

# An Overview of Linux Distributions

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# History

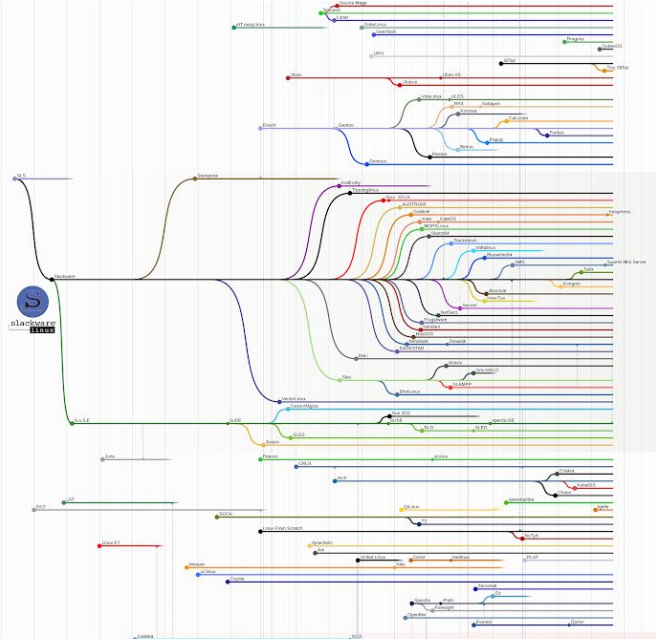
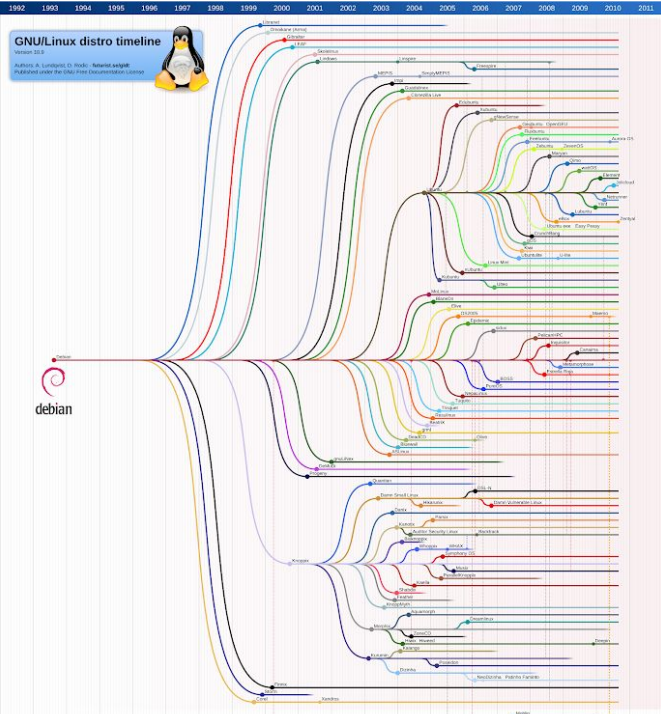
# Origin

Linux began in 1991 as a personal project by Finnish student Linus Torvalds to create a new free operating system kernel under personal licence. In 1992 relicensed under GNU GPL, first Linux distributions created. For 2020 around 27.8 million lines of code.



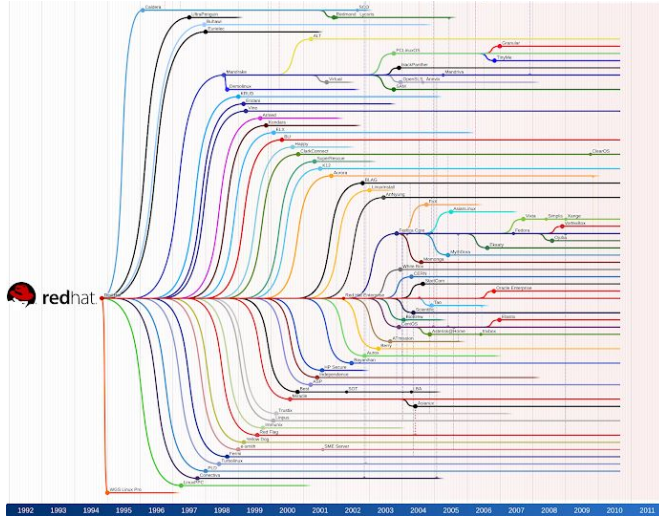
Linus Torvalds in 2002

# Distribution timeline



[https://commons.wikimedia.org/wiki/File:GNU-Linux\\_distro\\_timeline\\_10\\_9.png](https://commons.wikimedia.org/wiki/File:GNU-Linux_distro_timeline_10_9.png)

# Distribution timeline (cont)



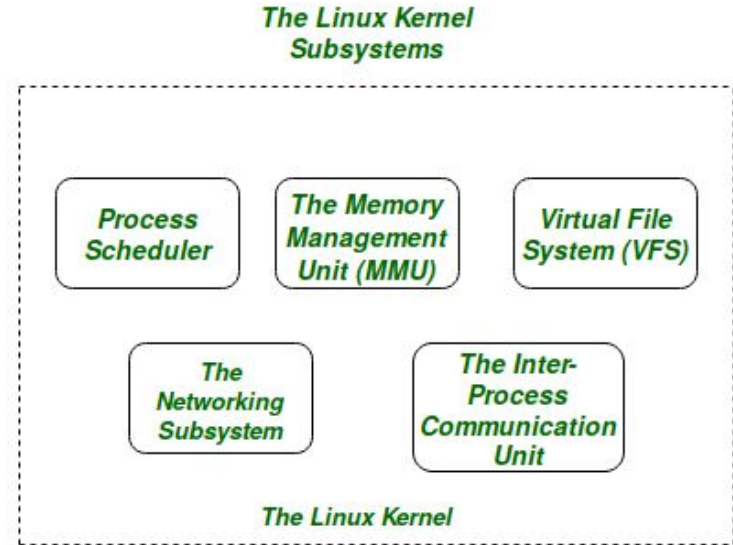
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# Architecture overview

# Main components (core)

Kernel is the core component of the system. It provides interface to hardware resources.

System libraries are predefined functions to provide applications and system utilities access kernel features.



# Main components (shell)

Shell is the Linux command line interpreter, provides an interface between the user and the kernel and executes programs.





# Main components (applications)

Splits into three groups: graphical (video players, browsers and etc), command line (usually used in shell pipelines) and TUI (browsers, text editors)

# Bootloaders

Program that loads operating system into RAM during boot process. Popular alternatives are GRUB, LILO, UEFI (loads kernel directly; efibootmgr, systemd-boot are UEFI managers).

Also there may be initramfs which is used for complicated boot sequence i.e. load roots from network, decrypt it or load from raid array or logical volumes (LVM).



GRUB logo

# Init systems

First process to run in system, used for service management, i.e. start, stop, supervise process. Popular choices systemd, openrc, SysV, Upstart.

[ ● ◀ ] **systemd**

 **upstart**

# Package managers

Package manager keeps track of installed software (i.e. packages) on linux box, and allows easy management of it. Usually shipped with Linux distribution. Popular choices are apt/aptitude (Debian and etc), yum/dnf (RHEL and etc), and various of them.

# Graphic stack

Consist of two separate parts: kernel drivers for various video cards (Intel, AMD, Nvidia) and userspace applications (graphic servers, i.e. Xorg, Wayland(protocol)).



Xorg logo



Wayland logo

# Audio stack

Also consist of kernel drivers for audio chips, audio subsystem (i.e. ALSA, OSS) and userspace audioservers (PulseAudio, PipeWire, JACK)



# Distributions

# Debian, Ubuntu

Debian (first release in 1993) is the popular for for PCs, laptops and servers. Also it is the basis for such popular systems as Ubuntu, Astra and etc.

Ubuntu (first release in 2004) based on Debian architecture became one of the most popular distributions for general purposes. Used for PCs, laptops, servers, mobile phones (Ubuntu Touch).



Debian logo



Ubuntu logo



# RHEL, Fedora, Rocky Linux and etc

RHEL (first release in 2000) is commercial Linux distribution developed for commercial market.

Fedora (first release in 2003) was developed as a continuation of the Red Hat Linux project and is the upstream for CentOS Stream and RHEL.

Rocky Linux (first release in 2021) is intended to be complete binary-compatible with RHEL. Was created because of in 2020 Red Hat announced the termination of CentOS development.



# Астра Линукс (Astra Linux)

Astra Linux (first release around 2010s) was created to lower dependence on Western products and widely deployed in order to replace Windows. Based on Debian distribution.



# РЕД ОС (Red OS)

Red OS (first release in 2017) is the Linux distribution based on RHEL-like. Used as workstation and server.



# openEuler, OpenScaler

openEuler (first release in 2021) community version of EulerOS developed by Huawei which based on RHEL. Supports various modern processor architectures as ARM, RISC, LoongArch.

OpenScaler (first release around 2023) used to adopt openEuler for Russian market with goal to be binary-compatible with RHEL. Also supports openEuler's architectures.



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