Gentoo Prefix

“Gentoo on a different level”

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Some History

- Gentoo for Mac OS X (ppc-macos)
- Portage on OSX installing in /bin, /usr/bin
- Rely on (outdated/buggy/non-GNU) host-provided software and tools
- Many blocks for packages that couldn’t be updated
Lessons Learnt

- Approach quickly stalls
- Annoys the hell out of everyone
  - users
  - developers
  - the other Gentoo developers
- Simply won’t work long term
Take Two

- Minimally rely on host-system
- “Upgrade” host-provided packages
- Have full development-friendly environment
- (Get vim and mutt out-of-the-box)

“Father, why are we hiding from the police?”
Introducing Prefix

- Portage installs into an offset (= prefix)
- Offset is arbitrary: no conflicts, full control
- Can install as much as possible
- Just rely on minimum (kernel, libc)

“because they use emacs son, and we use Vi”
Prefix for Dummies

- Avoid conflicts, use an offset
- Works on multiple platforms, not just Linux
- Builds identical toolset everywhere

“One Prefix to Rule Them All”
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“One Prefix to Rule Them All”
Wall of Fame

- Michael Haubenwallner makes patch
- Brian Harring forks off a branch
- Kito Danya Dietrich engineers first version

“Once upon a time...”
Start-up Problems

- Developers leave or disappear
- Knowledge vaporises
- Nothing happens

“... things that should not have been forgotten, were lost ...”
Get the Ball Rolling

- Rebirth of Prefix
- New Portage implementation
- Periodically sync prefix overlay with main tree for updates, fixes, etc.
- Package and contributions growth
Tree Overlay Keywords
Some Facts

- Prefix Portage is branch of official Portage
- Very close to “master”, but autotooled
- Merges are ~95% of the time automatic

“99% of all statistics are made up”
Infrastructure

- Prefix has its own rsync tree (generation and slaves)
- Fully signed (automated key)
- gx86 overlaid with Prefix overlay
- regeneration twice per hour

“Prefix, Just Do It”
Rsync Tree Generation

Prefix rsync0 generation timings breakdown for the last 24 hours

duration in minutes

generation start time
The Prefix

- No root privileges
- unnecessary in Prefix
- allows user installations

Exact Gentoo Linux layout in offset
- often makes no sense (/usr?)
- eases compatibility with mainline Gentoo

“Got root? No.”
Prefix EAPI 3

- The offset itself EPREFIX

- Two conveniences:
  - EROOT=${ROOT}${EPREFIX}
  - ED=${D}${EPREFIX}

- Functions econf, dosym, etc. are prefix-aware (--prefix=${EPREFIX}/usr)
Prefix Changes

- Patches for build-systems
  - hard-coded path lookups in host system, competitors (macports, fink, ...)
  - hard-coded system knowledge (Solaris always uses Sun ld, not in Prefix)

- (Config) file locations

  packages should look for config in Prefix
Ebuild Changes

- Ensure we find and use Prefix’
  - tools
  - headers
  - libs
- And install in the Prefix as well
Scripts

- Easily go unnoticed (emerge fine)
- Shebang, start of the story (Portage check)
  
  ```bash
  #!/usr/bin/ruby
  ```
- Encoded paths (needs manual checking)
- Essential ones (gcc-config, eselect, ...)

The Result

- Gentoo inside another system
- development-friendly
- superb package management
- Runs as an ordinary user
- Builds an identical toolset for different systems

“Going places no Gentoo has gone before”
Questions?
Thanks for your attention

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