Introduction to Gentoo Linux

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Gentoo Linux

- *Started 5 years ago by Daniel Robbins.*
- *Source-based meta distribution.*
- *x86, PPC, 32-bit or 64-bit Sparc, Alpha*
- *Active developer community.*
- *All developers are volunteers.*
- *GPL-2, LGPL, or other OSI-approved license.*
- *Bug-fixes and patches submitted upstream.*

How We Came to Gentoo

- *UNIX experience*
- *Linux experience*
- *Gear at home*

RedHat annoyances

- *config.rpmnew.*
- *OpenSSH privilege separation.*
- *PHP 4.2.x and xslt.*
- *wget 1.8 ?*
- *qmail ?*
- *No package management for non-rpm files.*

Gentoo features

- *We provide scripts which download, compile, and install packages.*
- *glibc, gcc, ext3, ReiserFS, XFS, ALSA, pcmcia-cs, Xfree86 OpenGL, KDE, Gnome*
- *devfs, GRUB, lilo, yaboot, BootX.*
- *Multiple kernel possibilities*
  - *Vanilla 2.4.20, aa-, ac-, acpi-, openmosix-, ppc-, redhat-sources, preempt, low latency, EVMS.*
- *Prelinking, ccache.*
- *genkernel tool for one-step kernel build*

Portage features

- Modeled on the ports-based BSD distributions.
- Dependency checking, extreme customization.
- No predefined set of optimization levels or configure options.
- Original source tarballs are downloaded.
- System is built to user specifications.
  - Compiles are optimized for your specific hardware.
    - E.g. Altivec on G4 PPC chips, Pentium versus Athlon.
  - Specify settings once, and all packages are built to those options.

USE flags

- Globally defined list of features.
  - Configure yours in /etc/make.conf.
- USE flags
  - Each one defines specific functionality for each package to support.
  - USE flags generally map onto --configure options.
  - “Opt-in” versus “opt-out”.
- Install only what you want. No need to trim down a default installation.

Sample USE flags

esd	Adds support for media-sound/esound (Enlightened Sound Daemon)
ethereal	Adds support for ethereal wiretap log support in kismet
ev6	Assume Alpha processor is EV6 or better
evo	Adds support for evolution in gnumeric
fastcgi	Add support for the FastCGI interface
fbcon	Adds framebuffer support for the console, via the kernel
firebird	Adds support for the Firebird relational database
flash	Adds support for creating flash files using Ming
foomaticdb	Adds support for the foomatic printing driver database
freetds	Adds support for the TDS protocol to connect to MSSQL/Sybase databases
freewnn	Adds support for FreeWnn kana to kanji conversion engine

Sample /etc/make.conf

```
# Build-time functionality
USE="X xv mmx arts odbc cups lame slang readline berkdb gdbm tcpd pam libwww ssl alsa nls mitshm perl gif sdl
vorbis ogg gtk qt kde motif opengl mozilla objprelink"

# Host Setting
CHOST="i686-pc-linux-gnu"

# Host and optimization settings
#CFLAGS="-mcpu=athlon-xp -O3 -pipe"
#CFLAGS="-march=pentium3 -O3 -pipe"
CXXFLAGS="${CFLAGS}"

GENTOO_MIRRORS="<your_mirror_here> http://www.ibiblio.org/pub/Linux/distributions/gentoo"
```

Sample /etc/make.conf

```
# Portage Directories
PORTAGE_TMPDIR=/var/tmp
PORTDIR=/usr/portage
DISTDIR=${PORTDIR}/distfiles
PKGDIR=${PORTDIR}/packages
PORT_LOGDIR=/var/log/emerge/

# Fetching files
FETCHCOMMAND="/usr/bin/lukemftp -s -a -o \${DISTDIR}/\${FILE} \${URI}"
RESUMECOMMAND="/usr/bin/lukemftp -s -a -R -o \${DISTDIR}/\${FILE} \${URI}"
# FETCHCOMMAND='/usr/bin/proz --no-getch -s ${URI} -P ${DISTDIR}'

# Advanced Features
MAKEOPTS="-j2"
AUTOCLEAN="yes"
FEATURES="sandbox ccache buildpkg"
RSYNC_RETRIES="3"
ALSA_CARDS="emu10k1"
```

Portage demo

- *rsync*
- *Package searching, installation, cleaning, removal*
  - *--pretend*
  - *--deep*
  - *Other options*
- *Ebuild command for developers.*
- *etc-update*
  - *CONFIG_PROTECT*
- */var/db/pkg*
- */usr/portage/distfiles*

Ebuild scripts

- *Easy to read format, clear separation of phases.*
- *KEYWORDS, DEPEND.*
- *Stable versus testing.*

Ebuild scripts in detail

- *Naming convention*
  - *Package_name-version:* **`blu-2.8`**
  - *Release indicators after underscore:* **`linux-2.4.20_pre10`**
- File format
  - Variables
  - Dependencies
  - Standard functions
    - `pkg_setup()`
    - `src_unpack()`
    - `src_compile()`
    - `src_install()`

Sample Ebuild: deps

```
#
# My ebuild script (gentooZealot@cubefarm.aq
#
SAFE_VERSION="2.09"
SRC_URI="ftp://ftp.perl.org/pub/CPAN/src/${MY_P}.tar.gz
        ftp://ftp.perl.org/pub/CPAN/modules/by-module/DB_File/DB_File-
${DB_FILE_VERSION}.tar.gz
        ftp://ftp.perl.org/pub/CPAN/modules/by-module/Safe/Safe-${SAFE_VERSION}.
tar.gz"
HOMEPAGE="http://www.perl.org/"
SLOT="0"
KEYWORDS="x86 amd64 sparc ppc alpha mips hppa ia64"
IUSE="berkdb doc gdbm threads"

DEPEND="sys-apps/groff
        berkdb? ( sys-libs/db )
        gdbm? ( >=sys-libs/gdbm-1.8.0 )
        >=sys-apps/portage-2.0.48-r4
        =sys-devel/libperl-${PV}*
        !<dev-perl/ExtUtils-MakeMaker-6.05-r6
        !<dev-perl/File-Spec-0.84-r1
        !<dev-perl/Test-Simple-0.47-r1”
```

Sample Ebuild: std. funcs

```
pkg_setup() {
        if [ -n "`use threads`" ]
        then
                ewarn "Threading?  Uh oh!"
                  rm -rf /
                  reboot
        else
                ewarn ""
                ewarn "PLEASE NOTE: If you want to compile perl-5.8 with"
                ewarn "threading enabled , you must restart this emerge"
                ewarn "with USE=threads emerge...."
                ewarn ""
        fi

        if [ ! -f /usr/lib/${LIBPERL} ]
        then
                # Make sure we have libperl installed ...
                eerror "Cannot find /usr/lib/${LIBPERL}!  Make sure that you"
                eerror "have sys-libs/libperl installed properly ..."
                die "Cannot find /usr/lib/${LIBPERL}!"
        fi
}
```

Binary packages

- *Build your own, distribute packages to your machines.*
  - *emerge --buildpkg*
- *GRP (Gentoo Reference Platform)*
  - *Pre-built binary packages using default options.*
  - *Gnome2, KDE, openoffice.*

Installation

- *Doesn't it take a long time to install packages?*
  - *Designed for modern hardware.*
  - *Will run on a Pentium or PPC 603 with 64mb RAM.*
- *Net connection required.*
- *Secure by default because nothing is installed by default.*
- *Packages are installed into a "staging" directory, then merged.*
- *Virtual packages.*

Installation process

- Currently no graphical installer.
- Just follow the detailed install documents.
  - Boot from CD, setup networking, partition.
  - Unpack stage 1, stage 2, or stage 3.
  - Chroot, bootstrap or emerge system.
  - Compile kernel, syslogger.
  - Setup bootloader.

Stage tarballs

- Stage 1 install
  - Bare-bones. Need to bootstrap, compile gcc, glibc, system (make, perl, etc), kernel, and user environment.
- Stage 2 install
  - Already bootstrapped. Compile system, kernel, and user environment.
- Stage 3 install
  - Base system included. Compile kernel and boot manager.

Init scripts

- Named (not numbered) run levels.
- Smart dependencies.
  - Scripts can ‘use’ or ‘depend’ on others.
- Start / Stop / Pause.
- /etc/runlevels/default/.

Coming soon

- *distcc, a distributed C compiler.*
- *CPAN/Portage integration.*
  - *Install and manage dependencies via Portage.*
  - *Package management for perl modules (including uninstall).*
- *CD-based installers.*
- *Port to S/390, ARM, embedded devices.*
- *cvsup instead of rsync.*

Try out Gentoo Linux

- Download from www.gentoo.org.
  - 16-230mb iso images, plus 10-85mb stage files.
- Unreal Tournament 2003 demo for x86/NVIDIA.
  - Does not touch your hard drive.
- Live CDs for x86, PPC (NewWorld and OldWorld).
- All live CDs are also install and rescue CDs.

Documentation

- *Installation, FAQs.*
- *Portage user manual.*
- *USE flags, ENV.D, Security guide, AFS.*
- *Desktop configuration guide, rc-scripts, ALSA.*
- *Developer documentation*
  - *Ebuild creation, eclass.*
  - *User-Mode Linux.*
  - *Documentation guide (XML syntax).*

Gentoo Community

- *Close contact with end users.*
- *Most ebuild scripts are submitted by users.*
- *Multiple mailing lists (each architecture, documentation, security).*
- *IRC channels (on irc.freenode.net).*
- *Web-based forums (on forums.gentoo.org).*
- *Fully-public bug tracking (bugs.gentoo.org).*
- *Linux World Expo this week.*