Free & Open Source Software

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FAU

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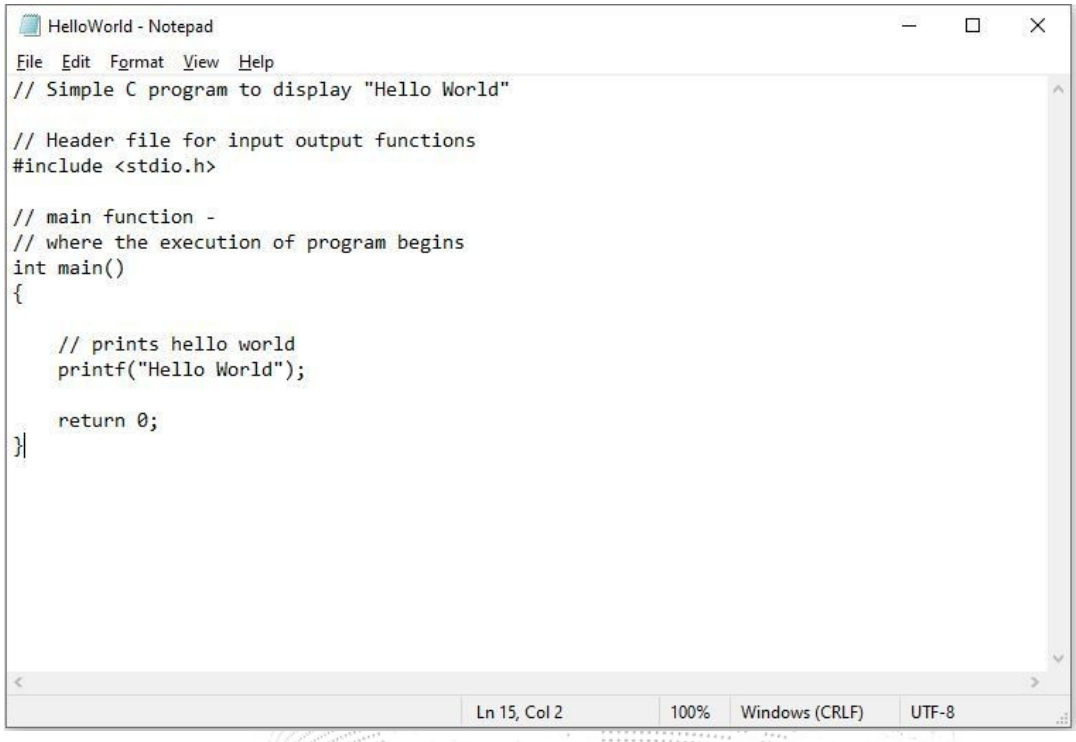
GeoZentrum Nordbayern

How are application software built?

The source code

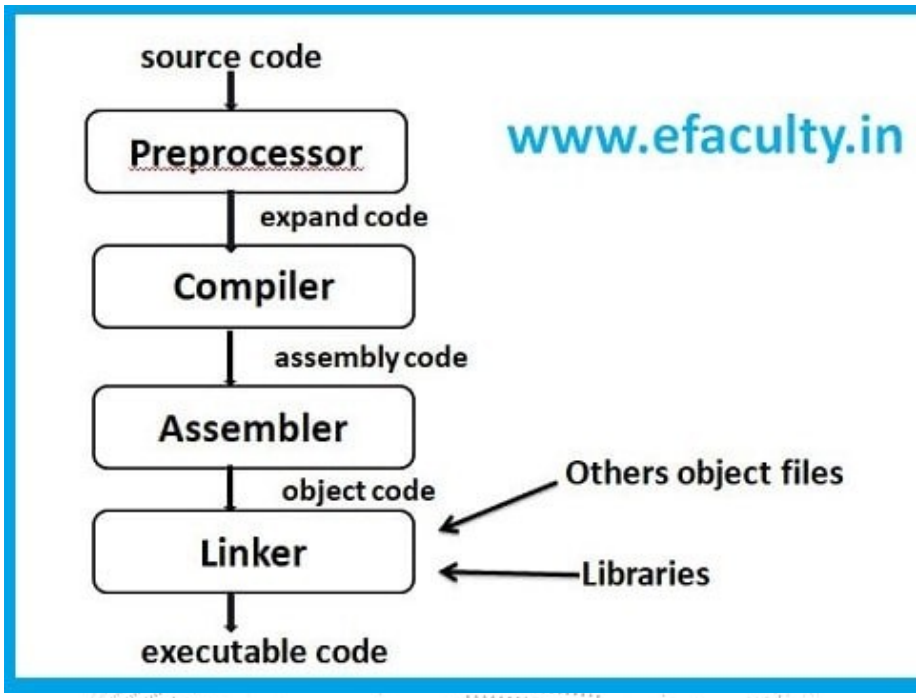
- Human-readable
- A language of some sort



How are application software built?

The building process (*sensu lato* compilation)

- Translate the source code to executable
- One way deal, i.e. irreversible process – the exact source code cannot be recreated!



Insert: compilation hello.exe

How are application software built?

Result: **binary executable**

- Modification is limited
- What the program does is cryptic (almost black box)
- Specific to Operating System and Architecture!

Download selection

- gplates_2.3.0_win64.exe
- gplates_2.3.0_win64.zip
- gplates_2.3.0_Darwin-x86_64.dmg
- gplates_2.3.0_ubuntu-18.04-amd64.deb
- gplates_2.3.0_ubuntu-20.04-amd64.deb
- gplates_2.3.0_ubuntu-20.10-amd64.deb
- gplates_2.3.0_ubuntu-21.04-amd64.deb
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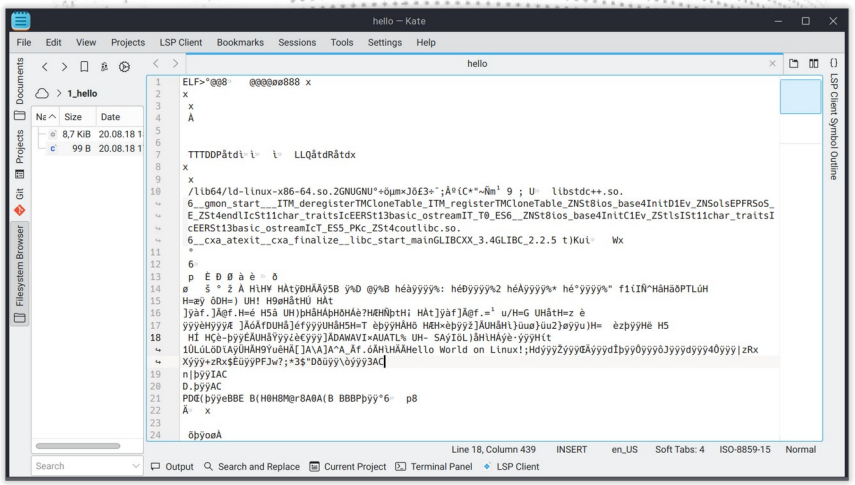


Free and Open Source Software?

Result

- You don’t need to use binaries from the authors (no charge or restrictions)
- You can modify the program’s behavior
- You can see what the program does

SOURCEFORGE

GitHub

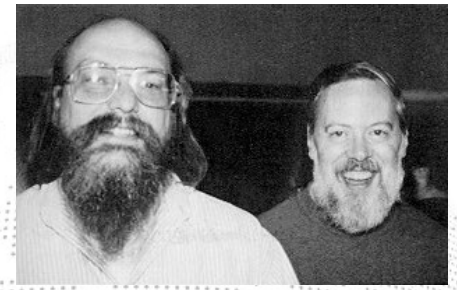
Original paradigm

Software only for specific hardware!

- No transferability
- Apple still does this

Same Hardware → Different Software

- Proprietary operating systems
- Expensive, opaque
- **UNIX** (1969, AT&T Bell Labs)



Ken Thompson and
Dennis Ritchie

UNIX®

A Standard of The Open Group®

AIX

XENIX

solaris

BSD

hp UX

A Free operating system?

Richard Stallman

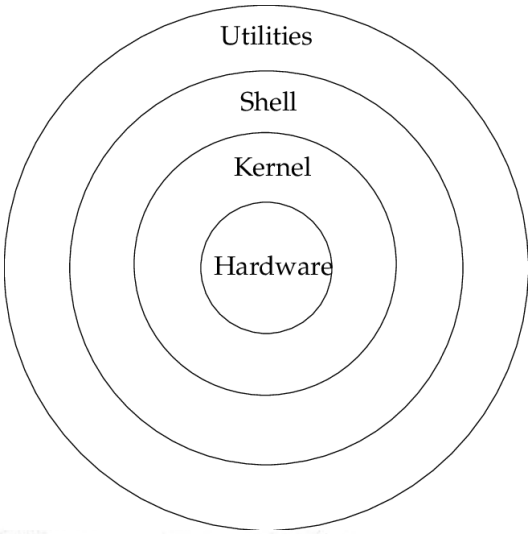
- *@MIT:* **G**NU is **N**ot **U**NIX (1983)

- Unix-like OS: Modular design
- do one thing, but very good!

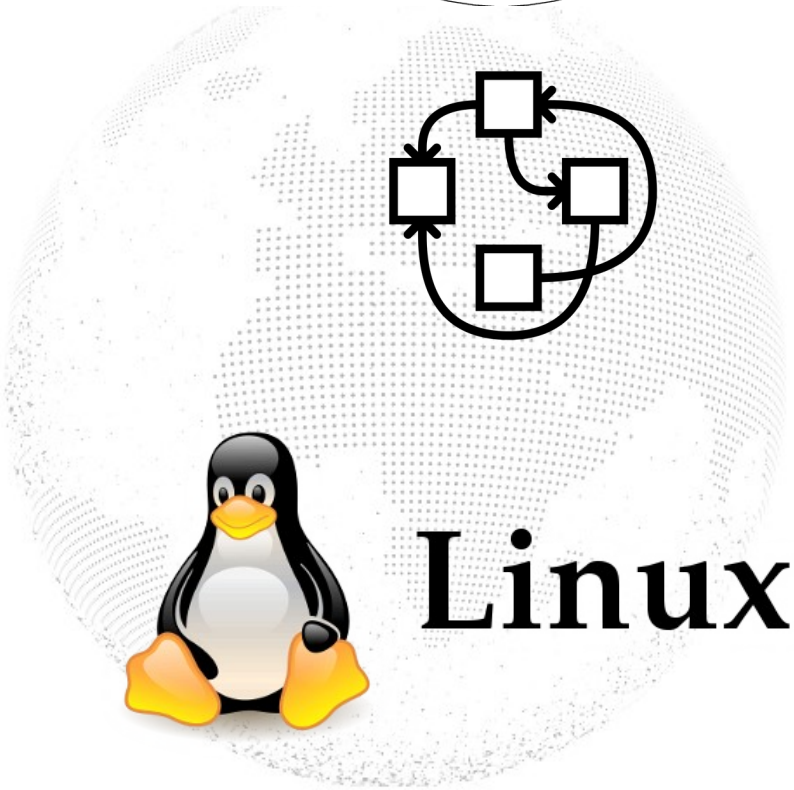
- Hundreds of software (including R!!)

- Works well with other open source software

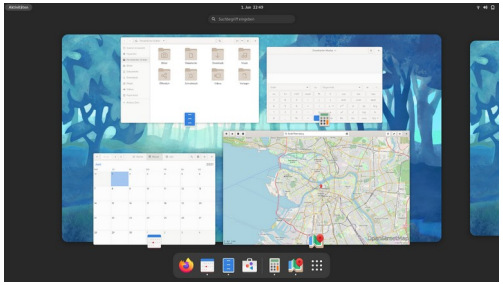
The Kernel



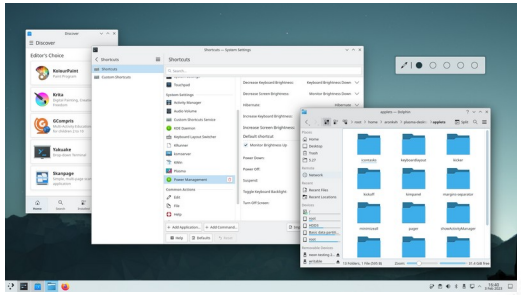
- The most important package of the OS, is built around this: Windows uses **NT,** MacOS: **Darwin**
- Handles hardware resources
- Original plans for GNU: *Hurd*
- 1991 UNIX-clone Minix was rebuilt by Linus Torvalds



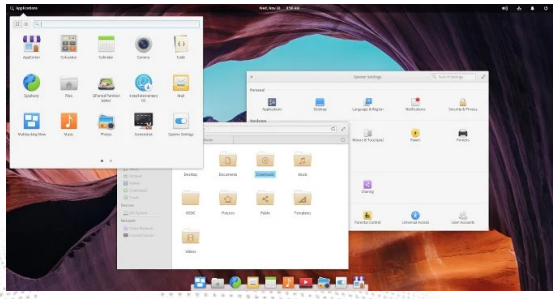
The Desktop Environment



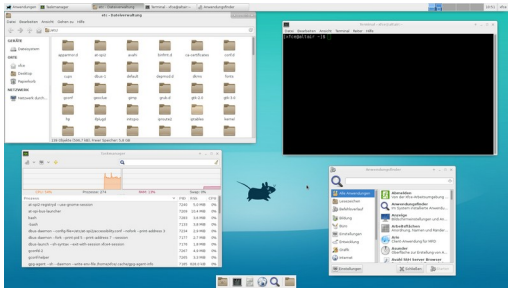
- Gnome



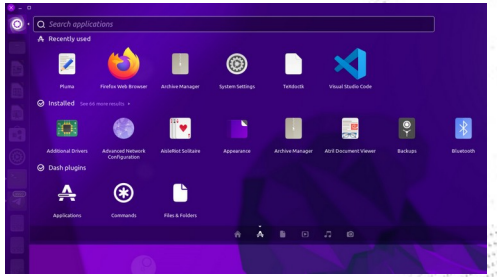
KDE



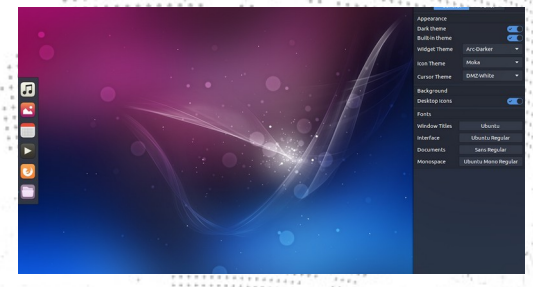
- Pantheon



XFCE



Unity



Budgie

Package management

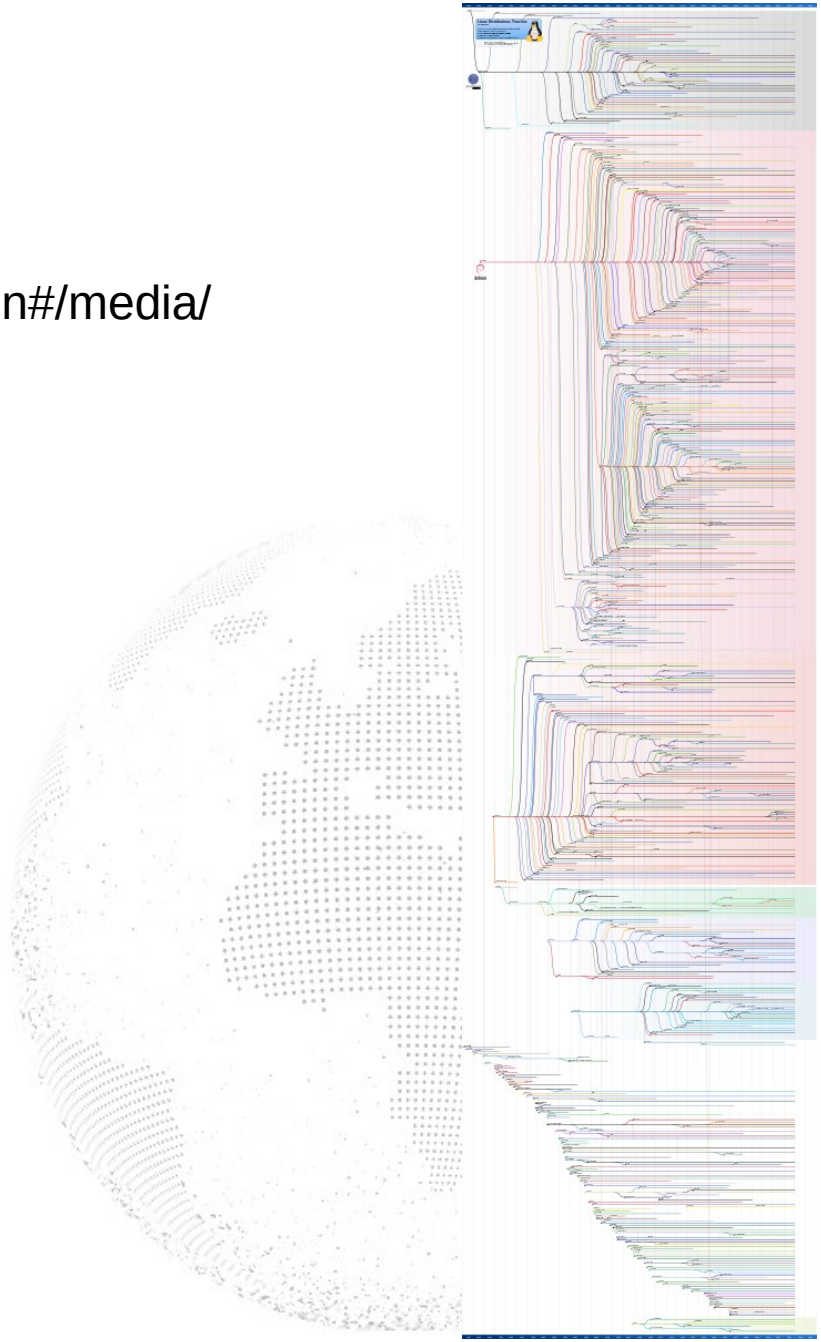
- You can build programs yourself, but it is easier to use pre-built ones
- Most important/prevalent ones



Primary Distribution	Debian	Arch	Red Hat
Manager Program	dpkg/apt	pacman	Re
Package extension	.deb	(AUR)	.rpm

The Phylogeny

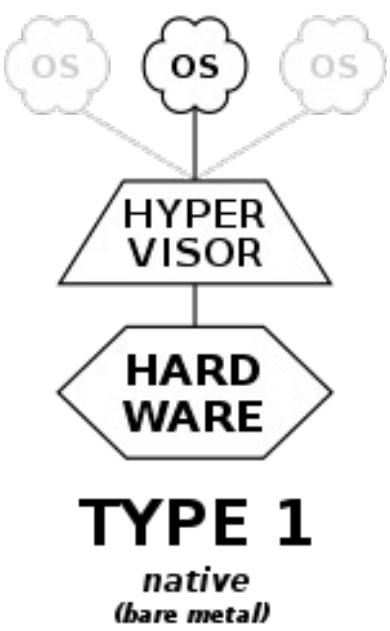
https://en.wikipedia.org/wiki/Linux_distribution#/media/File:2023_Linux_Distributions_Timeline.svg

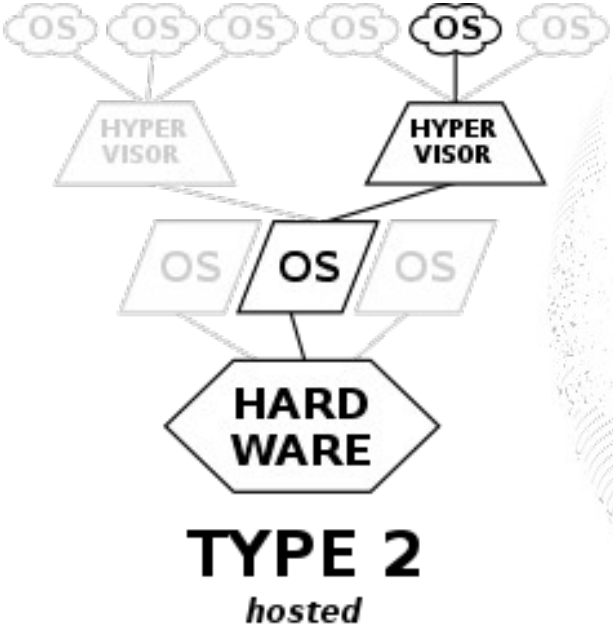


Try them!

In virtual computers...

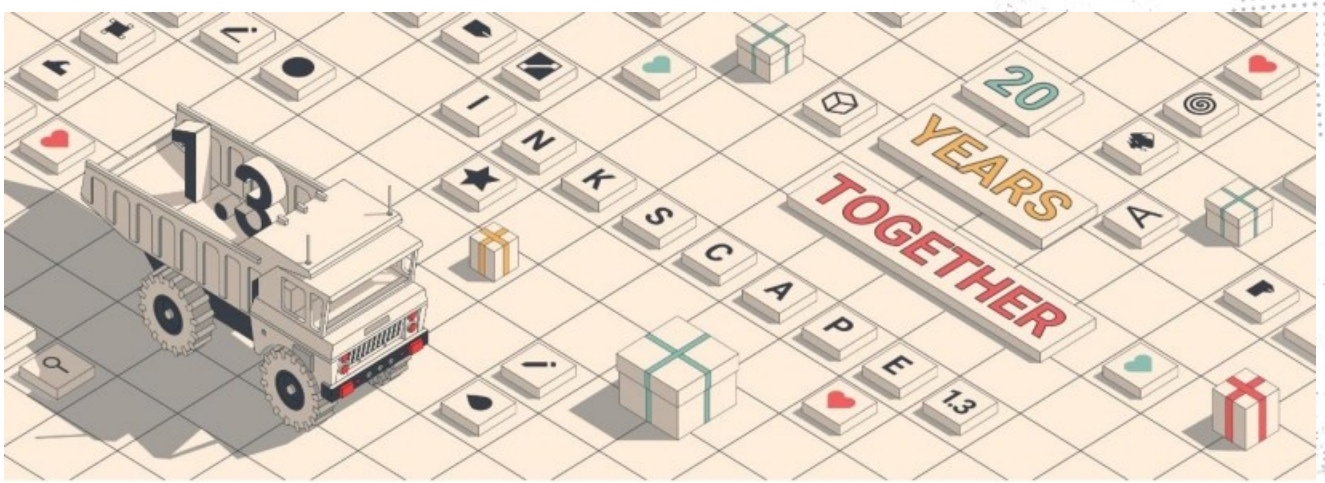
https://www.youtube.com/watch?v=v1JVqd8M3Yc





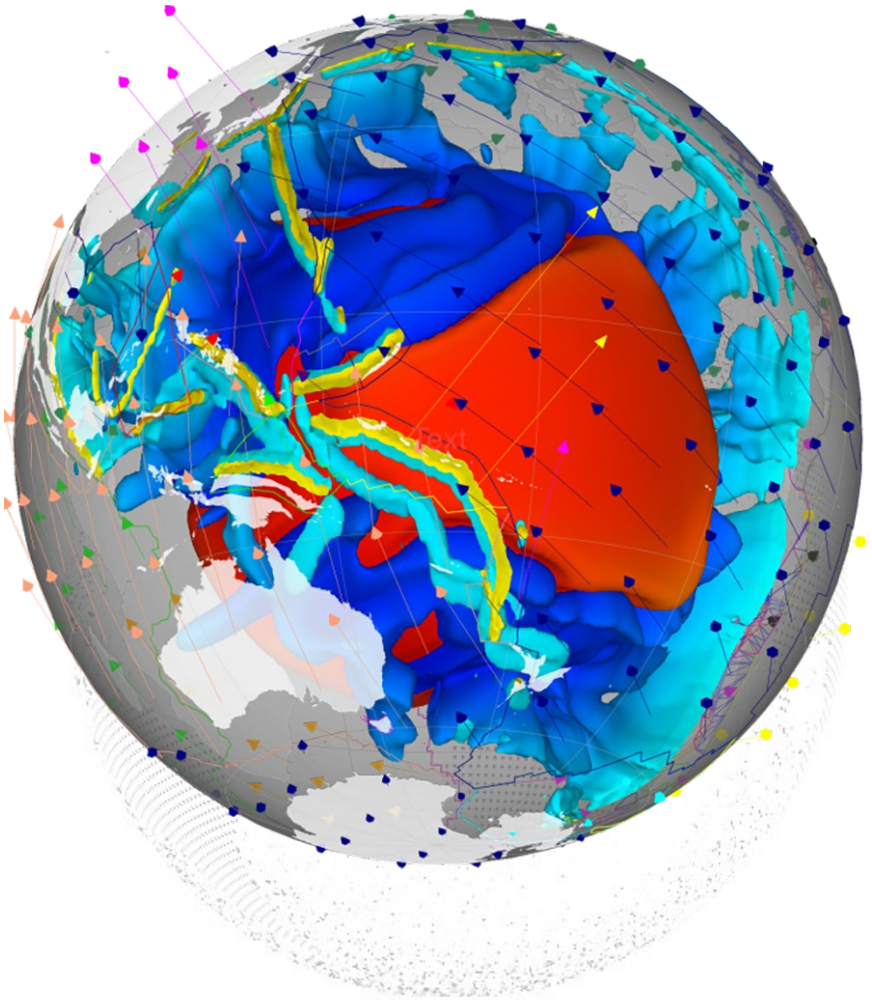
Inkscape

Vector graphics



GPlates

Plate tectonic reconstructions

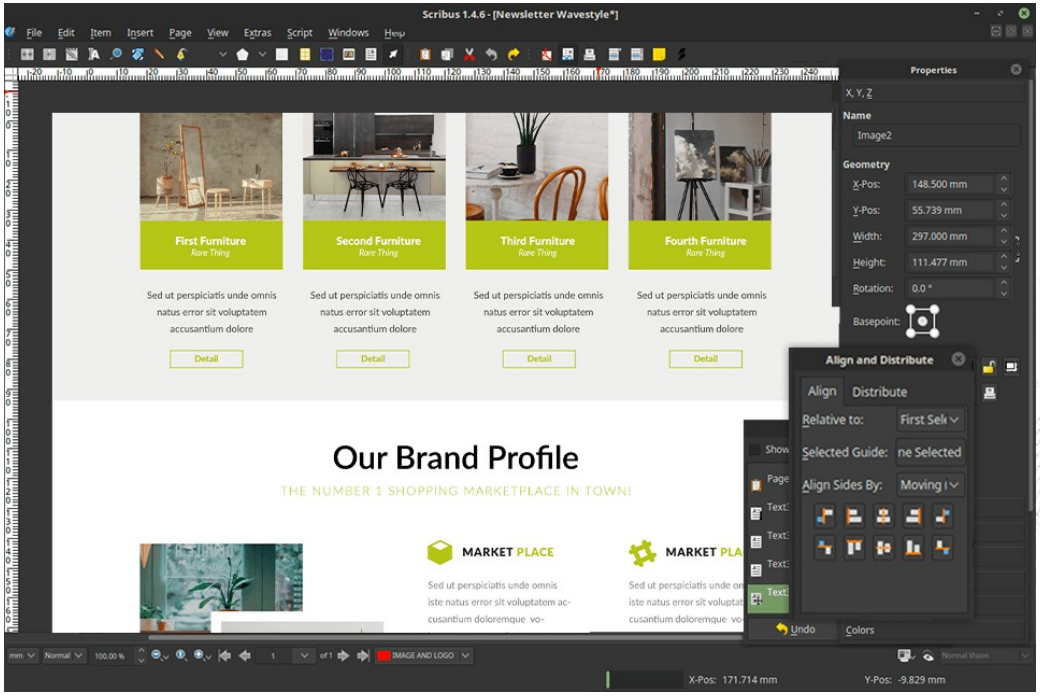


GIMP

Raster graphics editor

Scribus

Publishing (InDesign)

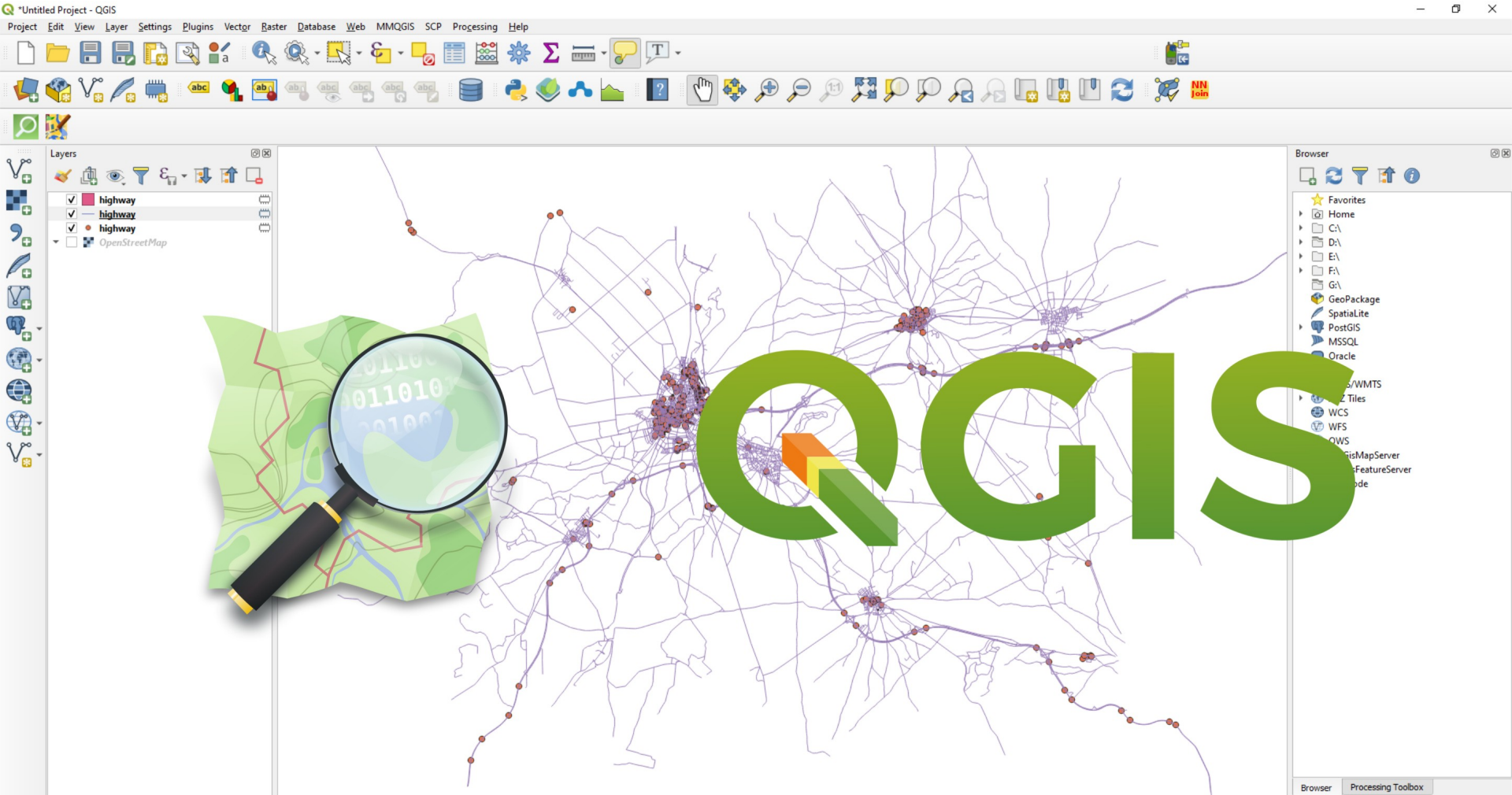


Blender

3D Graphics, Modelling, Shading, Animation, Rendering

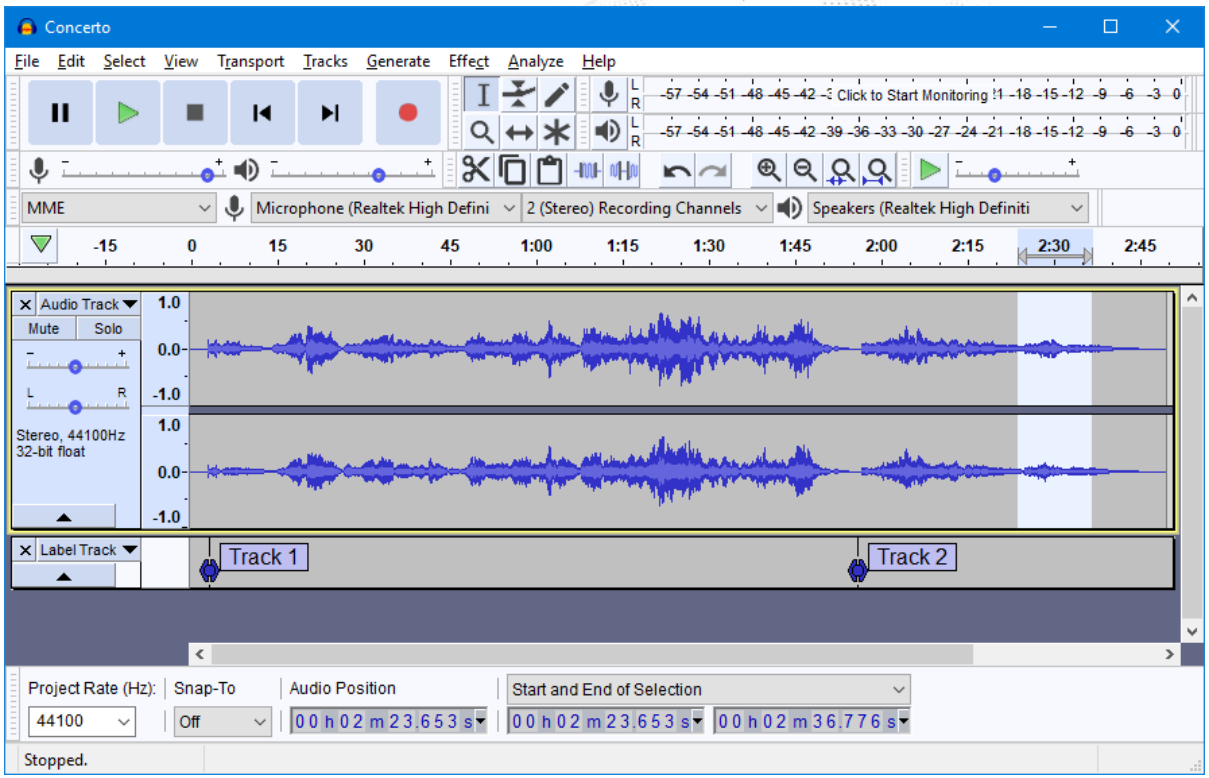
QGIS

Open source GIS



Audacity

Sound and music editor



Libreoffice

Open source office

Hundreds of command line tools, e.g.

Multimedia: FFmpeg

Images: ImageMagick

Compiler: GCC

Document conversion: