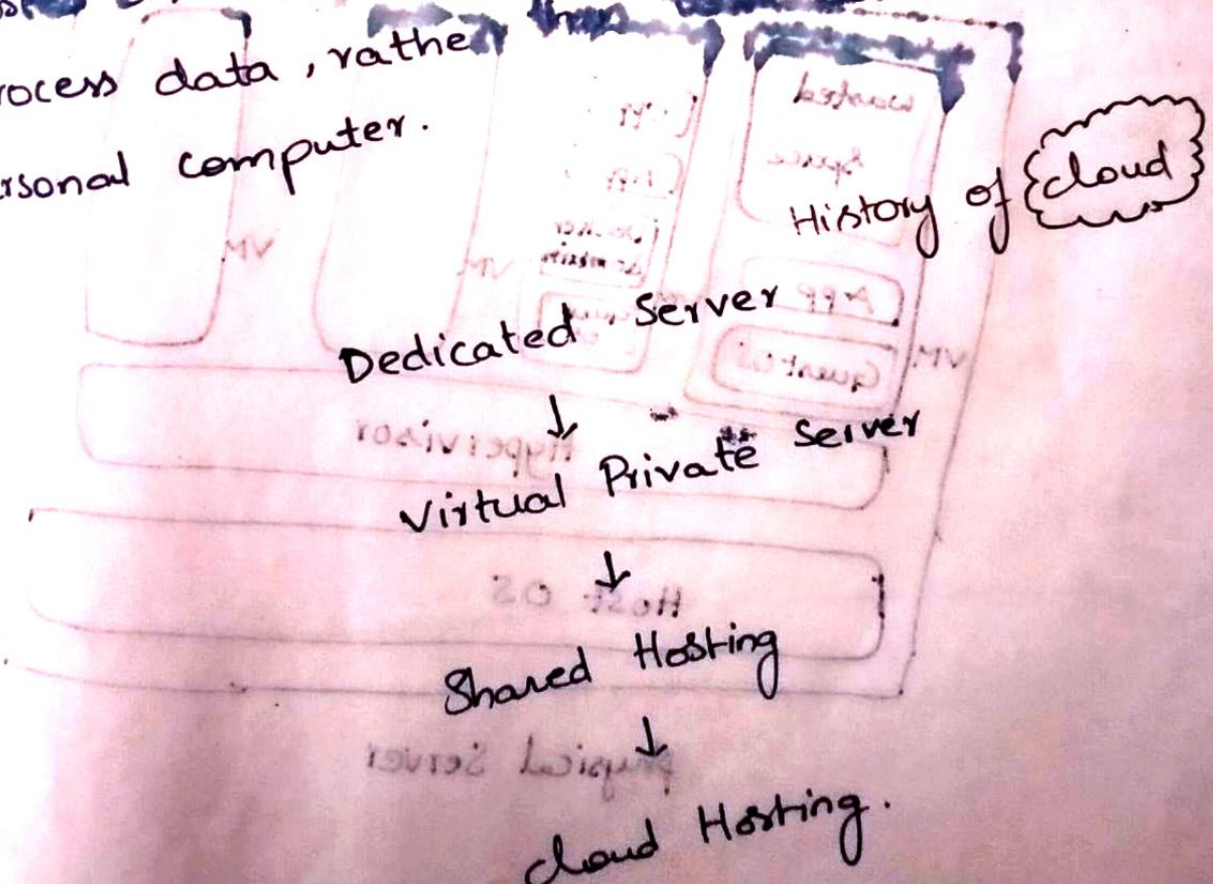
cloud :-

Cloud

* cloud concepts
* Security & compilance
* Technology
* Billing & pricing.

Cloud Computing :-

practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than on a local server or a personal computer.



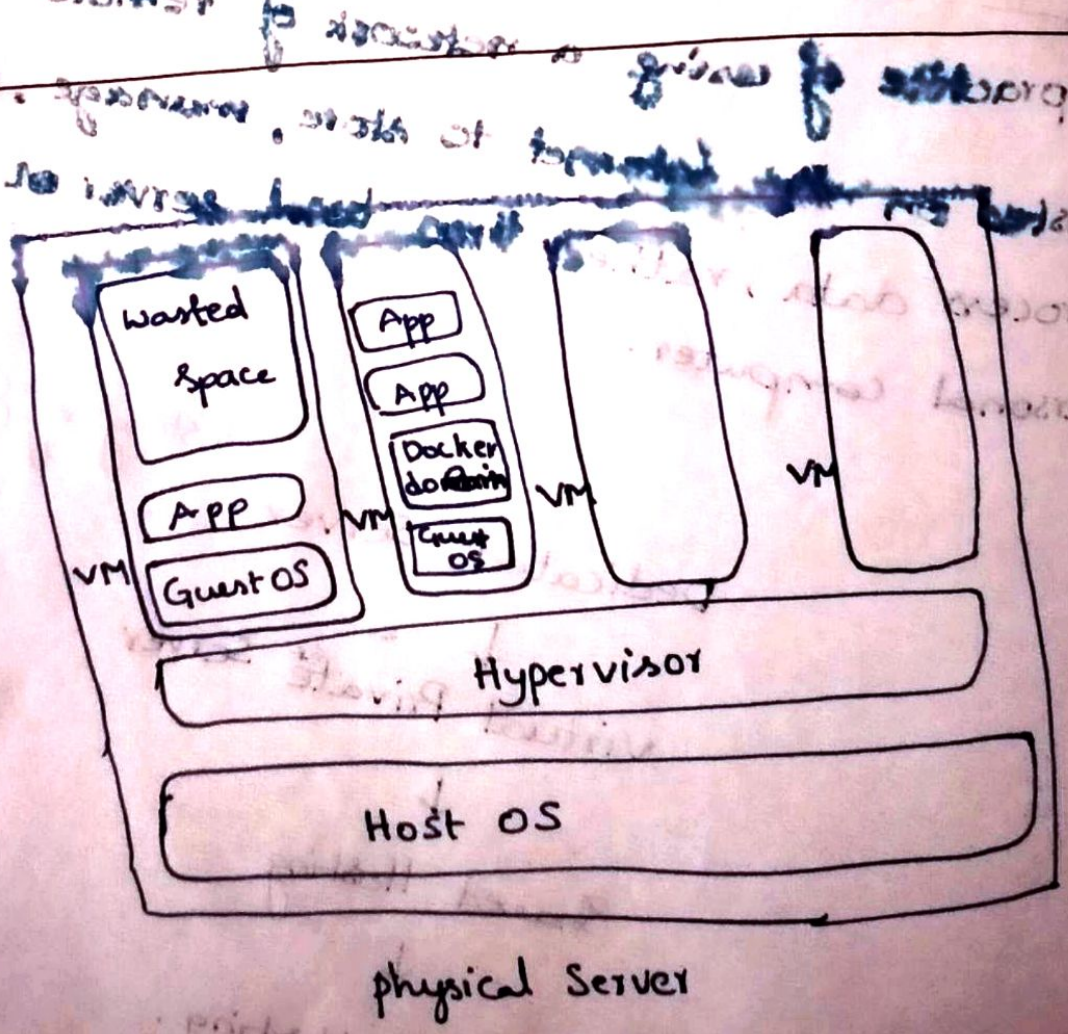
Cloud Service Provider :- (CSP)

company which

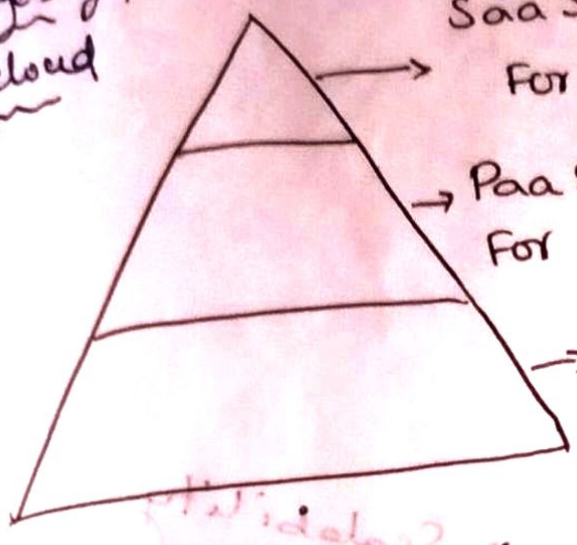
* provides multiple cloud services
* chained together to create architechtures etc, etc

Four core cloud Services :-

* Compute
* Networking
* Storage
* Data Bases



Layers of cloud :-



→ SaaS (Software as a Service)
For Customers (Gmail, Office 365, etc)

→ PaaS (platform)
For Developers (Heroku, etc)

→ IaaS (Infrastructure)
(AWS) For Admins

Cloud Computing Deployment Models :-

* Public Cloud
* Private Cloud
* Hybrid
* Cross-cloud

Evolution of Computing Power

↓

The throughput measured at which a computer can complete a computational task.

The Benefits of cloud :-

* Agility
* Pay as you go
* Economy of scale
* Global Reach
* Security
* Reliability
* High availability
* Scalability
* Elasticity.
* Fault Tolerance
* Disaster Recovery.

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* Benefit from massive economies of scale

* Stop guessing Capacity

* Increase speed & Agility

* Stop spending money on running & maintaining data centers

* Go Global in minutes.

AWS Global Infrastructure :-

: globally distributed hardware and datacenter physically networked together to act as one large resource for end customer.

Availability Zone :- Physical location made up of one or more datacenter

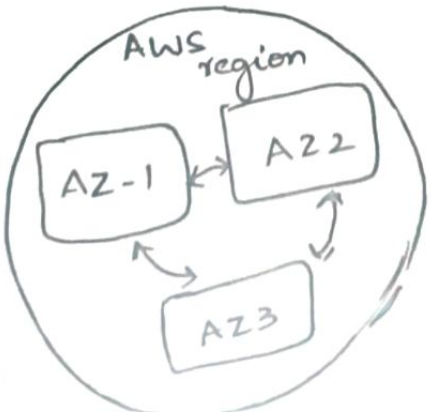
Each Region generally has 3 Availability zones.

High Availability → Common Practice to run workloads in atleast 3 AZs to ensure services remain available in case one or two datacenters fail.

Subnet is associated with an availability Zone

Never choose AZ,
always choose subnet associated with AZ.

AZs are interconnected with high bandwidth, low latency network (dedicated metro fibre)



AZs are within 100kms of each other)

Fault Domain :-

Section of a network vulnerable to damage if

: a particular device/system fails.

• can have fault domains inside fault domains

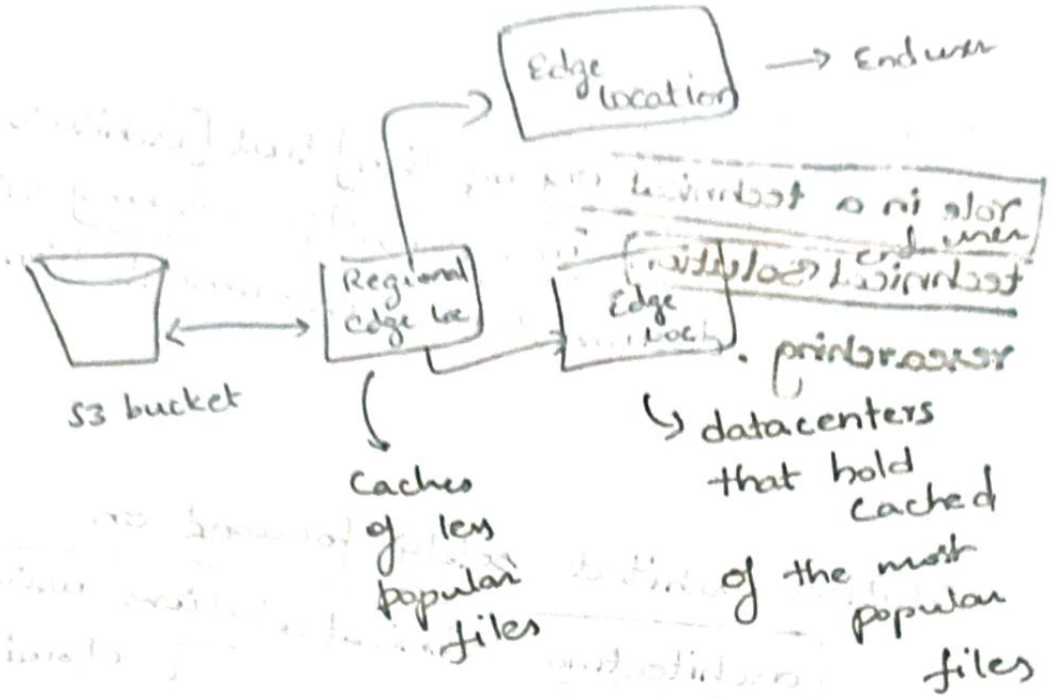
Fault level :- Collection of fault domains.

Each Amazon Region is designed to be completely isolated from other regions.

↳ Achieves greatest possible fault tolerance & stability

* Each AZ is isolated but the AZs in the region are connected through low-latency links.

* Each AZ is designed as an independent failure.



Combinedly called PoP (point of presence)

AWS direct Connect:

private/ dedicated connection b/w your datacenter/office and AWS

Direct Connect locations :-

trusted partnered datacenters that you can establish a dedicated high-speed connection to AWS.

Local zones :-

data centers located very close to a densely populated area to provide single-digit millisecond low latency performance.

Cloud Architecture Terminologies :-

Solutions Architect :-

Role in a technical organization that architects a technical solution using multiple systems via researching, documentation, experimentation.

Cloud Architect :-

Solutions architect solely focused on architecting technical solutions using cloud services

Considerations when designing cloud architecture:

Availability

Scalability

Disaster Recovery (Highly Durable)

Elasticity - Ability to shrink & grow

Fault Tolerance - Ability to prevent failure

(Security) How secure is the solution?

(Cost) How much is it going to cost?

High Availability :-

Ability for your service to be available.

* ensuring there is no single point of failure

* ensure a certain level of performance.

Solution:- Running your workload across multiple AZs.

Elastic Load Balancer :-

evenly distribute traffic to multiple servers.

If the ~~load balancer~~ server/datacenter becomes unavailable, load balancer will route traffic only to available servers.

High Scalability :- ability to Increase your capacity based on the increasing demand of traffic, memory and computing power.

Vertical Scaling :-

Scaling up

Upgrade to a bigger server

Horizontal Scaling :-

Scaling out

Add more servers of same size.

High elasticity:-

Ability: to increase/decrease your Capacity based on current demand of traffic, memory & computing power

Horizontal Scaling:-

Scaling Out: Add more servers

Scaling in: Remove under utilized servers

Auto Scaling Groups:- AWS feature that will automatically add or remove servers.

Highly Fault tolerant:-

Ability for your service to ensure there is no single point of failure.

Fail-overs:- plan to shift traffic to redundant system in case primary system fails.

RDS Multi-AZ:-

When you run a duplicate stand by database in another AZ in case your primary database fails.

High Durability:-
ability to recover from a disaster.

Solutions that recover from a disaster
↳ Disaster Recovery (DR).

* Do you have a backup?
* How fast can you restore backup?
* Does your backup still work?
* How do you ensure current live data isn't corrupt?

CloudEndure Disaster Recovery :-
Continuously replicates your machines into a low-cost staging area in your target AWS account and prefered region, enabling fast and reliable recovery in case of IT data center failures.

Business Continuty Plan (BCP) :-
document that outlines how a business will continue operating during an unplanned disruption in services

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Recovery Point Objective:-
maximum acceptable amount of data loss expressed in time

Recovery Time objective:-
maximum amount of downtime your business can tolerate.

Disaster Recovery Options:-

Back up & Restore

You back up your data and after the disaster, you restore it to new infrastructure.

RPO/RTO → Hours

Pilot light (RPO/RTO) → 10 mins

Data is replicated to another region with minimal services running.

warm standby (RPO/RTO) → Minutes

Scaled down copy of your infrastructure running ready to scale up.

Multi Site Active → Real Time

Scaled up copy of infrastructure in another region.

Cost increases from low end to high end.

Shared Responsibility Model

cloud security framework

↳ that defines security obligations of the customer versus the CSP

AWS Shared Responsibility model :-

customer :- Responsible for security "IN" the cloud.

AWS :- Responsible for security "OF" the cloud.

↳ Software :-
Compute, Storage, Database, Networking.

Hardware/Global Infrastructure :-
Regions, AZs, Edge Locations, Physical Security.

↳ Configuration of Managed Services or 3rd party Software Platforms, Applications, Identity & Access Management (IAM)

Configuration of virtual Infrastructure & Systems :-
OS, Network, Firewall.

Security Config of Data
Client Side Data Encryption, Server-side encryption,
Networking Traffic Protection, Customer Data.

AWS Application Programming Interface (API)

* An API is (software) that allows two applications to talk to each other.
* Most common type of API is via HTTP/s requests.
* AWS API is a HTTP API

AWS Management Console :-

web-based unified console.

Build, monitor & manage everything from simple web apps to complex cloud deployments.

Called "clickOps" since you can perform all your system operations via clicks.

Service Console :-

custom console for each service of AWS.

Simply search the service name to get the console.

AWS Account ID :-

Each AWS account has an unique ID

* Useful especially with

AWS Tools for Powershell :-

Powershell :- A command line shell and a scripting language

AWS Software Development KIT (SDK) :-

SDK → Collection of software development tools in one installable package.

* Can use AWS SDK to Programatically create, modify, delete or interact with AWS resources

* can be done with Java, Python, Ruby, etc, etc

Compute

EC2 Overview :- (Elastic Compute Cloud)

* Backbone of AWS

EC2 is a highly configurable server that allows you to launch VMs

* VM is an emulation of physical computer using software.

* Server virtualization allows you to easily create, copy, resize or migrate your server

* When we launch VM, we call it an instance.

Amazon Machine Image (AMI): predefined configuration for a VM

* The amount of CPUs
* The amount of Memory.
* The amount of Network Bandwidth etc, etc

Storage :-

Types of storage services :-

Elastic Block store (EBS) :-

Data is split into even-sized blocks.

Directly accessed by OS

when you need Virtual hard drive attached to VM.

AWS Elastic File storage :- (EFS)

File stored with data & metadata

Amazon Simple Storage Service (S3) - Object

Object stored with data, metadata & Unique IDs.

S3 Object → objects hold your data

S3 Bucket → buckets hold S3 objects.

Database :

data store that stores semi structered and structured data.

Relational databases & Non Relational.
↳ (SQL)

Databases have a rich set of functionality.

Key-value database (NOSQL)
↳ Due to their simple design, easy to scale.