



Gentoo Prefix for Mac and Linux on CVMFS

Guilherme Amadio

Agenda

- ▶ Short review of previous discussion
 - Introduction to Gentoo — <https://www.gentoo.org>
 - Portage package manager
 - Main features and concepts
 - Ebuild scripts
- ▶ Gentoo Prefix evaluation environment on CVMFS

Gentoo's Portage Package Manager

- ▶ Written in Python, based on FreeBSD's ports system
- ▶ Packages are special shell scripts called ebuilds
- ▶ Extensive options for dependency management
- ▶ Highly flexible configuration/customization
- ▶ Parallel and distributed builds (with distcc)
- ▶ Supports installing many versions of the same package
- ▶ Easy to support live packaging from git/svn/hg repos
- ▶ Use case in HEP: managing LCG releases in CVMFS

Why Use Portage?

- ▶ Portage is a mature solution (15+ years development)
 - Formal, versioned Package Manager Specification (PMS)
 - Used by Google's Chrome OS and CoreOS
- ▶ More than 19,000 currently available packages,
including many HEP packages (Geant4, ROOT, etc)
- ▶ Leverage work done by other volunteer developers
- ▶ Extensive documentation at devmanual.gentoo.org
- ▶ Support for multiple OS's and hardware architectures

Distribution Models for HEP

- ▶ Full OS, Virtual Machines, Containers
 - Base images with common HEP packages
 - Binary package servers with pre-compiled add-ons
 - Automated image build process with Catalyst
- ▶ Gentoo Prefix Environments
 - Packages installed within a prefix by non-root users
 - Good solution for distributing via CVMFS
 - Support for Mac OS X and other systems (users' laptops)
 - Experimental installations now available!

Gentoo Prefix Project

- ▶ Relies on host OS's kernel and C library
- ▶ Uses Portage to install packages within a prefix
- ▶ Optionally, can rely only on the host kernel on Linux
 - Works out of the box virtually on any distribution
- ▶ Support for Linux, Solaris, macOS, other UNIX systems

How do I use Gentoo Prefix?

Using Gentoo Prefix from CVMFS on Linux

```
$ /cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/startprefix
Entering Gentoo Prefix /cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux
$ which ls
/cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/bin/ls
$ which cmake
/cvmfs/sft.cern.ch/lcg/contrib/gentoo/linux/usr/bin/cmake
$ cmake --version
cmake version 3.9.2

CMake suite maintained and supported by Kitware (kitware.com/cmake).
$ gcc-<Tab>
gcc-4.8.5 gcc-4.9.4 gcc-5.4.0 gcc-6.3.0 gcc-6.4.0 gcc-7.1.0 gcc-7.2.0 gcc-ar gcc-config gcc-nm gcc-ranlib
$ clang++-<Tab>
clang++-4.0 clang++-5.0
$ eselect python list
Available Python interpreters, in order of preference:
[1] python3.5
[2] python2.7
[3] python3.6
[4] python3.4
$ python
python python2.7 python2-config python3.5 python3.5m python3.6 python3.6m python3-config
python2 python2.7-config python3 python3.5-config python3.5m-config python3.6-config python3.6m-config python-config
```

How do I use Gentoo Prefix?

Using Gentoo Prefix from CVMFS on macOS

```
$ /cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/startprefix
Entering Gentoo Prefix /cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos
$ which ls
/cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/usr/bin/ls
$ which cmake
/cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/usr/bin/cmake
$ cmake --version
cmake version 3.9.4

CMake suite maintained and supported by Kitware (kitware.com/cmake).
$ which make
/cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/usr/bin/make
$ gcc-
gcc-4.2.1  gcc-5.3.0  gcc-ar      gcc-config  gcc-nm      gcc-ranlib
$ clang++ --version
clang version 3.9.1 (tags/RELEASE_391/final)
Target: x86_64-apple-darwin16.7.0
Thread model: posix
InstalledDir: /cvmfs/sft.cern.ch/lcg/contrib/gentoo/macos/usr/bin
$ eselect python list
Available Python interpreters, in order of preference:
 [1]  python3.5
 [2]  python2.7 (fallback)
```


Thank you!