Linux – The Operating System of Freedom

Zoltán Szabó, Department of Statistics, LSE (May 23, 2023)
Contents

- A bit of Linux history.
- Linux distributions.
- Installation.
- Applications.
- Ricing and phones.
My journey

Win → start

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My journey

Win → 'Unix'

start → school

home → school

Ubuntu, macOS → home

CentOS → Arch
My journey

Win → 'Unix' → Fedora → Ubuntu
My journey

Win → 'Unix' → Fedora → Ubuntu, macOS

start → school → home → school → home

Zoltán Szabó

Linux
My journey

Win → 'Unix' → Fedora → Ubuntu, macOS → CentOS

Zoltán Szabó  Linux
My journey

Win → 'Unix' → Fedora → Ubuntu, macOS → CentOS → Arch.

School → home → school → home.
From: Linus Benedict Torvalds  
Date: Aug 25, 1991, 10:57:08 PM  
Newsgroups: comp.os.mimix  
Body: 
Hello everybody ... 
I’m doing a (free) operating system (just a hobby, won’t be big...
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Linus Torvalds (~now):
Linux today

- Supercomputer world: 100% market share,
- Runs: from old laptops to top 500 supercomputers,
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![Laptop and Supercomputer](image)

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- Web-facing servers, Microsoft’s own Azure cloud, IoT devices, international space stations, . . .
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One of the main secrets

free and open source ⇒ knowledge sharing ⇒ creativity can kick in ⇒ versatility!
In fact, Linux = GNU/Linux: Linus used the GNU development tools for his kernel, ... 

- Late 1970s: companies started to spread proprietary software ⇒

- GNU project = GNU is Not Unix:
  - Goal: write a UNIX-like operating system entirely of free software.
  - Users are legally free (GPL)
    0 to use,
    1 to study,
    2 to modify, and
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- give computer users freedom and control in their use of their computers.
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- mass collaboration announced by Richard Stallman ('83; his website).
Richard (Matthew) Stallman: RMS – his hacker name;

- Founder of the Free Software Foundation ('85) → resources,
  - non-profit organization to support the free software movement.
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    - any derivative work must be distributed under the same terms.
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any derivative work must be distributed under the same terms.

- Creator of GNU Emacs: 'text editor' (LISP interpreter).
GNU/Linux (’92-), shortly Linux

1. GNU utils: high-level utilities.
2. Kernel:
   - low-level ’stuff’, written in C, GPLv2,
   - manages the CPU, memory, device drivers, file system, . . .
Tux (the mascot of the Linux kernel) := Torvalds UniX.
Linus

- Tux (the mascot of the Linux kernel) := Torvalds UniX.

- Author of Git (GPLv2):
  - distributed version control system,
  - gold standard in collaborative coding efforts,
  - developed for the Linux kernel ('05),
  - # of lines in the code of Linux kernel: 30+ million.
Free vs open; $O := \text{Odysee}$

Free software (a.k.a. FOSS, libre software):

- goal: to respect user freedom and privacy.

To *not constrain* the user
Free vs open; \( O := \text{Odysee} \)

Free software (a.k.a. FOSS, libre software):
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\textit{to not constrain} the user

- free \( \supset \) open-source, but
  - free \( \neq \) open-source: text, vid[O],
  - open source code can 'spy' on you.
Free vs right to repair

- **idea in 60s**: $12 \ll $1500 (MacBook Pro),
- **my experience**: battery replacement in Surface Pro = 600€,
Free vs right to repair

- idea in 60s\textsubscript{vid}[$O$]: $12 \ll 1500$ (MacBook Pro),
- my experience: battery replacement in Surface Pro = 600€,
- I like to invest in our free future:
  - System76: repairable laptops, Launch keyboard, Pop!\_OS,
Free vs right to repair

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- I like to invest in our free future:
  - System76: repairable laptops, Launch keyboard, Pop!_OS,
  - a laptop initiative: frame.work.
Linux: free ⇒

- community-driven, versatile, transparent, secure & private, modular, resource-efficient, sustainable.
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specifically:

- no force to
  1. upgrade to the latest hardware,
  2. throw money out of the window (e.g., Win 11 Pro: £219.99),
  3. create accounts or watch dummy ads on the UI.
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- significant storage reduction ⇐ code sharing.
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- standard for computing clusters (example: slurm).
Versatility

Various distros (tree):
- there have been $>1000$ distributions,
- currently (May 23, 2023): 274 distributions
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- currently (May 23, 2023): 274 distributions,
- but minor differences.

Primary choice to make
point release vs rolling release.
Example:

- **Windows**: 3.0, 3.1x, 95, 98, Me, NT, 2000, XP, Vista, 7, 8, 10, 11.
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- **macOS**: Cheetah, Puma, Jaguar, Panther, Tiger, Leopard, Snow Leopard, Lion, Mountain Lion, Mavericks, Yosemite, El Capitan, Sierra, High Sierra, Mojave, Catalina, Big Sur, Monterey, Ventura.
Example:

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Properties:

1. occasional **big** changes,
2. **end-of-life** date!
Point release: Linux distributions

(Debian → ) Ubuntu → Pop!_OS; Fedora.
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- **Ubuntu:**
  - developer: Canonical Ltd.,
  - released every six months, LTS every 2 years.
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  - ≈ Ubuntu with customized Gnome (COSMIC),
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- Pop!_OS:
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- Fedora:
  - upstream source for Red Hat Enterprise Linux (developed by Red Hat),
  - released every 6 months.
Rolling release: Linux distributions

- **Arch Linux:**
  - one-time installation with continuous upgrades,
  - lightweight and flexible,
  - follows the keep it simple (**KISS**) principle,
  - designed to teach its user.
Rolling release: Linux distributions

- other examples: openSUSE Tumbleweed, Gentoo.
### Point release vs rolling release

<table>
<thead>
<tr>
<th>point</th>
<th>rolling</th>
</tr>
</thead>
<tbody>
<tr>
<td>always up-to-date</td>
<td>+</td>
</tr>
<tr>
<td>(new software features, bug fixes, security patches)</td>
<td>+</td>
</tr>
<tr>
<td>supports even very new hardware</td>
<td>+</td>
</tr>
<tr>
<td>more secure</td>
<td>+</td>
</tr>
<tr>
<td>no need to reinstall it</td>
<td>+</td>
</tr>
<tr>
<td>requires semi-decent internet</td>
<td>−</td>
</tr>
<tr>
<td>less suited for servers (where stability is max-ed)</td>
<td>−</td>
</tr>
</tbody>
</table>
My choice: Arch (released in 2002)

- rolling release.
- great package manager (pacman),
  - fast,
  - allows parallel downloading.

[Package managers handle dependencies.]
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   [Package managers handle dependencies.]
2 superb documentation (Arch Wiki):
   • base reference even for other distributions;)
   • readable[O] and searchable[O] offline.
3 excellent software availability:
   • main: 14K, AUR: 90K packages.
   Both are searchable.
1. Download, check, **burn the installation .iso to a USB stick**, leave the stick in your machine, reboot.
Installation

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2. Enter into the ‘BIOS’ (by pressing Esc, F1/F2/…):
   - disable Secure boot,
   - choose the boot medium to be the USB stick.
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   - disable Secure boot,
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3. Boot from the USB stick.

4. Follow the instructions.
Downloading note

- .iso size:

- 11 GB (MacOS Ventura) – for comparison.
iso size:

- 5.2 GB (Windows 11) – for comparison.
- 11 GB (MacOS Ventura) – for comparison.
iso size:

- 4.6 GB (Ubuntu),
- 5.2 GB (Windows 11) – for comparison.
- 11 GB (MacOS Ventura) – for comparison.
Download note

- .iso size:
  - 2.5 GB (Pop!_OS),
  - 4.6 GB (Ubuntu),
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.iso size:

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downloading:
http; torrent: this can be faster (⇐ sharing).
.iso size:

- 810 MB (Arch),
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Notes on the boot process — a 'bit' technical

1. system’s firmware (such as BIOS/UEFI/Coreboot/Libreboot) starts
2. bootloader (such as GRUB ← GNU; features & others) loads
3. the kernel (your operating system).

In practice:

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In practice:
- **Firmware:**
  - Probes for hardware, simple health checks,
  - It has a UI accessible with a magic key (Esc, F1/F2/…),
  - Allows you to designate a boot device (USB/hard/CD/DVD drive, …),
  - Consults the GPT† partition table to identify the **ESP‡**, and launches the target application (typically the bootloader).

†No chat 😊, ‡EFI System Partition.
Notes on the boot process — a ’bit’ technical

1. system’s firmware (such as BIOS/UEFI/Coreboot/Libreboot) starts
2. bootloader (such as GRUB ⇐ GNU; features & others) loads
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In practice:
- bootloader:
  - gives a menu on which kernel / operating system to invoke.
Instructions: for Arch – scary;)

2. Video guide:
   - vid₁[O]: UEFI; check the YouTube comments as well!
   - vid₂: BIOS, UEFI, UEFI-LVM-LUKS.

Definitions

- firmware: BIOS (very old machine), UEFI (semi-new computer).
- partition table: BIOS ⇒ MBR (a.k.a. DOS, MS-DOS); UEFI ⇒ GPT.
- LVM: adjustable layout, LUKS: encryption.
- LUKS: your data can't be read even if your laptop is stolen.
1. **Step-by-step text guide** (official one).

2. **Video guide:**
   - $\text{vid}_1[0]$: UEFI; check the YouTube comments as well!
   - $\text{vid}_2$: BIOS, UEFI, UEFI-LVM-LUKS.

### Definitions

- **firmware:** BIOS (very old machine), UEFI (semi-new computer).
- **partition table:** BIOS $\Rightarrow$ MBR (a.k.a. DOS, MS-DOS); UEFI $\Rightarrow$ GPT.
- **LVM:** adjustable layout, **LUKS:** encryption.
- **LUKS:** your data can’t be read even if your laptop is stolen.
Instructions: BIOS or UEFI

BIOS:

![BIOS screenshot]

UEFI:

![UEFI screenshot]
Installation hints

1. use ethernet: faster.
Installation hints

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2. start simply: no encryption, no LVM.
start simply – elaborated *(nerdness level dependent)*:

1. **Live media/USB/image** (Fedora, Ubuntu):
   - .iso writing, hardware support check, quick look at the system ✓,
   - slower than SSD.
Installation hints

2 start simply – elaborated (nerdness level dependent):
   1 Live media/USB/image (Fedora, Ubuntu):
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  2. **graphical installer** (Fedora, Ubuntu).
  3. **command line installer** (Arch):
     - UEFI, no LVM, no LUKS: basic understanding,
Installation hints

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   - Live media/USB/image (Fedora, Ubuntu):
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     - UEFI, LVM, LUKS: slightly deeper understanding.

2. Start with a DE before a WM.
Installation hints

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†Start with a DE before a WM.
partition formatting:

- **ext4**: more settled – my choice,

![Ext4 File System]

- **btrfs**:
  - modern alternative,
  - supports compression ⇒ less space, increased storage lifespan,
  - copy-on-write ⇒ consistency even in case of power loss,
  - snapshot feature,
  - limited LUKS support.

⇒ It is worth keeping an eye on it!
kernel (stable), LTS kernel (longterm) [others]:

- stable: maintained until the next stable release,
- LTS: maintained for a few extra years,
- good to have both: flexibility.
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5 **swap:**
- helps if RAM is exhausted (but slower, $\times 1000!$); **size recommendations**.
- 2 types:
  - **swap partition:** often preferred,
  - **swap file:** easier to resize, but less tested.
good boot time (∼ 11s):

- SSD matters: Samsung 970 EVO Plus ← my choice (for laptop).
good boot time (\(\sim 11s\)):  
- SSD matters: Samsung 970 EVO Plus \(\leftarrow\) my choice (for laptop).

6 Use a spare drive (to avoid the wrestling of the op. systems).
6. Create a normal user (beyond the root; ∈ wheel; sudo).
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Log your installation, usage, information sources (e.g. by Vimwiki)!
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Post-installation:

- think in terms of tasks not software, and use the native applications.
- a weekly system update can be healthy.
Applications: categorized; some handy ones

Notations: \( M = \in \text{main} \), \( A = \in \text{AUR} \), \( W = \text{web client} \), \( P = \text{pip} \), ✓ = installed by default.

- **Web & mail:**
  - browser: firefox (M), tor-browser (A).
  - e-mail: ProtonMail (W), thunderbird (M).
Applications: categorized; some handy ones

Notations: \( M = \in \text{main}, \ A = \in \text{AUR}, \ W = \text{web client}, \ P = \text{pip}, \)  
\( \checkmark = \text{installed by default.} \)

- **Web & mail:**
  - browser: firefox \((M)\), tor-browser \((A)\).
  - e-mail: ProtonMail \((W)\), thunderbird \((M)\).

- **Media:**
  - image viewer: feh \((M)\), gthumb \((M)\), geeqie \((M)\).
  - image editor: gimp \((M)\).
  - video player: mplayer \((M)\), vlc \((M)\), celluloid \((M)\).
  - video editor: kdenlive \((M)\).
  - video downloader: youtube-dl \((M)\), yt-dlp \((M)\).
  - spotify:
    - player: spotify \((A)\),
    - downloader: spotdl \((P)\).
  - audio editor: tenacity \((A)\).
Text:

- document viewer: xdvi (√, ∈ texlive), xpdf (M),
- .pdf annotation: xournalpp (M),
- text editing: texlive-most (LaTeX, group, M), kile (M) (∼ WinEdt), vim (M), libreoffice-still (M), notepadqq (M).
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Chat & collaboration:
- chat: skypeforlinux-stable-bin (A), zoom (A), qtox (M),
- version control: git (M),
- calendar & reminder: remind (M).
Applications+

- eye protection: redshift (M),
Applications

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- pwd manager: keepassxc (M),
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- remote support: teamviewer (A),
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- screen locker: slock (M),
- minimal dock: plank (M),
- remote support: teamviewer (A),
- terminal: tilix (M),
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- firewall: ufw (M),
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- minimal dock: plank (M),
- remote support: teamviewer (A),
- terminal: tilix (M),
- firewall: ufw (M),
- desktop environment: gnome (M, group), qtile (M, WM).
Desktop environments (DE)

- Desktop environments:
  - windows manager, and
  - a bundle of applications (calendar, image viewer, file manager, ...).
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Examples follow
DE: Xfce

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Extra DE inspiration
unixporn (screenshots).
Window managers (WM)

- It allows handling windows (open, close, min/max-ze, move, resize, ...).
- It can be part of a DE or standalone.
- Idea: WMs can be even snappier than DEs.
Window managers (WM)

- It allows handling windows (open, close, min/max-ze, move, resize, ...).
- It can be part of a DE or standalone.
- Idea: WMs can be even snappier than DEs.
- 3 types:
  1. stacking (a.k.a. floating),
  2. tiling: non-overlapping windows,
  3. dynamic: allows switching between tiling and floating layout.
Stacking:

- Mutter → GNOME,
- KWin → KDE,
- Xfwm → Xfce,
- Enlightenment → Enlightenment.

Tiling:

i3.

Dynamic:

Qtile: it uses Python;)

various (69) widgets.

Examples follow
Stacking:
- Mutter → GNOME,
- KWin → KDE,
- Xfwm → Xfce,
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Tiling:
- i3.
Stacking:
- Mutter $\rightarrow$ GNOME,
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Tiling:
- i3.

Dynamic:
- Qtile:
  - it uses Python;
  - various (69) widgets.

Examples follow
WM: i3

```c
/* Set up i3 specific atoms like I3_SOCKET_PATH and I3_CONFIG_PATH */
bool i3_atoms()
    struct ev_io *xkb_watcher = scalloc(sizeof(struct ev_io));
    struct ev_io *xkb_io = scalloc(sizeof(struct ev_io));
    struct ev_check *xkb_check = scalloc(sizeof(struct ev_check));
    struct ev_prepare *xkb_prepare = scalloc(sizeof(struct ev_prepare));
    xkb_init(xkb_watcher, xkb_get_event, event_get_file_descriptor(conn), EV_READ);
    xkb_start(main_loop, xkb_watcher);

    if (xkb_supported)
        xkb_init(xkb_watcher, xkb_get_event, xkb_connection_number(xkb_io), EV_READ);
        xkb_start(main_loop, xkb_io);

    /* Flush the buffer so that libev can properly get new events */
    xkb_free(xkb_io);

    ev_check_init(xkb_check, xkb_check_cb);
    ev_check_start(main_loop, xkb_check);
    ev_prepare_init(xkb_prepare, xkb_prepare_cb);
    ev_prepare_start(main_loop, xkb_prepare);
    xkb_flush(conn);
    xkb_remove_existing_windows(conn);

    if (xkbable_signalhandler)
        xkb_signal_handler();

    /* Ignore SIGPIPE to survive errors when an IPC client disconnects */
    while (we are handling him a message)
        xkb_signal_handler();

    /* Autostarting exec-lines */
    if (autostart)
        Autostart aexec;
        TAILForeach(aexec, autostarts, autostarts) {
            LOG(\"auto-starting \" <exec>\" command\"");
            start_application(exec, <command>);
        }

    /* Autostarting exec-always-lines */
    if (autostarts_always_lines)
        TAILForeach(aexec, autostarts_always, autostarts_always) {
            LOG(\"auto-starting (always) \" <exec>\" command\"");
            start_application(exec, <command>);
        }

eiu (mainloop loop, 0x1)
```
WM: Qtile
Login/display manager

- It gives graphical login – if you prefer not using/starting from tty:)
- Popular choices: (i) SDDM: tutorial[O] (further inspiration)
Login/display manager

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Login/display manager

- It gives graphical login – if you prefer not using/starting from tty:)
Terminal: used for instance @ Arch install

Command shell:
- like Jupyter notebook,
- interaction with the operating system,

```bash
mark@linux-desktop:~/tmp/tutorial
$ mkdir /tmp/tutorial
mark@linux-desktop:~/tmp/tutorial
$ cd /tmp/tutorial
mark@linux-desktop:~/tmp/tutorial
$ mkdir dir1 dir2 dir3
mark@linux-desktop:~/tmp/tutorial
$ mkdir
mkdir: missing operand
Try 'mkdir --help' for more information.
mark@linux-desktop:~/tmp/tutorial
$ cd /etc ~Desktop
bash: cd: too many arguments
mark@linux-desktop:~/tmp/tutorial
$ ls
dir1  dir2  dir3
mark@linux-desktop:~/tmp/tutorial
```

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Terminal: used for instance @ Arch install

Command shell:
- like Jupyter notebook,
- interaction with the operating system,

Google Colab: !shellcommand,
Terminal: used for instance @ Arch install

Command shell:
- like Jupyter notebook,
- interaction with the operating system,

Google Colab: `!shellcommand`,
- `virtual console = text terminal + login prompt (ttyX = Ctrl+Alt+FX, X ∈ [7]).`
Examples:

$ cd  : change the current working directory,
$ ls   : list directory content,
$ pwd  : print the name of the current directory,
$ cp   : copy files & directories,
$ mv   : move or rename files and directories,
$ touch: create file,
$ mkdir: create directory,
$ man  : manual page of a command.
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shell := command line interpreter $\xrightarrow{\text{example}}$ Bash
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shell := command line interpreter \(\xrightarrow{\text{example}}\) Bash

⇒

- shell/bash scripting.
- lot of automation possibilities.
Superb text editor: **Vim**

- modal editor \(\text{change}\) \(i = \text{input mode, } \text{Esc} = \text{command mode},\)
- highly customizable & efficient,
- keyboard-driven, language-like.

Example:

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</tr>
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Zoltán Szabó | Linux
Superb text editor: **Vim**

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cw       : change word,
d3w      : delete 3 words,
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dd       : delete line,
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y        : yank (copy),
yy       : yank line, . . .
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- `y` : yank (copy),
- `yy` : yank line, . . .

- cross-platform.
Vim – continued (free ⇒)

- integration to browser, Jupyter notebook, ...
- evolution: vi → Vim → Neovim (community-developed),

- personal Wiki: vimwiki,
- tutorials: $ vimtutor and

<table>
<thead>
<tr>
<th>Name</th>
<th>Vids</th>
</tr>
</thead>
<tbody>
<tr>
<td>ThePrimeagen</td>
<td>link₁, link₂, link₃, link₄, link₅, link₆</td>
</tr>
<tr>
<td>Missing Semester</td>
<td>link[O]</td>
</tr>
<tr>
<td>DistroTube</td>
<td>link₁[O], link₂[O]</td>
</tr>
<tr>
<td>Ben Awad</td>
<td>link</td>
</tr>
</tbody>
</table>
Hint: How to ask on forums?

- **Netiquette** [O]; discussion → guide.
- **DIY mentality:**
  - the community is friendly and helps *if* you put in effort,
  - ⇒ read & do your research first!
<table>
<thead>
<tr>
<th>Name</th>
<th>Odysee</th>
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</tr>
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<tr>
<td>DistroTube</td>
<td>link</td>
<td>link</td>
</tr>
<tr>
<td>Learn Linux TV</td>
<td>—</td>
<td>link</td>
</tr>
<tr>
<td>Eric Murphy</td>
<td>link</td>
<td>link</td>
</tr>
<tr>
<td>Brodie Robertson</td>
<td>link</td>
<td>link</td>
</tr>
<tr>
<td>EF - Linux Made Simple</td>
<td>link</td>
<td>link (less active nowadays†)</td>
</tr>
<tr>
<td>OldTechBloke</td>
<td>link</td>
<td>link (less active nowadays†)</td>
</tr>
<tr>
<td>Mental Outlaw</td>
<td>link</td>
<td>link (Linux, privacy)</td>
</tr>
<tr>
<td>Luke Smith</td>
<td>link</td>
<td>link (less active nowadays†)</td>
</tr>
<tr>
<td>VeronicaExplains</td>
<td>—</td>
<td>link (less active†)</td>
</tr>
<tr>
<td>MobileTechReview</td>
<td>—</td>
<td>link laptop &amp; mobile reviews</td>
</tr>
<tr>
<td>Naomi Brockwell: NBTV</td>
<td>link</td>
<td>link privacy</td>
</tr>
<tr>
<td>Louis Rossmann</td>
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<td>link right to repair</td>
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† but her/his past videos are nice.
Ricing: Conky

- system monitor: CPU, memory, swap space, disk storage, temperature, processes, network interfaces, battery power, system messages, e-mail, ...
**Ricing: Conky**

- system monitor: CPU, memory, swap space, disk storage, temperature, processes, network interfaces, battery power, system messages, e-mail, ...

- Example (further inspiration):

```
Linux 2.6.15-29-686 on i686
etrc @ druuna

Date: Thursday, 25 May
Time: 06:51:15  Uptime: 10h 10m

Temperatures
CPU: 40.5°C  MB: 37.0°C

CPU: 42%
R&M: 97%  615M/630M
Swap: 1% 18.6M/957M

File systems
/dev/sda1 33%  4.33G/6.17G
/dev/sda3 74% 113.92G/187.56G

Now Playing
Pain of Salvation
Song for the innocent

"The Perfect Element pt. 1"
2000 - Progressive metal

Collection Information
Artists: 98  Compilations: 7
Albums: 291  Genres: 41
Tracks: 2217

Collection Statistics
Most songs by Black Sabbath (100)
Most songs are Heavy Metal (691)
Most songs during 2005 (232)
Most albums by Black Sabbath (21)
Most albums are Heavy Metal (64)
Most albums during 2005 (22)
```
system monitor: CPU, memory, swap space, disk storage, temperature, processes, network interfaces, battery power, system messages, e-mail, ... 
Example (further inspiration):

```
explosia   Linux 2.6.12-gentoo-r6 on i686 
Batt: charged 100%

PROCESSING

CPUs: 1.596.651MHz  27%  67°C

NAME          PID  CPU%  MEMORY
%             4201  9.50   9.03
cpufreq        6965  3.01   6.12
firefox-bin    7234  2.51   9.47
pypanel        4628  6.84  1.15

DATA

RAW: 24%

NAME      PID  CPU%  MEMORY
firefox-bin  7270  0.00  9.47
firefox-bin  7254  0.00  9.47
firefox-bin  7252  0.00  9.47
firefox-bin  7250  0.00  9.47

Swap: 2%

/       93%  29.44G

Upload: 0 kb/s Download: 0 kb/s
```
Ricing: Conky

- system monitor: CPU, memory, swap space, disk storage, temperature, processes, network interfaces, battery power, system messages, e-mail, ...

- Example (further inspiration):

```
explosia Linux 2.6.12-gentoo-r6 on i686
Batt: charged 105%

PROCESSING
CPU: 1596.051MHz  27%  67°C

NAME     PID   CPU%  MEM%
%         4291   9.50   9.93
cpufreqd  6065   3.91   6.12
firefox-bin 7234  2.51   9.47
pypanel   4828  0.84  1.15

DATA
RAM: 24%

NAME     PID   CPU%  MEM%
firefox-bin 7270  0.00  9.47
firefox-bin 7254  0.00  9.47
firefox-bin 7251  0.00  9.47
firefox-bin 7250  0.00  9.47

Swap: 2%

/:
91%  29.4GB

Upload: 0 kb/s Download: 0 kb/s

To Do List
- 22:00 - Clean and refresh the system
- 22:10 - Do a full system inspection
- 22:30 - Update the software

Zoltán Szabó
Linux
```
Ricing: Conky on desktop
fast replacement of the status bar,
date, time, keyboard layout, backlight, volume, MPD, network, CPU, . . .
Ricing: Polybar (link₁, link₂)

- fast replacement of the status bar,
- date, time, keyboard layout, backlight, volume, MPD, network, CPU, …

Example follows.
Compositors: for **Xorg (a.k.a. X)**, **Wayland**

- They can
  - add effects like transparency, animations or blur,
  - be standalone or built into the DE / WM.
Compositors: for Xorg (a.k.a. X), Wayland

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Composers: for Xorg (a.k.a. X), Wayland

- They can
  - add effects like transparency, animations or blur,
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- For Hyprland: website, wiki; demo (screenshot):
Linux phones (security & privacy; beta!)

1 Librem 5:
   - by Purism, running PureOS.
Linux phones

2 PinePhone, PinePhone Pro:
   - by Pine64,
   - PinePhone Pro: Wiki; various op. systems ⊆ Arch;
   - recipe: vid_1, vid_2, vid_3, vid_4, vid_5.

My choice (more stable and transparent communication)
Summary

- Linux history, user freedom
Linux history, user freedom,
distributions, installation, applications
Summary

- Linux history, user freedom,
- distributions, installation, applications,
- DE ← WM ← CLI; Vim
Summary

- Linux history, user freedom,
- distributions, installation, applications,
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• Linux phones.
Are you ready to own your computer