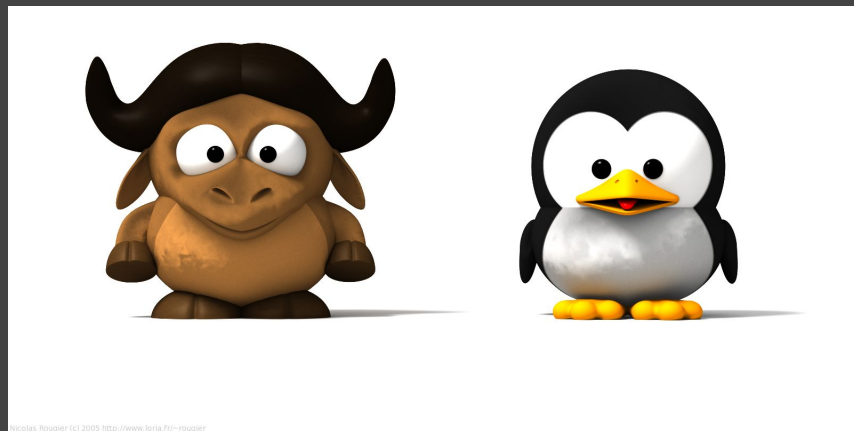# GNU/Linux

Why use it?

What is Linux?

Linux is a UNIX-like, GPL-licensed open-source kernel.

The GNU userland consists of
- *libc,*
- *the init system (SystemD)*
- *X11*
- *GUI toolkits*
- *etc.*

Ask the audience

- Who has used Linux?
- Who has a Linux install?
- Who **only** uses Linux?
- Which distros?

  Debian-based?
  Fedora/Redhat-based?
  ArchLinux?
  Gentoo?
  others?

Top 30 FOSS software

- Mozilla Firefox
- Google Chromium
- Linux kernel
- BSD kernels
- gcc/g++ compiler
- GIMP
- Inkscape
- Blender
- LibreOffice
- LaTeX

- GRUB bootloader
- MPlayer
- VLC
- GParted
- CUPS print server
- GNOME Desktop
- KDE Desktop
- GNU coreutils
- vi/vim text editor
- git version control

- Apache web server
- MySQL/MariaDB
- PHP
- JQuery
- webkit
- QEMU
- openJDK
- Eclipse
- Python
- Perl

Anatomy of a GNU/Linux system

A proper distribution (Live-only distros not included) include a <u>package manager</u>, one or more package repositories, tailored configuration files, documentation, and optionally one or more pre-configured <u>Desktop Environments</u>.

- **Major base distros**: ArchLinux, Debian, Fedora, Gentoo, openSUSE, Slackware
- **Core package managers**: apt-get (Debian-based), emerge (Gentoo-based), pacman (Arch-based), yum (Fedora/Redhat-based), zypper (SUSE-based)

Anatomy of a GNU/Linux system (cont.)

The Linux package paradigm is unlike those you may be familiar with: downloading software from random websites (Windows) or from "App Stores" (Mobile). All the components of the OS are individually packaged and dependent on other packages. Binary packages are uploaded to a central location and mirrored to participating trusted servers. Source packages are compiled and packaged locally from a provided text file "recipe" and downloaded source code.

Key points to look for while distro hopping:

- *Maintenance*: package quality vs quantity, stable=old and bleeding-edge=experimental, can the package manager adapt to complex situations?, ease of building your own packages, etc.
- *Upgrade path*: rolling-release (incremental), upgrade-by-release, re-install required, or discontinued
- *Documentation*: chat, forums, release notes, start guide, wiki, etc.

Anatomy of a GNU/Linux system (cont.)

Dependent on the vastness and variety of packages available in your distro's repos, you can change out individual components or switch to an entirely different desktop environment. These DEs often bundle a Window Manager, Login/Display Manager, a dock/panel as well as programs built with a specific GUI toolkit.

- **Popular Desktop Environments**: Cinnamon, Enlightenment/E17, Gnome, KDE, LXDE, MATE, Unity, XFCE
- **Common Window Managers**: Awesome, Compiz with or without Emerald, Fluxbox, FLWM, i3, JWM, Marco (MATE), Metacity (GNOME2), Muffin (Cinnamon), Mutter (GNOME3), OpenBox, Plasma (KDE)
- **Major GUI toolkits**: GTK, QT, TK. Also Java's AWT/SWING/SWT and Mono.
- **Popular Display Managers**: GDM (Gnome), KDM (KDE), LightDM, SLiM

Anatomy of a GNU/Linux system (cont.)

You can theme entire DEs or individual components: WMs, GUI toolkits, icon sets, mouse cursor, display manager, widgets (conky), etc.

Lastly you might hear rumblings about
Display Servers: X.org's X11 (referred to as "X"), Wayland, and Canonical's Mir.

Distrohopping

Linux Distro Timeline:
http://tinyurl.com/linux-timeline2012

- Live CD-Rs / DVD±Rs
- Live USB
- I-ODD virtual CD/USB emulator

Distro Wars

ArchLinux

+ Bleeding edge
+ Okay packages
+ AUR repo
+ PKGBUILDs
- pacman package manager
- breakages
- no install wizard

Debian

+ Long term "stable"
+ Many packages
+ Many architectures
+ .deb format
- apt-get package manager
- lack of non-free

Fedora

+ Bleeding edge
+ Many DEs supported
+ yum package manager
- .rpm format
- lack of packages
- depends on RPMFusion for proprietary drivers

Distro Wars (cont.)

Gentoo

+ Highly configurable
+ Portage/emerge
  package manager
+ Overlays
+ .ebuilds
- compile everything
- USE flags
- no install wizard

openSUSE

+ Long term "stable"
+ Good installer
- .rpm format
- zypper package
  manager
- lack of packages

Ubuntu

+ Long term "stable"
+ "Just works"
+ Many tutorials available
+ PPAs
- apt-get package
  manager
- bad quality repos

Demo: ACII fun and games

- asciiquarium
- cmatrix
- sl
- mplayer -vo caca/fbdev2
- toilet

Demo: ncurses

- dialog
- greed
- nano
- tmux
- wavemon

Demo: window managers

- Compiz Fusion
- i3 WM

Demo: Photoframe

Demo: "volunteers" from audience

- CLI editor `ctrl-x + e`

- `screen`

- *middle click paste*

- `sshfs`

Demo: "volunteers" from audience (cont.)

- `mkdir -p`; *tab completion*; `alt + .`; curly brace `{}` expansion

- `sshfs` and `symlinks`

- `chroot` and `systemd-nspawn`

- `:() { :|:& };:` and Magic SysRq

Demo: Terminals

- `mate-terminal / gnome-terminal`

- `terminator`

- `tilda`

- `cool-retro-term`

- `VTs`

Q&A

More Questions?

- GPU drivers
- Games (Steam, FOSS, etc.)

Links

LUG and .ova images:

http://linuxcsuf.pw

Contact me

http://hirekevin.xyz