

SysAdmin - Introduction - Up to Linux OS

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6 septembre 2023

Operating Systems

Main roles

An operating system is a set of softwares that "give life" to a computer.



It organizes the management of :

- Peripheral devices : how to "talk to the hardware" ;
- Programs : launching, sharing time, halting, freeing resources ;
- Files : organizing the file system, R or RW access, concurrent access ;
- Network : protocol stack, developer model ;
- ...

You can find a lot of operating systems families, principally :

- Dos family (8/16/32 bits) :
 - CP/M (Control Program/Monitor), the precursor ;
 - DR / IBM / MS DOS (Disk Operating System) ;
 - DOS + Windows 95 / Windows 98 ;
- Windows NT family (32/64 bits) :
 - for workstations (NT3.1, NT4, 2000, XP, ..., 10, ...) ;
 - for servers (2000, 2003, 2008, ..., 2019, ...) ;
- Unix family (32/64 bits) :
 - Multics, the precursor ;
 - AT & T Unix ;
 - "Unix like" (GNU, BSD, Linux).





Unices are a family of multitasking, multi-user computer operating systems that derive from the original AT&T Unix.

AT&T licensed its Unix to outside parties in the late 1970s (this is EPOCH time, january the 1st), leading to a variety of both academic variants (free to use) :

- University of California, Berkeley (BSD);
- ...

and commercials :

- IBM (AIX);
- Sun Microsystems (SunOSSolaris);
- HPHPE (HP-UX);
- ...

and commercial Unix variants from vendors including University of California, Berkeley (BSD)

In September 1983, Richard STALLMAN¹ wishes to bring back the spirit of cooperation that prevailed in the computing community in the old days. He announces the framework for the GNU operating system :



As an operating system developer, I had the right skills for this job. So even though I could not take success for granted, I realized that I was elected to do the job. I chose to make the system compatible with Unix so that it would be portable, and so that Unix users could easily switch to it.

In 1985, he publishes the GNU Manifesto. The name GNU is a recursive acronym for **GNU's Not Unix**².

1. https://fr.wikipedia.org/wiki/Richard_Stallman

2. GNU - <https://fr.wikipedia.org/wiki/GNU>

In 1985, Andrew TANENBAUM³ develops a minimal operating system to teach the concept of operating systems to his students.



Minix :

- it's a free Unix-like operating system ;
- it has many fans on the Usenet network ;
- it evolves too little, to the regret of the fans.

3. https://fr.wikipedia.org/wiki/Andrew_Tanenbaum

In 1991, Linus TORVALDS⁴, a Finnish student, designs a new OS based on the Minix model for Intel 80386 processor architectures.



```
From:torvalds\@klaava.Helsinki.FI (Linus
      Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in
         minix?
Date: 25 Aug 91 20:57:08 GMT
      Hello everybody out there using minix.
      I'm doing a (free) operating system (just a
        hobby, won't be big and professional like
        GNU) ...
```

Lots of Minix fans ask Torvalds for the source files. The administrator creates a *linux* directory⁵ (contraction of Linus'unix). Its original name was *freax* !

4. https://fr.wikipedia.org/wiki/Linus_Torvalds

5. Linux is a registered trademark of Torvalds

The reunion of the Linux kernel and the software edited within the GNU project gives birth to GNU-Linux, today abbreviated to **Linux Distribution**⁶



6. <https://www.gnu.org/distros/distros.fr.html>



The linux timeline begins as follows :

- The Linux kernel itself was created by Linus Torvalds in 1991 ;
- **Debian** was founded in 1993 by Ian Murdock ;
- Slackware is born the same year.

Debian is a distribution focused on stability, security and open source software.

It's the richest and most open in terms of the number of architectures supported and it is used by numerous industrial projects (*Cumulus network, ProxMox, Aastra, ...*).

It's the basis of Ubuntu and numerous other Linux distributions !!!

In 1988, IEEE⁷ achieves **Portable Operating System Interface for uniXes**⁸ :

- Known officially as IEEE 1003 or ISO/IEC 9945 ;
- Which defines OS user interfaces and software interfaces (APIs) ;

7. Institute of Electrical and Electronics Engineers - <http://www.ieee.org>

8. POSIX - <https://fr.wikipedia.org/wiki/POSIX>

POSIX standard is not free (and expensive). Then, in 1990, a working group suggests **Single Unix Specification**⁹ :

- POSIX based ;
- But free !

9. SUS - https://fr.wikipedia.org/wiki/Single_UNIX_Specification

In 2001, the **Linux Standard Base**¹⁰ wants to develop and promote a set of standards that will increase compatibility between different Linux distributions. It rules :

- Standard libraries calls ;
- POSIX command line tools ;
- The File System Hierarchy¹¹ ;

```
# lsb_release -a
No LSB modules are available.
Distributor ID: Debian
Description:    Debian GNU/Linux 11 (bullseye)
Release:       11
Codename:      bullseye
```

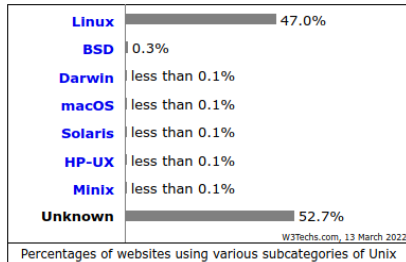
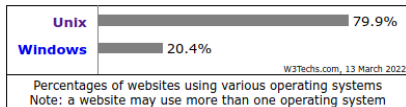
10. LSB - https://fr.wikipedia.org/wiki/Linux_Standard_Base

11. <https://www.pathname.com/fhs/>

Linux

Who runs on Linux?

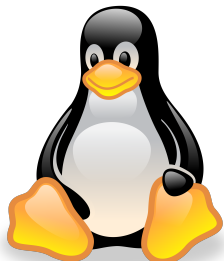
Linux is the most used operating system on the Internet¹².



12. March 2021, for websites - <https://w3techs.com/technologies>

Linux is the most used operating system for embedded software.

You can find it in :

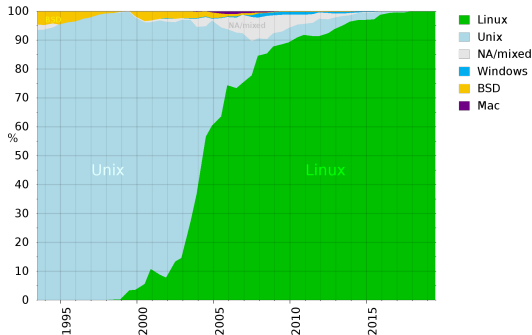


- all IAP/ISP Internet routers ;
- 90% of TV set-top boxes ;
- most of flat screen TV ;
- most of MP3-capable car audio systems ;
- Cumulus network Ethernet switches OS ;
- ProxmoxVE free virtualisation solutions ;
- ...
- and, of course, in the lower layer of Android OS !

Linux

Is Linux a versatile OS ?

Since 2017, almost all TOP500¹³ computers are using Linux.



We can also find it on SBC¹⁴, like **Raspberry Pi**.

13. <https://en.wikipedia.org/wiki/TOP500>

14. SBC, March 2019 - <https://www.linux.com/topic/open-source/top-10-new-linux-sbcs-watch-2019>



*Really, I'm not out to destroy Microsoft.
That will just be a completely unintentional side effect !*
Linus TORVALDS