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.
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 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
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

   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. package.use

   This is for individual package USE flag toggles.
   Syntax: <package name> <+/-flag>

3. package.mask

   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 Wiki
Gentoo upstream documentation
Gentoo forums

Gentoo/FreeBSD logo

Unofficial Gentoo mascot:
Larry the Cow

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