynamic code translation technology—no recompilation
- Source code compatibility from PA-RISC to Intel® Itanium® Processor Family—single source code stream
- Data compatibility between PA-RISC and Itanium Processor Family—no data conversions



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PRESENT → FUTURE

SOLUTIONS THAT INVOLVE AN ADAPTIVE INFRASTRUCTURE



ADAPTIVE INFRASTRUCTURE



RESOURCES / APPROACH

WHO

HOW

FUNCTIONAL OBJECT

PROGRAM

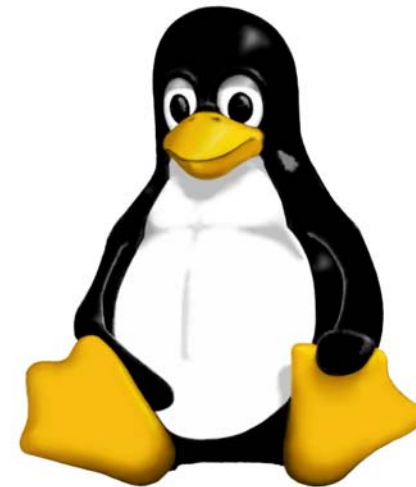
Next steps



Where to go for more information

References

- **HP-UX 11i web site**
<http://www.hp.com/go/hpux11i>
- **Linux web site from HP**
<http://www.hp.com/linux>
- **HP's developer & solution partner portal**
<http://www.hp.com/dspp>
- **Linux web site from HP**
<http://www.hp.com/go/LPK>



Business Systems Evolution

- Visit the website: <http://www.hp.com/go/evolve>
 - Centralized resource for programs, white papers, tools, web-based training, etc.
 - Select your present platform (AlphaServer, HP 9000, HP e3000)
- Sign up for “Customer Times” newsletter for quarterly updates
- Contact your sales rep or channel partner



HP Integrity Power Partner Program

- Worldwide DSPP program for ISVs
- Launched on June 30, 2003
- Provides marketing programs, technical resources, and hardware access for volume ISVs to transition their applications to one or more of the following:
 - HP-UX 11i v2 on Itanium
 - Windows Server 2003 on Itanium
 - Linux on Itanium
- Visit web site:
<http://www.hp.com/go/itaniumpartners>



Q & A



i n v e n t

Thank you for your attention!



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