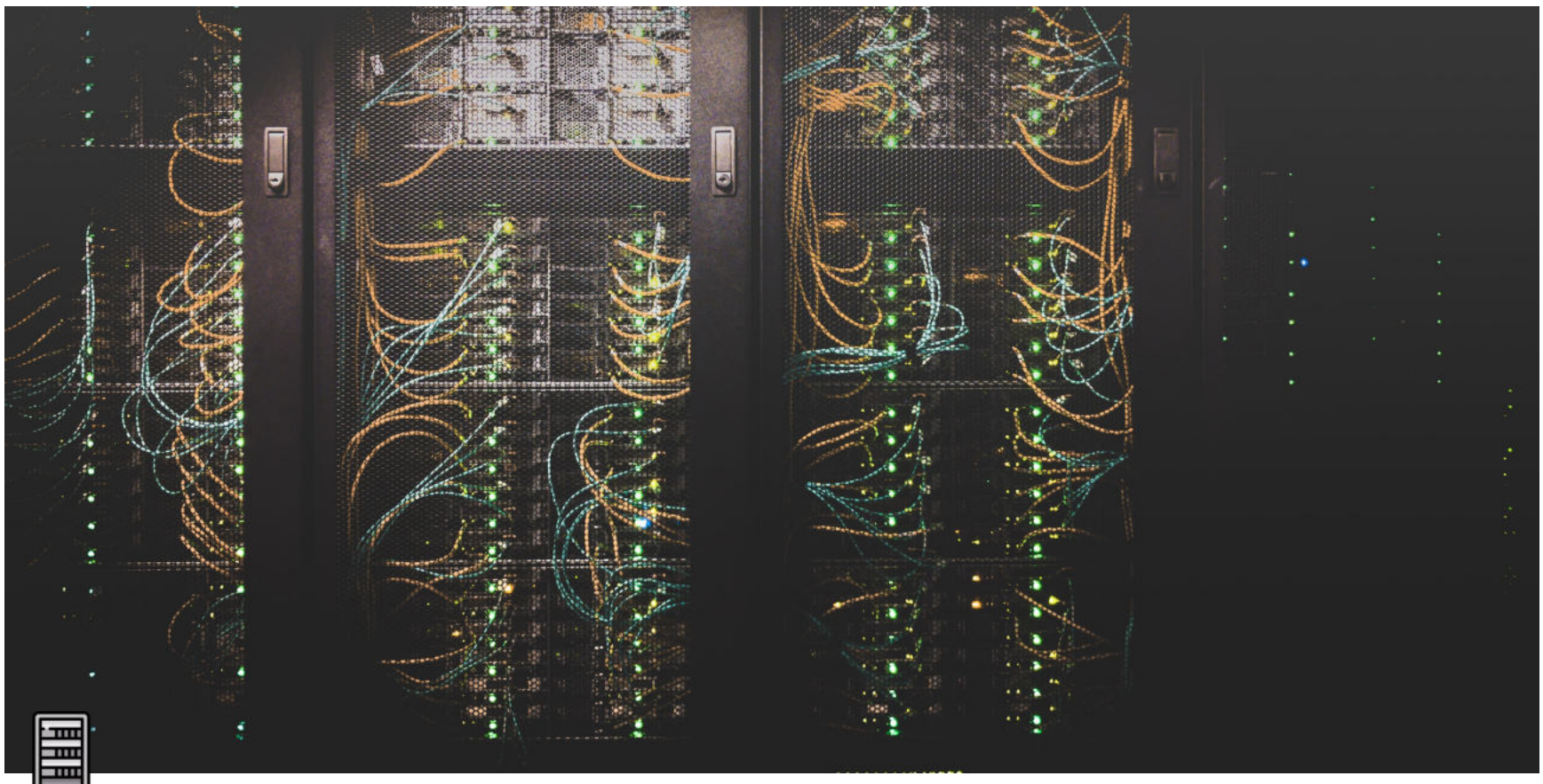


Launching a Virtual Machine

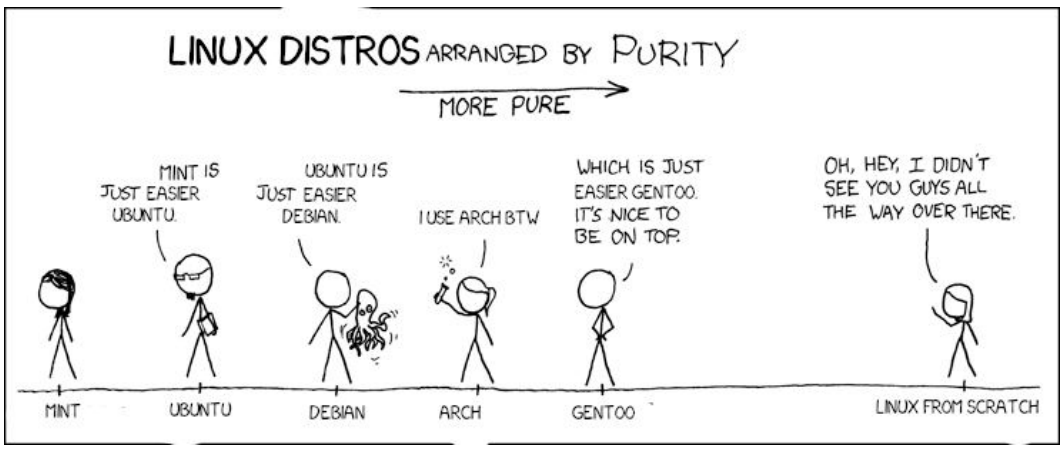
Type	📒 Lecture
Date	@December 22, 2021
Lecture #	1
Lecture URL	https://youtu.be/PHrN7yp1AJw
Notion URL	https://21f1003586.notion.site/Launching-a-Virtual-Machine-e493cecce6a743a9b37516d196c07c1d
Week #	1

Why do we need a Virtual Machine (VM)?

- Laptops usually come pre-installed with Windows
  - Unless, of course, you are an 🍎 person
- We wish to try Linux almost natively, without removing the existing OS
  - Also considering the fact that we do not wish to dual boot

Requirements

- An .iso image of the operating system we want
  - Ubuntu 20.04 is recommended, or just use arch btw



    - Can be downloaded here
- A Hypervisor
  - A **hypervisor**, also known as a virtual machine monitor or VMM, is software that creates and runs virtual machines (VMs). A hypervisor

allows one host computer to support multiple guest VMs by virtually sharing its resources, such as memory and processing.

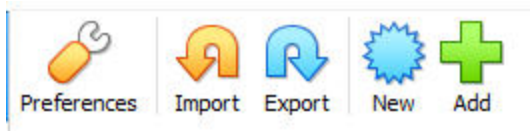
Source: https://www.vmware.com/topics/glossary/content/hypervisor.html

- Oracle VirtualBox
- VMWare Workstation Player
- or just use Windows Subsystem for Linux
- Atleast 20GB free space for the VM
- Some RAM ¯_(ツ)_/¯
  - 8GB+ recommended

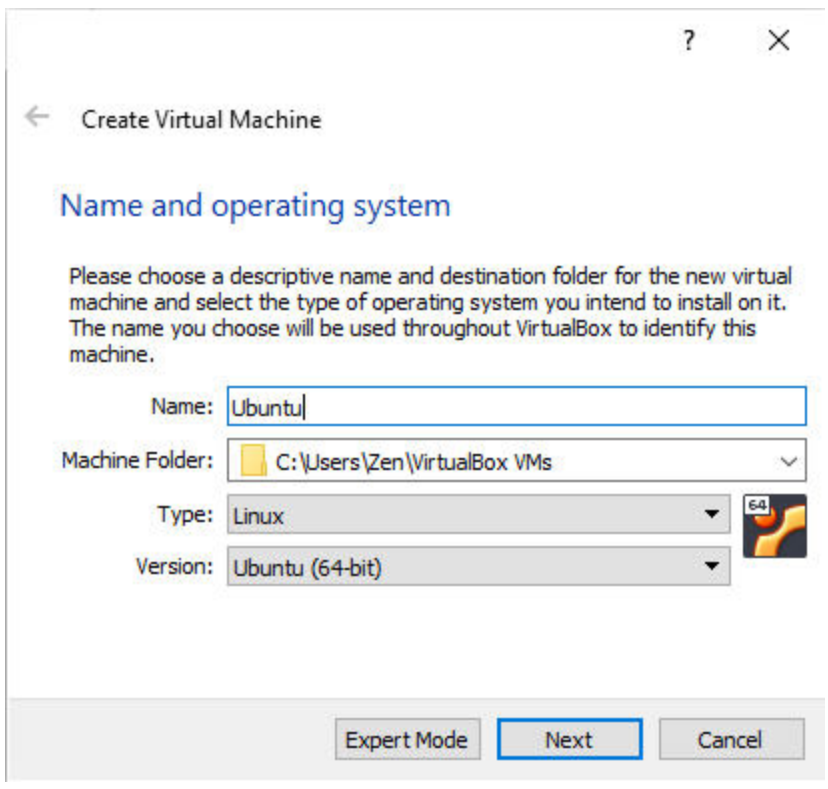
Steps

- Download the Ubuntu .iso file from https://ubuntu.com/download/desktop
- Download either VirtualBox or the VMWare Workstation Player
  - Install them
- Open VirtualBox / VMWare Workstation Player

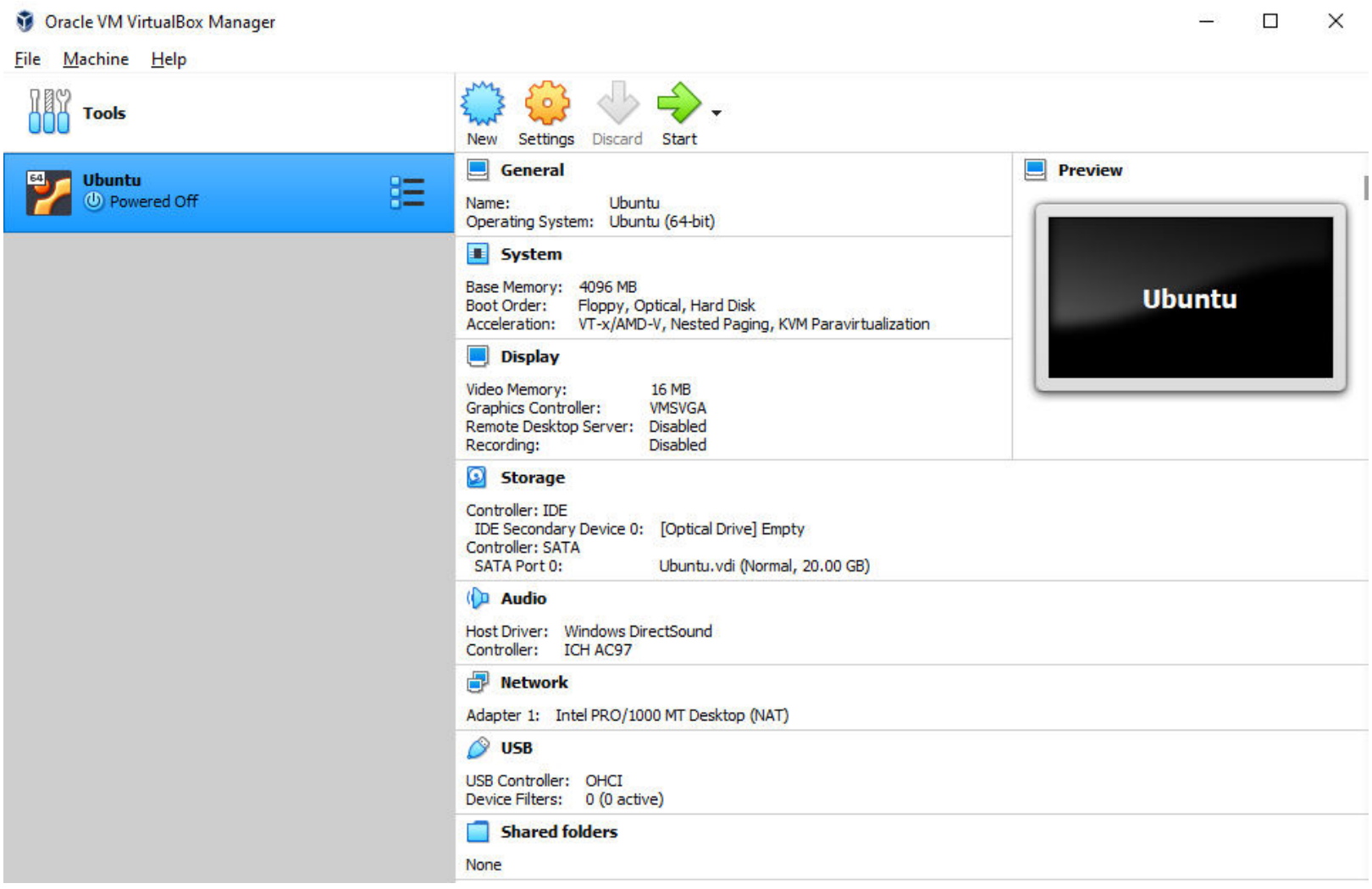
  (I will be using VirtualBox)
  - Click on the “New Button to create a new VM”



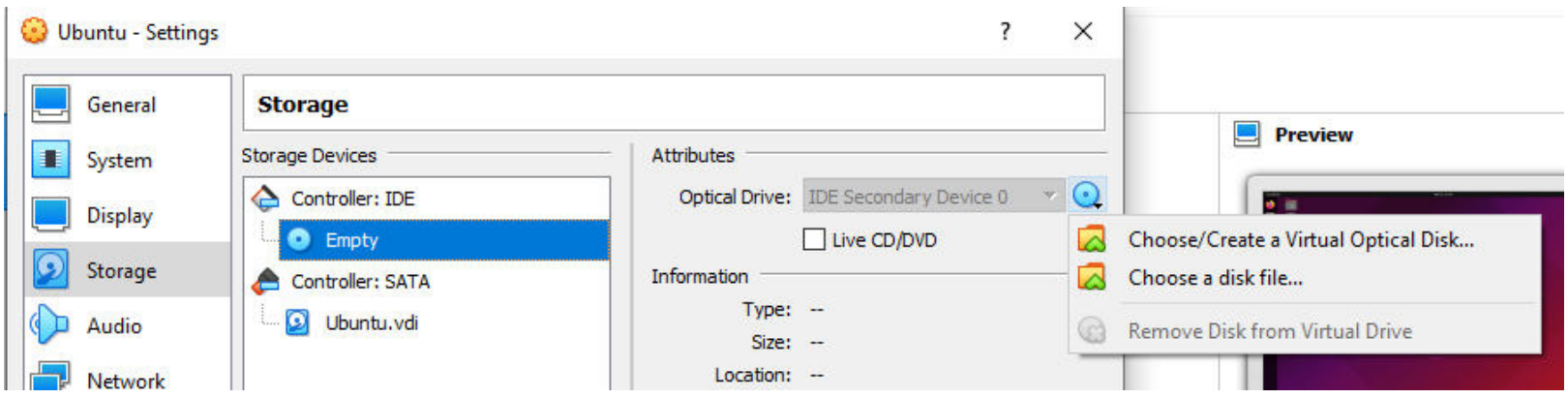
  - Add a name and choose the OS type and version



  - Adjust the RAM and Storage as per your liking, make sure to keep the minimum specs
  - Select the VM on the left menu and go to settings

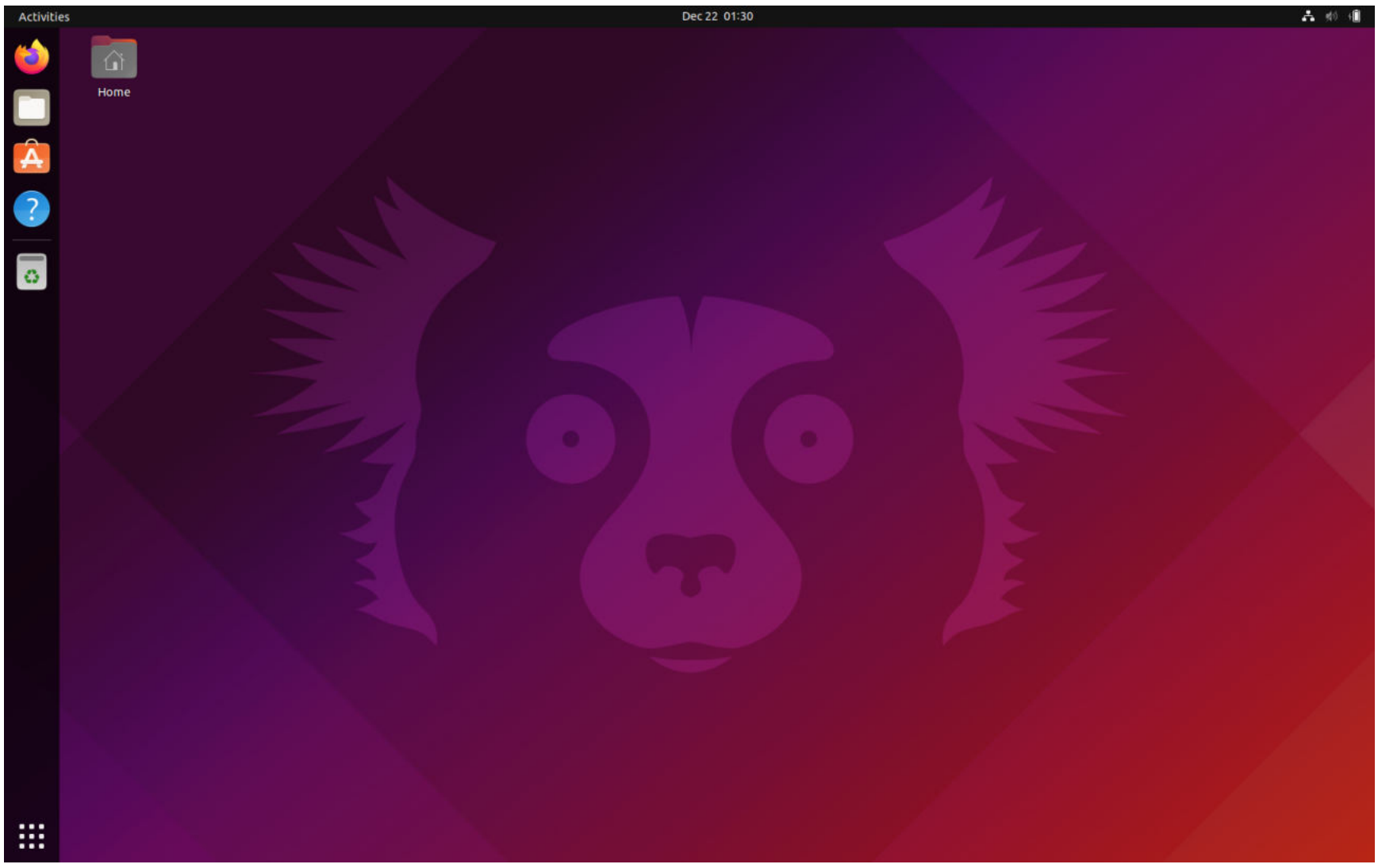


- Go to Storage → Storage Devices → Controller → Empty → Click on the CD icon and choose "**Choose/Create a Virtual Optical Disk...**" and choose your .iso file

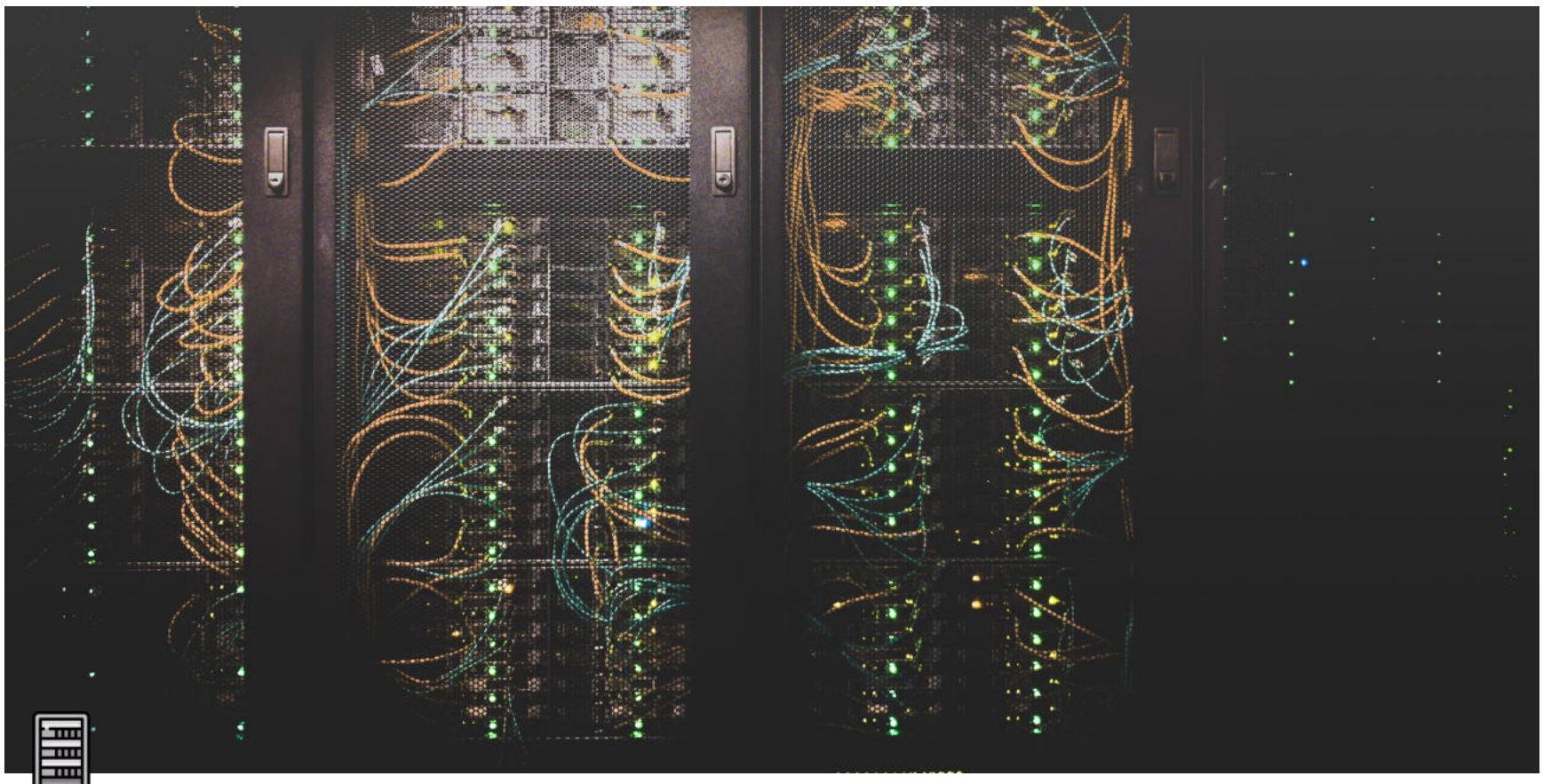


- Proceed with the installation
  - Uhh it's just Next, Next, Next .... Next ... Restart

When you install it correctly and get it up and running, you might see something like this ...



(this screenshot here is Ubuntu 21.10 and gosh that's a creepy monke)



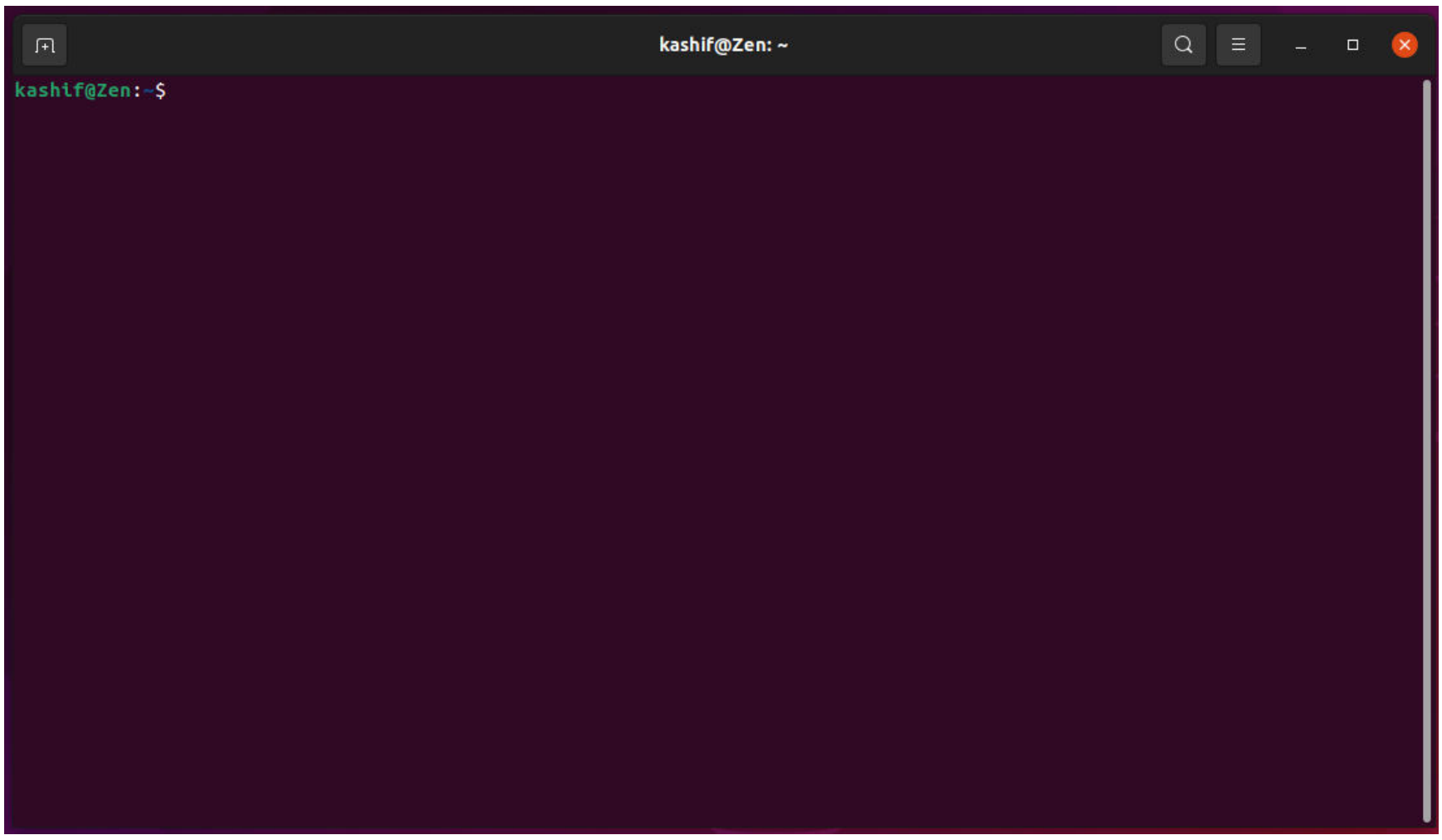
Command Line Environment

Type	📒 Lecture
Date	@December 22, 2021
Lecture #	2
Lecture URL	https://youtu.be/qrAnlpcMyYc
Notion URL	https://21f1003586.notion.site/Command-Line-Environment-f96a91e782a147a88894028d7848a2c4
Week #	1

Why use Command Line environment?

- To use linux at its max potential
- Combine commands to form powerful scripts
    - To automate using these scripts
- *To assert dominance over GUI plebs*

Terminal in Ubuntu



This is what the default terminal looks like in Ubuntu

To clear the command line

```
clear
```

- or you can press `Ctrl + L` to clear the terminal screen

To check which directory we currently are in

```
pwd
```

By default, you are placed in the home directory of the currently logged in user

To list all the files and folders in the current directory

```
ls
```

To view the currently running processes

```
ps
```

To know the OS, duh

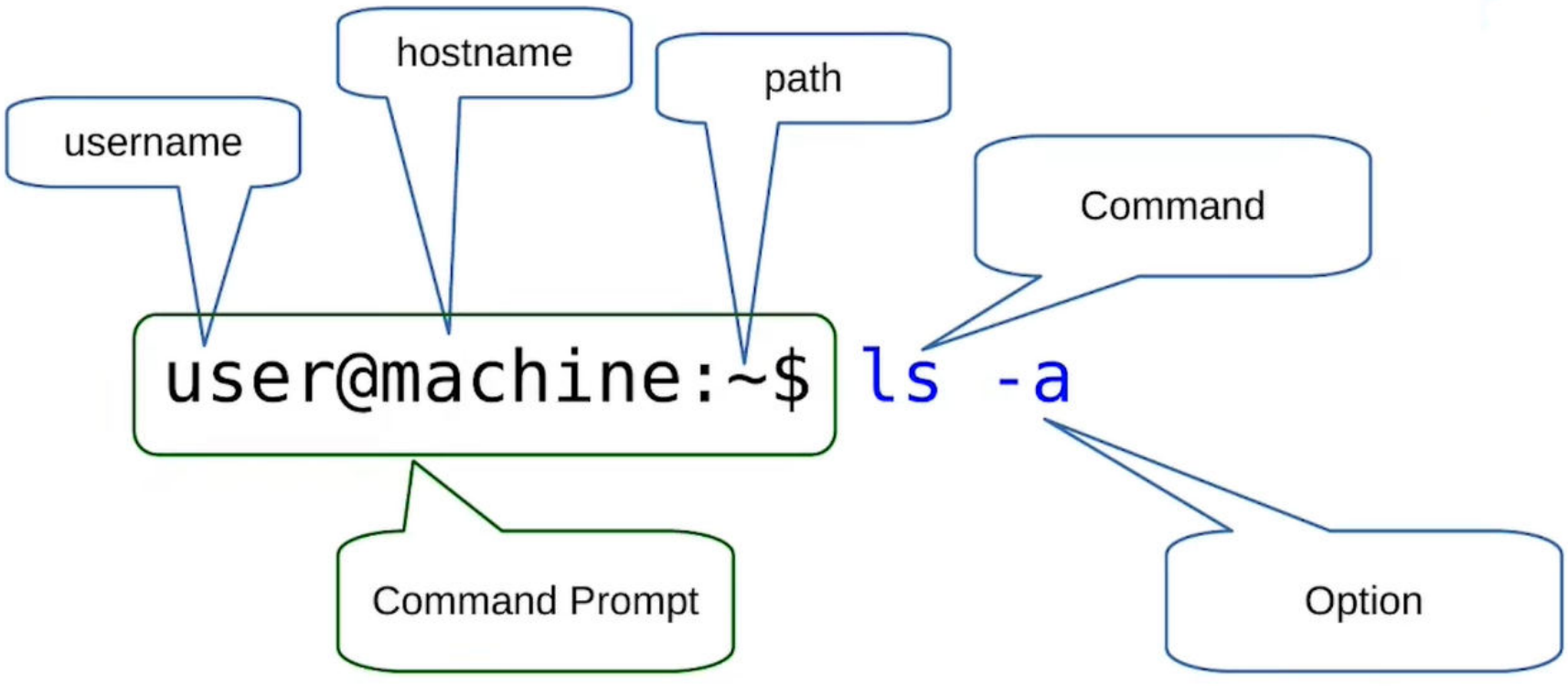
```
uname
```

To exit the shell

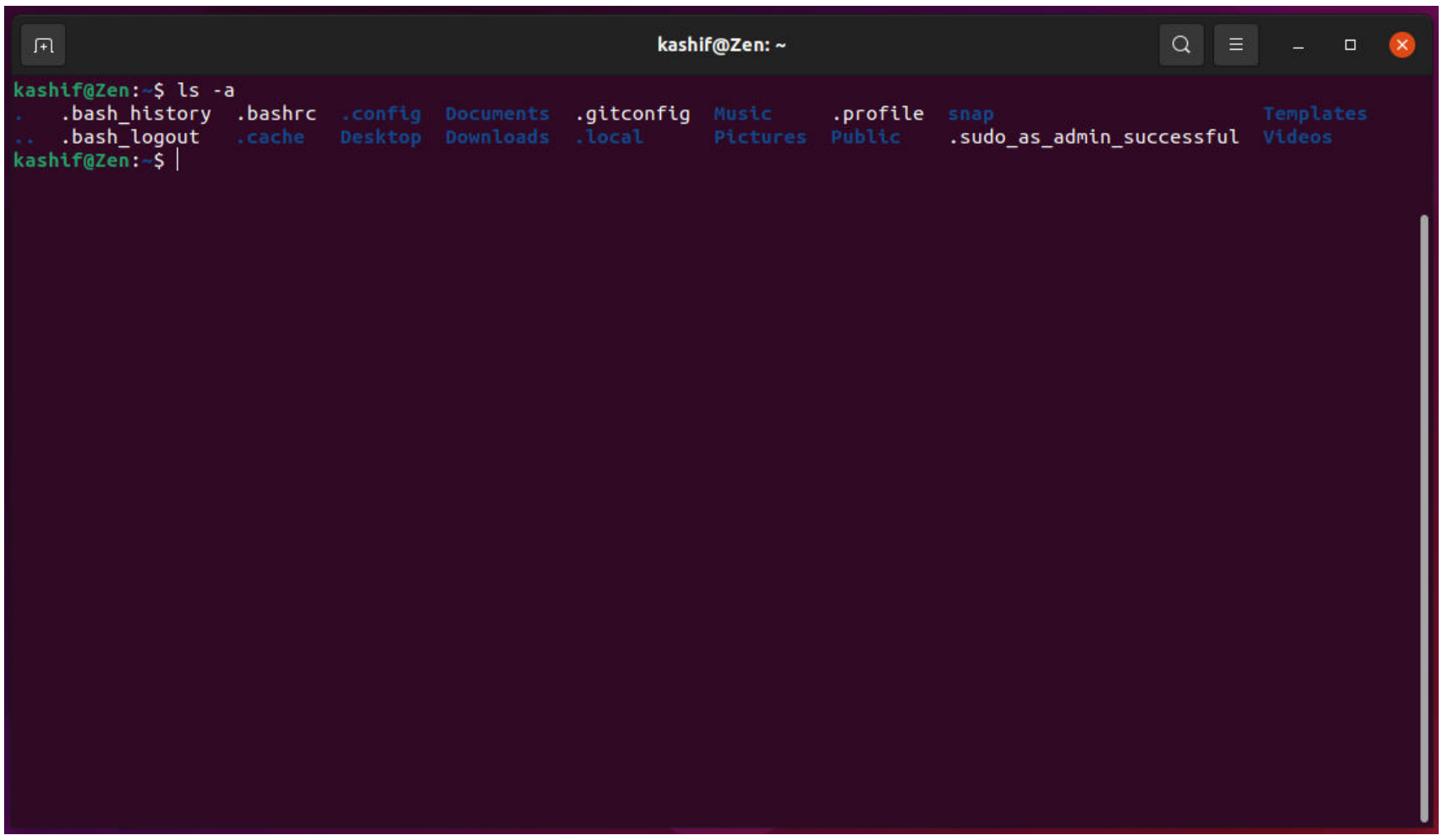
```
exit
```

- Or you can also press `Ctrl + D` to exit out of the terminal session

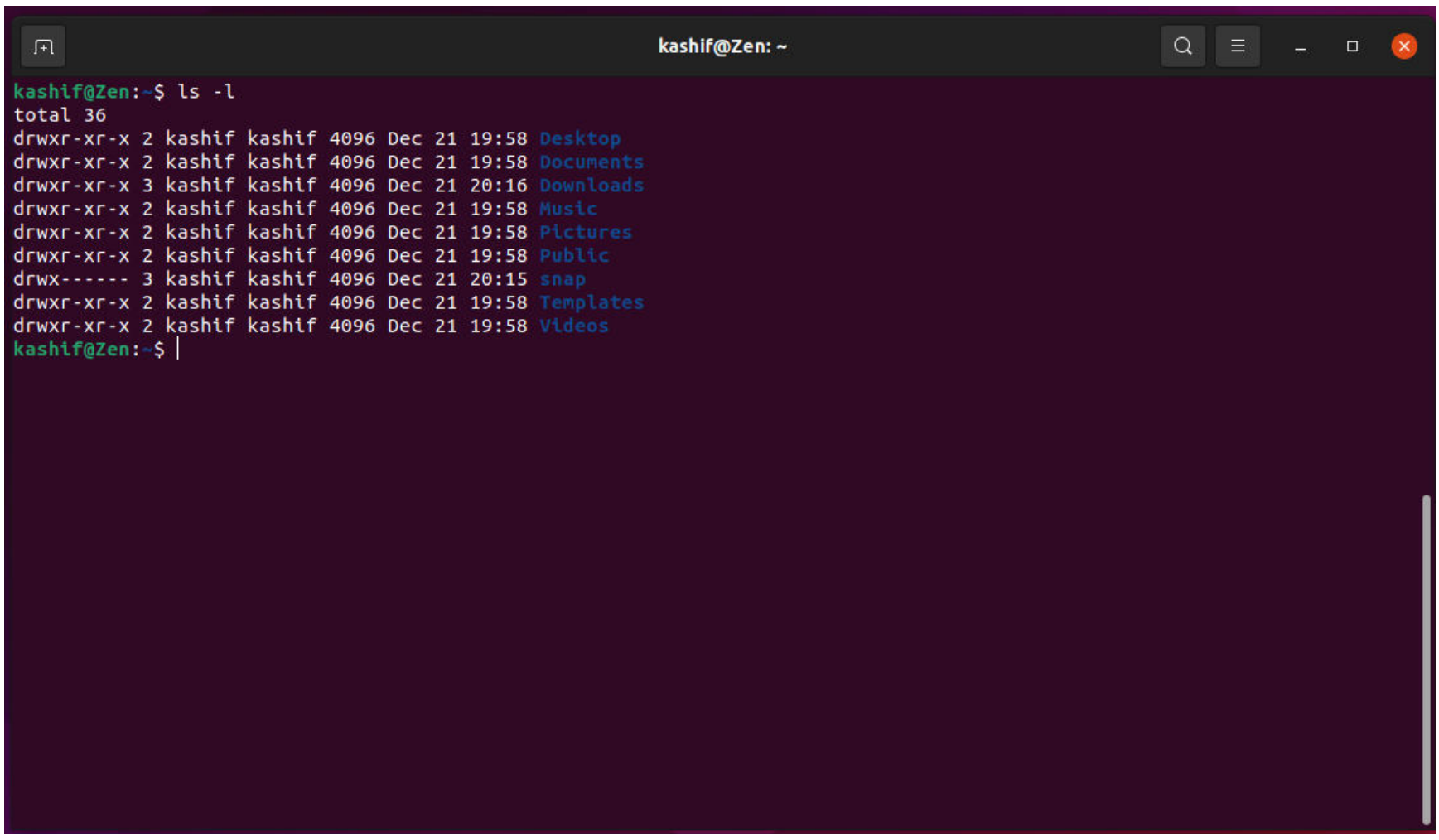
Anatomy of a typical command on the terminal



- To display all the files, press `ls -a`



- To display the files in a list, press `ls -l`



These two flags are the most commonly used ones, ***we can also combine them as one flag***

like, `ls -al`

To get help on any command

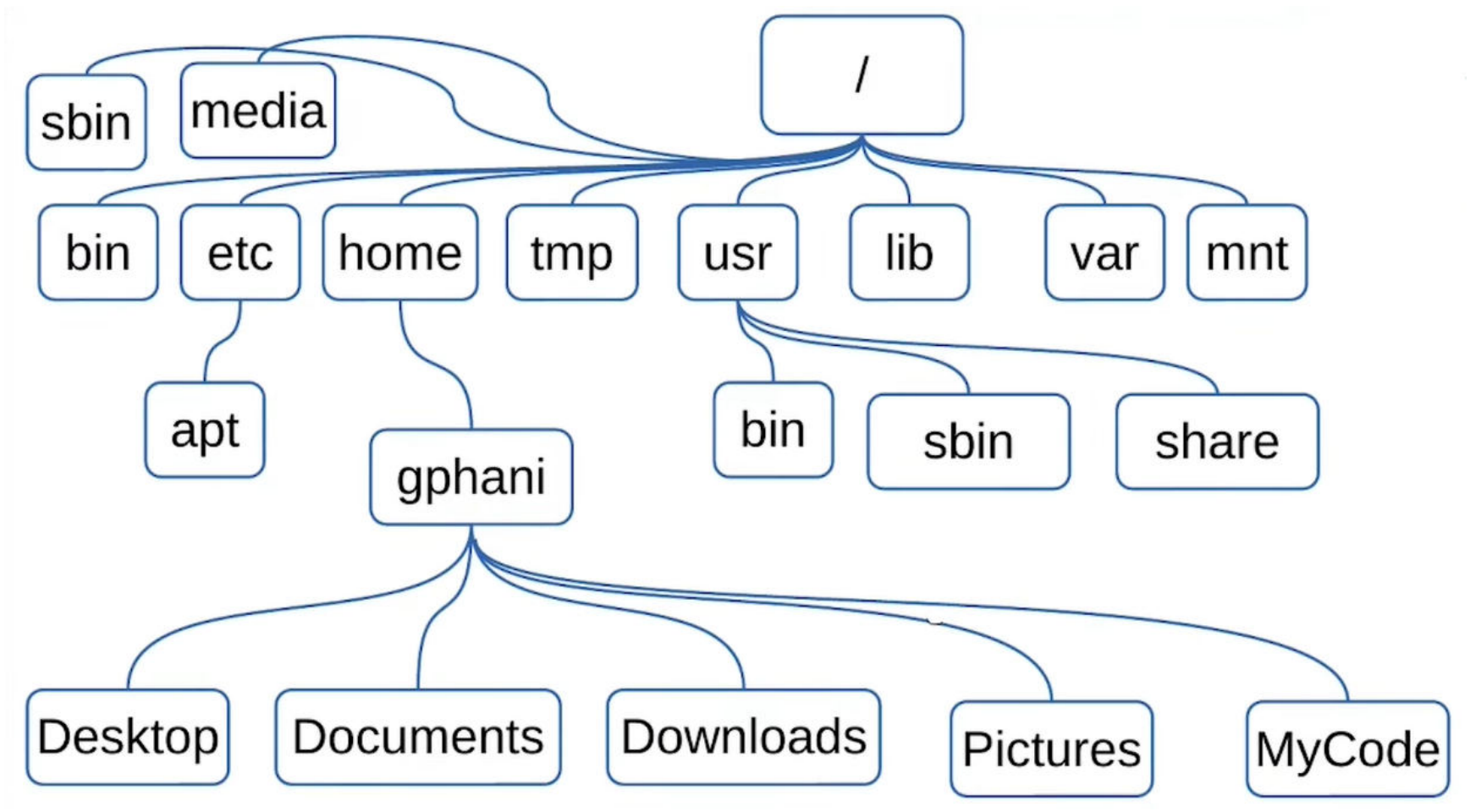
```
man <command-name>
```

- For example

  ```
  man ls
  ```

  gives us the manual for the command `ls`

Filesystem in Linux



Traversing the tree

`/` is the root of the file system

`/` is also the delimiter for sub-directories

- `.` is the current directory
- `..` is the parent directory

Path for traversal can be absolute or relative

To change directory

```
cd <location>
```

Examples

- `cd` without any arguments will take us to the home directory of the currently logged in user
- `cd <folder-name>` will change the move us into the `folder-name`
- `cd ..` will takes us to the parent of the current directory
- `cd /` will takes us to the root directory

What does this *directory* do?

- `/bin` → Essential command binaries
- `/boot` → Static files for the bootloader
- `/dev` → Device files
- `/etc` → Host specific system configuration
- `/lib` → Essential shared libraries and kernel modules
- `/media` → Mount points for removable devices
- `/mnt` → Mount points
- `/opt` → Add on application software packages
- `/run` → Data relevant to running processes
- `/sbin` → Essential system binaries
- `/srv` → Data for services
- `/tmp` → Temporary files
- `/usr` → Secondary hierarchy
- `/var` → Variable data

`/usr` hierarchy

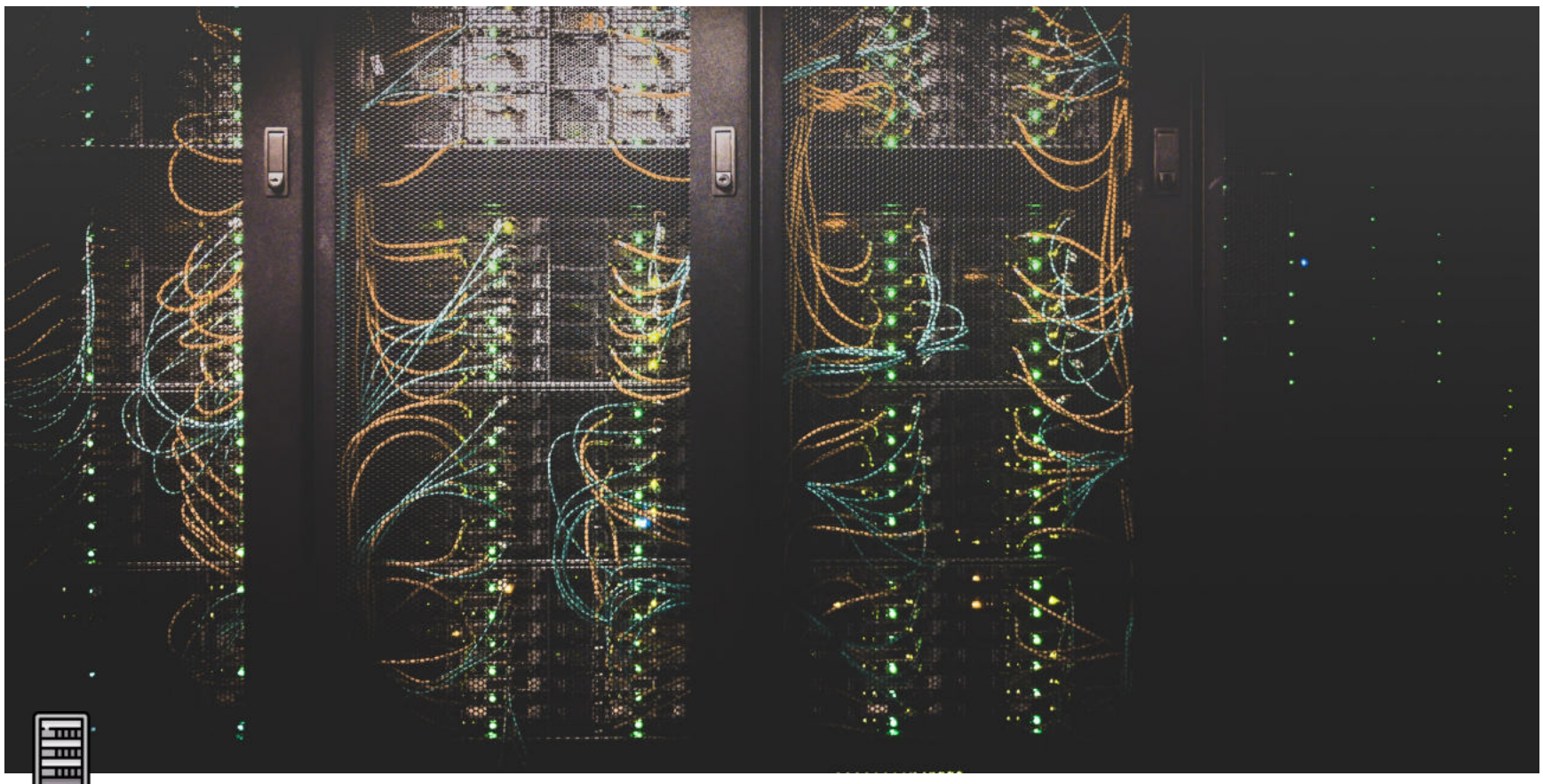
- `/usr/bin` → User commands
- `/usr/lib` → Libraries
- `/usr/local` → Local hierarchy
- `/usr/sbin` → Non-vital system binaries
- `/usr/share` → Architecture dependent data
- `/usr/include` → Header files included by C programs
- `/usr/src` → Source code

`/var` hierarchy

- `/var/cache` → Application cache data
- `/var/lib` → Variable state information
- `/var/local` → Variable data for `/usr/local`
- `/var/lock` → Lock files

- `/var/log` → Log files and directories
- `/var/run` → Data relevant to running processes
- `/var/tmp` → Temporary files preserved between reboots

	sharable	**unsharable**
static	/usr /opt	*/etc* */boot*
variable	*/var/mail*	/var/run /var/lock



Simple Commands in Linux - 1

Type	📒 Lecture
Date	@December 22, 2021
Lecture #	3
Lecture URL	https://youtu.be/DIpBEmRDHnw
Notion URL	https://21f1003586.notion.site/Simple-Commands-in-Linux-1-3e5b2c25e6d04a7499afcb89af041b20
Week #	1

Some basic commands

- `date` → Date and time

```
kashif@Zen:~/Desktop$ date
Wednesday 22 December 2021 12:05:01 PM IST
```

  - `date -R` → Gives the date in RFC5322 standard
- `cal` → Calendar of a month

```
kashif@Zen:~/Desktop$ cal
   December 2021
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
```

- `free` → Memory statistics

```
kashif@Zen:~/Desktop$ free
               total        used        free      shared  buff/cache   available
Mem:         4020444      589808     2725032       36244      705604     3170416
Swap:         945368           0      945368
```

  - `free -h` → Makes the output human readable
- `groups` → Groups to which the user belongs

```
kashif@Zen:~/Desktop$ groups
kashif adm cdrom sudo dip plugdev lpadmin lxd sambashare
```

idk what the junk is this

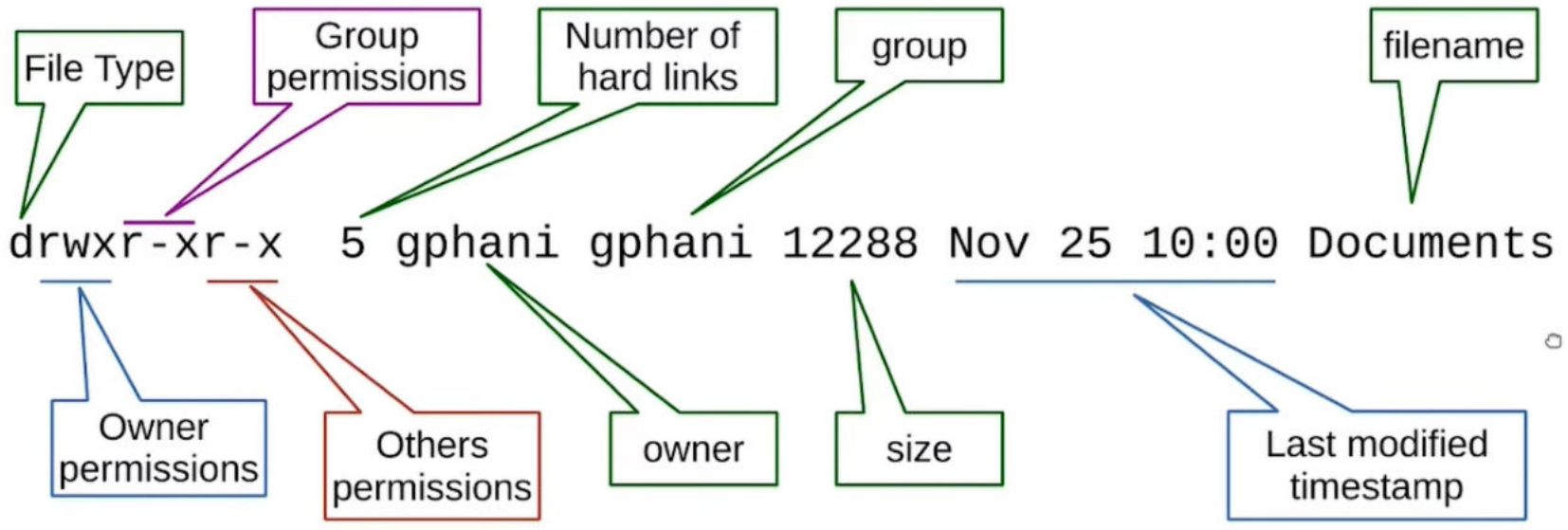
- `file` → What type of a file it is

```
kashif@Zen:~$ file .bashrc
.bashrc: ASCII text
```

- `cd -` → To visit the previous directory we were in

```
kashif@Zen:~$ cd -
/home/kashif/Desktop
kashif@Zen:~/Desktop$
```

Typical output of `ls -l`



File types

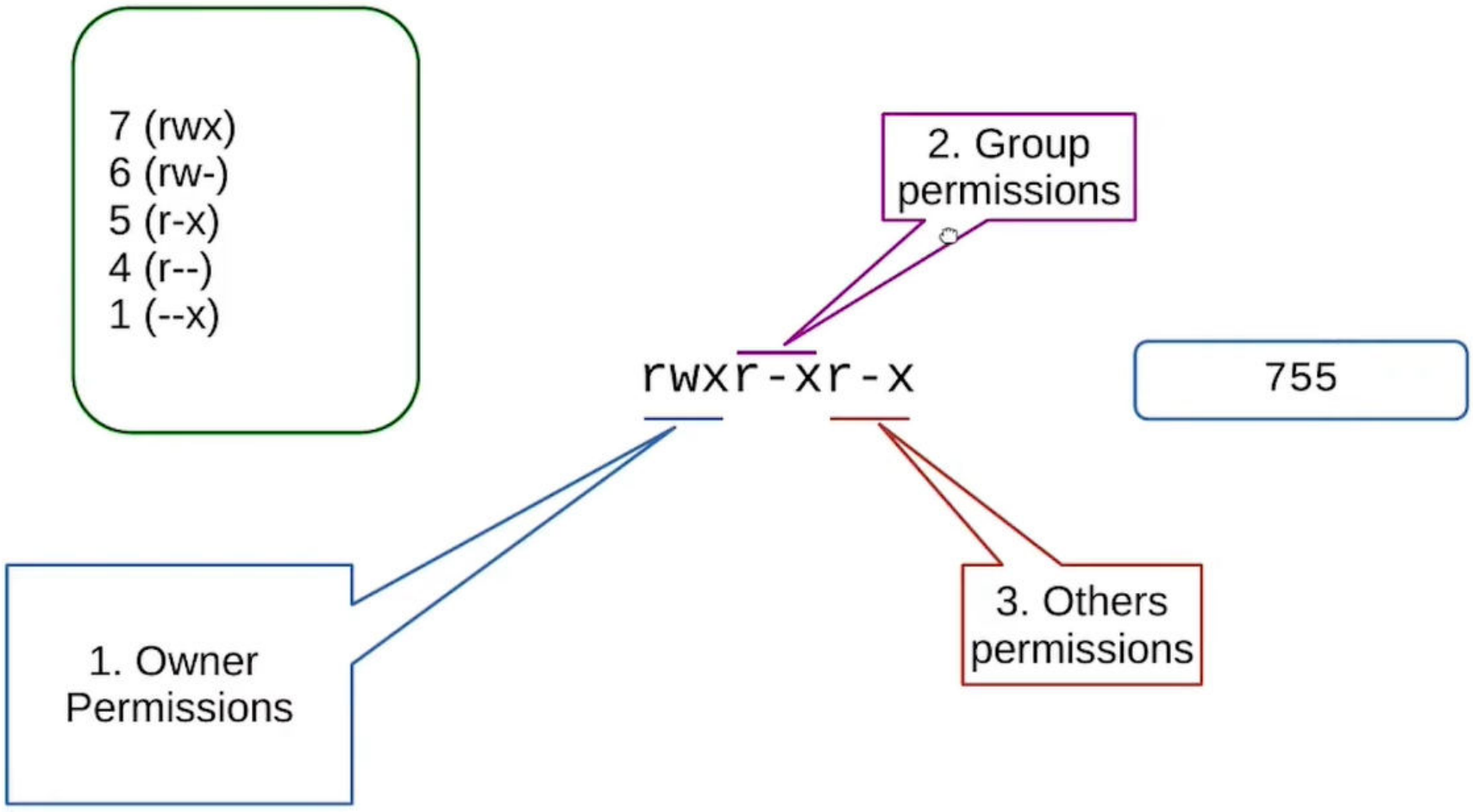
- `-` → Regular file
- `d` → Directory
- `l` → Symbolic link
- `c` → Character file
- `b` → Block file
- `s` → Socket file
- `p` → Named pipe

inode (Read: eye node)

`ls -l <name>`

- An entry in the filesystem table about the location in storage media

Permission string



To modify permissions

- Create a folder
  - `mkdir <folder-name>`
  - `chmod g-w <folder-name>` to remove the write permission from the group
  - Similarly, `chmod g-x <folder-name>` to remove the execute permission from the group
  - To add permission, `chmod g+w <folder-name>` to give write permission to the group
- So, a general structure of permission syntax is something like ...
  - `chmod <user-group><plus/minus><r/w/x> <folder-name/file-name>`
    - Where `<user-group>` are ...
      - `u` → User
      - `g` → Group
      - `o` → Others
    - `<plus/minus>` are ...
      - `-` → To remove permission
      - `+` → To add permission
    - `<r/w/x>` are ...
      - `r` → Read
      - `w` → Write
      - `x` → Execute
- We can also use numerical values for permissions
  - `chmod 700 <folder-name>` to give the `rwx` permission to user only

`touch` command

- Used to modify the timestamp of a file or folder
  - If a file does not exist, it will be created
- `touch <file-name>` to create a new file
  - `chmod 700 <file-name>` to give `rwx` permission to user only

`cp` command

- `cp <file-name> <new-name>` to copy a file to a new name
  - `cp <file-name> <new-path>` can be used to copy a file to a new path

`mv` command

- `mv <file-name> <new-path>` to move a file to a new path
  - `mv <file-name> <new-file-name>` can be used to rename a file

Also, use quotation marks if the file name includes a space

`rm` command

- `rm <file-name>` to remove a file
  - **IT WILL NOT ASK FOR YOUR CONFIRMATION**
    - Just straight up delete

    - This is the default behaviour
  - We can pass `-i` flag for the confirm remove prompt

Alias

- We can also set an alias for long commands, for example ...
  - `alias ll="ls -altrhF"`

Know current user

```
whoami
```

Read a text file, page-by-page

```
less <file-name>
```

To know the type of a file

```
file <file-name>
```

Some commands

- `chmod` → Change permissions of a file
- `touch` → Change modified timestamp of a file
- `cp` → Create a copy of a file
- `mv` → Rename/Move a file
- `mkdir` → Create a directory
- `rm` → Remove a file