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SUMMER SCHOOL

The Digital Revolution and the Hackers Culture.

SAS Summer School
June 10–15th, 2019

Fabio Grazioso

The Hackers Culture

A definition of Hacking

early disclaimer about hacking

- definition of hacking
- mainstream idea

early disclaimer about hacking

hack[1] | hak |

verb

1 *[with object]* cut with rough or heavy blows: *I watched them hack the branches* | *[no object]* : *men* ***hack at*** *the coalface.*
- kick wildly or roughly: *he had to race from his line to hack the ball into the stand.*

2 *[no object]* gain unauthorized access to data in a system or computer: *they* ***hacked into*** *the bank's computer* | *[with object]* : *someone hacked his computer from another location* | (as noun **hacking**) : *outlawing hacking has not stopped it.*
- program quickly and roughly.

3 *[no object]* cough persistently: *I was waking up in the middle of the night and coughing and hacking for hours.*

4 *[usually with negative]* **(hack it)** *informal* manage; cope: *lots of people leave because they* ***can't hack it.***

early disclaimer about hacking

early disclaimer about hacking

early disclaimer about hacking

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early disclaimer about hacking

noun

1 a rough cut, blow, or stroke: *he was sure one of us was going to take a hack at him*.
- (in sport) a kick or a stroke with a stick inflicted on another player.
- a notch cut in the ice, or a peg inserted, to steady the foot when delivering a stone in curling.
- a tool for rough striking or cutting, e.g. a mattock or a miner's pick.
- *archaic* a gash or wound.

2 *informal* an act of computer hacking: *the challenge of the hack itself*.
- a piece of computer code providing a quick or inelegant solution to a particular problem: *this hack doesn't work on machines that have a firewall*.
- a strategy or technique for managing one's time or activities more efficiently: *another hack that will save time is to cover your side mirrors with a plastic bag when freezing rain is forecast*.

Cuba's DIY Inventions from 30 Years of Isolation
Motherboard documentary
https://www.youtube.com/watch?v=v-XS4aueDUg

Life Hacks

To remove the stem from strawberries, use a straw

EXTRA

Use a clothespin to hold a nail whilst hammering...

No cupholder? No problem.

Do something unusual when locking the door before a long trip etc to remember that you've definitely done it

Notable Authors

Richard Stallman

From Stallman website: a definition of hacking:

“It is hard to write a simple definition of something as varied as hacking, but I think what these activities have in common is playfulness, cleverness, and exploration. Thus, hacking means exploring the limits of what is possible, in a spirit of playful cleverness. Activities that display playful cleverness have "hack value".”

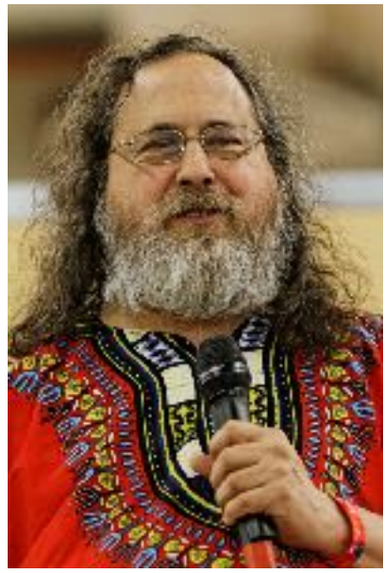
Richard Stallman

“Yet when I say I am a **hacker**, people often think I am making a naughty admission, presenting myself specifically as a security breaker. How did this confusion develop?
Around 1980, when the *news media* took notice of hackers, they fixated on one narrow aspect of real hacking: the security breaking which some hackers occasionally did. They ignored all the rest of hacking, and took the term to mean breaking security, no more and no less. The media have since spread that definition, disregarding our attempts to correct them. As a result, most people have a mistaken idea of what we hackers actually do and what we think.”

Free software movement

The free software movement (FSM) or free / open source software movement (FOSSM) or free / libre open source software (FLOSS) is a social movement with the goal of obtaining and guaranteeing certain freedoms for software users, namely the freedom to run the software, to study and change the software, and to redistribute copies with or without changes. Although drawing on traditions and philosophies among members of the 1970s hacker culture and academia, Richard Stallman formally founded the movement in 1983 by launching the GNU Project. Stallman later established the Free Software Foundation in 1985 to support the movement.

The philosophy of the movement is that the use of computers should not lead to people being prevented from cooperating with each other. In practice, this means rejecting "proprietary software", which imposes such restrictions, and promoting free software, with the ultimate goal of liberating everyone in cyberspace – that is, every computer user.



GNU project

Unix

Unix is a family of multitasking, multiuser computer operating systems that derive from the original AT&T Unix, development starting in the 1970s at the Bell Labs research center by

Ken Thompson, Dennis Ritchie, and others.
Initially intended for use inside the Bell System, AT&T licensed Unix to outside parties in the late 1970s, leading to a variety of both academic and commercial Unix variants from vendors like the University of California, Berkeley (BSD), Microsoft (Xenix), IBM (AIX), and Sun Microsystems (Solaris).

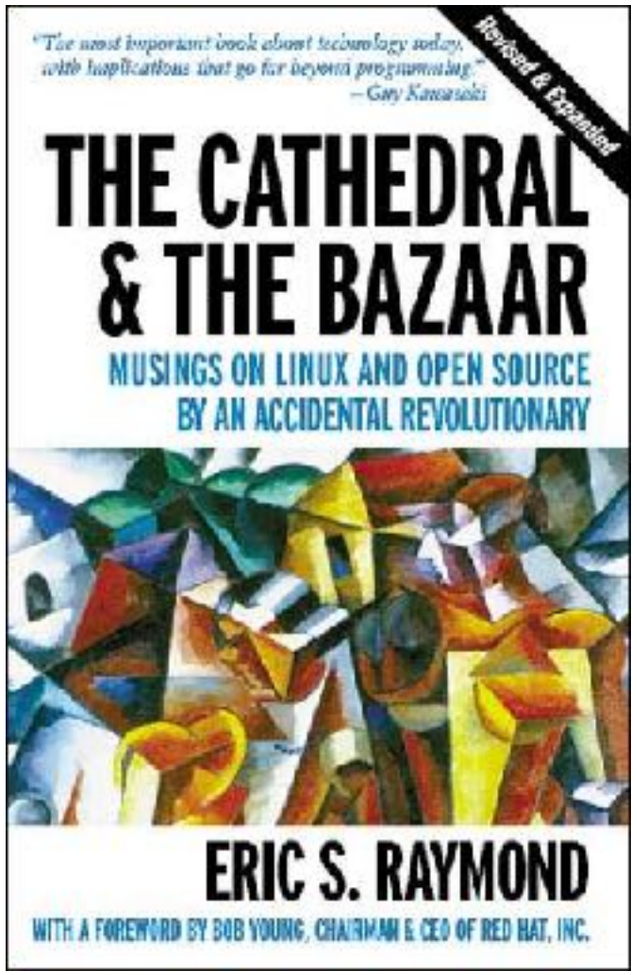
Linus Torvalds

Linus Torvalds is a Finnish-American software engineer who is the creator, and for a long time, principal developer of the Linux kernel, which became the kernel for operating systems such as the Linux operating systems, Android, and Chrome OS. He started reading the book of professor Andrew Tanenbaum's “Operating Systems: Design and Implementation”, in which Tanenbaum describes MINIX, a version of Unix. Torvalds then started to create his own operative system: his M.Sc. thesis was titled “Linux: A Portable Operating System”.

the Linux logo

The Cathedral and the Bazaar

This is an essay, and later a book, by Eric S. Raymond on software engineering methods, based on his observations of the Linux kernel development process and his experiences managing an open source project Fetchmail. It examines the struggle between top-down and bottom-up design.
The essay contrasts two different free software development models:
The Cathedral model, in which source code is available with each software release, but code developed between releases is restricted to an exclusive group of software developers. GNU Emacs and GCC were presented as examples.
The Bazaar model, in which the code is developed over the Internet in view of the public. Raymond credits Linus Torvalds, leader of the Linux kernel project, as the inventor of this process.
The essay's central thesis is Raymond's proposition that "given enough eyeballs, all bugs are shallow" (which he terms Linus's Law): the more widely available the source code is for public testing, scrutiny, and experimentation, the more rapidly all forms of bugs will be discovered. In contrast, Raymond claims that an inordinate amount of time and energy must be spent hunting for bugs in the Cathedral model, since the working version of the code is available only to a few developers.



RSA ANIMATE: Drive: The surprising truth about what motivates us

https://www.youtube.com/watch?v=u6XAPnuFjJc

Guido van Rossum

Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.
Guido van Rossum is a Dutch programmer, the author and "Benevolent Dictator For Life" (BDFL) of the Python project, which means he continues to oversee Python development, making decisions when necessary. From 2005 to December 2012, he worked at Google, where he spent half of his time developing the Python language.

Aaron Swartz

Digital activist

Aaron Swartz

- Aaron Hillel Swartz (November 8, 1986 – January 11, 2013) was an American computer programmer, entrepreneur, writer, political organizer, and Internet hacktivist. He was involved in […] the organization **Creative Commons** […] and was a co-founder of the social news site **Reddit**.

- Swartz's work also focused on civic awareness and activism. He founded the online group Demand Progress, known for its campaign against the Stop Online Piracy Act.

- In 2011, Swartz was arrested by Massachusetts Institute of Technology (MIT) police on state breaking-and-entering charges, after connecting a computer to the MIT network in an unmarked and unlocked closet, and setting it to download academic journal articles systematically from JSTOR using a guest user account issued to him by MIT. Federal prosecutors later charged him with two counts of wire fraud and eleven violations of the Computer Fraud and Abuse Act, carrying a cumulative maximum penalty of $1 million in fines, 35 years in prison [….]

- Swartz declined a plea bargain under which he would have served six months in federal prison. Two days after the prosecution rejected a counter-offer by Swartz, he was found dead in his Brooklyn apartment, where he had hanged himself.

(from Wikipedia)

Wikimedia foundation

- The Wikimedia Foundation, Inc. (WMF, or simply Wikimedia) is an American non-profit and charitable organization headquartered in San Francisco, California.

- It is mostly known for participating in the Wikimedia movement.

- It owns the internet domain names of most movement projects and hosts sites like Wikipedia.

- The foundation was founded in 2003 by Jimmy Wales as a way to fund Wikipedia and its sibling projects through non-profit means.

WIKIMEDIA

FOUNDATION

Social Media Hacking

The Facebook (and social media) practices with links

what happens when we share a facebook (and other social media) hyperlink?

The Facebook (and social media) practices with links

https://www.facebook.com/photo.php?fbid=10211539583798623&set=a.10265416772 13&type=3&eid=ARCaTcHvZc9vYwS8a-9f4vJWKjetUpVOGyL2Hq4a3fsO6_Z-aUxkcsZx-IN44TdPOfWexIwstRDgeNBJ

The Facebook (and social media) practices with links

https://www.facebook.com/photo.php?fbid=10211539583798623&set=a.10265416772 13&type=3&eid=ARCaTcHvZc9vYwS8a-9f4vJWKjetUpVOGyL2Hq4a3fsO6_Z-aUxkcsZx-IN44TdPOfWexIwstRDgeNBJ

The Facebook (and social media) practices with links

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The Facebook (and social media) practices with links

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The Facebook (and social media) practices with links

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HASH TABLE

Key:
"Paloma Guerrero"
Value:
"Toronto"

Key:
"Katie Huang"
Value:
"New York"

Key:
"Karl Dippmann"
Value:
"Manila"

Hash Function

Key	Bucket
00	"New York"
01	
02	
03	"Toronto"
04	
05	"Manila"
06	

Science Fiction

and other cultural references

Novels, fiction, books

- Edward Forster - “The machine stops” (1909)
- William Gibson - “Burning Chrome” (1982)
- William Gibson - “Neuromancer” (1984)
- Eric Raymond - “The Cathedral and the Bazaar” (1999)
- Kevin Mitnick - “The Art of Deception” (2002)
- Donald Norman - The Design of Everyday Things (2002)
- Aaron Swartz - Wikimedia at the Crossroads (online essay) (2006)
- Evgeny Morozov - “The Net Delusion: The Dark Side of Internet Freedom” (2011)
- Richard Stallman - “Free Software, Free Society” 3rd Ed. (2015)

films

- Tron (1982)
- Wargames (1983)
- Ghost in the Shell (1995)
- Pirates of silicon valley (1999)
- Swordfish (2001)
- The Social Network (2010)
- Blackhat (2015)
- Steve Jobs (2015)
- Snowden (2016)
- The Circle (2017)

Philip K. Dick

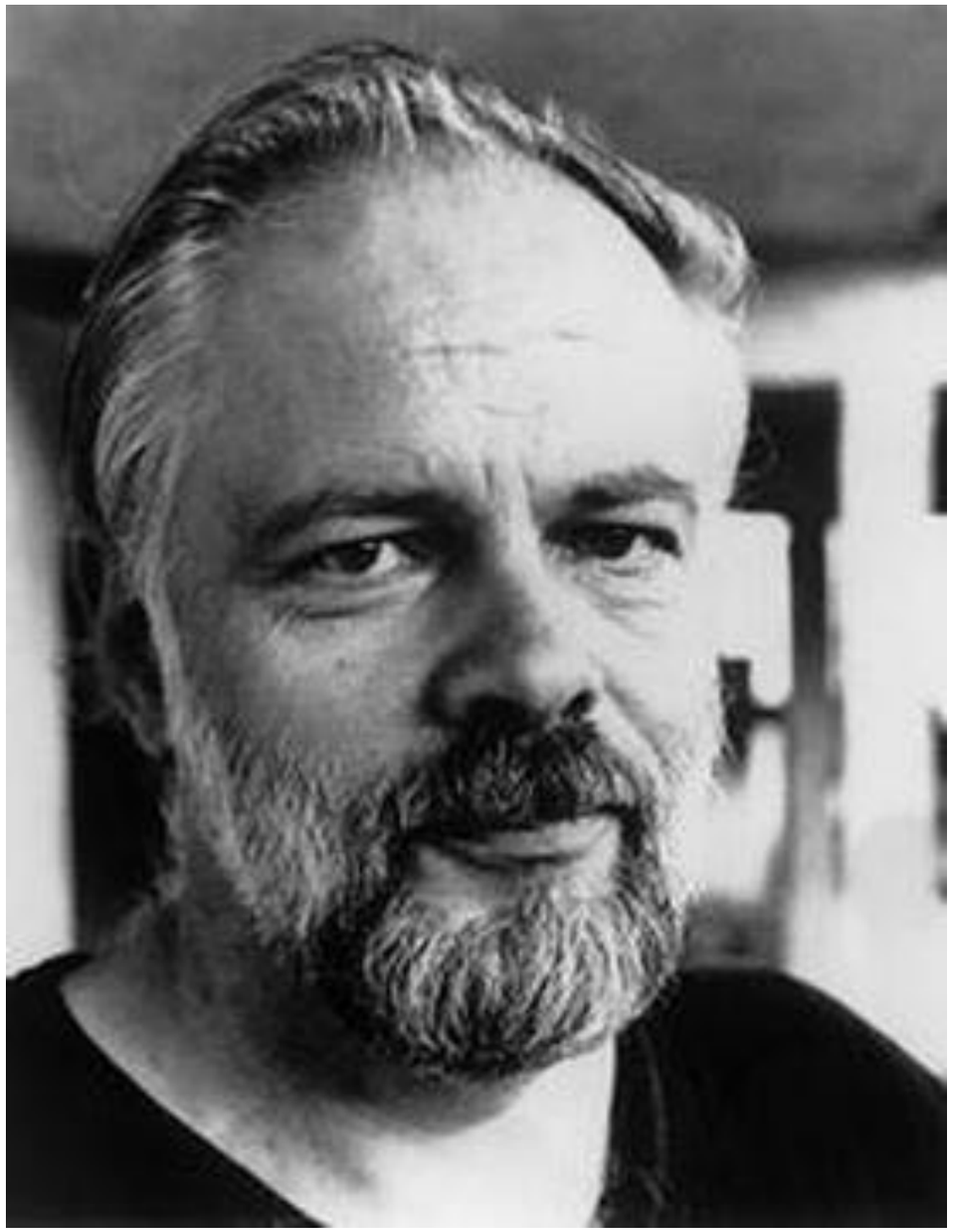
Themes

- The fragile nature of what is real

- The construction of personal identity

- The everyday world is actually an illusion assembled by powerful external entities

- "What constitutes the authentic human being?”



Philip K. Dick

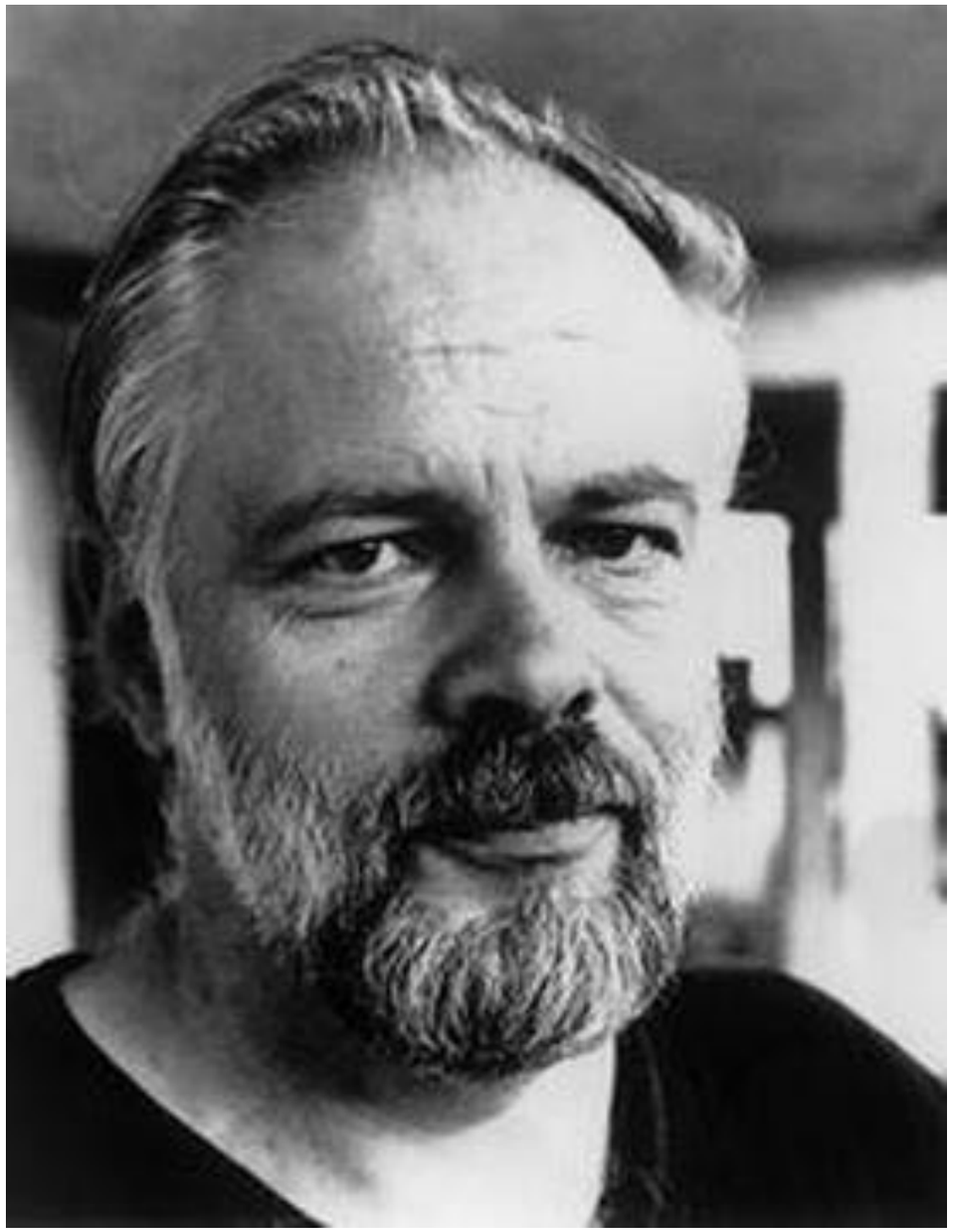
Works

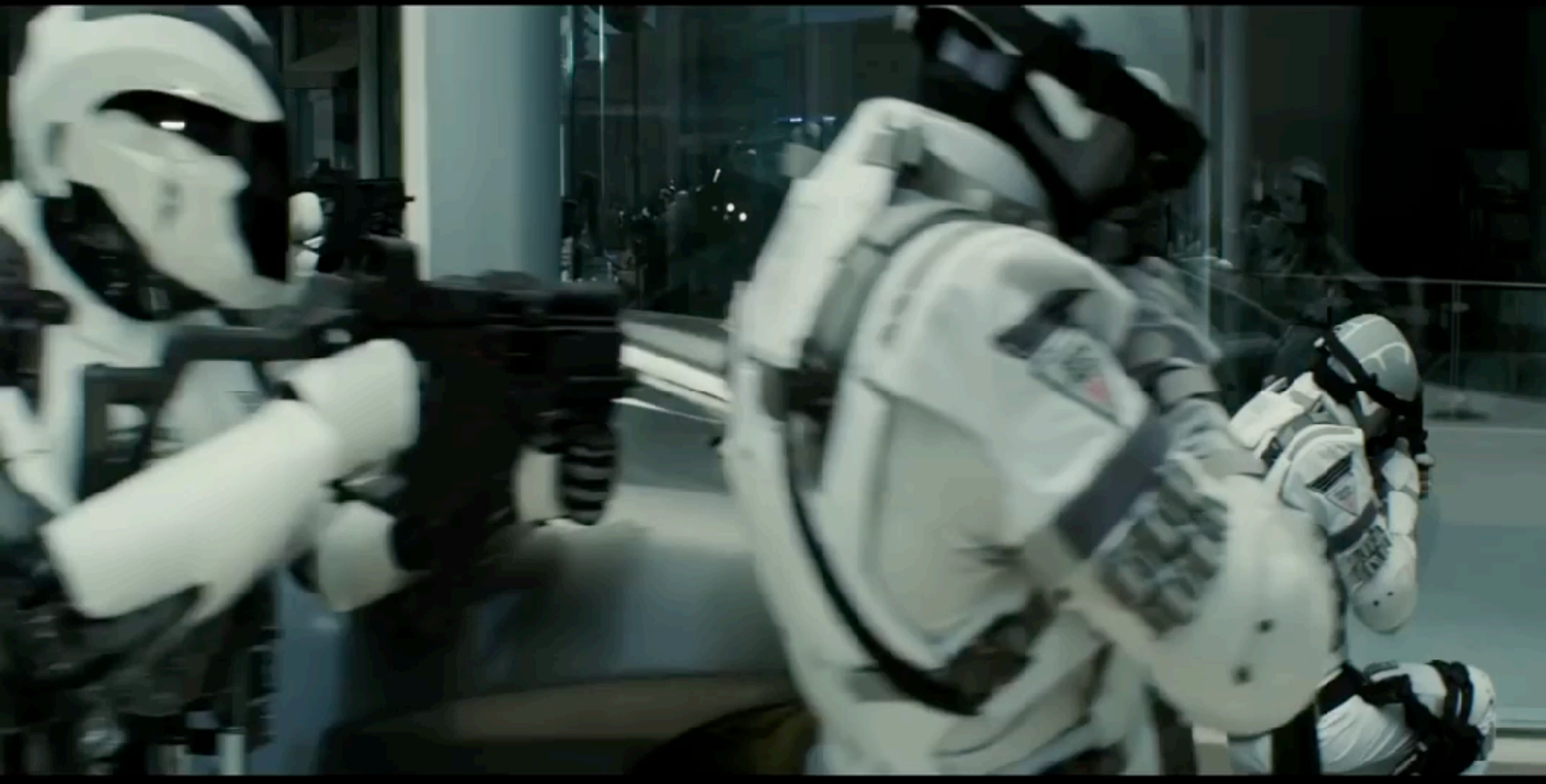
- “Do Androids Dream of Electric Sheep?”. (film: Blade Runner)

- "We Can Remember It for You Wholesale”. (short story) (film: Total Recall)

- "The Minority Report” (short story)

- “Flow My Tears, the Policeman Said,”





scene from “Total Recall”

Unix/Linux

historical excursus

Early steps

- The Unix operating system was created in 1969, at AT&T's Bell Labs (USA) by Ken Thompson, Dennis Ritchie, Douglas McIlroy, and Joe Ossanna

- When it was first released Unix was written in “machine language”.

- Later in 1973, it was rewritten in the C programming language by Dennis Ritchie, a high-level language. This made its porting to different computer platforms easier.

- In the meanwhile, AT&T had some legal problems (antitrust) and was forced to make the source code public.

- As a result, Unix became widely adopted by academic institutions and businesses.

- In 1984, AT&T divested itself of Bell Labs, so Bell Labs began selling Unix as a proprietary product, and users were no more legally allowed to modify it.

source: Wikipedia

UNIX

Early steps

- In 1983 by **Richard Stallman** started the GNU Project, with the goal of creating a "complete Unix-compatible software system" composed entirely of free software.

- In 1985, Stallman started the Free Software Foundation and wrote the GNU General Public License (GNU GPL) in 1989.

- By the early 1990s, many of the programs required in an operating system (such as libraries, compilers, text editors, a Unix shell, and a windowing system) were completed.

source: Wikipedia

Early steps

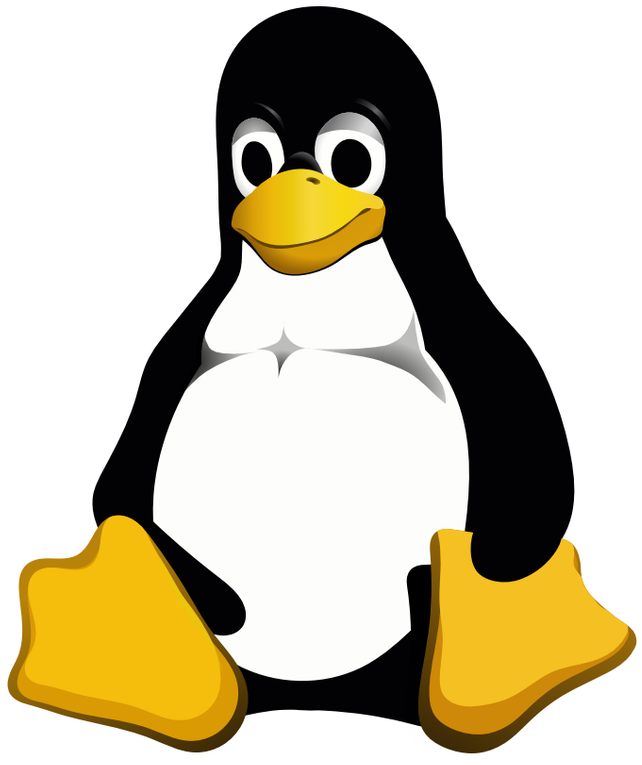
- In 1991, while attending the University of Helsinki, **Linus Torvalds** became curious about operating systems.

- Linus Torvalds has stated that if the GNU kernel had been available at the time (1991), he would not have decided to write his own.

- Torvalds started to study MINIX, an operating system created by Andrew S. Tanenbaum in 1987 as a minimal Unix-like operating system

- MINIX was targeted at students and others who wanted to learn the operating system principles, and the licensing terms prevented it from being free software.

- Frustrated by these restrictions in the licensing of MINIX, Torvalds he began to work on his own operating system kernel, which eventually became the **Linux** kernel.



source: Wikipedia

On 25 August 1991, (at age 21) Linus Torvalds announced this system in a Usenet posting to the newsgroup "**comp.os.minix**."

> Hello everybody out there using minix -
>
> I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).
>
> I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)
>
> Linus (torvalds@kruuna.helsinki.fi)
>
> PS. Yes - it's free of any minix code, and it has a multi-threaded fs. It is NOT portable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that's all I have :-(

— *Linus Torvalds*

source: Wikipedia

Linux

- In the mid-1990s started the adoption of Linux in production environments, rather than being used only by hobbyists. In particular it started to take off first in the **supercomputing** community, where organizations such as NASA started to replace their increasingly expensive machines with clusters of inexpensive commodity computers running Linux.

- Commercial use began when Dell and IBM, followed by Hewlett-Packard, started offering Linux support to escape Microsoft's monopoly in the desktop operating system market.

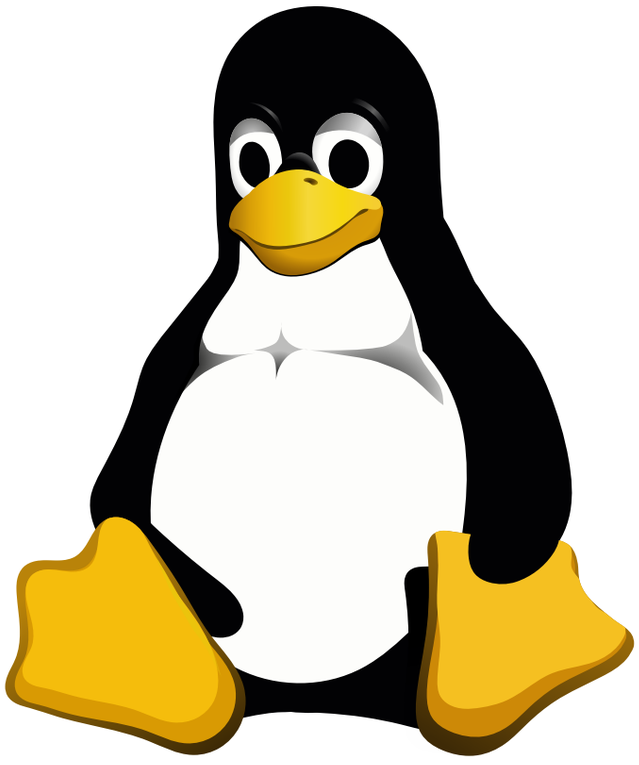
- Today, Linux systems are used throughout computing, from embedded systems to virtually all **supercomputers**, and have secured a place in the market of **internet servers**.

- Use of Linux distributions in home and enterprise **desktops** has been growing. Linux distributions have also become popular in the **netbook** market, with many devices shipping with customized Linux distributions installed.

- Linux's greatest success is the **mobile device** market, with **Android** being one of the most dominant operating systems on smartphones.

- Linux **gaming** is also on the rise with Valve showing its support for Linux and rolling out its own gaming oriented Linux distribution.

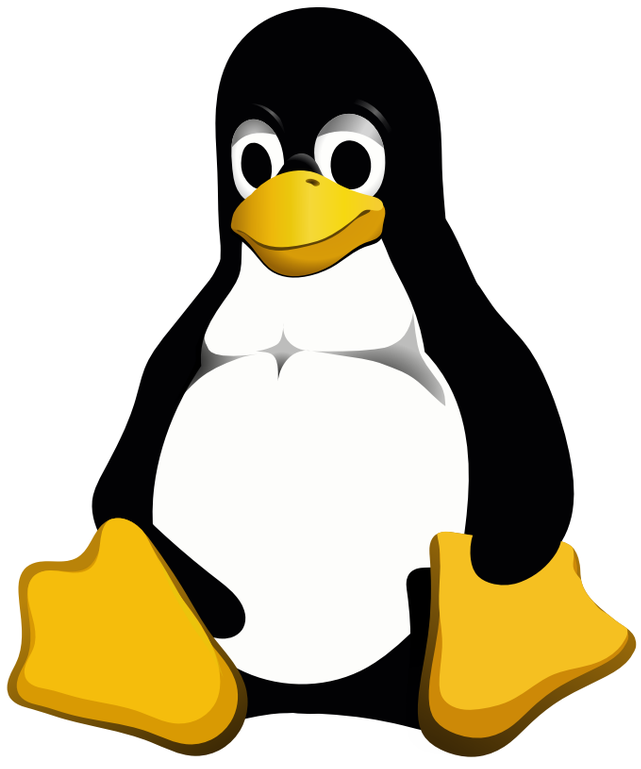
- Linux distributions have also gained popularity with various local and **national governments**, such as the federal government of **Brazil**.



source: Wikipedia

Linux internal design

- Linux is a modular Unix-like operating system, deriving much of its basic design from Unix.
- It has a monolithic kernel, the Linux kernel, which handles process control, networking, access to the peripherals, and file systems.
- Device drivers are either integrated directly with the kernel, or added as modules that are loaded while the system is running.
- It also incorporates the C programming language library functions.
- The system also includes a popular Command Language Interface (CLI) “shell”, i.e. a text-commands based interface.
- The graphical user interface (GUI) used by most Linux systems is built on top of an implementation of the X Window System.
- Many other open-source software projects contribute in a “modular” way to Linux.



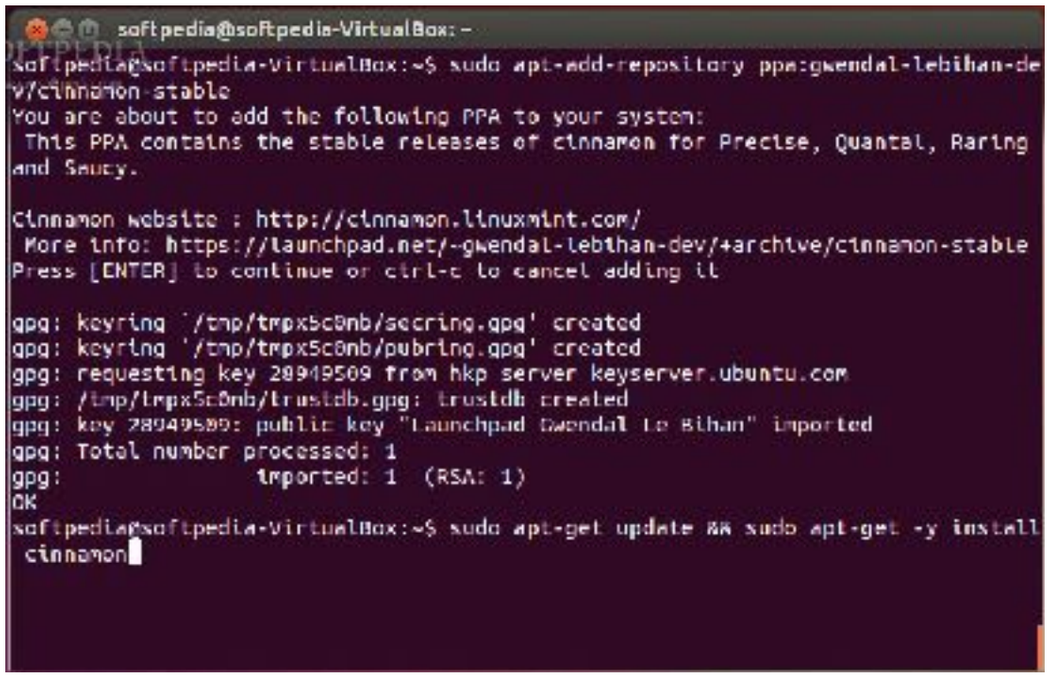
source: Wikipedia

Linux appearance

- The user interface, also known as the shell, can be a **command-line interface** (CLI), or a **graphical user interface** (GUI).

- CLI shells are text-based user interfaces, which use text for both input and output. The dominant shell used in Linux is the Bourne-Again Shell (bash), originally developed for the GNU project. The CLI is particularly suited for automation of repetitive or delayed tasks, and provides very simple inter-process communication.

source: Wikipedia



Linux appearance

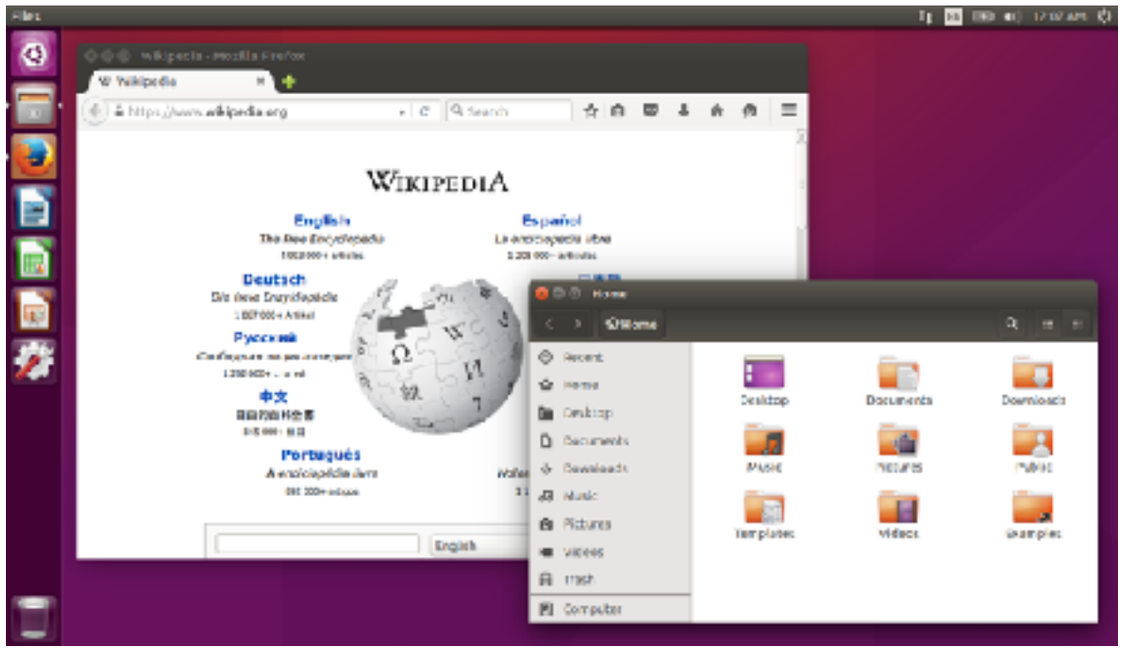
- For recent desktop systems, the default user interface is usually **graphical**, although the CLI is commonly available through terminal emulator windows or on a separate virtual console.

- The most popular graphical user interfaces, called also desktop environments, are KDE Plasma, GNOME, MATE, Cinnamon, Unity, LXDE, Pantheon and Xfce, though a variety of additional user interfaces exist.

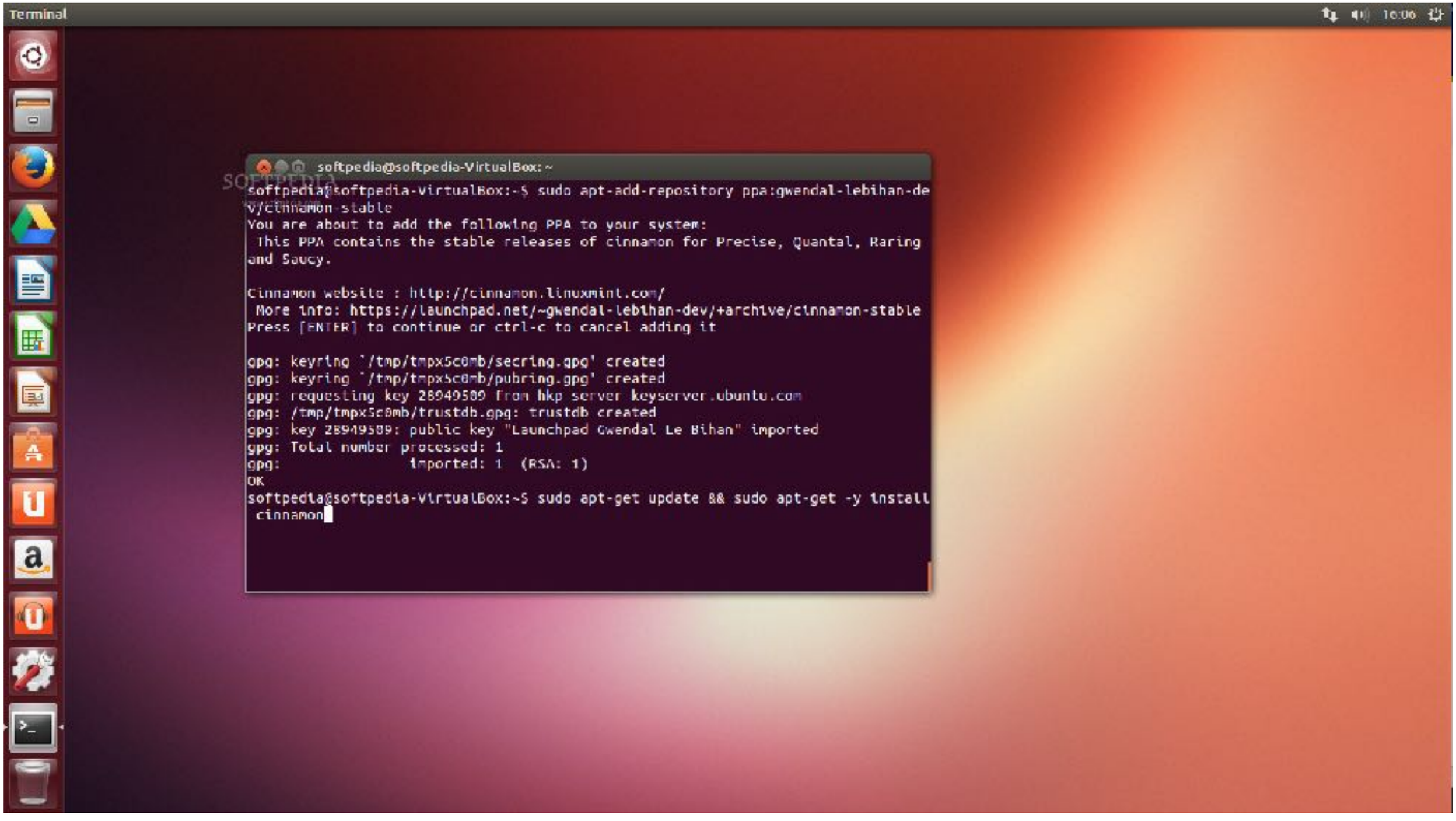
- Most popular user interfaces are based on the X Window System, often simply called "X".

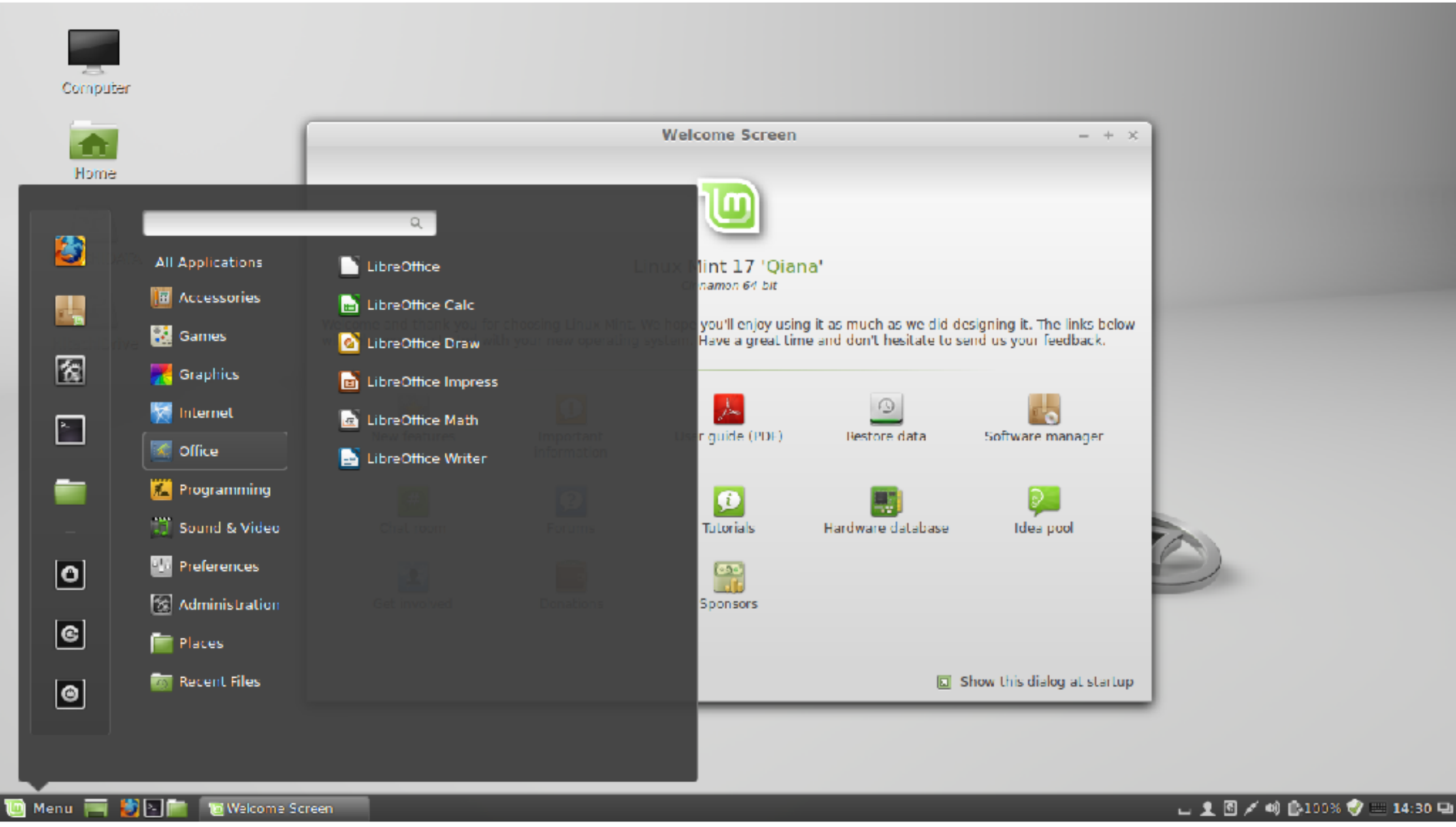
- Several types of window managers exist for X11.

- Window managers provide means to control the placement and appearance of individual application windows, and interact with the X Window System.



source: Wikipedia


Terminal
16:06
softpedia@softpedia-VirtualBox: ~
softpedia@softpedia-VirtualBox:~$ sudo apt-add-repository ppa:gwendal-lebihan-dev/cinnamon-stable
You are about to add the following PPA to your system:
 This PPA contains the stable releases of cinnamon for Precise, Quantal, Raring and Saucy.
Cinnamon website : http://cinnamon.linuxmint.com/
 More info: https://launchpad.net/~gwendal-lebihan-dev/+archive/cinnamon-stable
Press [ENTER] to continue or ctrl-c to cancel adding it
gpg: keyring `/tmp/tmpx5c0mb/secring.gpg' created
gpg: keyring `/tmp/tmpx5c0mb/pubring.gpg' created
gpg: requesting key 28949589 from hkp server keyserver.ubuntu.com
gpg: /tmp/tmpx5c0mb/trustdb.gpg: trustdb created
gpg: key 28949589: public key "Launchpad Gwendal Le Bihan" imported
gpg: Total number processed: 1
gpg: imported: 1 (RSA: 1)
OK
softpedia@softpedia-VirtualBox:~$ sudo apt-get update && sudo apt-get -y install cinnamon

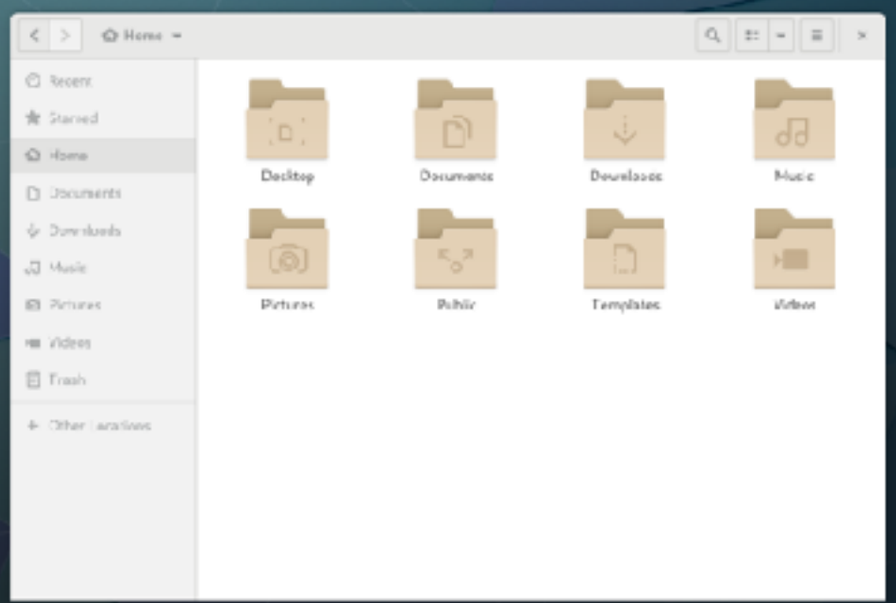

Computer
Home
Welcome Screen
Linux Mint 17 'Qiana'
Cinnamon 64 bit
you'll enjoy using it as much as we did designing it. The links below
Have a great time and don't hesitate to send us your feedback.
User guide (PDF)
Restore data
Software manager
Tutorials
Hardware database
Idea pool
Sponsors
Show this dialog at startup
All Applications
Accessories
Games
Graphics
Internet
Office
Programming
Sound & Video
Preferences
Administration
Places
Recent Files
LibreOffice
LibreOffice Calc
LibreOffice Draw
LibreOffice Impress
LibreOffice Math
LibreOffice Writer
Menu
Welcome Screen
100%
14:30

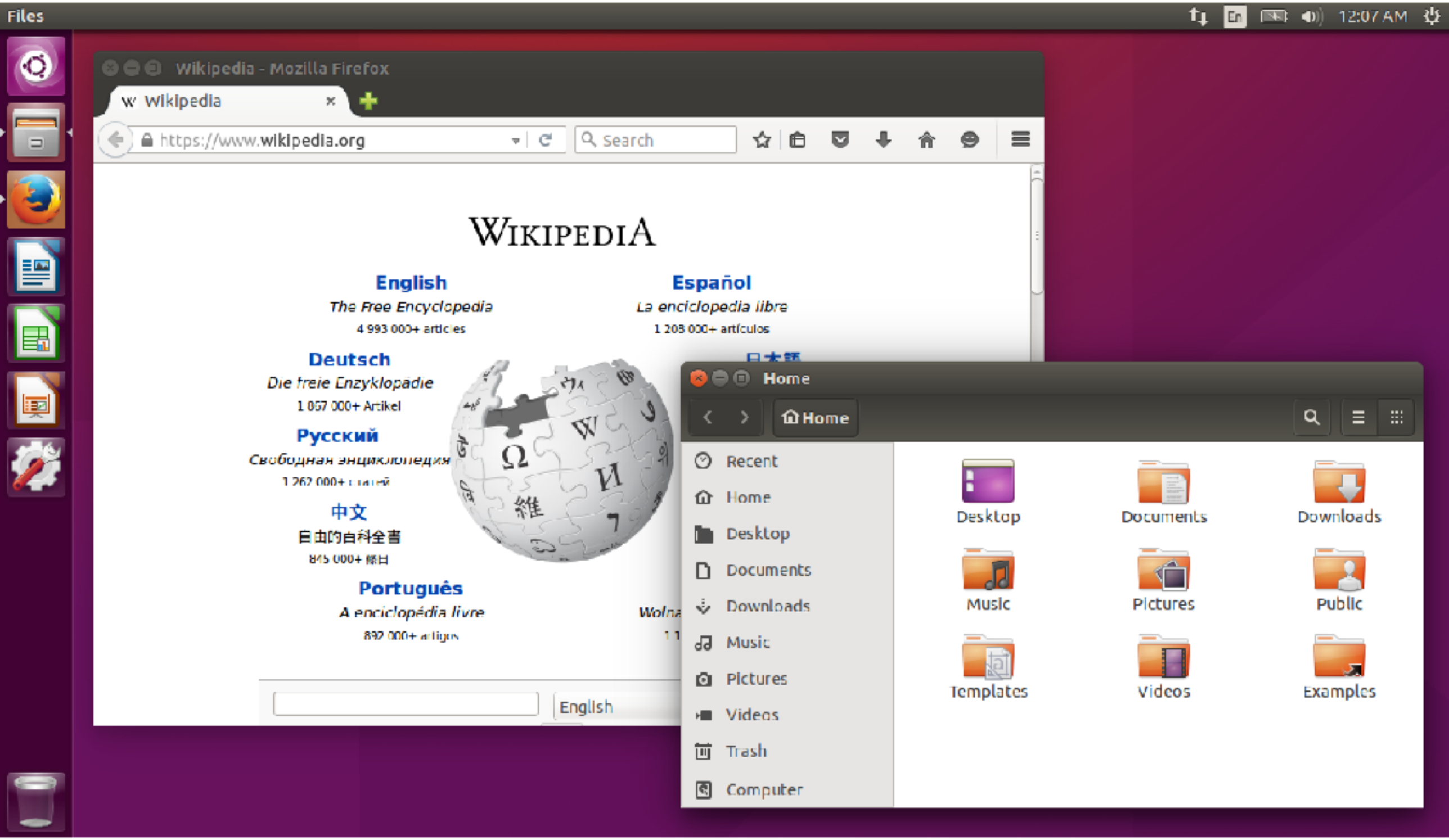
Activities

Wed 22:03

en

Type to search...




Files
12:07 AM
Wikipedia - Mozilla Firefox
Wikipedia
https://www.wikipedia.org
Search
WIKIPEDIA
English
The Free Encyclopedia
4 993 000+ articles
Español
La enciclopedia libre
1 208 000+ artículos
Deutsch
Die freie Enzyklopädie
1 857 000+ Artikel
Русский
Свободная энциклопедия
1 262 000+ статей
中文
自由的百科全書
845 000+ 條目
Português
A enciclopédia livre
892 000+ artigos
English
Home
Home
Recent
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Trash
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Examples

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/home/luis/
DEVICES
File System
SDCARD
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luis
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Enlac
Calibre_Library
Desktop
Documents
Downloads
Music
Pictures
Public
Templates
Videos
VirtualBox VMs
config
11 items (840 bytes), Free space: 174.3 GB
Settings
Settings
Customize your desktop
Personal
Appearance
Desktop
File Manager
Notifications
Panel
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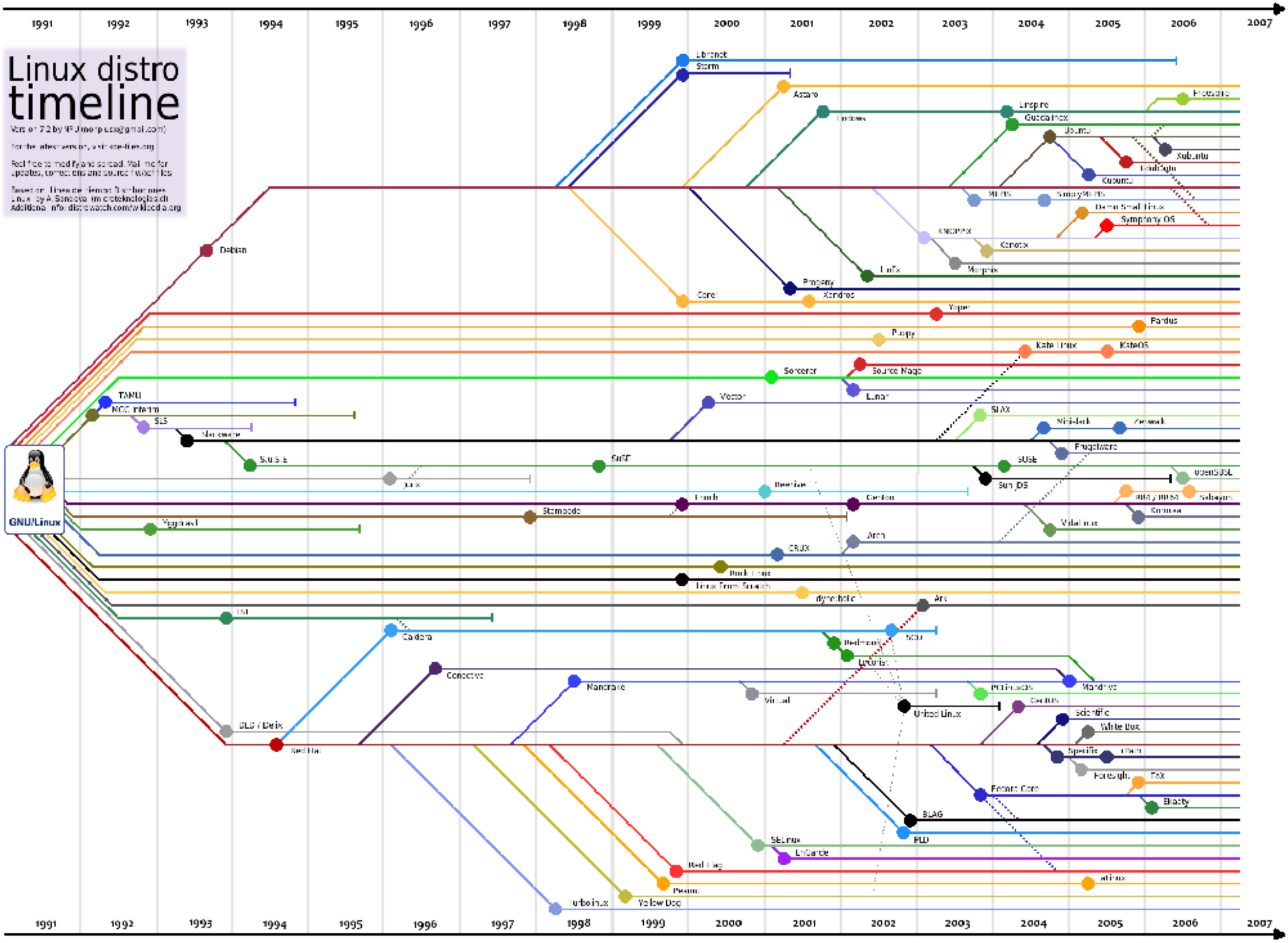
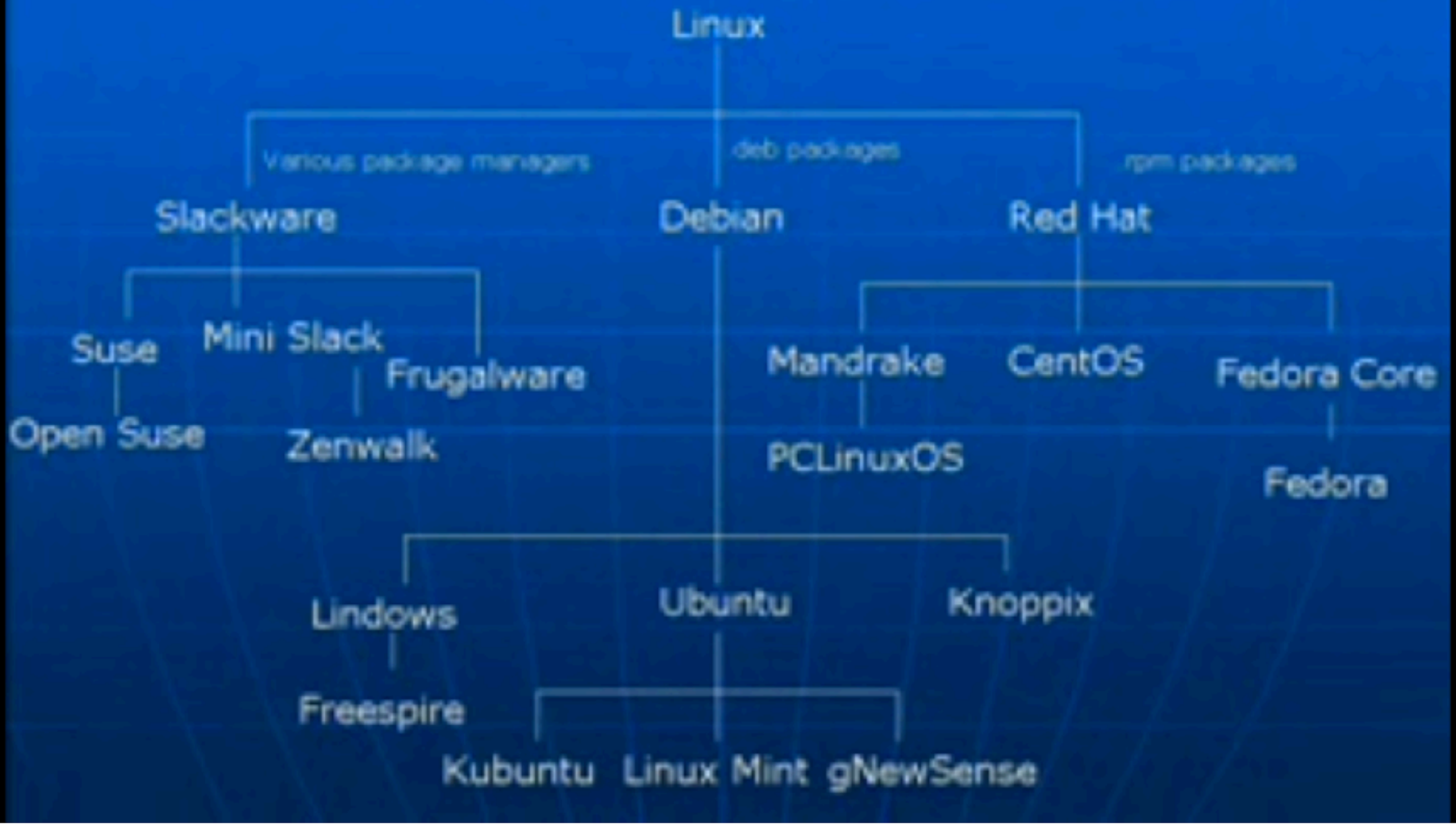
Workspaces
Hardware
Display
Keyboard
Mouse and Touchpad
Removable
Help
All Settings
Close



Linux distro timeline
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
GNU/Linux
Libranet
Storm
Astaro
Linspire
Guadalinex
Ubuntu
Xubuntu
Kubuntu
Symphony OS
Kanotix
Morphix
Progeny
Xandros
Corel
Yoper
Pardus
Puppy
Kate Linux
KateOS
Sorcerer
Source Mage
Lunar
Vector
SLAX
Frugalware
SUSE
Sun JDS
Debian
TAMU
NCC Interim
SLS
Slackware
SuSE
Stampede
Yggdrasil
Arch
CRUX
Linux From Scratch
Ark
Caldera
Conectiva
Mandrake
Mandriva
United Linux
Scientific
White Box
Specific
Foresight
FaX
Ekaaty
Fedora Core
BLAG
PLD
SELinux
LinGarde
Red Flag
Pearl
Yellow Dog
Turbolinux

Linux Family Tree

Source: http://upload.wikimedia.org/wikipedia/commons/8/8c/Gldt.svg



TIMELINE OF
25 YEARS OF LINUX
IT'S FOSS

Slackware

- Slackware is a Linux distribution created by Patrick Volkerding in 1993.
- Originally based on Softlanding Linux System, Slackware has been the basis for many other Linux distributions, most notably the first versions of SUSE Linux distributions, and is **the oldest distribution that is still maintained**.
- Slackware aims for design **stability** and **simplicity** and to be the most "Unix-like" Linux distribution. In contrast to most modern Linux distributions, Slackware provides **no graphical installation procedure** and no automatic dependency resolution of software packages. It uses plain text files and only a small set of shell scripts for configuration and administration. Without further modification it boots into a command-line interface environment.
- Because of its many conservative and simplistic features, Slackware is often considered to be **most suitable for advanced and technically inclined Linux users**.
- Slackware is available for the IA-32 and x86_64 architectures, with a port to the ARM architecture. While Slackware is mostly free and open source software, it does not have a formal bug tracking facility or public code repository, with releases periodically announced by Volkerding.
- There is no formal membership procedure for developers and Volkerding is the primary contributor to releases.

source: Wikipedia

Debian

- Debian is a Unix-like operating system consisting entirely of **free software**. Ian Murdock started the Debian Project on August 16, 1993.
- Debian 0.01 was released on September 15, 1993, and the first stable version, 1.1, was released on June 17, 1996.
- The Debian stable branch is the **most popular edition for personal computers** and network servers, and is used as the basis for many other distributions.
- Debian is one of the **earliest** operating systems based on the Linux kernel. The project's work is carried out over the Internet by a team of volunteers guided by the Debian Project Leader and three foundational documents: the Debian Social Contract, the Debian Constitution, and the Debian Free Software Guidelines.
- Debian has been openly developed and freely distributed **according to the principles of the GNU Project** founded by Richard Stallman.
- This philosophy drew the support of the Free Software Foundation, which sponsored the project from November 1994 to November 1995.
- When the sponsorship ended, the Debian Project formed **Software in the Public Interest** to continue financially supporting development.

source: Wikipedia

debian

Red Hat

- Red Hat, Inc. is an American multinational software company providing open-source software products to the enterprise community. Founded in 1993, Red Hat has its corporate headquarters in Raleigh, North Carolina, with other offices worldwide.

- Red Hat has become associated to a large extent with its enterprise operating system Red Hat Enterprise Linux and with the acquisition of open-source enterprise middleware vendor JBoss. Red Hat also offers Red Hat Virtualization (RHV), an enterprise virtualization product. Red Hat provides storage, operating system platforms, middleware, applications, management products, and support, training, and consulting services.

- Red Hat creates, maintains, and contributes to many free software projects. It has acquired several proprietary software product codebases through corporate mergers and acquisitions and has released such software under open-source licenses. As of March 2016, Red Hat is the second largest corporate contributor to the Linux kernel version 4.14 after Intel.

- On October 28, 2018, **IBM** announced its intent to acquire Red Hat for $34 billion.

source: Wikipedia

Ubuntu

- Ubuntu is a free and open-source Linux distribution **based on Debian**. Ubuntu is officially released in three editions: Desktop, Server, and Core (for IoT devices and robots).

- Ubuntu is a popular operating system for cloud computing, with support for OpenStack.

- Ubuntu is released **every six months**, with long-term support (LTS) releases every two years. The latest release is 18.10 ("Cosmic Cuttlefish"), and the most recent long-term support release is 18.04 LTS ("Bionic Beaver"), which is supported until 2028.

- Ubuntu is developed by Canonical and the community under a **meritocratic governance model**. Canonical provides security updates and support for each Ubuntu release, starting from the release date and until the release reaches its designated end-of-life (EOL) date.

- Canonical **generates revenue** through the sale of **premium services** related to Ubuntu.

- Ubuntu is named after the **African philosophy** of ubuntu, which Canonical translates as "humanity to others" or "I am what I am because of who we all are".

source: Wikipedia

ubuntu

History of early networks and on-line culture

Bulletin Board Systems

- A Bulletin Board is something where to put public messages, for a local community

- Out of this concept, we have the Bulletin Board System (BBS) which was the electronic (digital) version of this

- “Electronic” or “digital” means that you want to do this with a computer, over a **Computer Network**

Computer network

- What is a **Computer Network**? A network of computers, of course!

- But the question is: how do you *implement* this?

Computer network

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- How do you make the connections?

Computer network

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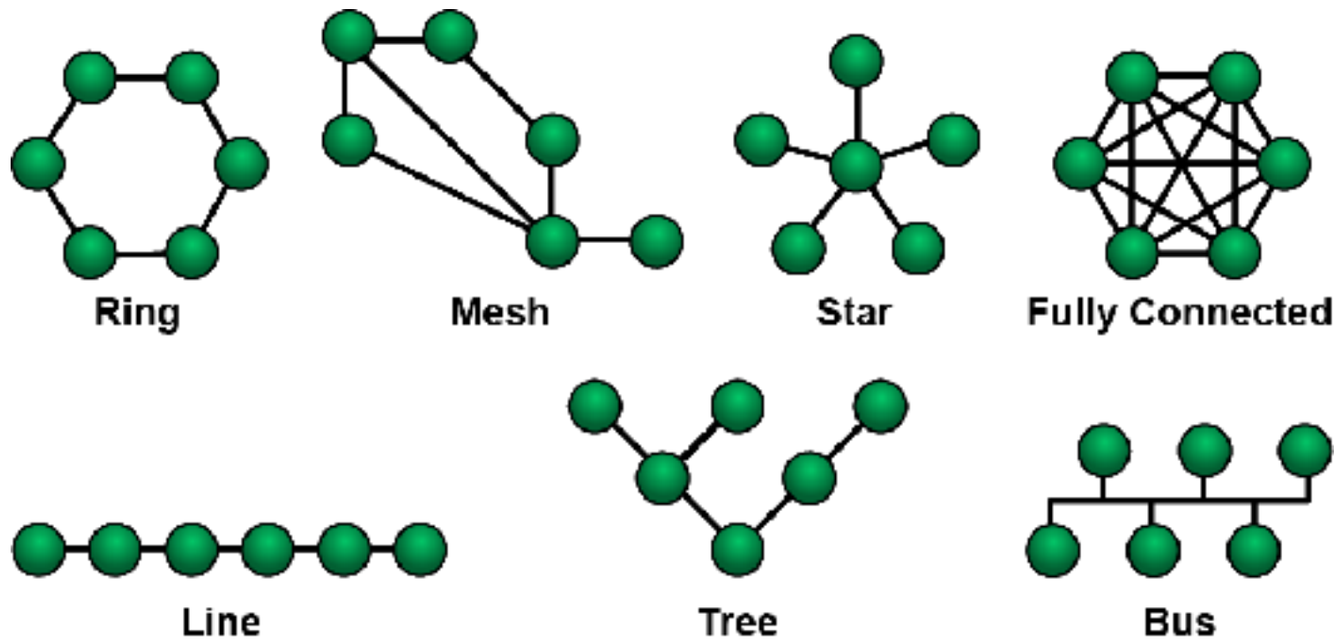
- But the question is: how do you *implement* this?

- How do you make the connections?

- What **topology**?



Bulletin Board Systems

- The earliest BBS can be considered “Community Memory”, started in 1973 in Berkeley, California running on a **mainframe** computer and accessed through terminals located in around San Francisco Bay Area.

Modem connection

- Regarding the “medium” the way to implement a computer network, in the ‘70s, was through telephone lines

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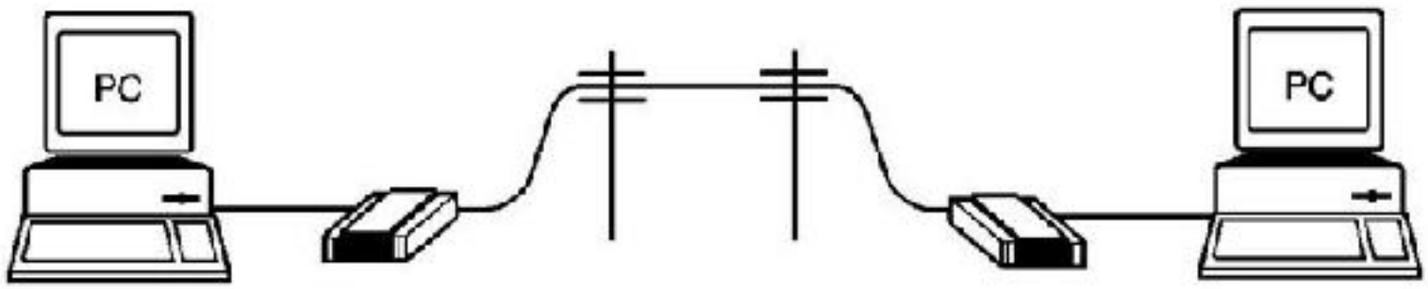

- Then, the connection can be done only point-to-point, because this is how the telephone system works

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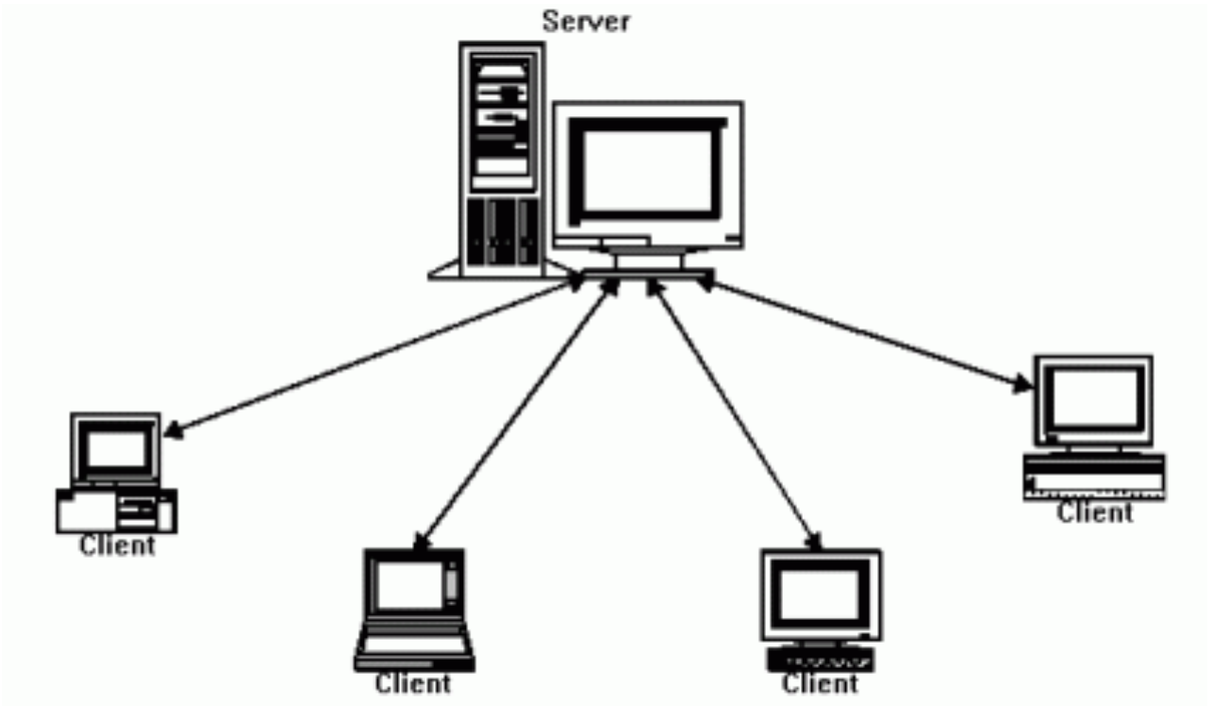
- To transmit data over telephone lines, a ***modem*** (modulator-demodulator) was used.

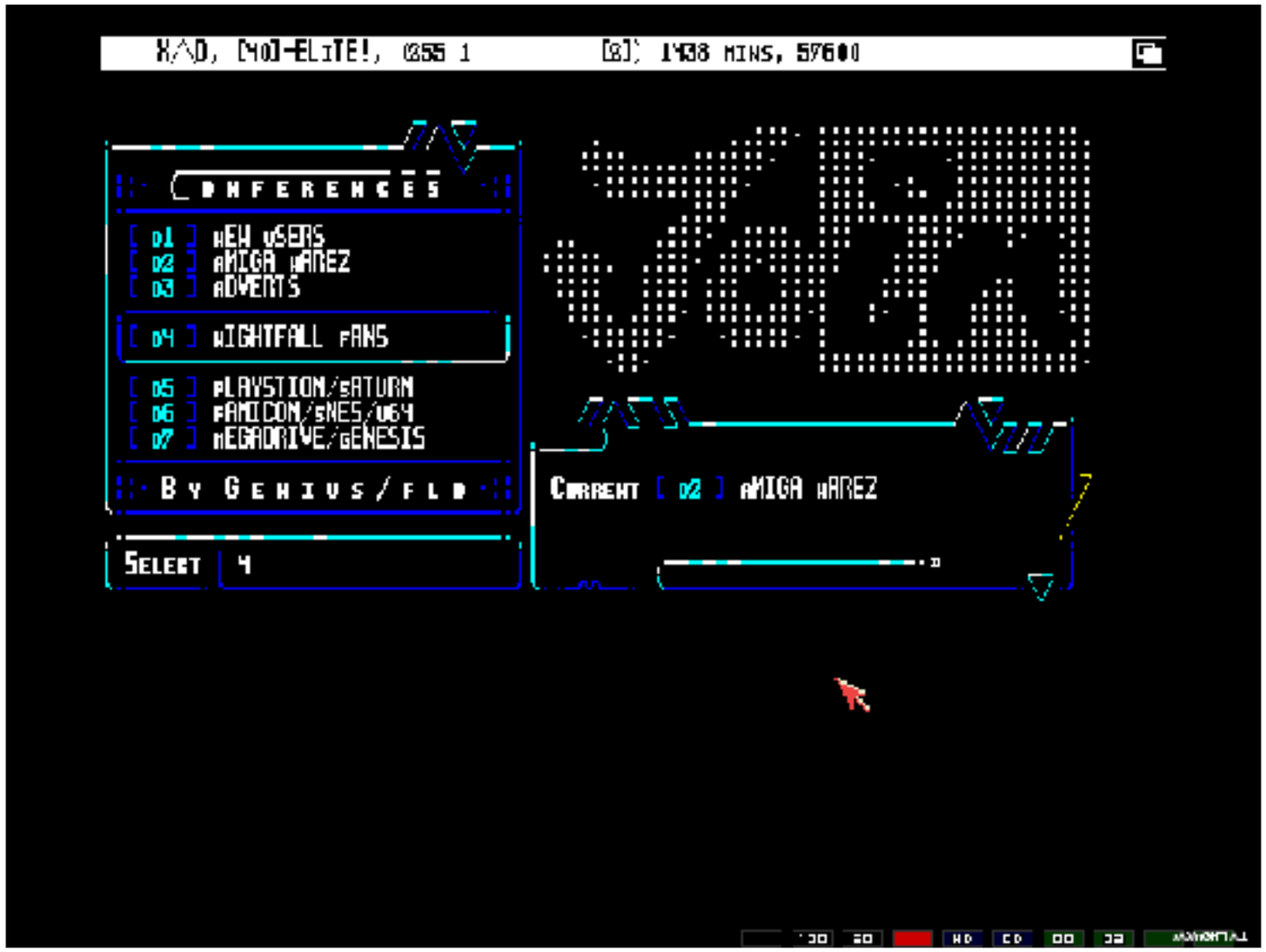
- Then, the connection can be done only **point-to-point**, because this is how the telephone system works.

- And you have a star topology, where many clients connect to the same server. **One connection at a time.**



Bulletin Board Systems content

- The users connect to the BBS server, one by one, what do they find?
  - A collection of public messages
  - a collection of files
  - later, a private messaging system was developed



Bulletin Board Systems content

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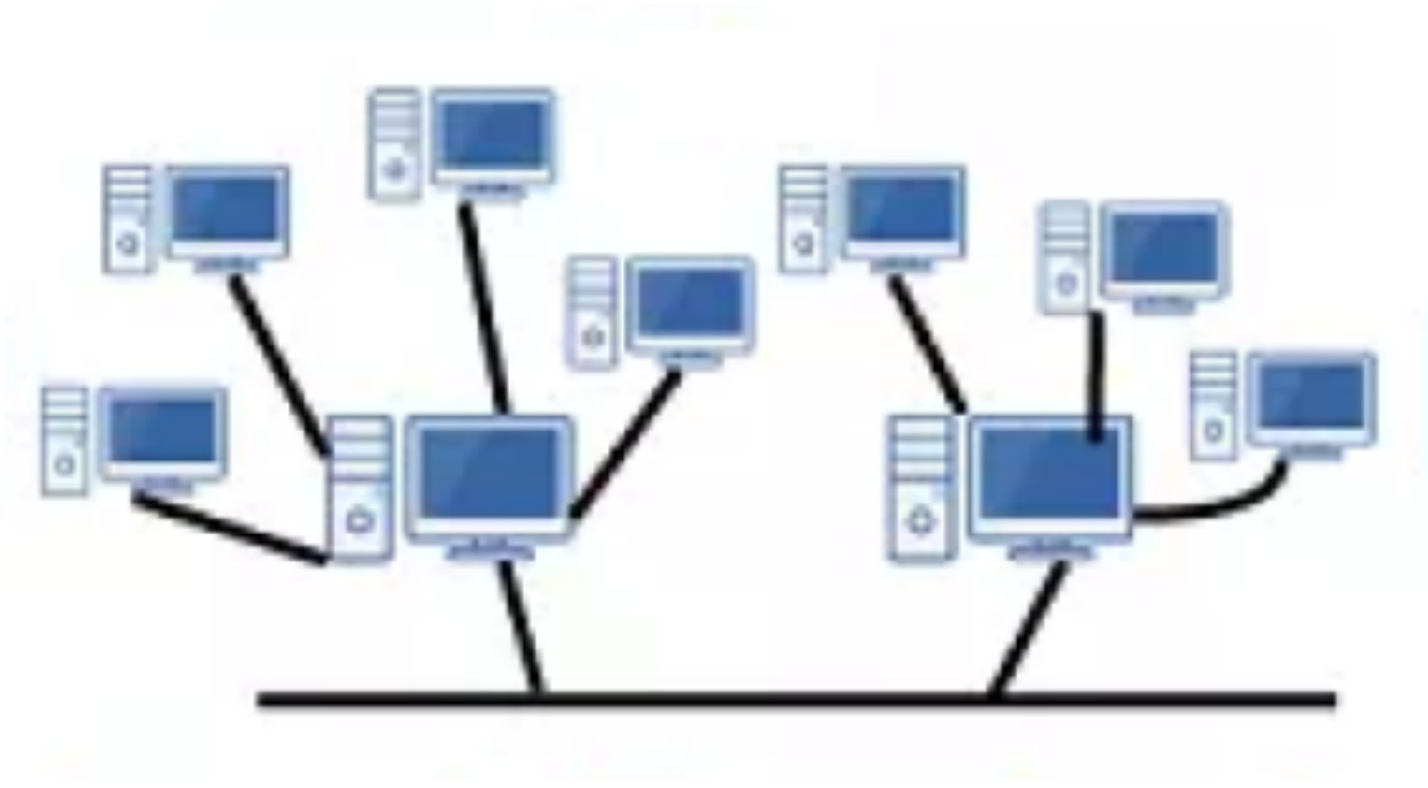
Bulletin Board Systems content

- How do you send messages to other users?

- Either you are limited to the users of that BBS,

- or you implement a system where each server connects with other servers, and exchange data.

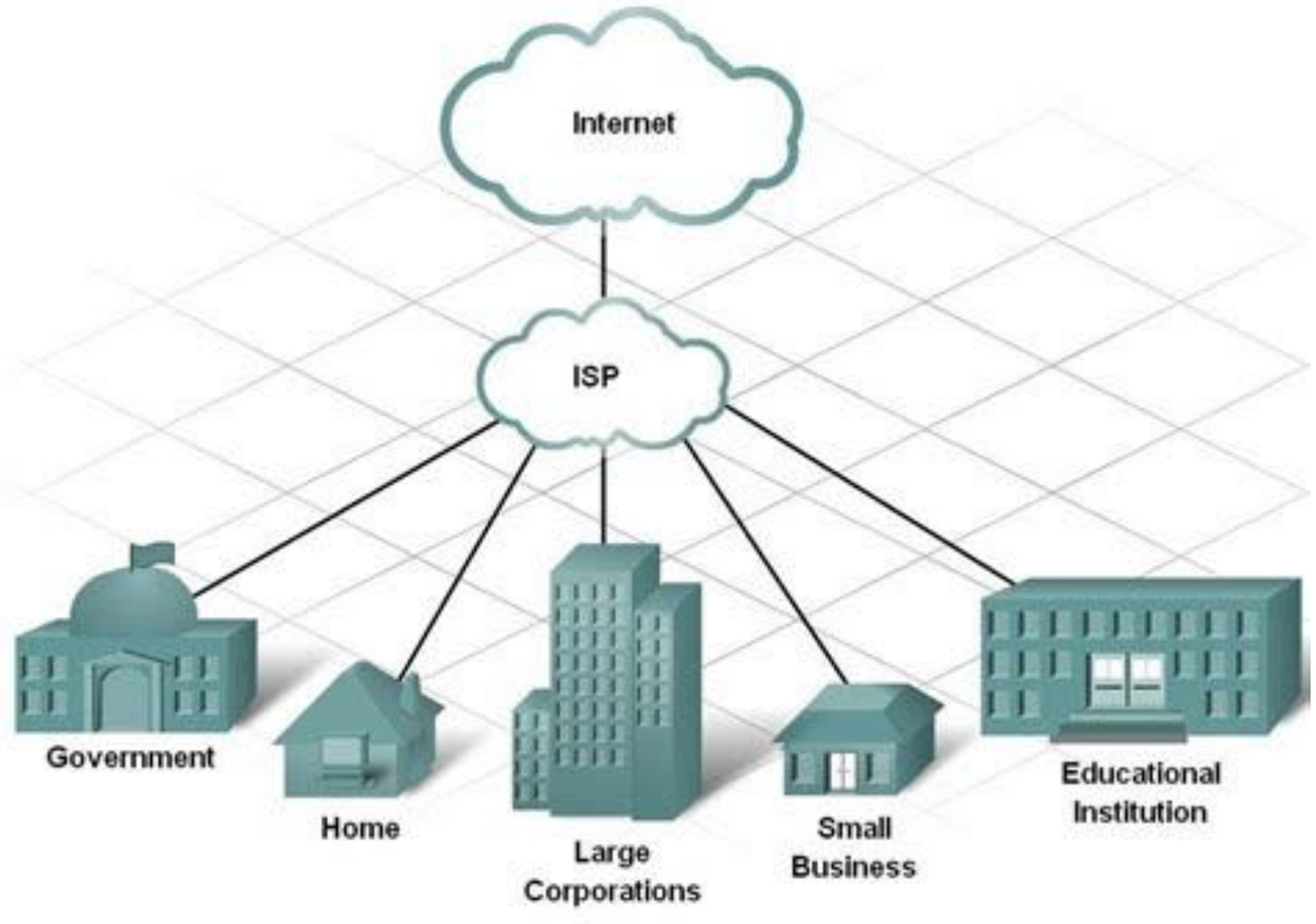


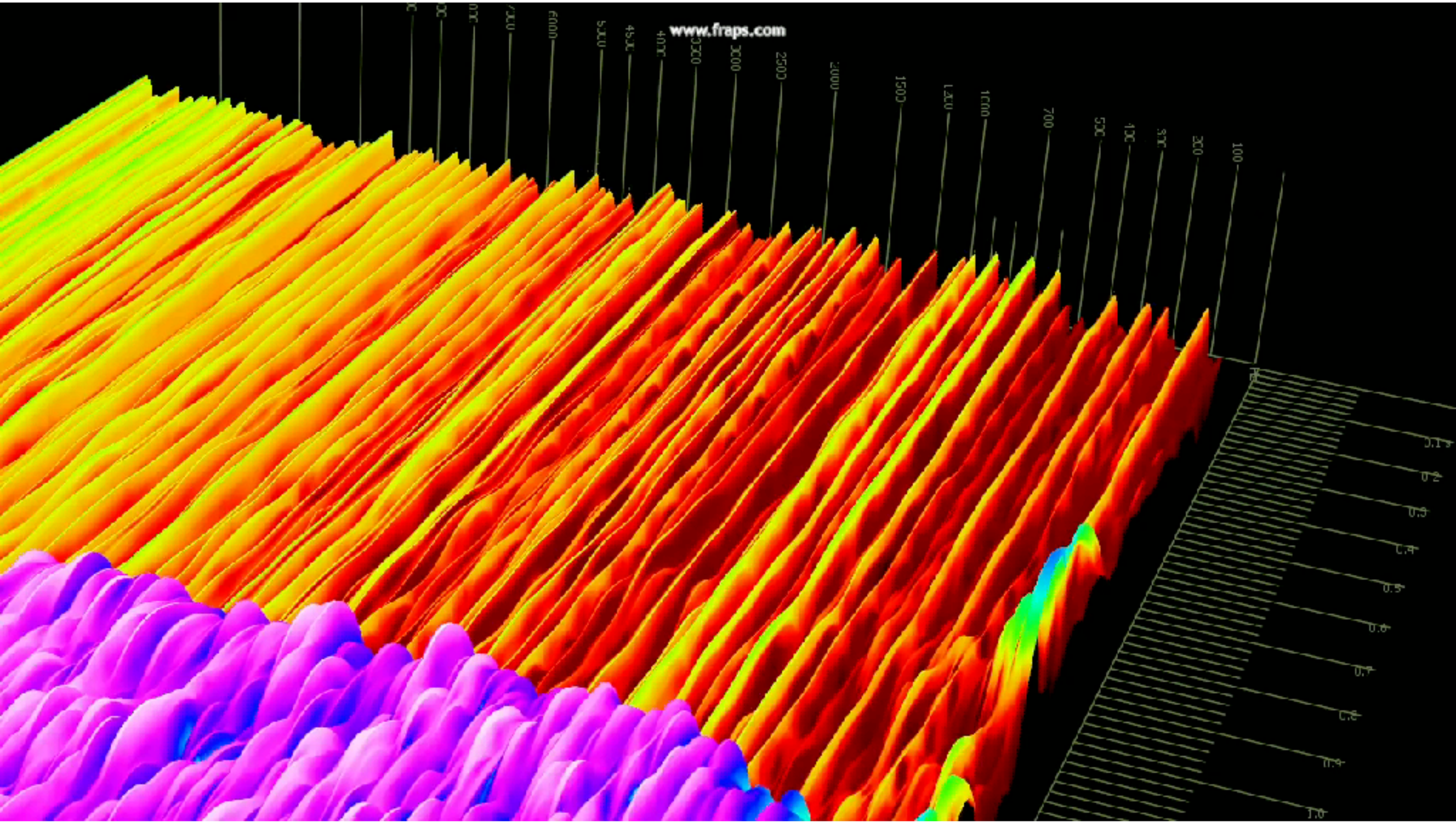
Academic networks

- DECnet, a network of mainly academic institutions, operated on VAX minicomputer networks

Internet Service Providers

- In the ‘90s the “internet” started to became available
- The connection to the internet (interconnected network) was implemented through specialized physical connections (backbones) for big institutions (Universities, corporations etc.)
- To commercial users (households, offices, etc) the connection was implemented through Internet Service Providers, still using telephone lines
- A *point-to-point protocol* (PPP) was used, with a **modem**, to call a local server and, through that, to the internet.




www.fraps.com
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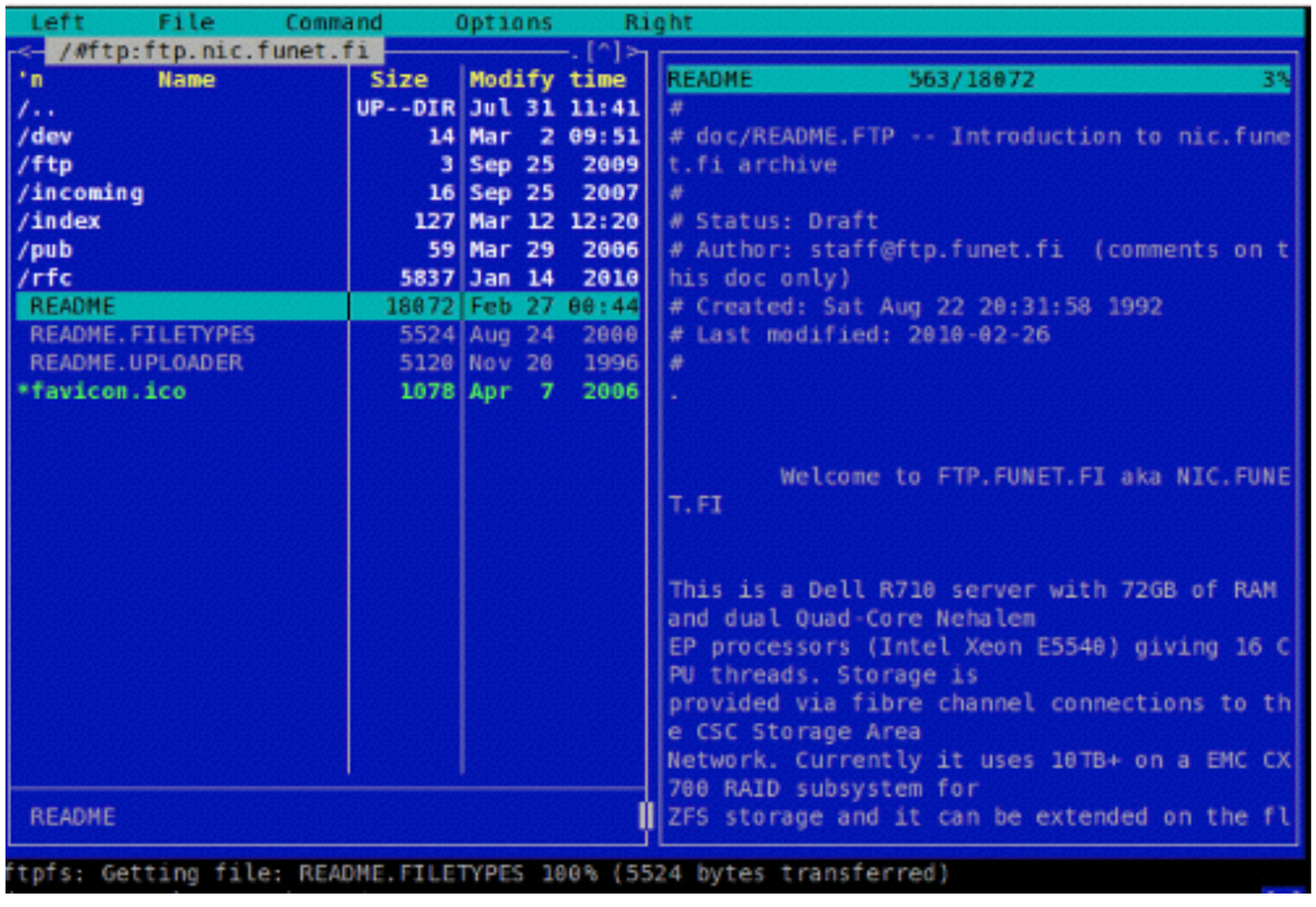
Anonymous FTP servers

- A host that provides an FTP service may provide anonymous FTP access. Users typically log into the service with an 'anonymous' (lower-case and case-sensitive in some FTP servers) account when prompted for user name. Although users are commonly asked to send their email address instead of a password, no verification is actually performed on the supplied data. Many FTP hosts whose purpose is to provide software updates will allow anonymous logins.

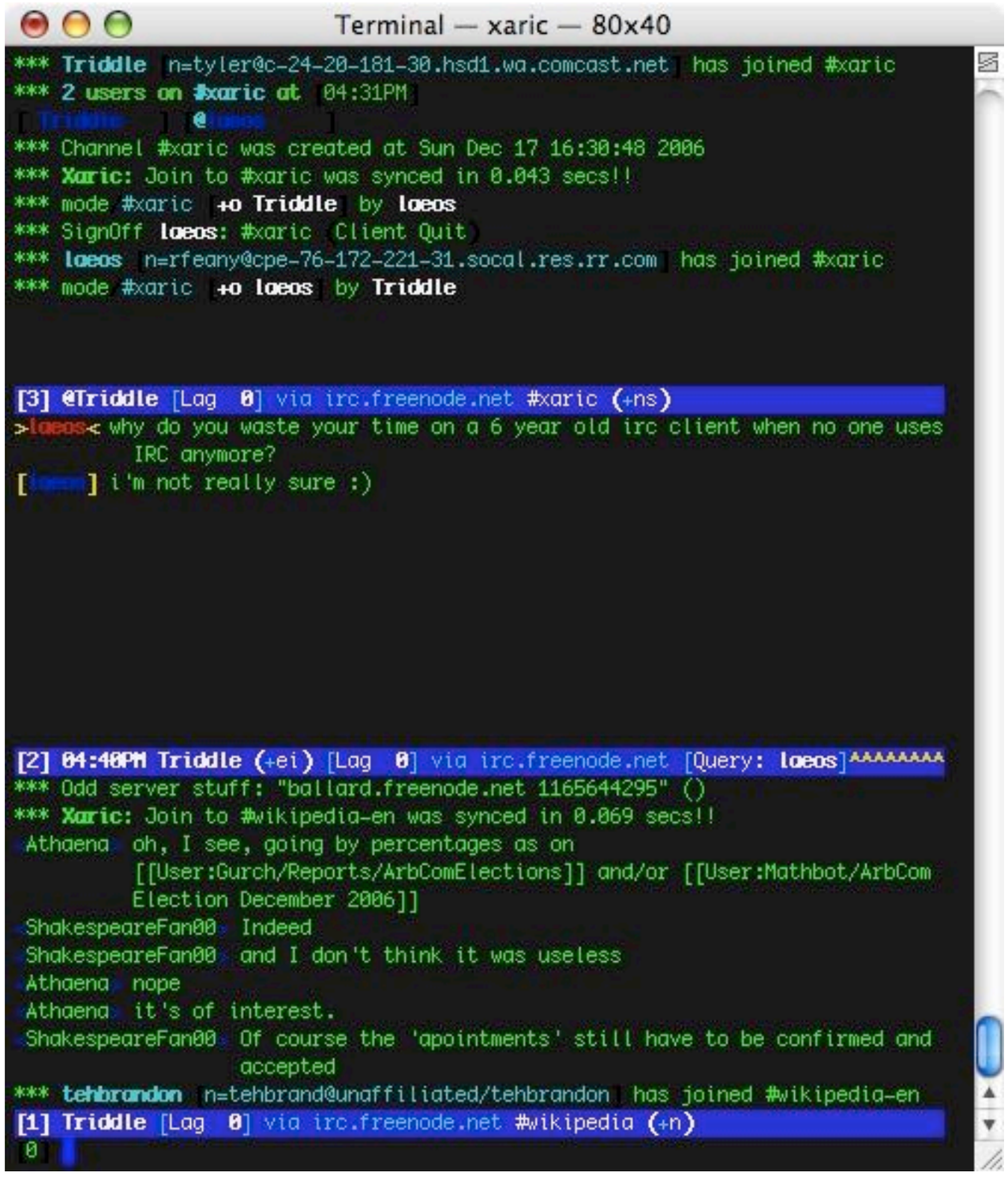


Internet Relay Chat

- Internet Relay Chat (IRC) is an application layer protocol that facilitates communication in the form of text.

- The chat process works on a client/server networking model. IRC clients are computer programs that users can install on their system or web based applications running either locally in the browser or on 3rd party server.

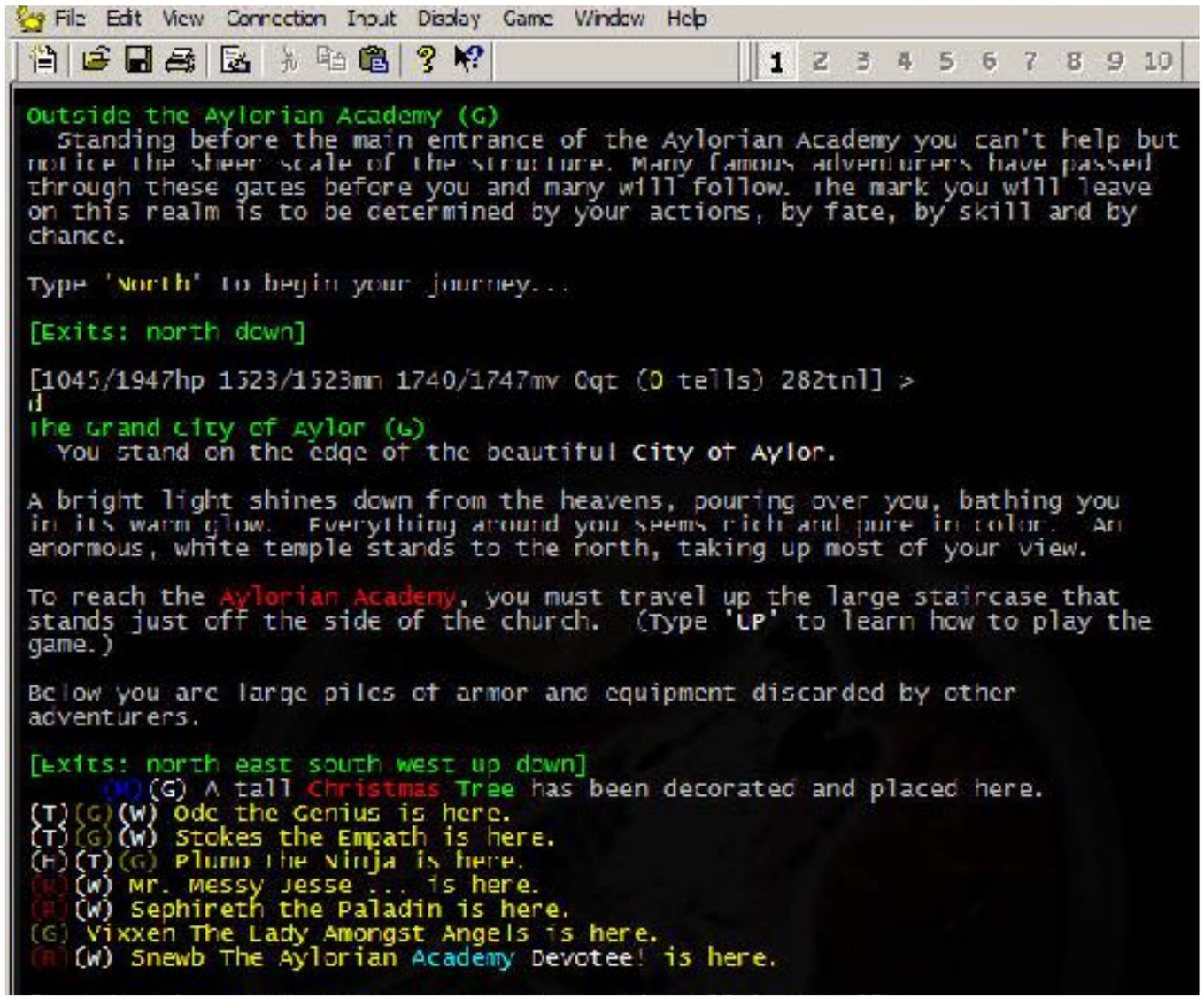
- These clients communicate with chat servers to transfer messages to other clients. IRC is mainly designed for group communication in discussion forums, called channels, but also allows one-on-one communication via private messages as well as chat and data transfer, including file sharing.



Multi-User Dungeon

- A MUD (Multi-User Dungeon) is a multiplayer real-time virtual world, usually **text-based**. MUDs combine elements of role-playing games, hack and slash, player versus player, interactive fiction, and online chat.

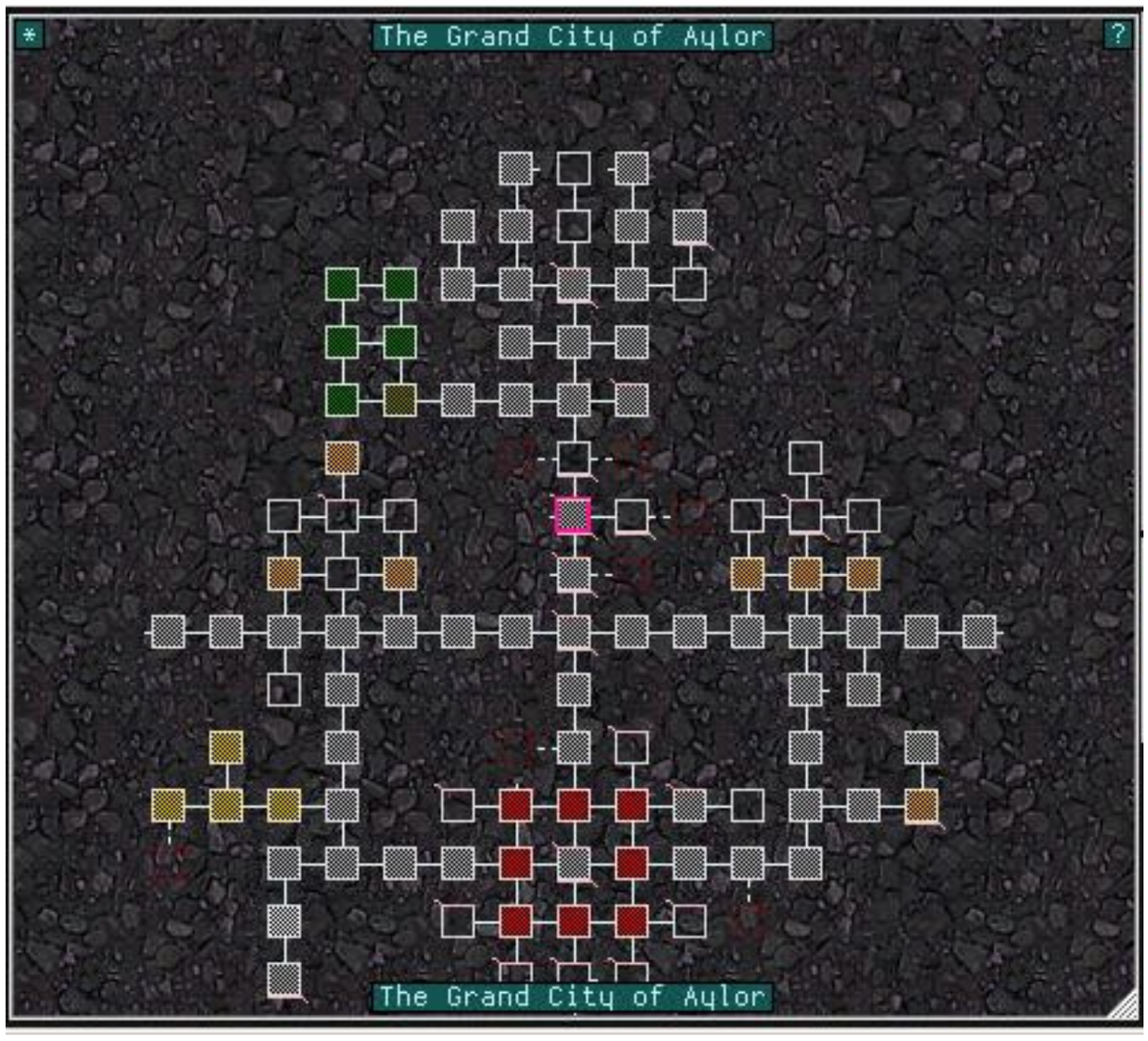
- Players can read or view **descriptions of rooms**, objects, other players, non-player characters, and actions performed in the virtual world. Players typically interact with each other and the world by **typing commands** that resemble a natural language.



Multi-User Dungeon

- Traditional MUDs implement a role-playing video game set in a **fantasy world** populated by fictional races and monsters, with players choosing classes in order to gain specific skills or powers.

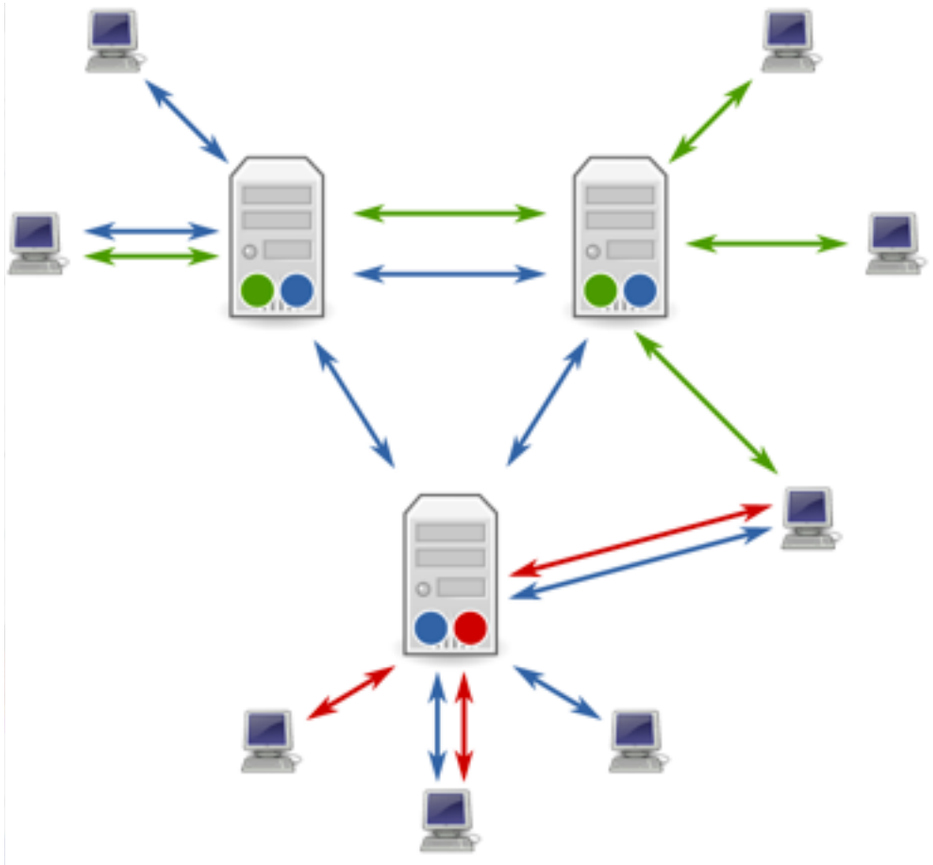
- The objective of this sort of game is to slay monsters, explore a fantasy world, complete quests, go on adventures, create a story by roleplaying, and advance the created character. Many MUDs were fashioned around the dice-rolling rules of the **Dungeons & Dragons** series of games.



Usenet

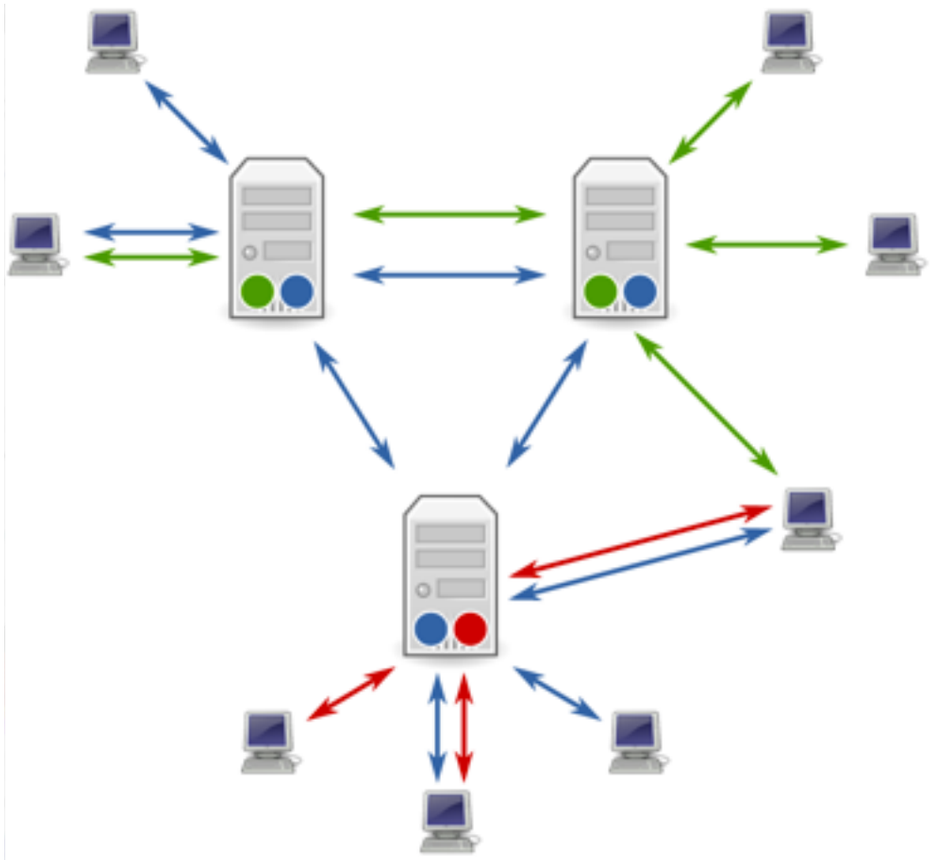
- Usenet is a worldwide distributed discussion system available on computers. Tom Truscott and Jim Ellis conceived the idea in 1979, and it was established in 1980. Users read and post messages (called articles or posts, and collectively termed news) to one or more **categories**, known as **newsgroups**.

- Usenet resembles a bulletin board system (BBS) in many respects and is the precursor to **Internet forums** that are widely used today. Discussions are threaded, as with web forums and BBSs, though posts are stored on the server sequentially. The name comes from the term "users network".



Usenet

- A major difference between a BBS or web forum and Usenet is the absence of a central server and dedicated administrator. Usenet is distributed among a large, constantly changing conglomeration of servers that store and forward messages to one another in so-called news feeds.

- Individual users may read messages from and post messages to a local server operated by a commercial usenet provider, their Internet service provider, university, employer, or their own server.

- Usenet is culturally significant in the networked world, having given rise to, or popularized, many widely recognized concepts and terms such as "FAQ", "flame", and "spam".