

Gentoo. Why might you?



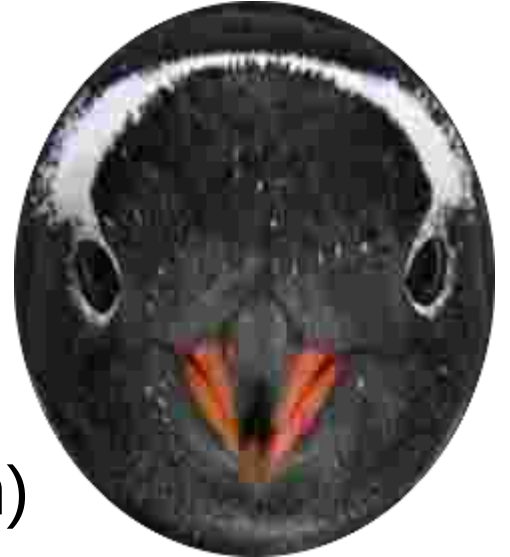
“***Gentoo*** is as tedious as a twice-told tale,
Vexing the dull ear of a drowsy man.”

- William Shakespeare – *King John* – 1598

Gentoo Penguin

The fastest penguin in the south (36 km/h)

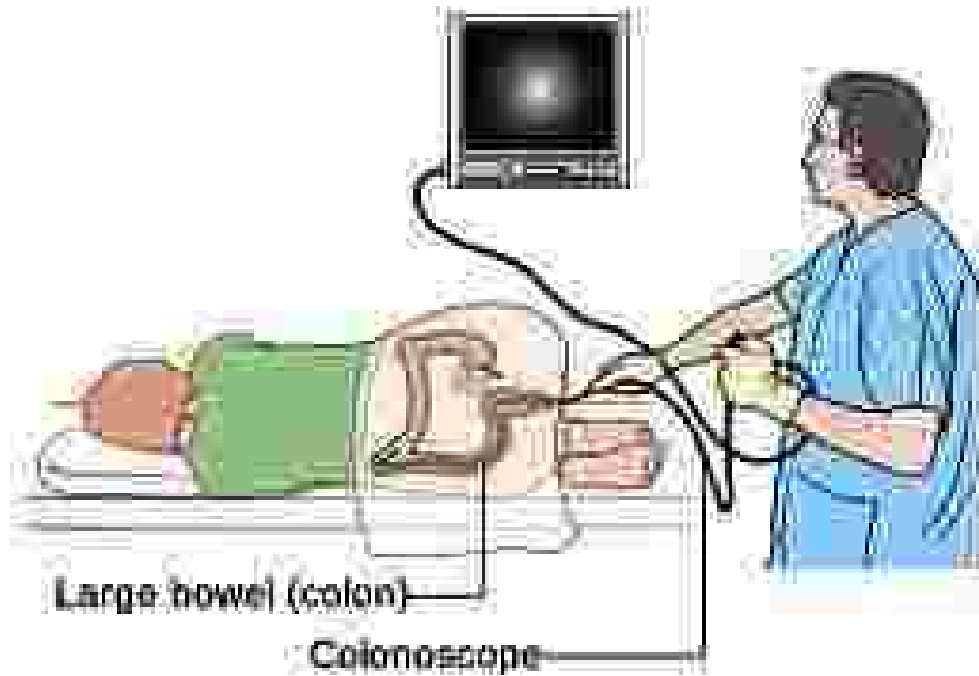
- **Penguin** – etymology unclear
 - Welsh: pen (“head”) and gwyn (“white”).
 - Latin: pinguis (“fat”).
- **Gentoo** – etymology
 - Anglo Indian “Gentoo” (Hindu, not Muslim)
 - from Portuguese “gentio” (gentile – non Jewish)
- **Gentoo Penguin** – probably
 - from Falkland Island English



Gentoo Linux

- *Not* about being the fastest Linux.
 - Flexible.
 - With flexibility comes complexity.
 - But. Gentoo ***is*** faster...
- How to install Gentoo?
 - NOT GOING TO TELL YOU!

Colonoscopy



- How to install an colonoscope.
- Want a colonoscopy?
- Ask about the benefits of a colonoscopy before requesting one.

Benefits of Gentoo...

- **USE flags** – controlling features to be built into packages
- **Profiles** – predefined sets of USE flags.
- **genkernel** – roll your own kernel, adding or removing features.
- **ebuilds, overlays** and **layman** – building unofficial packages
- Home rolled binary packages – **buildpkg** and **usepkg**.

---- USE flags ----

- Configure features from packages.
 - Exclude unused functionality.
 - Include exotic functionality.
 - Remove or permit un-free software.
 - Select language version (python, ruby, perl)
- Overview
 - <https://www.gentoo.org/support/use-flags/>

Profiles

- Set of USE flags
- Default set from profile (desktop, developer, server, selinux etc)
- Change the profile and rebuild will transform your system, without re-installation.
- View available profiles ('eselect profile list')

Profiles ('eselect profiles list')

<snip>

- [12] default/linux/amd64/17.0 (stable) *
- [13] default/linux/amd64/17.0/selinux (stable)
- [14] default/linux/amd64/17.0/hardened (stable)
- [15] default/linux/amd64/17.0/hardened/selinux (stable)
- [16] default/linux/amd64/17.0/desktop (stable)
- [17] default/linux/amd64/17.0/desktop/gnome (stable)
- [18] default/linux/amd64/17.0/desktop/gnome/systemd (stable)
- [19] default/linux/amd64/17.0/desktop/plasma (stable)
- [20] default/linux/amd64/17.0/desktop/plasma/systemd (stable)
- [21] default/linux/amd64/17.0/developer (stable)
- [22] default/linux/amd64/17.0/no-multilib (stable)
- [23] default/linux/amd64/17.0/no-multilib/hardened (stable)
- [24] default/linux/amd64/17.0/no-multilib/hardened/selinux (stable)
- [25] default/linux/amd64/17.0/systemd (stable)

<snip>

- [54] hardened/linux/uclibc/amd64 (exp)

Use *speex* codec to compress audio

- Script to download rss news podcasts (40Mb for 50 minute show)
- Compress with speex codec. Open source version of “gsm” codec.
- Compresses 40Mb => 2.4Mb
- Download at cabin (at 5c / Mb)
- ffmpeg doesn't support speex by default.

eix ffmpeg

```
[i] media-video/ffmpeg
  Available versions: 3.2.6(0/55.57.57)^d (~)3.2.7(0/55.57.57)^d 3.3.4(0/55.57.57)^d 3.3.6(0/55.57.57)^d (~)
3.3.8(0/55.57.57)^d (~)3.4.4(0/55.57.57)^d [M](~)4.0.2(0/56.58.58)^d [M]**9999(0/56.58.58)^d {X also altivec amr
amrenc appkit armv5te armv6 armv6t2 armvfp bluray bs2b +bzip2 cdio celt chromaprint chromium codec2 cpudetectio
n debug doc ebur128 +encode fdk flite fontconfig frei0r fribidi gcrypt gme gmp gnutls +gpl gsm +hardcoded-tables
+iconv iec61883 ieee1394 jack jpeg2k kvazaar ladspa libaom libass libcacca libdrm libilbc libressl librtmp libso
xr libv4l lv2 lzma mipsdsp1 mipsdsp2 mipsfpv mmal modplug mp3 neon +network nvenc opengl openc1 openglopenh26
4 openssl opus oss pic +postproc pulseaudio rubberband samba schroedinger sdl snappy sofalizer speex ssh static-
libs svg test theora +threads truetype twolame v4l vaapi vdpau vorbis vpx wavpack webp x264 x265 xcb xvid zeromq
zimg +zlib zvbi ABI_MIPS="n32 n64 o32" ABI_PPC="32 64" ABI_S390="32 64" ABI_X86="32 64 x32" CPU_FLAGS_ARM="neon
thumb thumb2 v6 v8 vfp vfpv3" CPU_FLAGS_X86="3dnow 3dnowext aes avx avx2 fma3 fma4 mmx mmxext sse sse2 sse3 sse
4_1 sse4_2 ssse3 xop" FFTOOLS="+avioat +cws2fws +ffescape +ffeval +ffhash +fourcc2pixfmt +graph2dot +ismindex +
pktdumper +qt-faststart +sidxindex +trasher" VIDEO_CARDS="nvidia"}
  Installed versions: 3.4.4(0/55.57.57)^d(16:13:39 29/09/18){X also bzip2 encode fdk fontconfig gpl hardcode
d-tables iconv jpeg2k libv4l mp3 network opengl oss postproc pulseaudio sdl static-libs svg theora threads truet
ype v4l vorbis webp x264 x265 xvid zlib -altivec -amr -amrenc -appkit -bluray -bs2b -cdio -celt -chromaprint -ch
romium -cpudetection -debug -doc -flite -frei0r -fribidi -gcrypt -gme -gmp -gnutls -gsm -iec61883 -ieee1394 -jac
k -kvazaar -ladspa -libass -libcacca -libdrm -libilbc -librtmp -libsoxr -lzma -mipsdsp1 -mipsdsp2 -mipsfpv -mma
l -modplug -nvenc -openal -openc1 -openh264 -openssl -opus -pic -rubberband -samba -snappy -speex -ssh -test -tw
olame -vaapi -vdpau -vpx -wavpack -xcb -zeromq -zimg -zvbi ABI_MIPS="-n32 -n64 -o32" ABI_PPC="-32 -64" ABI_S390=
"-32 -64" ABI_X86="64 -32 -x32" CPU_FLAGS_ARM="-neon -thumb -thumb2 -v6 -v8 -vfp -vfpv3" CPU_FLAGS_X86="3dnow 3d
nowext mmx mmxext sse sse2 sse3 -aes -avx -avx2 -fma3 -fma4 -sse4_1 -sse4_2 -ssse3 -xop" FFTOOLS="avioat cws2fw
s ffescape ffeval ffhash fourcc2pixfmt graph2dot ismindex pktdumper qt-faststart sidxindex trasher")
  Homepage:          https://ffmpeg.org/
  Description:       Complete solution to record, convert and stream audio and video. Includes libavcodec
```

Enable / disable USE flags

- Per package (*/etc/portage/package.use*)
 - Turn on: **media-video/ffmpeg speex**
 - Turn off: **net-analyzer/wireshark -qt4 qt5**
- Globally (*/etc/portage/make.conf*)
 - **USE= "-qt4 qt5"**
 - **USE= "-doc"**
 - **USE= "-X wayland"**

re 'emerge' ffmpeg

- **emerge -uDN @world**
 - u (--update) to most recent supported version
 - D (--deep) check entire dependency tree
 - N (--newuse) apply new USE flags
 - Update everything (only ffmpeg will be updated)
- USE flags allow Gentoo to:
 - exclude the cruft you don't need
 - include stuff you do need

Global or package USE flags?

- Easier to change a single global flag vs multiple package flags.
- Officially “Use package flags not global flags”
 - Global flags can have unintended consequences.
 - Flags don’t always mean the same thing.

e.g. gtk, gtk2, gtk3 USE flags

- In theory turn on gtk – use any version. OR, force gtk v2, gtk v3
- In practice
 - **gtk**: Build GTK GUI, defaults to GTK3 / Use gtk+ to determine mimetypes / Enable ArtworkDB support
 - **gtk2**: Build GTK2 GUI / Enable GTK2 instead of GTK3 even if GTK3 is available / Install GTK+2 theme
 - **gtk3**: Build GTK3 GUI / Enable GTK3 interface (default) / Support GTK 3.x, too / Install GTK+3 theme / Enable support for the experimental native GTK File Dialog
- **force-gtk3**: Use the cairo-gtk3 rendering engine
- **gtk2-only** : Allow dependency-resolution for a system without GTK+3
- What happens when GTK4 comes around, and nobody maintains each use of gtk3.

EXPAND_FLAGS vs USE flags

- `/etc/portage/make.conf` (EXPAND_FLAGS)
 - `PYTHON_TARGETS="python2_7 python3_6"`
 - `PYTHON_SINGLE_TARGET="python3_6"`
 - `ACCEPT_LICENSE="*"`
 - `LINGUAS="en en_GB"`
- `/etc/portage/package.use` (USE FLAGS)
 - `python_targets_python3_5`
 - `python_single_target_python3_5`

---- genkernel ----

- <https://wiki.gentoo.org/wiki/Genkernel>
 - Configuring the kernel sources.
 - Build kernel bzImage, initramfs and symlinks.
 - Configuring bootloader.

zcat /proc/config.gz

- The file is 7000 lines long.
- Requires IKCONFIG support in kernel (security risk)
- name/value pairs
 - Flags are Y (in kernel), N (don't build) or M (module)
 - **CONFIG_IKCONFIG=y** (built into kernel)
 - **CONFIG_IKCONFIG=m** (module, must run “modprobe configs”)
 - **CONFIG_IKCONFIG_PROC=y** (through /proc/config.gz)

auto-genkernel.sh (my wrapper)

- Ensure
 - running as root
 - Mount /boot
 - /proc/config.gz exists (`# modprobe configs`)
- Backup current environment
 - /proc/config.gz
 - /boot/kernel-genkernel-x86_64-4.14.52-gentoo
 - /boot/System.map-genkernel-x86_64-4.14.52-gentoo
 - /boot/initramfs-genkernel-x86_64-4.14.52-gentoo
- Run genkernel on current config.gz
 - `zcat /proc/config.gz > /usr/src/linux/.config.`uname -r`.zcat`
 - `genkernel --kernel-config=/usr/src/linux/.config.`uname -r`.zcat all --menuconfig`
- Install kernel
 - `grub-mkconfig -o > /boot/grub/grub.cfg`

genkernel --menuconfig

```
.config - Linux/x86 4.14.65-gentoo Kernel Configuration

Linux/x86 4.14.65-gentoo Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty
submenus ----). Highlighted letters are hotkeys. Pressing <Y>
includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to
exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]

Gentoo Linux --->
[*] 64-bit kernel
  General setup --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
  Processor type and features --->
  Power management and ACPI options --->
  Bus options (PCI etc.) --->
  Executable file formats / Emulations --->
[*] Networking support ---->
  Device Drivers --->
  Firmware Drivers --->
  File systems --->
  Kernel hacking --->

↑(+)
```

<Select> < Exit > < Help > < Save > < Load >

(find) / IKCONFIG

```
.config - Linux/x86 4.14.65-gentoo Kernel Configuration  
> Search (IKCONFIG)
```

Search Results

```
Symbol: IKCONFIG [=y]  
Type : tristate  
Prompt: Kernel .config support  
Location:  
(1) -> General setup  
Defined at init/Kconfig:481  
Selects: BUILD_BIN2C [=y]
```

```
Symbol: IKCONFIG_PROC [=y]  
Type : boolean  
Prompt: Enable access to .config through /proc/config.gz  
Location:  
-> General setup  
(2) -> Kernel .config support (IKCONFIG [=y])  
Defined at init/Kconfig:494  
Depends on: IKCONFIG [=y] && PROC_FS [=y]
```

(100%)

< Exit >

Option (1)

```
.config - Linux/x86 4.14.65-gentoo Kernel Configuration
> Search (IKCONFIG) > General setup
                                General setup
Arrow keys navigate the menu. <Enter> selects submenus ---> (or
empty submenus ----). Highlighted letters are hotkeys.
Pressing <Y> includes, <N> excludes, <M> modularizes features.
Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend:
^(-)
[*] uselib syscall
[*] Auditing support
    IRQ subsystem --->
    Timers subsystem --->
    CPU/Task time and stats accounting --->
    RCU Subsystem --->
<*> Kernel .config support
[*]   Enable access to .config through /proc/config.gz
(17) Kernel log buffer size (16 => 64KB, 17 => 128KB)
(12) CPU kernel log buffer size contribution (13 => 8 KB, 1
(13) Temporary per-CPU printk log buffer size (12 => 4KB, 1
*- Control Group support --->
[ ] Checkpoint/restore support
^(+)
```

<Select> < Exit > < Help > < Save > < Load >

<Help>

```
.config - Linux/x86 4.14.65-gentoo Kernel Configuration  
> Search (IKCONFIG) > General setup
```

Kernel .config support

CONFIG_IKCONFIG:

This option enables the complete Linux kernel ".config" file contents to be saved in the kernel. It provides documentation of which kernel options are used in a running kernel or in an on-disk kernel. This information can be extracted from the kernel image file with the script scripts/extract-ikconfig and used as input to rebuild the current kernel or to build another kernel. It can also be extracted from a running kernel by reading /proc/config.gz if enabled (below).

Symbol: IKCONFIG [=y]

Type : tristate

Prompt: Kernel .config support

Location:

-> General setup

Defined at init/Kconfig:481

Selects: BUILD_BIN2C [=y]

(100%)

< Exit >

Build and install

- Exit the ncurses dialogue, and build files.
- Reboot machine.
- Use new kernel – or restore old and figure out what you broke.
- Breaking your kernel: New flags, existing ones removed, or changed.

---- overlays ----

- Overlays are repositories, including unofficial repositories.
- <https://gpo.zugaina.org/>

https://gpo.zugaina.org/



gentoo portage overlays

Search Portage & Overlays:



Newest

News

Repository news

GLSAs

Browse

USE Flags

Overlays

More...

Search Results

Search: *bluegriffon*

Page: 1

Results: 1 - 1 of 1

[dev-util/bluegriffon](#)

The next-generation Web Editor based on the rendering engine of Firefox

Page: 1

Results: 1 - 1 of 1

<https://gpo.zugaina.org/>



gentoo Portage Overlays

Search Portage & Overlays:

Newest

News

Repository news

GLSAs

Browse

USE Flags

Overlays

More...

dev-util/bluegriffon

The next-generation Web Editor based on the rendering engine of Firefox

<http://www.bluegriffon.org/>

bluegriffon-3.0.1

amd64 ~x86



View



Download



Browse

License: GPL-2

Overlay: [spikyatlinux](#) (layman)

layman

- The tool that allows you to add overlays to your installation.
- `layman -a spikyatlinux` (add an overlay)
- `layman -L` (list all overlays)
- `layman -I` (list installed overlays)

```
* cg [Git ](https://github.com/brothermechanic/cg.git)
* spikyatlinux [Git ](https://github.com/spikyatlinux/ebuilds_for_gentoo.git)
```

'equery has repository'

```
equery has repository spikyatlinux
```

```
* Searching for repository spikyatlinux ...
```

```
[I-O] [ ] dev-util/bluegriffon-3.0.1:0
```

```
[I-O] [ ] sys-block/gparted-0.32.0:0
```

- **I** (installed)
- **P** (available from portage – NOT available)
- **O** (available from an overlay)
- 2 packages installed from spikyatlinux overlay
 - bluegriffon (Web Editor)
 - gparted (newer version than official 0.29.0)

ebuilds

- `ls /usr/portage/media-video/ffmpeg/*.ebuild`
 - `ffmpeg-3.2.6.ebuild`
 - `ffmpeg-3.2.7.ebuild`
 - `ffmpeg-3.3.4.ebuild`
 - `ffmpeg-3.3.6.ebuild`
 - `ffmpeg-3.3.8.ebuild`
 - **`ffmpeg-3.4.4.ebuild`**
 - `ffmpeg-4.0.2.ebuild`

ffmpeg.ebuild

- Too complex for this introduction
- 500 lines long

eix civetweb

- eix civetweb
 - www-servers/civetweb
 - Available versions: (~)1.10 {ssl}
 - Installed versions: 1.10(09:12:12 21/06/18)(ssl)
 - Homepage: <https://github.com/civetweb/civetweb/>
 - Description: Embedded C/C++ web server

civetweb files

- ls /usr/portage/www-servers/civetweb/
 - Manifest (checksums)
 - civetweb-1.10.ebuild
 - metadata.xml (source and maintainer email)

civetweb-1.10.ebuild

```
EAPI=6
```

```
inherit cmake-utils
```

```
HOMEPAGE="https://github.com/civetweb/civetweb/"  
DESCRIPTION="Embedded C/C++ web server"
```

```
SRC_URI="https://github.com/civetweb/${PN}/  
archive/v${PV}.tar.gz -> ${P}.tar.gz"
```

```
LICENSE="MIT"
```

```
SLOT="0"
```

```
KEYWORDS="~amd64 ~x86"
```

```
IUSE="ssl"
```

```
RDEPEND="ssl? ( dev-libs/openssl:0= )"
```

```
DEPEND="${RDEPEND}"
```

```
src_prepare() {  
    sed -e 's|DESTINATION lib$|DESTINATION $  
{CMAKE_INSTALL_LIBDIR}|' \  
        -i src/CMakeLists.txt ||  
    die  
    cmake-utils_src_prepare  
}  
  
src_configure() {  
    local mycmakeargs=(  
        -DBUILD_TESTING=OFF  
        -DBUILD_SHARED_LIBS=ON  
        -DCIVETWEB_ENABLE_LUA=OFF  
        -DCIVETWEB_ENABLE_DUKTAPE=OFF  
        -DCIVETWEB_ENABLE_SSL="${usex ssl}"  
    )  
  
    cmake-utils_src_configure  
}
```

modifying ebuilds

Original version

```
KEYWORDS="~amd64 ~x86"  
IUSE="ssl"
```

```
src_configure() {  
    local mycmakeargs=(  
        -DBUILD_TESTING=OFF  
        -DBUILD_SHARED_LIBS=ON  
  
        -DCIVETWEB_ENABLE_LUA=OFF  
        -DCIVETWEB_ENABLE_DUKTAPE=OFF  
  
        -DCIVETWEB_ENABLE_SSL="$(usex ssl)"  
    )
```

Modified for ARM + websockets

```
KEYWORDS="~amd64 ~x86 ~arm"  
IUSE="ssl websockets lua debug"
```

```
src_configure() {  
    local mycmakeargs=(  
        -DBUILD_TESTING=OFF  
        -DBUILD_SHARED_LIBS=ON  
        -DWITH_DEBUG="$(usex debug)"  
        -DCIVETWEB_ENABLE_LUA="$(usex lua)"  
        -DCIVETWEB_ENABLE_DUKTAPE=OFF  
        -DCIVETWEB_ENABLE_WEBSOCKETS="$(usex websockets)"  
        -DCIVETWEB_ENABLE_SSL="$(usex ssl)"  
    )
```

My local civetweb.ebuild

```
$ eix civetweb
[I] www-servers/civetweb
  Available versions:  (~)1.10 (~)1.10[1] {debug lua ssl websockets}
  Installed versions:  1.10[1](09:12:12 06/21/18)(debug ssl websockets -lua)
  Homepage:           https://github.com/civetweb/civetweb/
  Description:        Embedded C/C++ web server
```

```
[1] "tug" /usr/local/portage-tug
```

```
$ equery has repository tug
* Searching for repository tug ...
[I-0] [  ] games-adventure/pioneer-20150715:0
[I-0] [  ] www-servers/civetweb-1.10:0
```

buildpkg, usepkg and usepkgonly

- Inside /usr/portage/make.conf
 - PKGDIR="/mnt/binpkg/ARMv7" (nfs shared disk)
 - FEATURES= "buildpkg" (*only on build machine*)
 - EMERGE_DEFAULT_OPTS="--usepkg"
 - EMERGE_DEFAULT_OPTS="--usepkgonly"
- /mnt/binpkg/ARMv7/www-servers/civetweb-1.10.tbz2
- /mnt/binpkg/ARMv7/Packages (flat ascii)

Package contents:

- /mnt/binpkg/ARMv7/www-servers/civetweb-1.10.tbz2
 - ./usr/
 - ./usr/bin/
 - ./usr/bin/civetweb
 - ./usr/share/
 - ./usr/share/doc/
 - ./usr/share/doc/civetweb-1.10/
 - ./usr/share/doc/civetweb-1.10/README.md.bz2
 - ./usr/lib/
 - ./usr/lib/libcivetweb.so
 - ./usr/lib/libcivetweb.so.1.10.0
 - ./usr/include/
 - ./usr/include/civetweb.h

Want to install Gentoo?



“I gyve unto my wief my second best bed with the furniture, ***and my Gentoo server***”

- William Shakespeare – *Last Will and Testament* – 1616