Linux, Aws & Devops Session

Cloud Computing:

It is on demand delivery of compute power, database storage, application and other IT resources through a cloud services platform with pas as you go.

NIST : It is responsible for Developing standards and guideline.

Service Model

*SaaS : Software as Service

*Paas: Platform as Service

*Iaas: Infrastructure as Service)

*Amazon web services is IaaS service

->It is service provider

-> https://aws.amazon.com (internet to connect)

-> Two Types of Account

1.Root Account

2.IAM account (Identity Access Management)

-> In the year 2006 AWS started providing this services IT Infrastructure

-> Type of Services AWS provider

- Machine

-Servers

-Database

-Storage

-Security

-Analysis

-Monitoring

-> 190 + countries AWS provide the services

-> Region : It is an Geographical locations

->Data centre: Availability zone ,a room with server having complex network connections.

Challenge Before cloud

- Power back issue
- Natural Disaster
- Security
- Physical Damage

Benefits after Cloud

- No need to buy servers/machine
- No physical damage
- Pay for what we use

AWS

-> AWS stand for Amazon web services

-> Amazon is the company name

-> Amazon is cloud providing Infrastructure as a service(Iaas)

->Infrastructure we need to host application we can take from AWS on rent.

->Services provided by

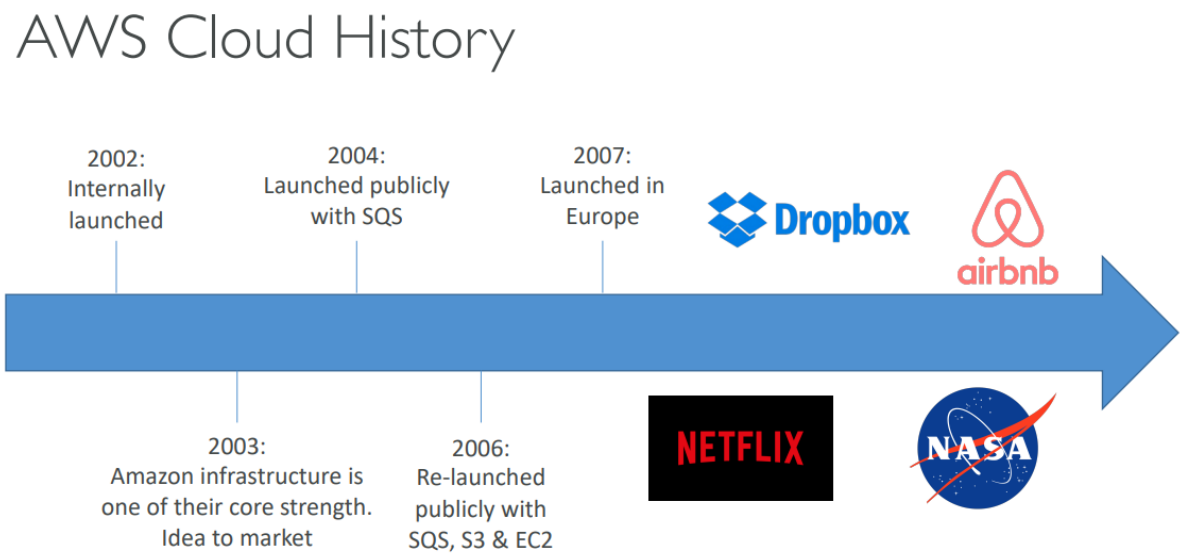
- Machines
- Servers
- DB
- Storages
- Network Security
- Analytics & Monitoring

->AWS provide services across the globe using Region & Availabilty Zone

->Region is nothing but geographical location.

->AZ : avaialbility zone means data centre

-> Data centre: It is an room with server



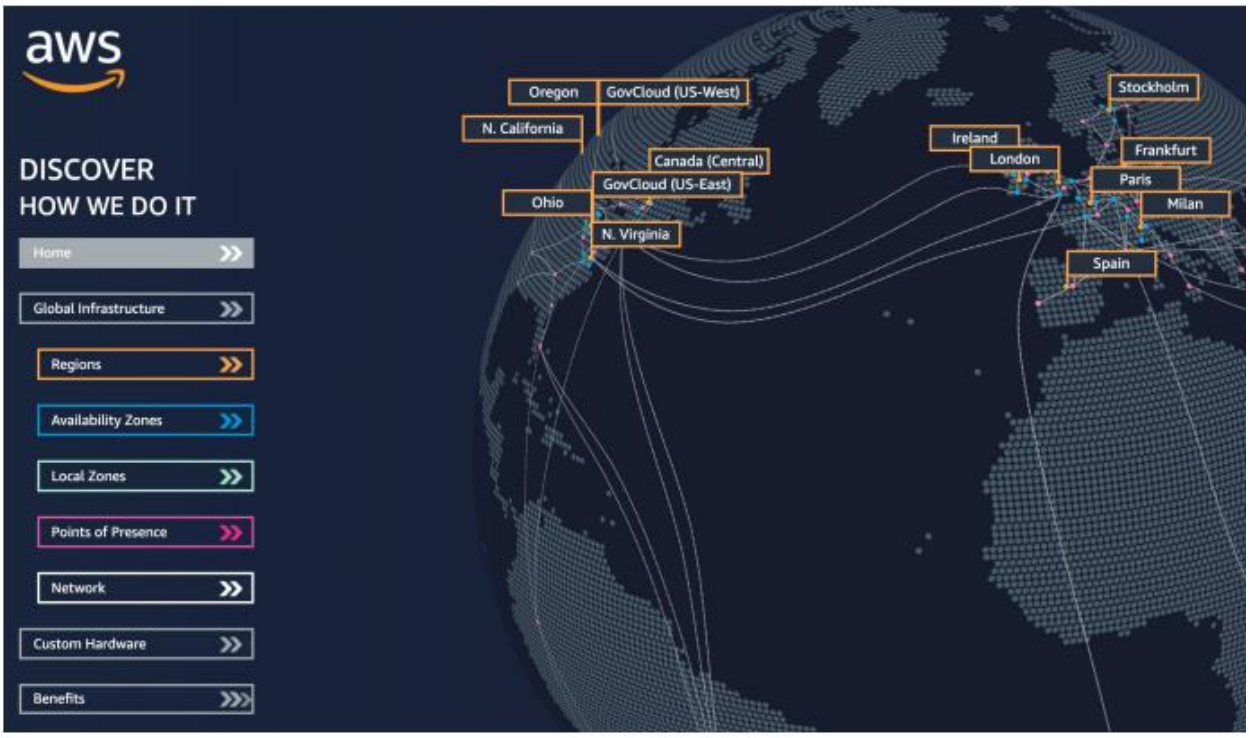
AWS Cloud Use Cases

- AWS enables you to build sophisticated, scalable applications
- Applicable to a diverse set of industries
- Use cases include
- Enterprise IT, Backup & Storage, Big Data analytics
- Website hosting, Mobile & Social Apps
- Gaming

AWS Global Infrastructure

- AWS Regions
- AWS Availability Zones

- AWS Data Centers
- AWS Edge Locations / Points of Presence

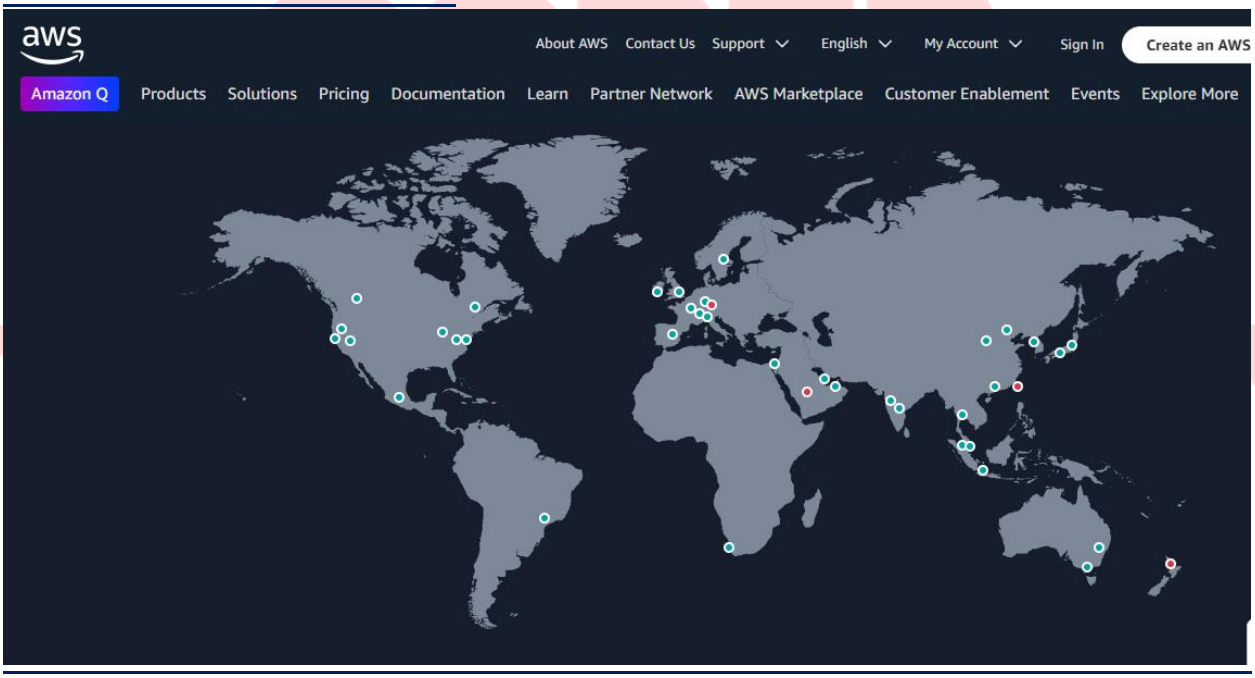


AWS Regions

- AWS has Regions all around the world
- Names can be us-east-1, eu-west-3…
- A region is a cluster of data centers
- Most AWS services are region-scoped

Global Infrastructure - AWS

- **US East (N. Virginia)** us-east-1
- US East (Ohio) us-east-2
- US West (N. California) us-west-1
- US West (Oregon) us-west-2
- Africa (Cape Town) af-south-1
- Asia Pacific (Hong Kong) ap-east-1
- Asia Pacific (Mumbai) ap-south-1
- Asia Pacific (Seoul) ap-northeast-2
- Asia Pacific (Singapore) ap-southeast-1
- Asia Pacific (Sydney) ap-southeast-2
- Asia Pacific (Tokyo) ap-northeast-1
- Canada (Central) ca-central-1
- Europe (Frankfurt) eu-central-1
- Europe (Ireland) eu-west-1
- Europe (London) eu-west-2
- Europe (Paris) eu-west-3
- Europe (Stockholm) eu-north-1
- Middle East (Bahrain) me-south-1
- South America (São Paulo) sa-east-1



AWS Availability Zones

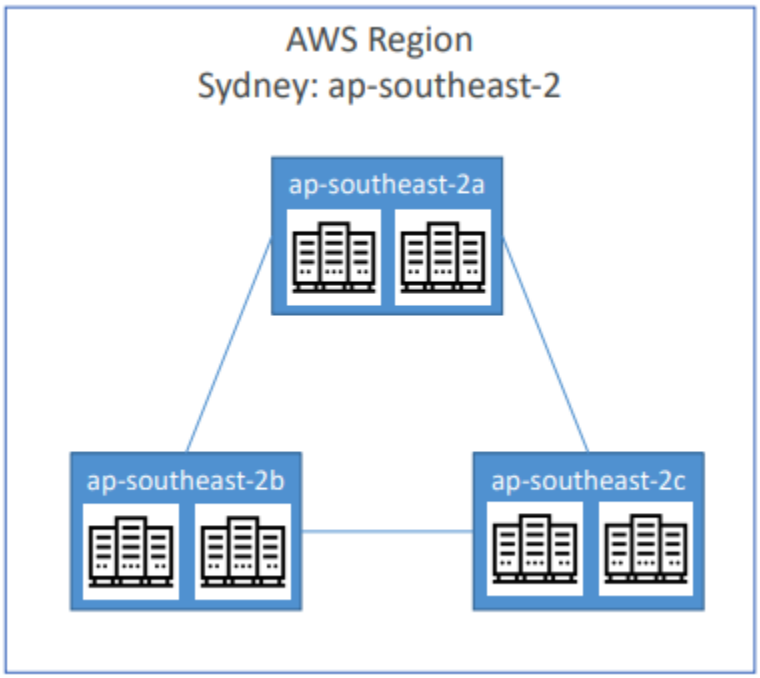
• Each region has many availability zones (usually 3, min is 3, max is 6).

Example:

• ap-southeast-2a

• ap-southeast-2b

• ap-southeast-2c



• Each availability zone (AZ) is one or more discrete data centers with redundant power, networking, and connectivity

• They're separate from each other, so that they're isolated from disasters

• They're connected with high bandwidth, ultra-low latency networking

Amazon EC2

• EC2 is one of the most popular of AWS' offering

- EC2 = Elastic Compute Cloud = Infrastructure as a Service
- It mainly consists in the capability of :
- Renting virtual machines (EC2)
- Storing data on virtual drives (EBS)
- Distributing load across machines (ELB)
- Scaling the services using an auto-scaling group (ASG)
- Knowing EC2 is fundamental to understand how the Cloud works

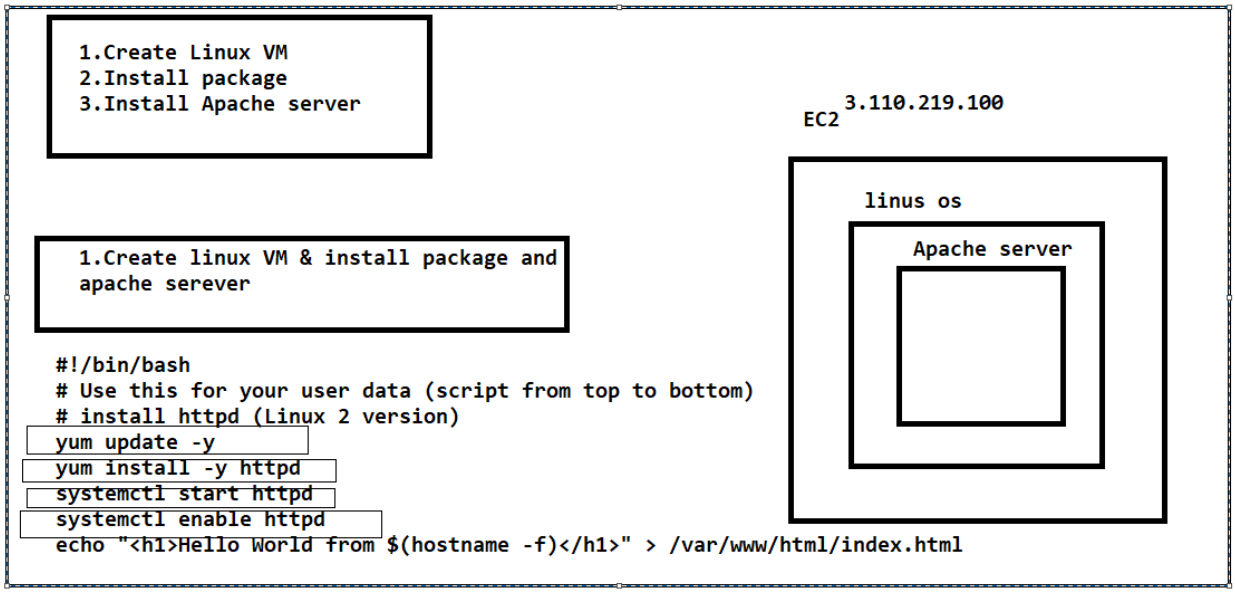
EC2 sizing & configuration options

- Operating System (OS): Linux, Windows or Mac OS
- How much compute power & cores (CPU)
- How much random-access memory (RAM)
- How much storage space:
- Network-attached (EBS & EFS)
- hardware (EC2 Instance Store)
- Network card: speed of the card, Public IP address
- Firewall rules: security group
- Bootstrap script (configure at first launch): EC2 User Data

Sample script :

```
#!/bin/bash
# Use this for your user data (script from top to
bottom)
```

```
# install httpd (Linux 2 version)
yum update -y
yum install -y httpd
systemctl start httpd
systemctl enable httpd
echo "<h1>Hello World from $(hostname -f)</h1>" >
/var/www/html/index.html
```



Feature of EC2

- We can create or manage lifecycle of EC2 instance.
- Load Balancing & Auto scaling for multiple EC2 instance. EC2/ELB/EBS
- Attach storage (& network storage) to our EC2 instance.

EC2 Instance Type

EC2 Instance Type : Example

Instance	vCPU	Mem(gib)	Storage	Network Performanace	EBS Bandwidth
t2.micro	1	1	EBS-Only	Low to Moderate	
t2.xlarge	4	16	EBS-only	Moderate	
c5d.4xlarge	16	32	1 X 400NVmeSSD	up to 10Gbps	4750

Optimized combination of compute(CPU),memory,disk.

270+ instance types across 40+ instance type.

t2.micro

- t- instance family
- 2- generation
- micro - size(nano< micro < small< medium < large < xlarge <...)

m5.2xlarge

- m : instance family
- 5 : generation
- 2Xlarge : size within instance class

General Purpose :

• Great for a diversity of workloads such as web servers or code repositories

- Balance between:
- Compute
- Memory
- Networking
  - In the course, we will be using the t2.micro which is a General Purpose

Compute Optimised

- Batch processing workloads
- Media transcoding
- High performance web servers
- High performance computing (HPC)
- Scientific modeling & machine learning
- Dedicated gaming server

Eg: c6g/c6gn/c5/c5a/c4

Memory Optimized

- High performance, relational/non-relational databases
- Distributed web scale cache stores
- In-memory databases optimized for BI (business intelligence)
- Applications performing real-time processing of big unstructured data

Eg : R6g/R5/R5b/R5n

EC2 Instance Types – Storage Optimized

• Great for storage-intensive tasks that require high, sequential read and write access to large data sets on local storage

• Use cases:

• High frequency online transaction processing (OLTP) systems

• Relational & NoSQL databases

• Cache for in-memory databases (for example, Redis) • Data warehousing applications • Distributed file systems

->For storage of data that required sequential read & write access.

-> SQL DB and NO sql DB

-> Cashe for in-memory (Redis)

-> Distributed file system

Eg: D2/D3

Security Groups

-> It is kind of network security in AWS.

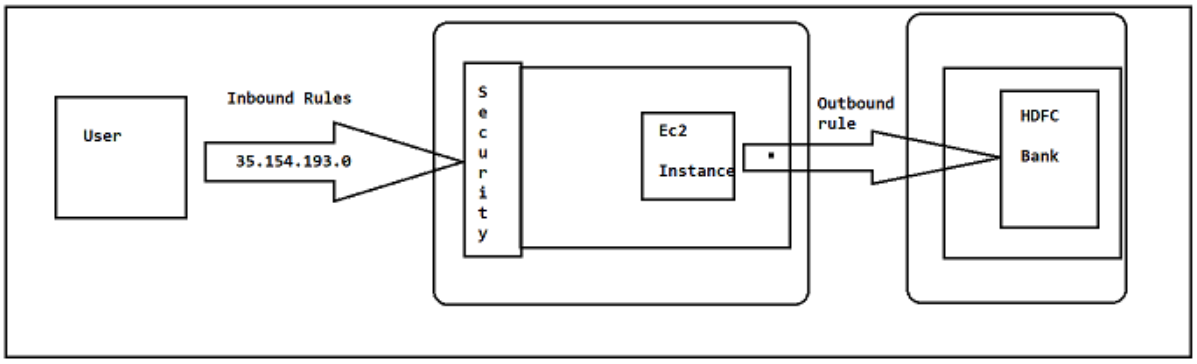
-> SG control traffic "in & Out" of our EC2 Instance.

-> SG contains only rules to allow or reject traffic.

-> It is acting as an firewall on EC2 instance.

-> SG is controlling

- Ports
- IP ranges - IPv4 to IPv6
- Control in bound rules (from outside to our Ec2 instance)
- control out bound rules (from Ec2 instance to other)



Linux

Windows OS:

- It is provided by Microsoft company.
- It is paid s/w
- It is single user based .
- It can run multiple application.
- It is less secured
- It is giving beautiful UI

Linux OS:

- Linux is free & Open source.
- Anyone can take Linux OS source code and customize.
- Linux is multi user based OS.
- It is very secured.
- It is community based.
- First OS come into market in the year 1956.
- General motor la b implemented the OS for IBM
- In 1969 the first version of UNIX OS come into market by Ken Thomson
- Linus Torvolds , made the changes in existing OS anf then release the new one in the market

LINUS+UNIX => LI+NIX => Linux

Different flavors of Linux OS

RHEL -> Red Hat

CENTOS -> community

Ubuntu -> community

openuse-> Microsoft

Linux Commands

PWD : Present Working directory

cd : change directory

Ports to Know

SSH = 22 -> log into a linux instance

FTP = 21 ->File Transfer Protocol

->upload files into a file share

SFTP= 22 ->Secure File Transfer Protocol

-> Upload the file using SSH

HTTP = 80 -> We want to access unsecured website

HTTPS = 443 ->We want to access secured website

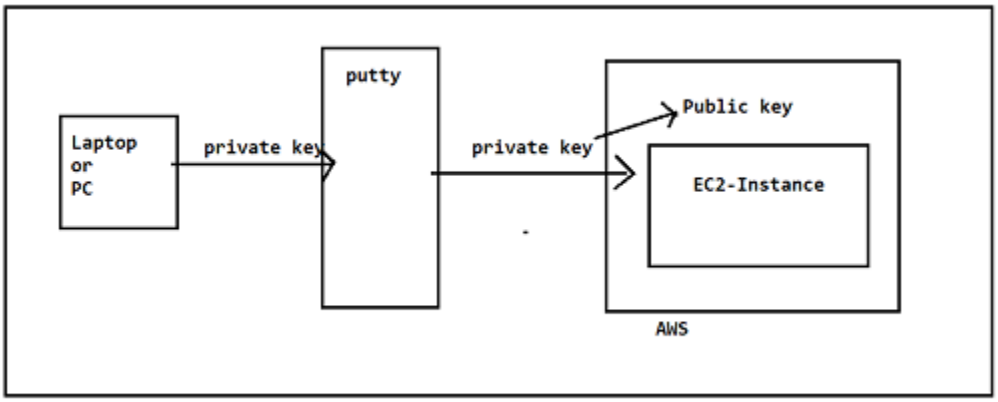
RDP = 3389 ->(Remote Desktop Protocol)

-> log into a windows instance

Type	Protocol	Range	Source
Http	TCP	80	0.0.0.0/0
SSH	TCP	22	122.149.196.58/32
Custom Tcp protocol	TCP	4567	0.0.0.0/0

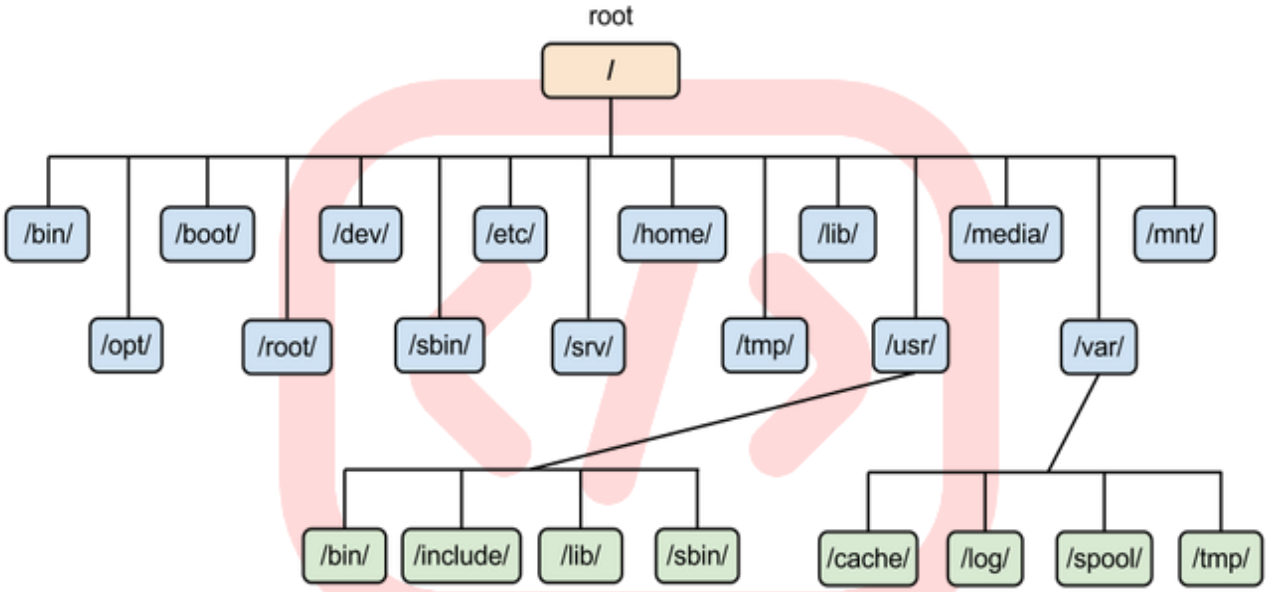
- clear : It is used to clear the console/terminal
- pwd : present working directory
- whoami: user details
- mkdir : It is used to create the directory/
- ls : List the directory.
- touch : It is used to create the text files.

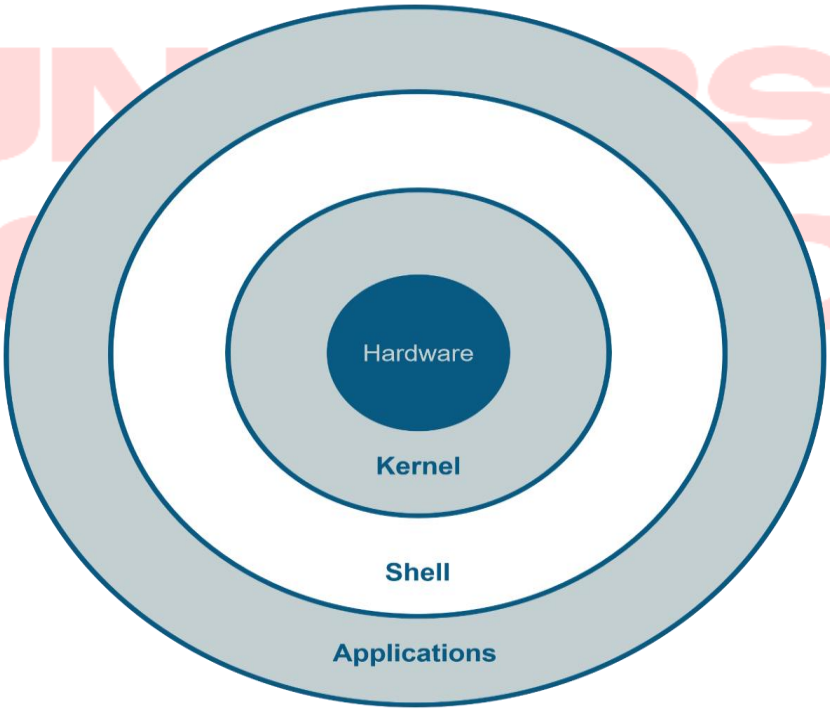
What is the key-pair ?



- Key pair consist basically Public Key & an Private Key.
- AWS stores the public key and we store the private key.
- These keys are used to connect EC2 instance securely.

Linux File System & Architecture





-> All the files in Linux are of 3 types

1.Ordinary Files (-)

2.Directory Files (-d)

3.Device Files

4.linked files (l)

/ -> It is root directory of entire file system

/ & root : -> / means root

-> /root it represent root account user home directory

/bin/ : It is having binary files

/boot/ : It is having static files for boot loader

/dev/ : Device files

/etc/ :System configuration files

/home/ : Uder home directory

/lib/ : Shared libraries

/media/ : Removable media

/mnt/ : Mounted file system

/opt/ : Application software packages

/sbin/ : System binaries files

/srv/ : Site specific data of the system

/tmp/ : temporary files

/usr/: binaries/libraries/documentation/source code

Linux commands

ls-l : It is giving details in alphabetical order

ls-lr: It is giving details in reverse alphabetical order

ls | more : It is giving files and directory names line by line

clear : It is clear the console/terminal

ls -a : To see the hidden files with "." & ".."

ls -A : To see the hidden files with "."

ls-i : It represent the address of the files attribute are store.

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