emerge world

Putting Your Processor to the Grindstone

What is Gentoo?

- Simply: a GNU/Linux metadistribution that focuses on building systems and software from source.
    - Full x86 installation instructions from the Gentoo Foundation here.
- The user is responsible for:
    - fetching necessary binaries for system functionality (all of /usr/bin);
    - installing the bootloader;
    - configuring and installing the kernel;
    - other basic programs for a bootable system.
- Upstream provides:
    - documentation on all of the above;
    - a bootable liveCD/liveDVD/liveUSB;
    - basic utilities to build the above.
- Portage works with both FreeBSD and Linux From Scratch.

The setup

- The computer used for this talk is a stable x86 machine with the following:
  - kernel; bootloader (GRUB 2); other packages as needed
- Portage already installed
- Assuming the user installed the system per the Gentoo installation manual.

Portage utility: emerge

emerge is the central program for installing, managing and updating programs. This comes standard with the system.

Some important features:

- Package information stored in flat files (ebuilds)
- USE flags for feature toggling
- Source build instructions
- Portage-dependent package dependencies
- Sync feature keeps systems current.
- Source files known as distfiles

Dealing with packages in Portage

- Keep up-to-date with with the emerge --sync command
  - Upstream Gentoo team maintains new & removed packages on their server.
  - Sync can be done via rsync (default) or over HTTP (webrsync option)
- Searching in Portage
  - emerge -S <program name>
  - Time consuming

- Package structure
  - <category>/<package name>
  - Ex: app-misc/hello

An ebuild exemplar: GNU hello

What is hello? It is simply a GNU "Hello, world" application.

```
user@host:~$ hello
Hello, world!
```

For the sake of time, it is listed as `app-misc/hello`.
Some highlights of the ebuild file:

- `DESCRIPTION` & `HOMEPAGE`: software description & homepage, respectively
- `SRC_URI`: where to obtain the source files
  - Full documentation via upstream.
- `KEYWORDS`:
- `IUSE`: USE flags that the package will accept.

src functions - specific instructions to carry out during certain phases of the build

- `src_configure`: carry out the specified instructions and pass them to autoconf
- `src_install`: carry out the specified instructions before and/or after executing `make install`

USE Flags

Gentoo upstream maintains full documentation online.

USE flags ~= keywords:

`gnome` enables GNOME support, `ncurses` enables the NCURSES text-based interface, and so forth.

Some packages have USE flags specific to the program itself.

E.g. Lighttpd (`www-servers/lighttpd`) has the `webdav` flag that enables a patch for that specific package.

Users may set USE flags globally or on a package-specific level.

Calling emerge to build packages

Installing GNU Hello:

emerge -pv app-misc/hello

emerge -v app-misc/hello

[Documentation from Gentoo upstream]

[`man 1 emerge`]

`-p` or `--pretend`: set up, calculate dependencies, but do nothing

`-a` or `--ask`: set up, calculate dependencies, but prompt the user prior to merge

`-v` or `--verbose`: Tell me **EVERYTHING**.

Files in /etc/portage

1. make.conf
2. package.use
3. package.mask

1. This is where users can toggle USE flags globally for their system, and set other Portage-related variables. This also includes GCC flags for their processors.
2. This is for individual package USE flag toggles.
   Syntax: `<package name> <+/-flag>`
3. Block packages entirely.

Keeping up with the Joneses

Maintaining a list of installed packages (sets) via flat files.

system: the list of packages needed for basic system functionality

To update this set:

```
emerge system
```

world: all the packages that the user has manually installed as well as any dependencies merged.

To update this set:

```
emerge world
```

These packages are written to `/var/lib/portage/world`. **DO NOT EDIT THIS FILE MANUALLY.**

- Flexibility
  - install what programs you want and how you want them
- Control
  - Specify what programs you want built with certain functionality;
  - Filter programs based on stability, license, and personal choice.
- Competent package nomenclature.

- And lastly, a slight inclination towards insanity.

But why Portage?

Hacking Portage for Fun and Profit

- eix (`app-portage/eix`)
  - Builds a flat file database of everything installed & available in Portage
    - This speeds up searches greatly
  - Provides version information
  - Provides description & homepage
  - Will also list toggled & available USE flags

- Gentoolkit (`app-portage/gentoolkit`)
  - A suite of programs, inc:
  - equery
    - The `uses` flag lists and describes all of the available USE flags for a package.
    - `list` flag will search for any packages installed matching the query

Other resources

Gentoo/FreeBSD
logo

[Gentoo Wiki]

[Gentoo upstream documentation]

[Gentoo forums]

Unofficial Gentoo mascot:
Larry the Cow

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