

DATE : 08.12.2023

DT/NT : DT

LESSON : LINUX

SUBJECT: LINUX ESSENTIALS

SESSION : 1

BATCH : B 224

AWS-DEVOPS



TECHPRO
EDUCATION



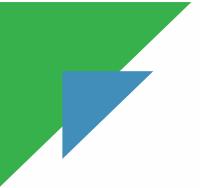
Introduction to Linux



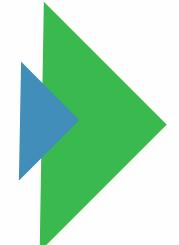
Table of Contents

- ▶ Why/Where/When Linux
- ▶ Linux Evolution
- ▶ Major Open Source Applications
- ▶ FSF and OSI
- ▶ Using Linux on Different Platforms
- ▶ What is SHELL?
- ▶ Case Sensitivity
- ▶ Simple Globbing
- ▶ Basic SHELL Commands-1





Why Linux?

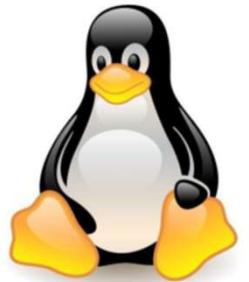


Where Linux?

When Linux?



Why Linux?



- ★ Total cost of ownership
- ★ Beginner friendly and easy to use
- ★ Reliability
- ★ Hardware
- ★ Software
- ★ Security
- ★ Freedom
- ★ Annoying crashes and reboots
- ★ Server segment
- ★ Linux is everywhere

Where Linux?

Google™

IBM

twitter

amazon.com



London
Stock
Exchange



<http://www.tecmint.com>

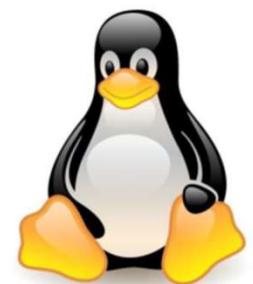


WIKIPEDIA



UnionBank™

**30 Companies and Devices
Running on GNU/Linux**



Where Linux?



1. Google

The services of which includes search, cloud computing and online advertising technologies runs on Linux.

2. Twitter

Twitter, famous online social networking and micro-blogging site is Powered by Linux.

3. Facebook

Facebook, one of the most famous and most widely used Social Networking service runs on the same platform.

4. Amazon

An American based international company which deals with International Online Retailing is in the list of Linux powered Company.

5. IBM

IBM (International Business Machine Corporation) the American based company which for sure don't requires any introduction, is again powered by Linux.

Where Linux?



6. McDonalds

The world's largest chain of hamburger fast food restaurant uses GNU/Linux (Ubuntu) too.

7. Submarines

The submarines in the United State Navy are controlled by same platform.

8. NASA

National Aeronautical and Space Administration, The United Nations Space program widely uses Linux in many of their programmes.

9. Watches

Most of you would not be knowing that there are Linux Powered Watches in the market, already. The watch developed by IBM running Linux.

10. Mobile Devices

True, you all know that Linux is powering Mobile Phones, Tablets and Kindle.

Where Linux?



11. Space

A Specific Linux Distro (Debian) is already in the space. Debian led all the rest.

12. Raspberry pi

The business card sized computer designed for electronic projects as well as desktop computing which is very cheap in cost and is fully functional. Raspberry is a landmark in Linux Development.

13. Desktop Computing

Though a little late, Linux made a notable presence in the desktop computing market. In school and academics as well as in government offices Linux are being widely used, these days.

14. Corporates

The corporate offices are using Linux and finds it more productive than any other alternatives.

Where Linux?



15. New York Stock Exchange

New York Stock Exchange (NYSC) which provides means for buyers and sellers in order to trade shares of stock in companies registered for public trading relies solely on Linux.

16. Traffic Controlling

The Traffic controlling system in most of the countries be it Road Traffic or Air Traffic Linux proved to be the best than any other available alternative.

17. Nuclear Projects

When it comes to Nuclear Ambitious projects, Linux is the best option. One of such OS is QNX, which lately is acquired by Blackberry Ltd.

18. Bullet Trains

The Bullet Trains in Japan runs at the speed of 240-320 km/h. All train tracking, maintenance, scheduling and controlling is Linux based.

Where Linux?



19. Internet Hosting

More than 70% of Internet Hosting and service providers are Linux based. Thought this statistic is difficult to figure out but based upon the Linux compatible hardware sold, and demand for cross platform compatible hardware, the above statistics is a rough estimation.

20. Missiles and Weapons

The Missiles and destructive weapons of next generation is themed to be much advanced and Intelligent system than its predecessors. Well what else would have been its alternative.

When Linux?





Linux Evolution



What is Linux?



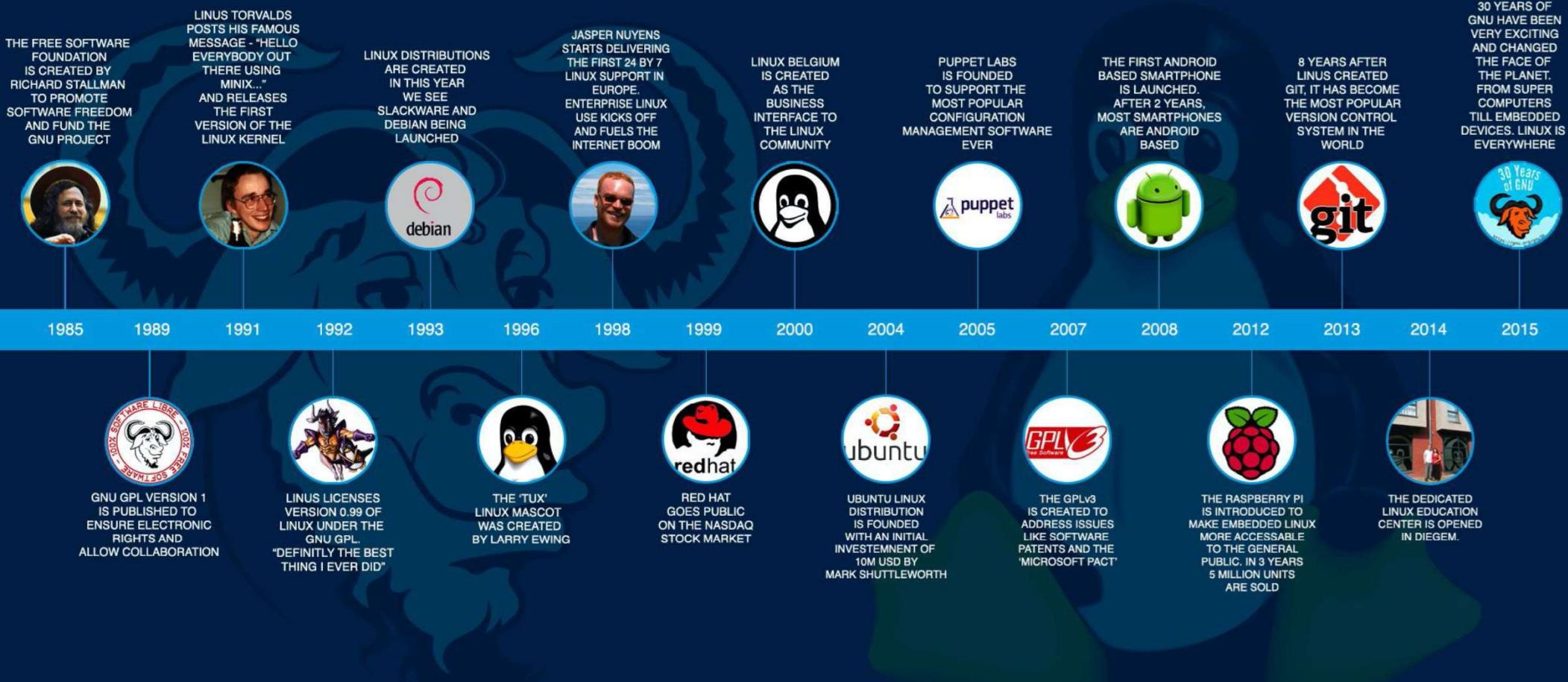
- Free
- Open-Source
- OS



A collage of various terms related to open-source computing, including:
OPEN SOURCE, STANDARD OPERATING SYSTEM, DIGITAL SERVER, FREE COPYRIGHT PRODUCER, LICENSE, CONTENT CONCEPT, COMPUTING CODE, INTERNET, COMMUNITIES, DOCUMENTATION BARTERING, MODIFICATION, PEER, DEVELOPER APPROACH, and MOVEMENT.

MEMORABLE LINUX EVENTS

CELEBRATING 30 YEARS OF GNU LINUX



Linux is a registered trademark of Linus Torvalds. Linux Belgium is a registered trademark of Linux Belgium b.v.b.a. Red Hat is a registered trademark of Red Hat Inc. Android is a trademark of Google Inc.

Memorable Linux Events

1991



Linus Benedict Torvalds



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).

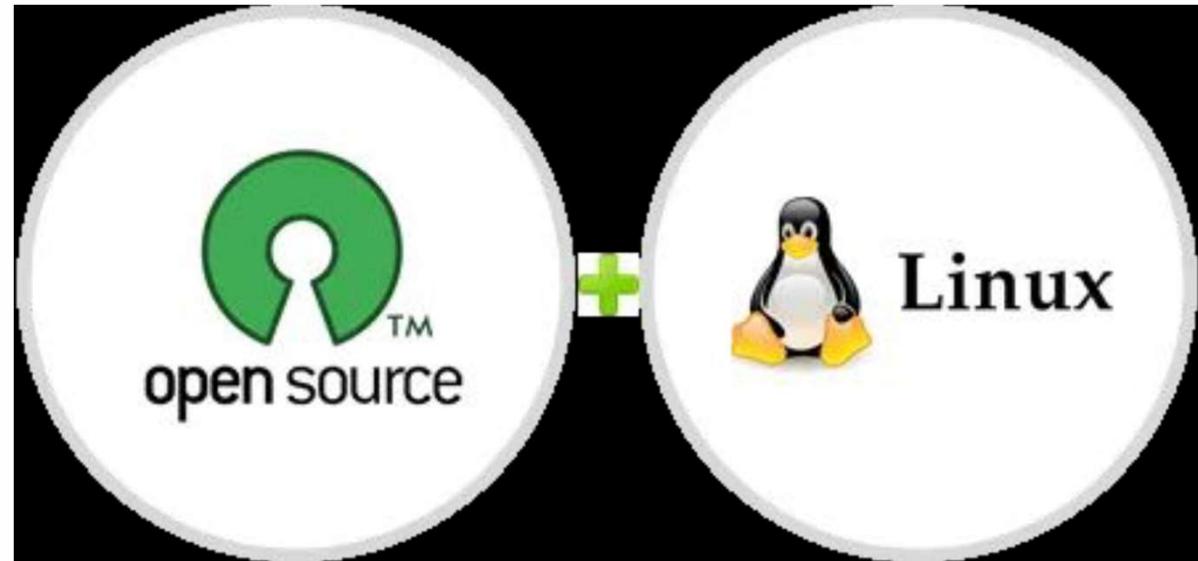
I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

Linus (torv...@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 :-(.

Memorable Linux Events

1992

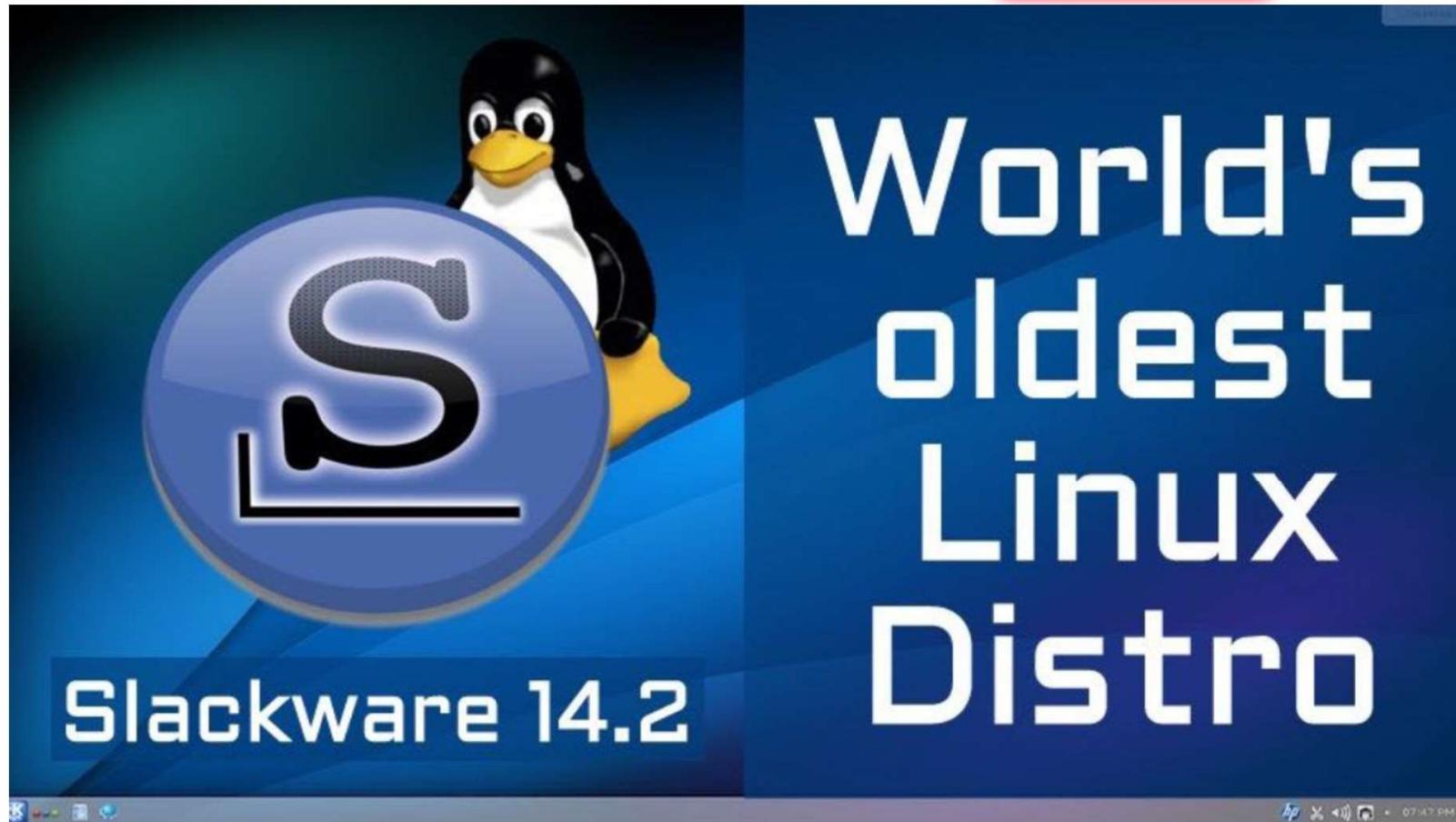


"Making Linux GPLed was definitely the best thing I ever did."

Torvalds, L.

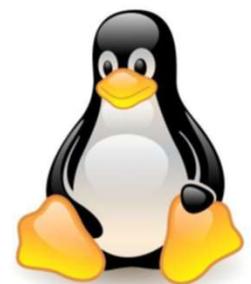
Memorable Linux Events

1993



Memorable Linux Events

1995



Memorable Linux Events

1996





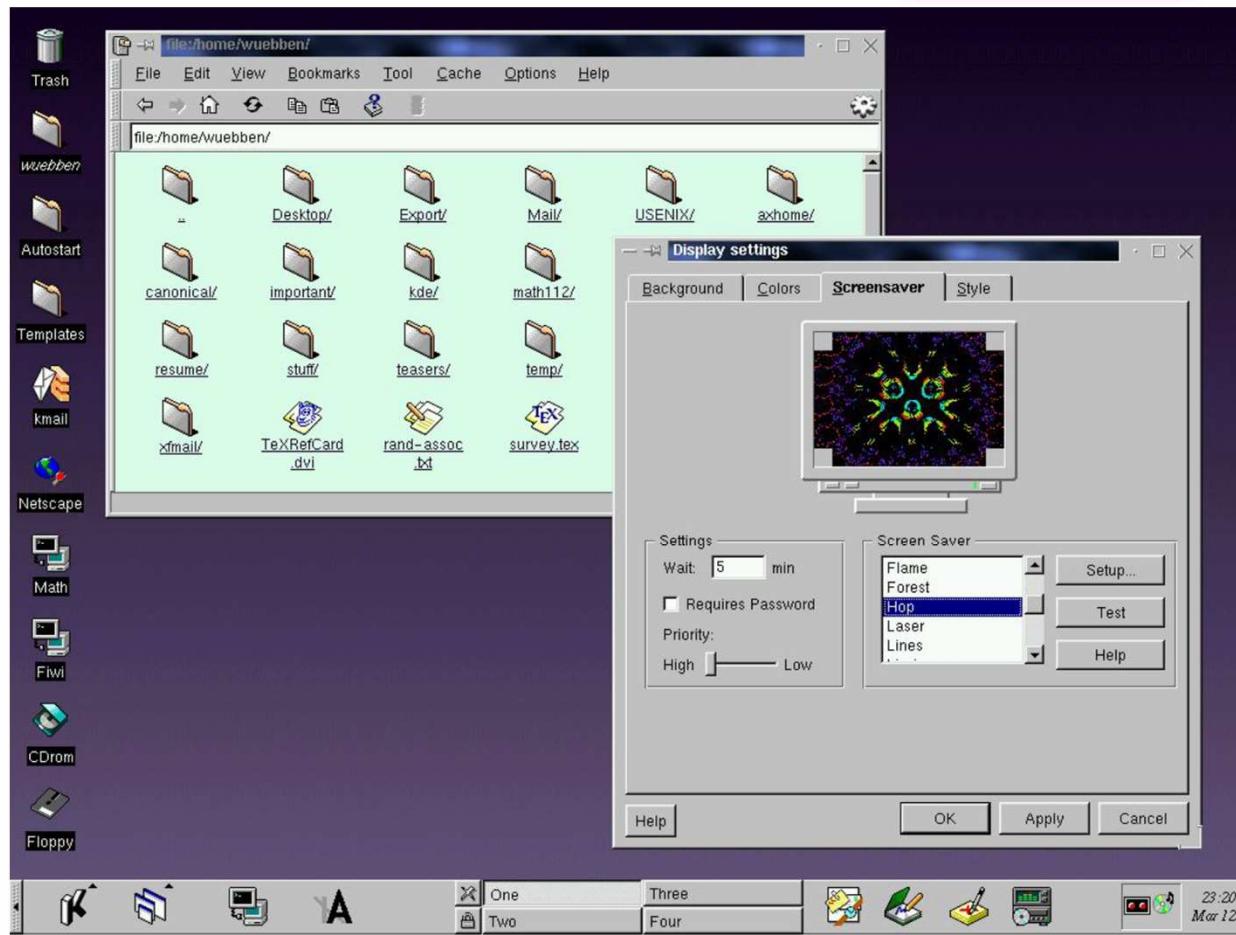
Memorable Linux Events

1997



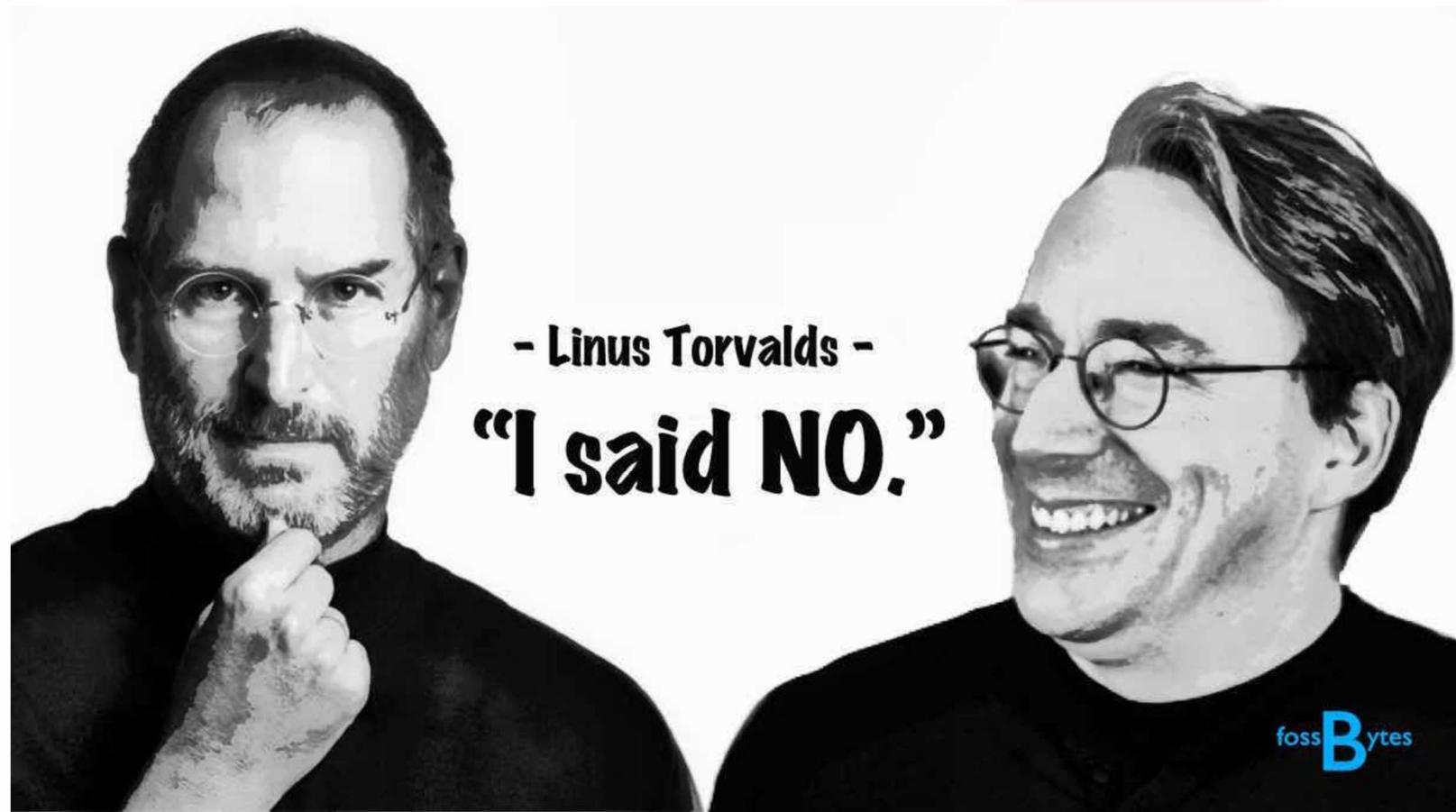
Memorable Linux Events

1998



Memorable Linux Events

2000



fossBytes

Memorable Linux Events

2002

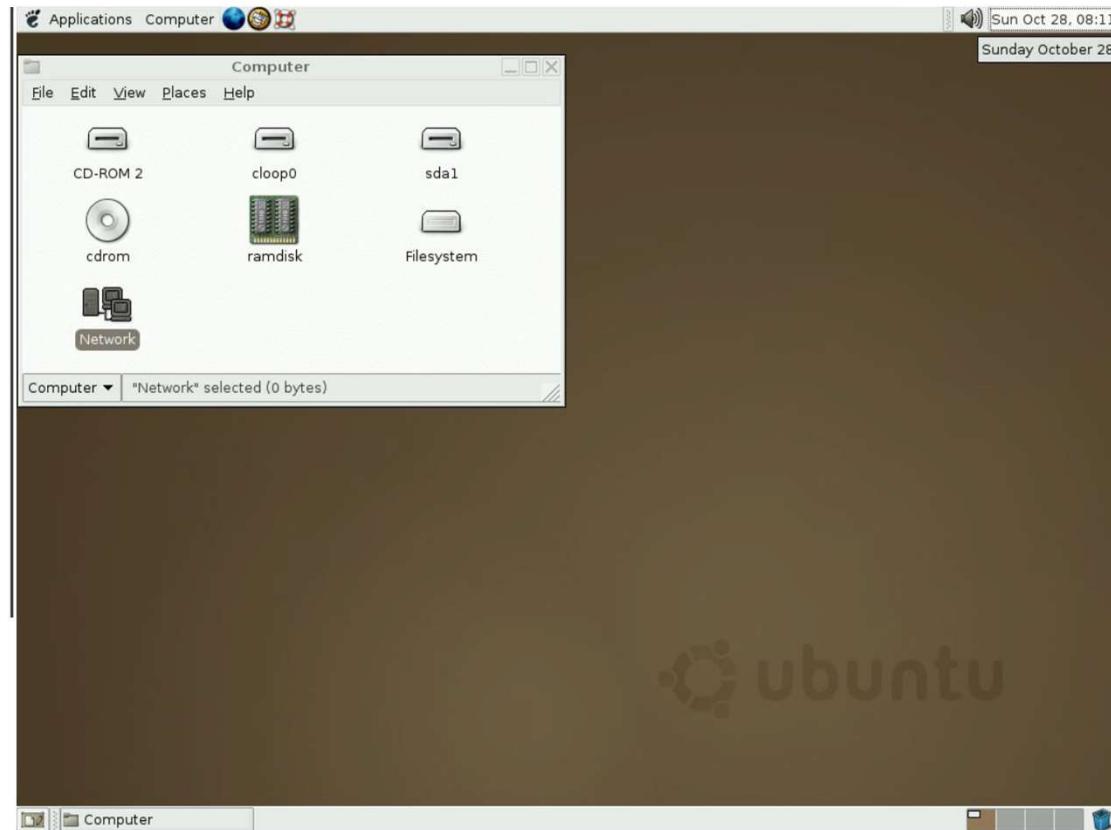


Memorable Linux Events

2004



ubuntu



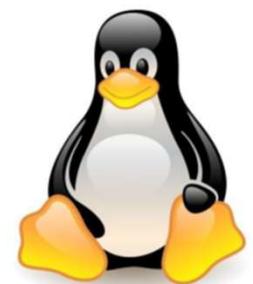
Memorable Linux Events

2005



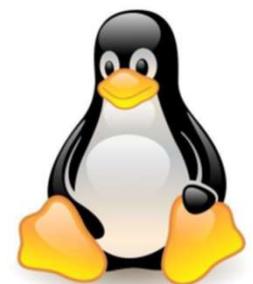
Memorable Linux Events

2008



Memorable Linux Events

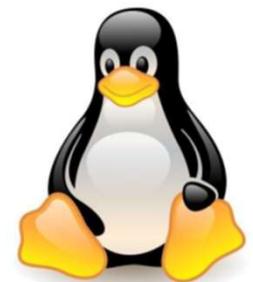
2009



Operating System

Memorable Linux Events

2014



“Microsoft loves Linux”
- Satya Nadella, 2014

Microsoft ❤️ Linux

Memorable Linux Events

2019



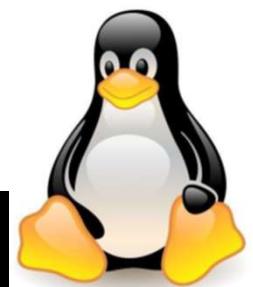
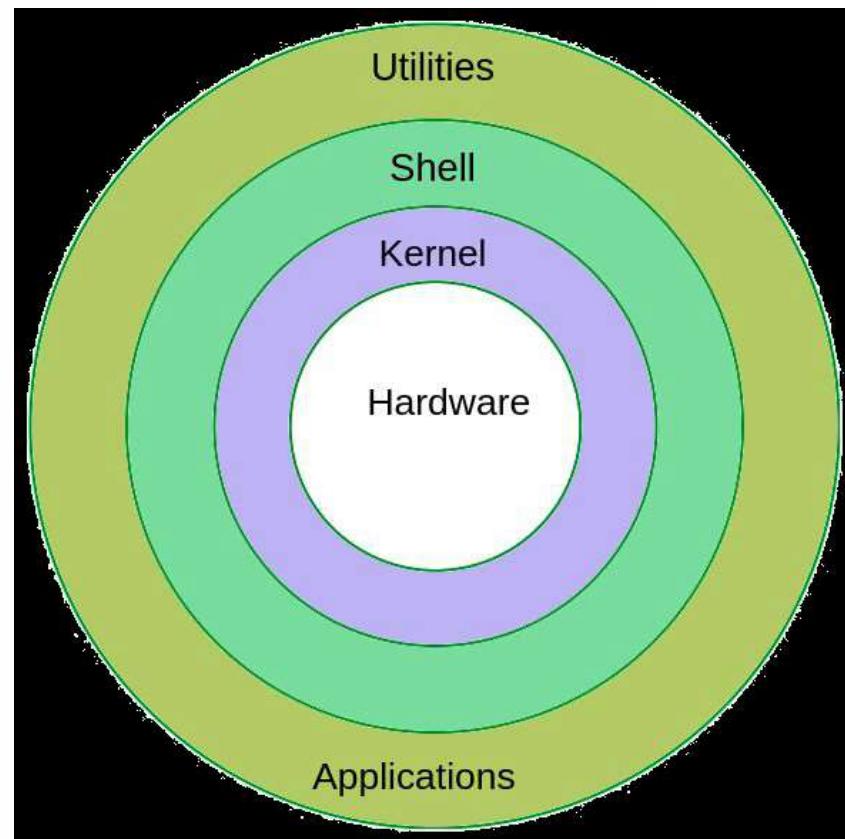
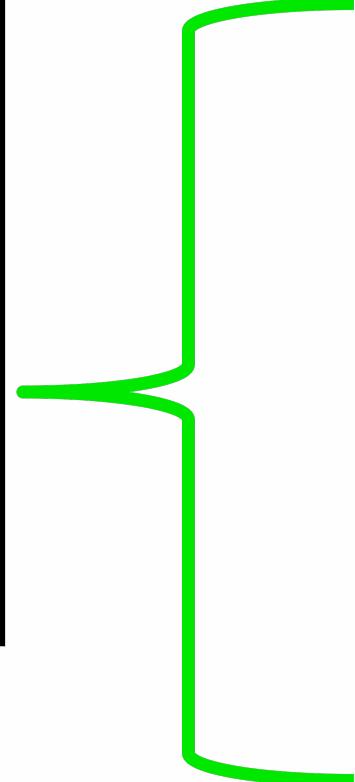
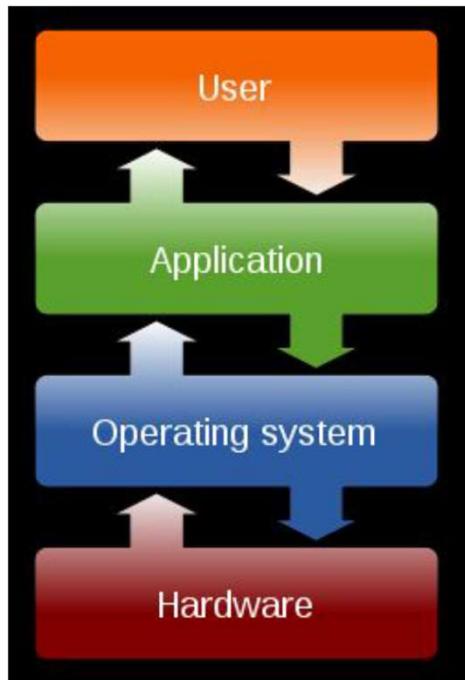
WSL 2 BRINGS

**Linux Kernel
in Windows 10**

For Real!



Components of Linux



USER

Popular Linux Distributions



- Debian
- Ubuntu
- Centos
- Mint
- Manjaro
- openSUSE
- RedHat
- Fedora



Linux Embedded Systems



Embedded System

An embedded system is a computer system that is dedicated to one or two specific functions.

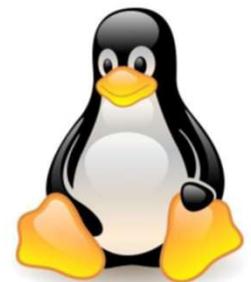


Major Open Source Applications



Desktop Applications

BEST OPEN SOURCE SOFTWARE



1. LibreOffice
2. VLC Media Player
3. GIMP
4. Shotcut
5. Brave
6. Audacity
7. KeePass
8. Thunderbird
9. FileZilla
10. Linux



Server Applications

- Apache Web Server
- NGINX
- MySQL
- Samba
- ownCloud



Package Management Tools



Contemporary distributions of Linux-based operating systems install software in pre-compiled packages, which are archives that contain binaries of software, configuration files, and information about dependencies.

- **dpkg**: Debian Package Manager
- **apt-get**
- **rpm**: Red Hat Package Manager
- **yum**: yellowdog updater modified





**Free Software Foundation
(FSF)**

**Open Software Initiative
(OSI)**



FSF and OSI



Free Software Foundation (FSF)

- The Free Software Foundation (FSF) is a nonprofit organization with a worldwide mission to promote computer user freedom.
- The FSF is working to secure freedom for computer users by promoting the development and use of free software and documentation.



FSF and OSI



Open Source Initiative (OSI)

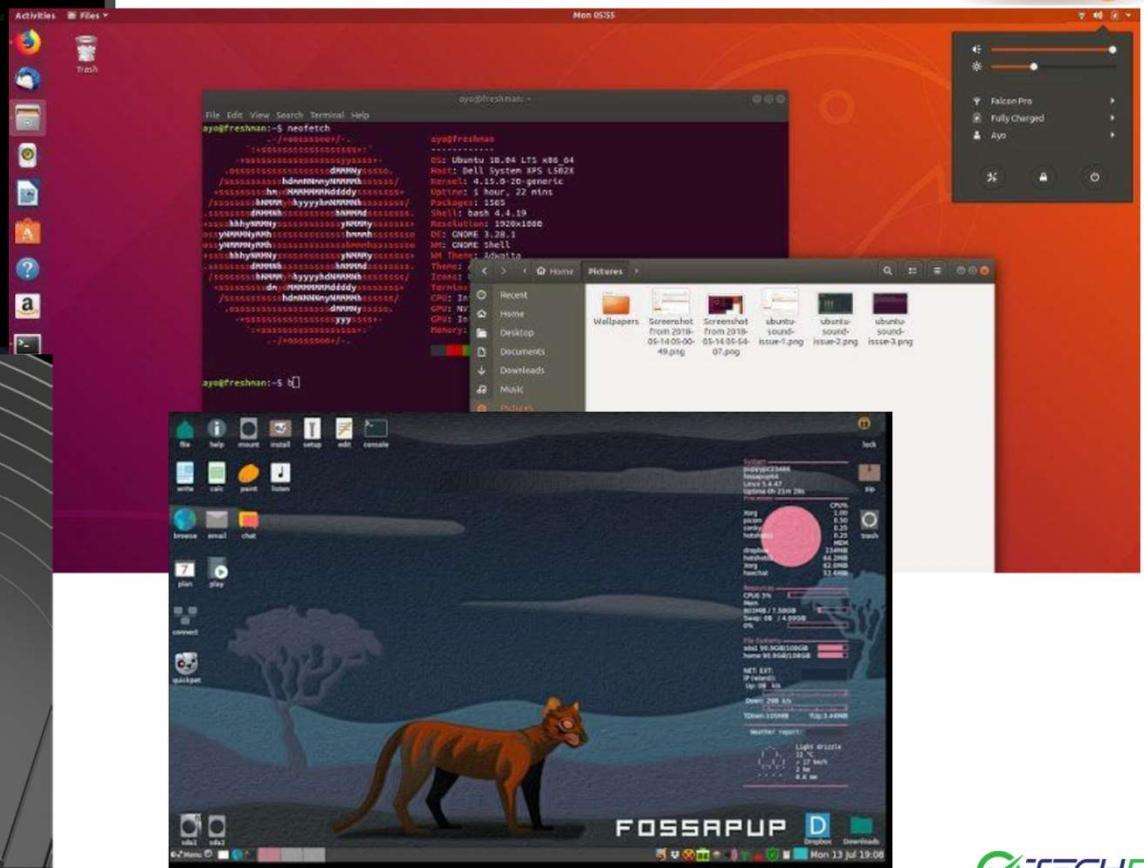
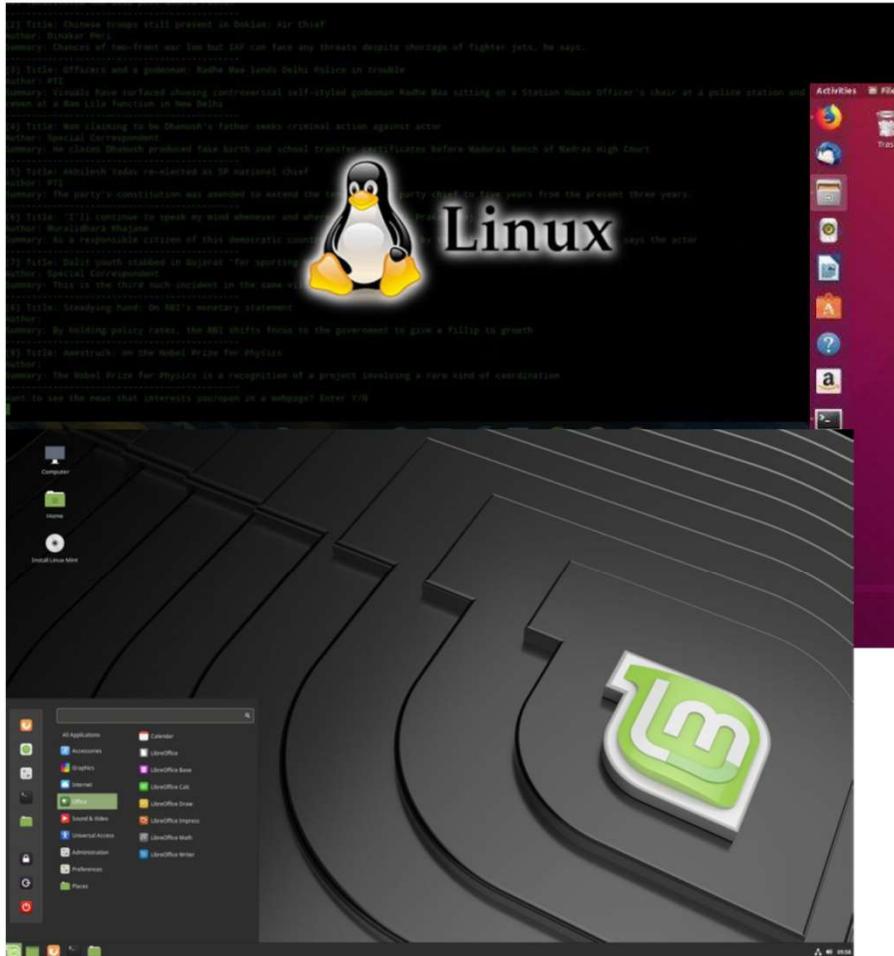
- The Open Source Initiative (OSI) is a non-profit organization dedicated to the promotion of open-source software.
- OSI was founded in 1998 by Bruce Perens and Eric Raymond.



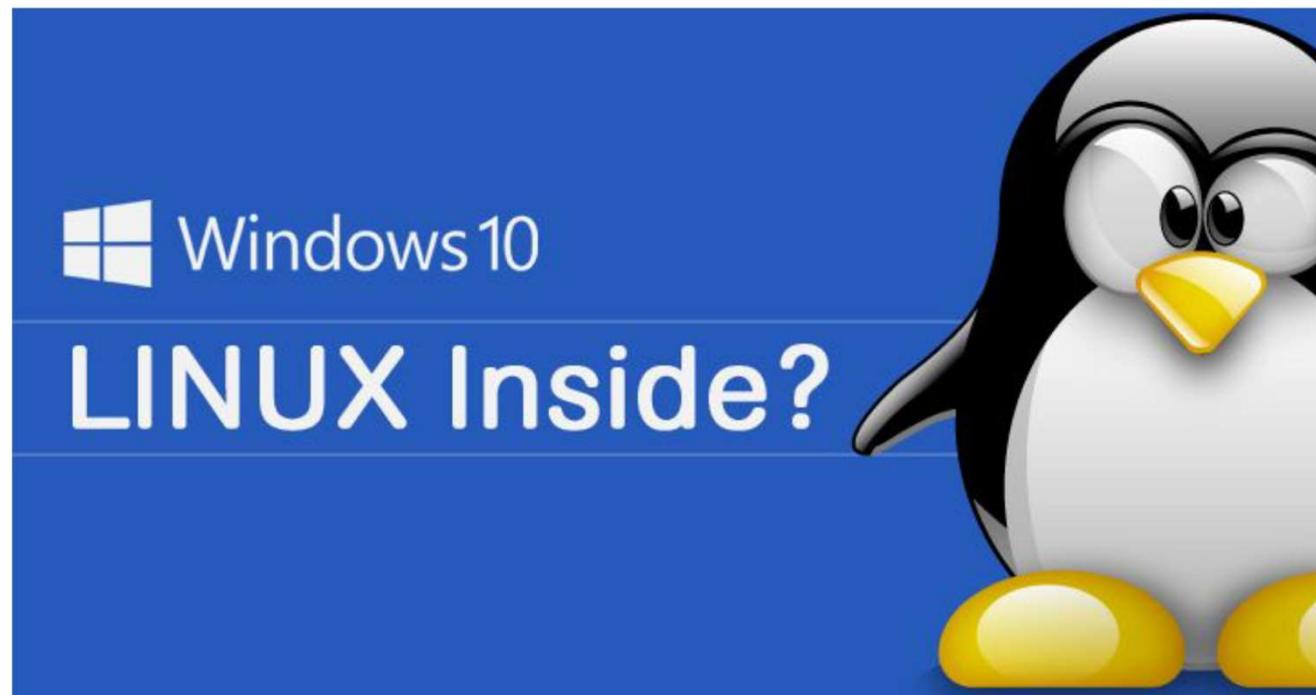


Using Linux on Different Platforms

Linux Alternatives



Linux Alternatives



WSL 2

Linux Alternatives

Linux Distros on Virtual Machines



MacOS/Windows



ORACLE
VM
VirtualBox

Windows

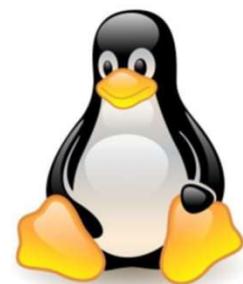


Linux Alternatives

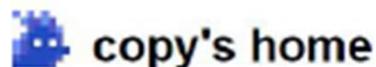
Linux Distros on Virtual Machines



Linux Alternatives



<https://copy.sh/>



You can email me at copy@copy.sh. Use my GnuPG key.

Projects

 **Virtual x86**
Run KolibriOS, Linux or Windows 98 in your browser.

linuxzoo.net



Look at the [Our Environment](#) link, and then [Running Your Machine](#) for getting started.
Quick start hints: register/login, Join Queue, Switch On (in Control tab). Wait for successful boot, click the Connect tab, and then click "telnet: linuxzoo.net" (or type telnet linuxzoo.net at your command prompt). Username root, password secure.

Image	Username	Password
Linux CentOS 7	root	secure
	alice	secure
Caine Forensics 10.0	caine	caine

FAQ for VNC: There are a few options to getting a remote graphical desktop. In "connect" you can click on Java VNC, which requires java 7 installed on your machine. JavaScript VNC is more flexible, but it may be slower (it is experimental). Some systems do not like you logging in graphically as root.

Minimize

Login Details
Email:
Password:
 Refresh in: 2:00.
NOT currently queued
0 user(s) ahead in queue.

Queue **Stats**

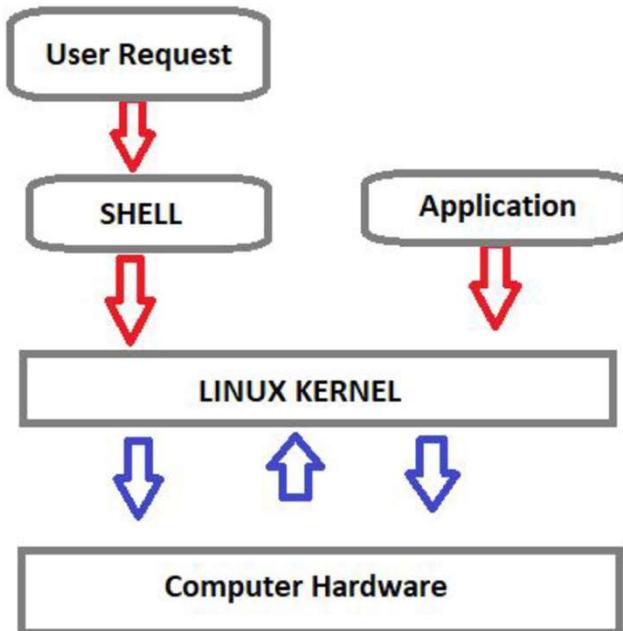
You must register and login before you can use a virtual machine

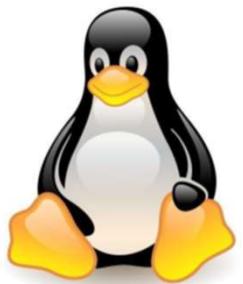


What is SHELL?

What is SHELL?

- Shell is a program that receives the user's commands and gives them to the operating system to process and displays the output.
- Bash (Bourne Again SHell) is an enhanced version of Steve Bourne's first Unix Shell application, and serves as the shell program on most Linux systems.





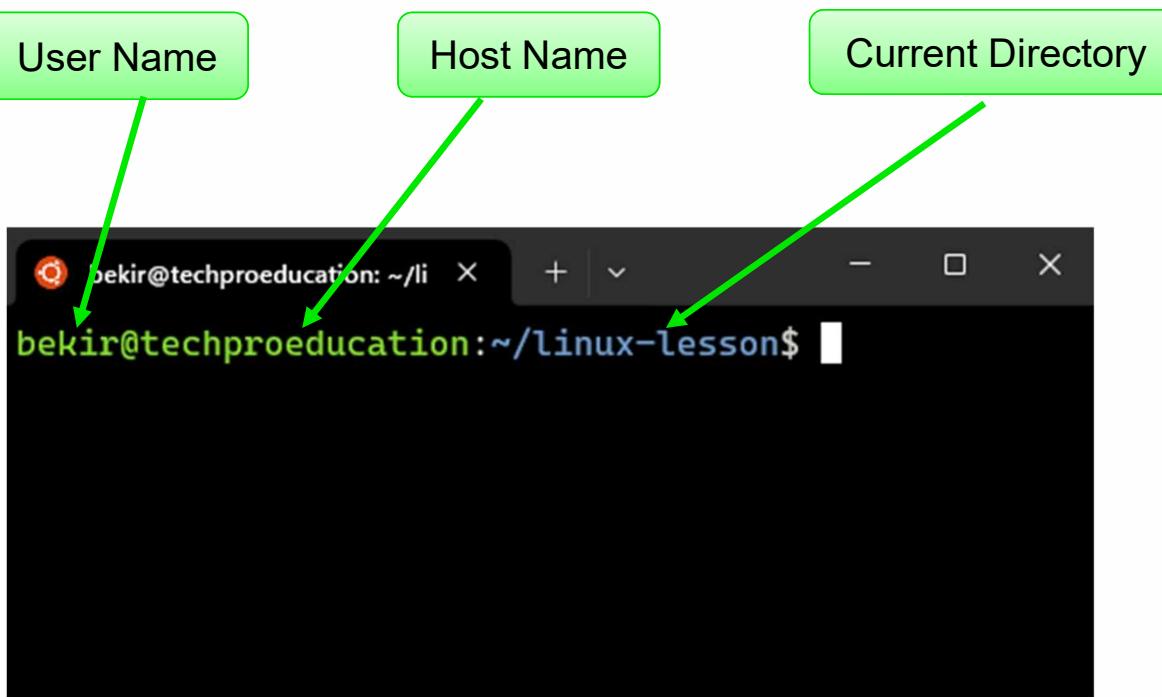
What is SHELL?

- The standard Linux shell is both a command-line interpreter and a programming language.
- The command prompt for Linux generally shows the current user, the current host, and the appropriate directory.
- At the end of the prompt list, the \$(dollar sign) signifies the current user being unprivileged, and the device is ready to receive feedback.
- The input is sent for parsing and execution to the interpreter.

>_

A screenshot of a terminal window titled 'bekir@techproeducation: ~/li'. The window shows a command prompt 'bekir@techproeducation:~/linux-lesson\$' followed by a blank black area where input can be typed.

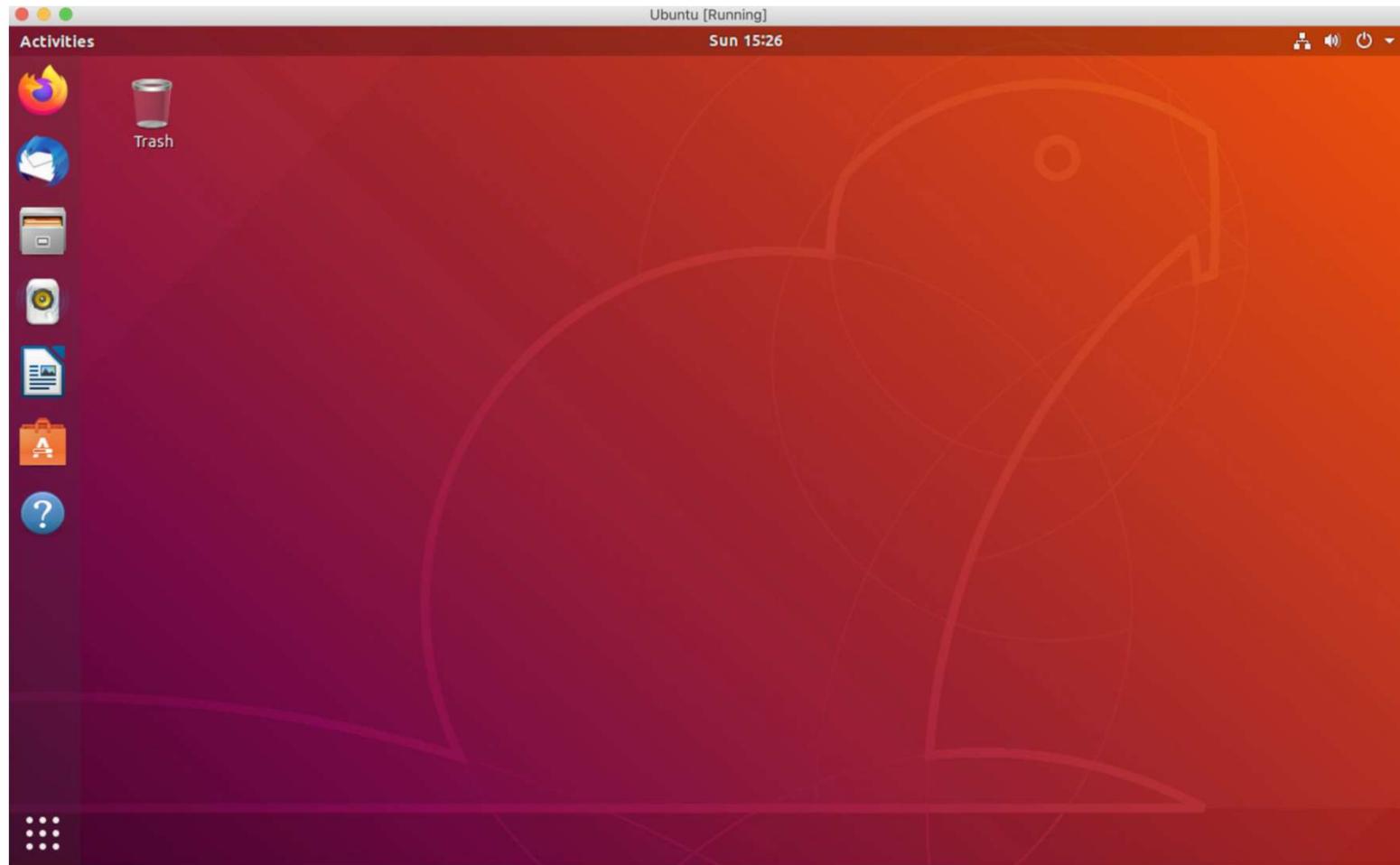
Command Prompt



A screenshot of a terminal window on a dark background. At the top left is a user icon. To its right is the text "bekir@techproeducation: ~/li". On the far right of the bar are window control buttons. Below this bar, the text "bekir@techproeducation:~/linux-lesson\$" is displayed in green, followed by a blue dollar sign and a small black square cursor. Three green arrows point from three rounded rectangular boxes above the terminal to specific parts of the text: the first arrow points to "bekir" (User Name), the second to "techproeducation" (Host Name), and the third to "linux-lesson" (Current Directory).

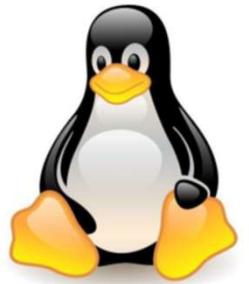
User Type
\$ normal user
Privileged user

GUI



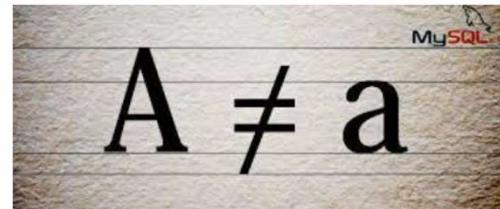


Case Sensitivity



Case Sensitivity

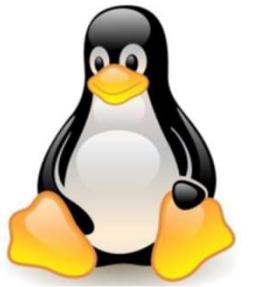
Most of the common Linux file systems are case sensitive; this is something to keep in mind when creating files or directories and moving through directories.



Lower-case and upper-case letters have different ASCII representation.

```
touch newfile  
touch Newfile
```

Will create two different files.



Simple Globbing

Simple Globbing



Globbing is primarily used to match patterns in filenames or text by using a wildcard character to create a pattern.

Character	Name	Function
?	Question mark	Match any single character
*	Asterisk	Match any number of character(s)
[]	Brackets	Match character from a range
{}	Curly brace	Used to match more than one pattern
	Pipe	Used for applying more than one condition

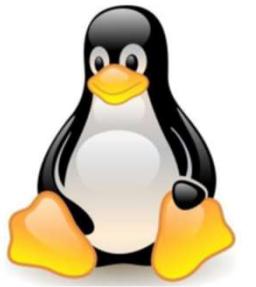
Multiple File/Directory Operations



? used for a single character
* used for multiple characters.

```
bekir@techproeducation:/ ls
bin  etc  lib   libx32    mnt  root  snap  tmp
boot home lib32 lost+found opt   run   srv   usr
dev   init lib64 media     proc  sbin  sys   var

bekir@techproeducation:/ ls lib* -l
lrwxrwxrwx 1 root root 7 May  2 2023 lib -> usr/lib
lrwxrwxrwx 1 root root 9 May  2 2023 lib32 -> usr/lib32
lrwxrwxrwx 1 root root 9 May  2 2023 lib64 -> usr/lib64
lrwxrwxrwx 1 root root 10 May  2 2023 libx32 -> usr/libx32
bekir@techproeducation:/ ls lib3? -l
lrwxrwxrwx 1 root root 9 May  2 2023 lib32 -> usr/lib32
bekir@techproeducation:/ ls li? -l
lrwxrwxrwx 1 root root 7 May  2 2023 lib -> usr/lib
bekir@techproeducation:/
```



Basic SHELL Commands-1

Basic Shell Commands



pwd show current path

```
bekir@techproeducation: ~/li + | X
bekir@techproeducation:/$ pwd
/
bekir@techproeducation:/$ cd
bekir@techproeducation:~$ pwd
/home/bekir
bekir@techproeducation:~$ cd linux-lesson/
bekir@techproeducation:~/linux-lesson$ pwd
/home/bekir/linux-lesson
bekir@techproeducation:~/linux-lesson$ █
```



Basic Shell Commands

ls lists directory contents

ls -l lists directory contents with details

ls -al lists all the contents with hidden ones

```
bekir@techproeducation:/$ ls
bin  dev  home  lib   lib64  lost+found  mnt  proc  run  snap  sys  usr
boot etc  init  lib32  libx32  media      opt  root  sbin  srv  tmp  var
bekir@techproeducation:/$ ls -l
total 2000
lrwxrwxrwx  1 root root      7 May  2 2023 bin -> usr/bin
drwxr-xr-x  2 root root  4096 Apr 18 2022 boot
drwxr-xr-x 16 root root  3560 Nov 29 13:37 dev
drwxr-xr-x 78 root root  4096 Nov 29 13:48 etc
drwrxr-xr-x 4 root root  4096 Oct  1 20:37 home
-rwxrwxrwx  1 root root 1978872 Apr 20 2023 init
lrwxrwxrwx  1 root root      7 May  2 2023 lib -> usr/lib
lrwxrwxrwx  1 root root      9 May  2 2023 lib32 -> usr/lib32
lrwxrwxrwx  1 root root      9 May  2 2023 lib64 -> usr/lib64
lrwxrwxrwx  1 root root  10 May  2 2023 libx32 -> usr/libx32
drwxr----- 2 root root 16384 Sep 22 20:38 lost+found
drwxr-xr-x  2 root root  4096 May  2 2023 media
drwxr-xr-x  6 root root  4096 Sep 22 20:38 mnt
drwxr-xr-x  3 root root  4096 Oct  1 21:28 opt
dr-xr-xr-x 186 root root     0 Nov 29 13:37 proc
drwxr----- 4 root root  4096 Nov 25 21:19 root
drwxr-xr-x 23 root root   680 Nov 29 13:58 run
lrwxrwxrwx  1 root root     8 May  2 2023 sbin -> usr/sbin
drwxr-xr-x  8 root root  4096 May  2 2023 snap
drwxr-xr-x  2 root root  4096 May  2 2023 srv
dr-xr-xr-x 11 root root     0 Nov 29 13:37 sys
drwxrwxrwt  6 root root  4096 Nov 29 13:53 tmp
drwxr-xr-x 14 root root  4096 May  2 2023 usr
drwxr-xr-x 13 root root  4096 May  2 2023 var
bekir@techproeducation:/$
```

Basic Shell Commands



<code>cd [dir]</code>	change (current) directory
<code>cd ..</code>	change current directory to one level up
<code>cd /</code>	change current directory to the root directory
<code>cd</code>	change current directory to the home directory

```
bekir@techproeducation:/ ~$ pwd  
/home/bekir  
bekir@techproeducation:~$ cd ..  
bekir@techproeducation:/home$ pwd  
/home  
bekir@techproeducation:/home$ cd  
bekir@techproeducation:~$ pwd  
/home/bekir  
bekir@techproeducation:~$ cd /  
bekir@techproeducation:/ $ pwd  
/  
bekir@techproeducation:/ $ █
```



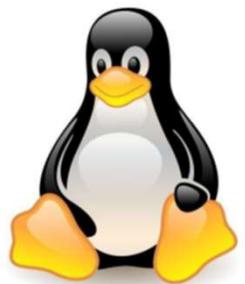
Basic Shell Commands

mkdir [dir] create a new directory

A screenshot of a terminal window titled "bekir@techproeducation: ~". The window shows the user's home directory. The user runs the command "ls" to list files, then "mkdir python" to create a new directory named "python". Finally, the user runs "ls" again to show that the "python" directory has been created.

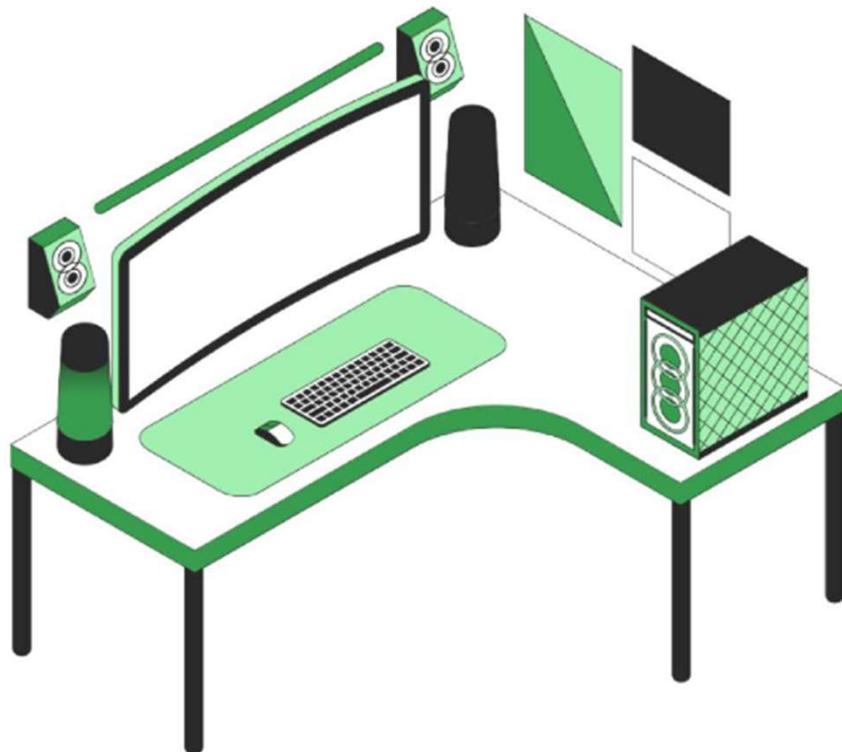
```
bekir@techproeducation:~$ ls
linux-lesson
bekir@techproeducation:~$ mkdir python
bekir@techproeducation:~$ ls
linux-lesson  python
bekir@techproeducation:~$
```

Basic Shell Commands



touch create a file

```
bekir@techproeducation:~/li  + | - | X
bekir@techproeducation:~/linux-lesson$ pwd
/home/bekir/linux-lesson
bekir@techproeducation:~/linux-lesson$ touch file1 file2
bekir@techproeducation:~/linux-lesson$ ls
file1  file2
bekir@techproeducation:~/linux-lesson$ █
```



Do you
have any
questions?

Send it to us! We hope you learned
something new.