

# Issues Encountered Porting Debian GNU/Linux to PARISC and IA-64

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# Objectives

- What is Debian GNU/Linux?
- How and why the PARISC and IA-64 Debian Ports Happened.
- Lessons learned during the ports that may help porting applications to these platforms in the future.
- Ongoing HP / Debian activities.

# What is Debian?

*"The Debian Project is an association of individuals who have made common cause to create a free operating system."*

- One of the most popular Linux distributions
- 11 architectures, nearly 10,000 packages
- Completely open volunteer organization
- International, with almost 1000 developers
- Focussed on Freedom
- Well represented in the Free Software world

# What Do I Mean by "Porting"?

- The act of making an existing piece of software work on some system other than that for which it was written.
- Porting Linux is a complex process...
  - Toolchain (compilers, libraries, etc.)
  - Kernel (CPU specifics, device drivers)
  - Applications

# Why Porting is Important

- ❑ Solving porting problems improves overall software quality
- ❑ Must support new hardware to take advantage of best price / performance
- ❑ When accomplished the way Debian handles ports, can provide a completely uniform computing environment across diverse systems

# A Personal Porting History

- RCA 1802 and the ACE
- Z80s and CP/M
- Early'ish Days of UNIX
- Emergence of the Free OS Community
- Debian

# The PARISC Port

- PARISC was the only major 32-bit CPU Family *NOT* running Linux!
- Various internal discussions at HP
- The Puffin Group, Oct 1998
- HP agrees to participate, March 1999
- Linuxcare acquires the Puffins
  - No longer just a "fun" project
  - Contract to continue porting efforts
- HP wanted a complete distribution

# Why Debian for PARISC?

- Port irrelevant without a full distribution.
- Public message: IA64 replaces PARISC
- PARISC port a community activity, not driven by direct business needs.
- Commercial distributors wanted "real" \$\$
- Debian perceived as "a Commons"
- Key engineers on project liked Debian...



# How HP Engaged Debian

- No Forks!
  - Must be a "real" Debian port
  - Merge all code upstream immediately
- Continue Linuxcare contract
- Hire existing Debian developers
- Encourage HP engineers to join Debian
- Selected investments in Debian features

# The IA-64 Port

- Large industry focus on IA-64
- HP already a significant contributor
  - HP Labs hosting key contributors
    - David Mosberger
    - Stephane Eranian
  - Joint development efforts with Intel
- Commercial Linux distributions had a head start, which helped Debian

# The IA-64 Port

- Before Debian acquired hardware
  - Packages built on Sourceforge machines
- HP unknowingly provides a machine...
  - Evaluation systems provided to Agilent
  - Compiled in chroot until self-hosting
  - Debian autobuilder activation
  - HP hires Bdale, sends out systems ...

# Current Status

- Both ports are now "community supported"
- Both ports released with Debian 3.0
- Most Debian packages built and tested
  - 95% of packages run on PARISC
  - 97% of packages run on IA-64
- Both full Debian media kits and installer-only CD images are available now

# Porting Issues Encountered

- Not all CPU's are 32 bits!
  - IA-64 is LP64
  - PARISC can run 32 or 64 bit modes
- New architectures ***MUST*** track development kernels and toolchains
  - gcc 2.96+patches for ia64, 3.0 for hppa
  - Kernel version 2.4 vs 2.2

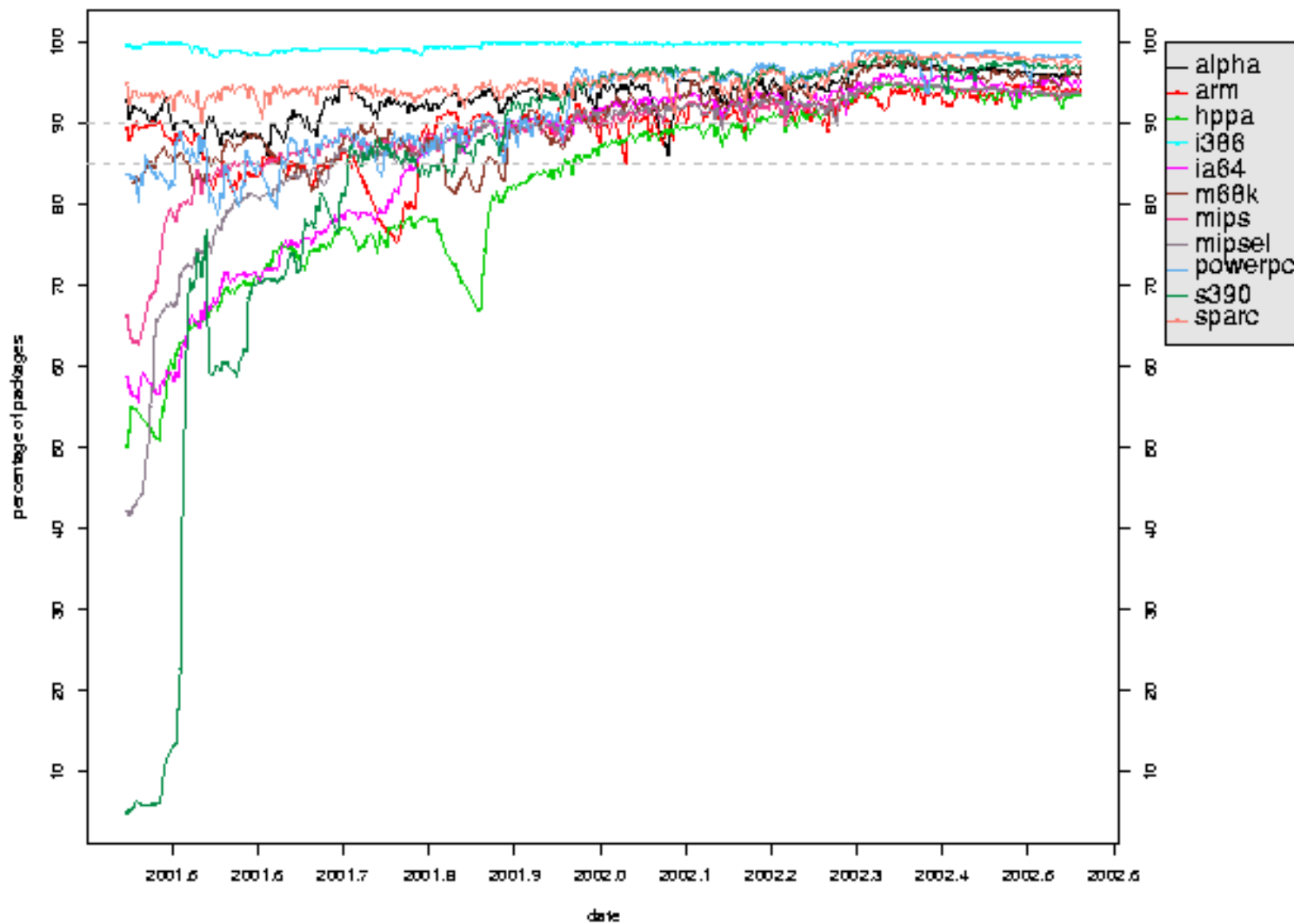
# More Porting Issues

- config.{sub, guess} updates required
- unraveling dependency chains
- hppa == hp-ux (or mips == irix), etc.
- gcc (g++) 3.0 errors, particularly on i386
- non-PIC in shared objects
- assuming that char == [un]signed char
- Software authors who would rather exclude an architecture than fix it

# Other Things to Think About

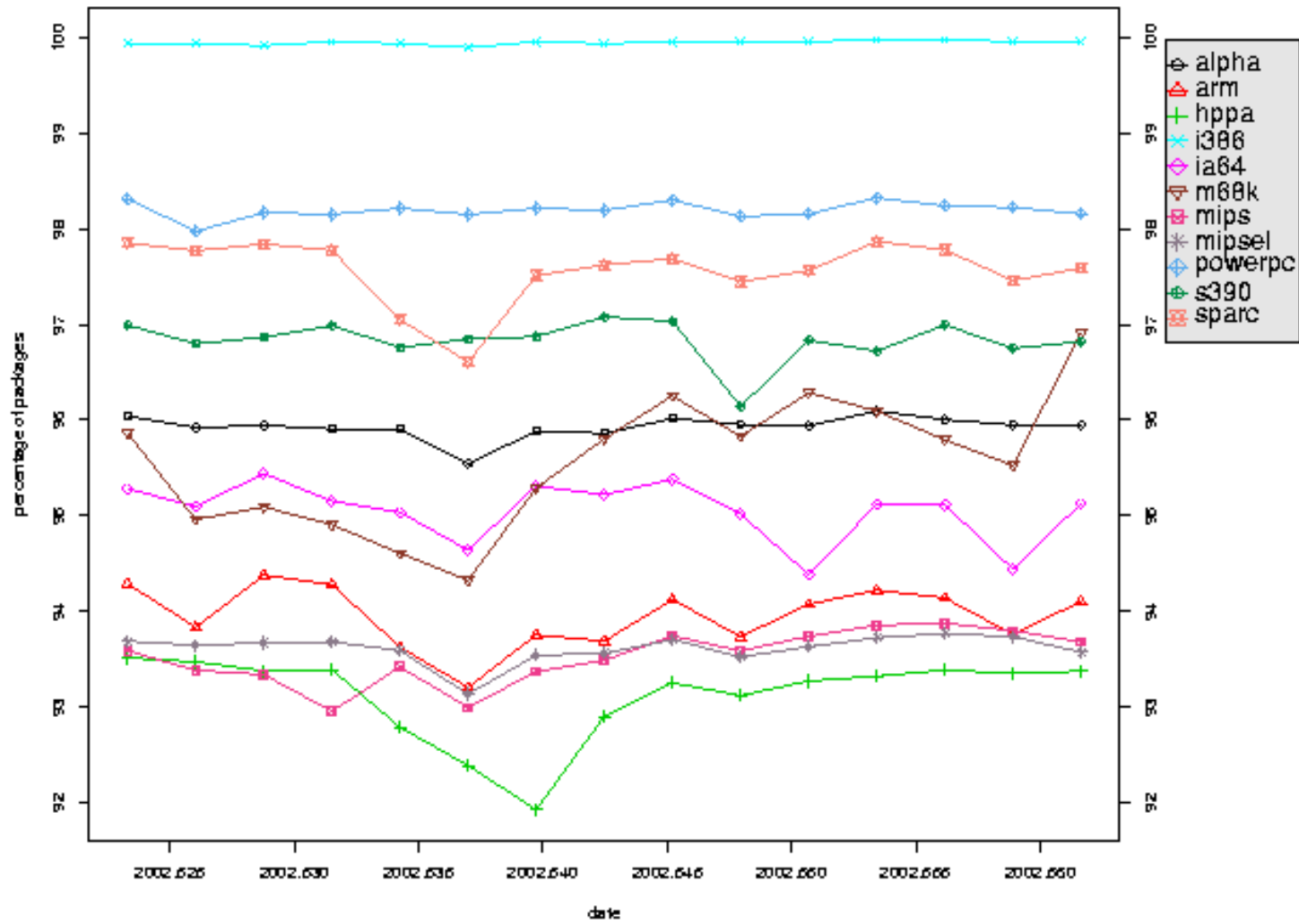
- Not all platforms have all features...
  - Some applications assume special hardware is available.
    - Sound Interfaces
    - Joysticks
- Support for serial consoles is very important for servers and embedded systems!

What percent is built for each architecture





What percent is built for each architecture (past two weeks)



## For More Information

- Debian website is [www.debian.org](http://www.debian.org)
- Each port has an information page
  - <http://www.debian.org/ports/hppa>
  - <http://www.debian.org/ports/ia64>
- Each port has at least one mailing list, details are on the ports pages