

# Google Cloud

(~~Google~~ Google Cloud Platform (GCP) is a suite of cloud computing services that runs on the same infra. that Google uses internally for its end-user products such as Google Search, YouTube, Gmail, Drive etc.

GCP offers 4 main features →

- ~~compute~~ compute
- storage
- big data
- ML

Cloud Computing → Practice of using a network of remote servers hosted on the internet to store, manage and process data, rather than a local server or PC

It is the on-demand availability of computer resources, especially data storage & computing power w/o direct active management by the user

It is a way of using I.T. that has these 5 equally imp. traits

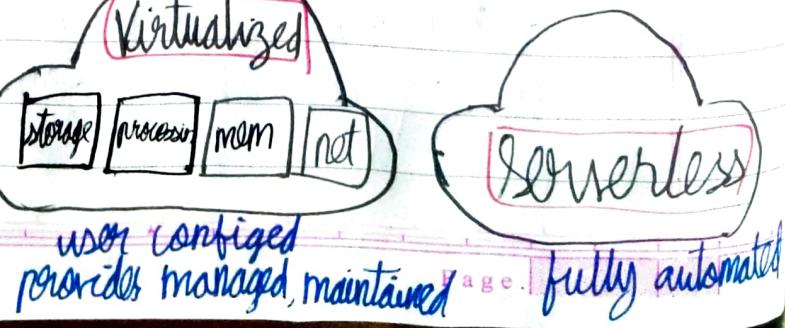
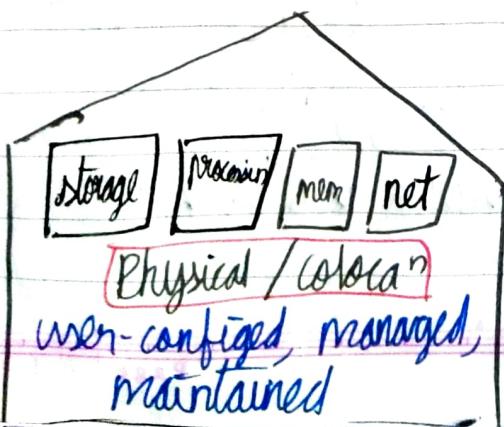
- ① ~~get~~ On demand self-service → We get computing resources on-demand & self-service. All you gotta do is use a simple interface to get it w/o any need for human intervention
  - processing power
  - storage
  - network

- ② ~~Broad net access~~ can access these resources over the ~~net~~ from anywhere you want
- ③ ~~The~~ Resource pooling → The provider of those resources has a big pool of them, and allocates them to customers outta that pool. Thus → providers get economies of scale by buying in bulk and; → these savings are passed onto customers

Customers go chill - customers don't have to know or care abt the exact physical loc<sup>n</sup> of those resources

- ④ ~~The~~ Rapid elasticity → Resources are elastic i.e. if you need more resources, you can get them rapidly. If you need less, you can scale back.
- ⑤ Pay as per measured service → Pay <sup>ONLY</sup> for what you use.

## History of Computing



user-configured  
provider-managed, maintained  
fully automated

## ① Physical / Colocation data centers

- (i) Instead of ~~buying~~ bldg costly capital intensive data IT companies (bunch of em) come together and rent spaces in shared facilities
- (ii)节省 capital for more flexib. uses as compared to real estate

## ② Virtualized data center

- (i) Comps. match the parts of a physical data center; servers, disks etc.
- (ii) But now there are virtual devices separately manageable from underlying hardware.
- (iii) Resources used  $\xrightarrow{\text{more}}$  efficiently  $\xrightarrow{\text{flexibly}}$ .
- (iv) You can still buy, house, maintain infra. but you still gotta guess how much hardware you'll need & when, settin it up and keepin it runnin

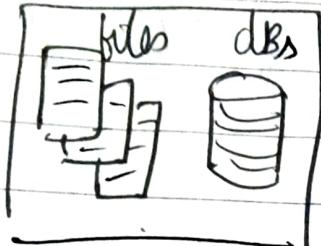
## ③ Cloud (~~serverless~~ GCP provides this in a serverless manner)

- (i) In internal cloud, services auto-provision and config the infra used to run familiar Google apps.
- (ii) Uses ~~cont~~ container (cnr) based architecture
- (iii) Provides wide variety of services (pre-configured) to manage & get data at large scale.

# Cloud Computing

Delivery Model for services like

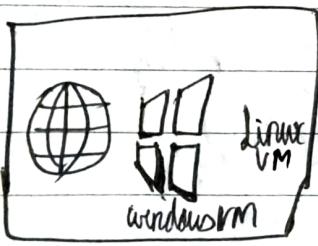
① Storage



unstructured or structured data  
in files or DBs  
Cloud delivers over 100s of  
services to do so.

Also stores all the services  
and tools need to migrate  
your data to the cloud.

② Compute Power



Windows, Linux VMs

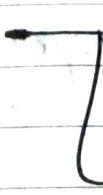
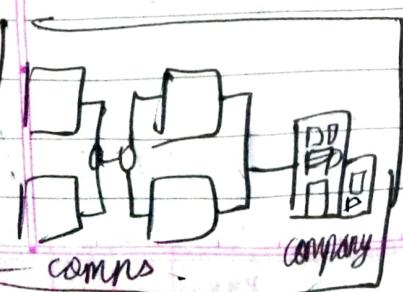
Any of 100s of services  
available in the cloud cuz  
cloud cuz cloud is all  
about creating apps → web

→ AI

→ ML

→ reports  
etc.

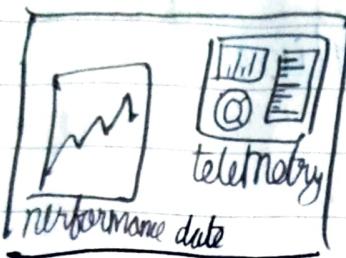
③ Network



Connect your components  
each other securely

Cloud delivers ~~is~~ a set of  
abilities to create secure  
networking b/w these comps,

## ④ Analytics



performance data

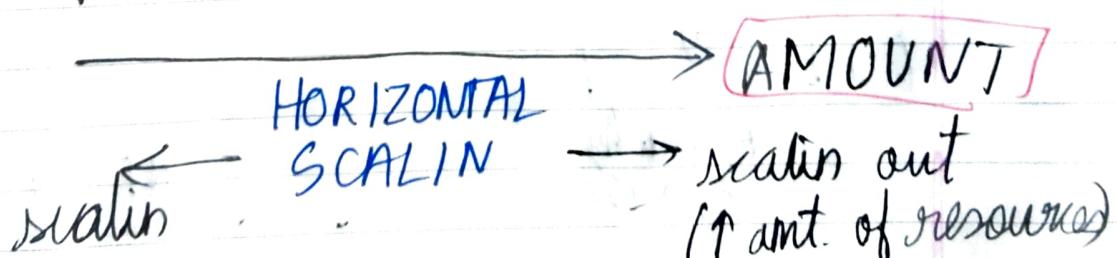
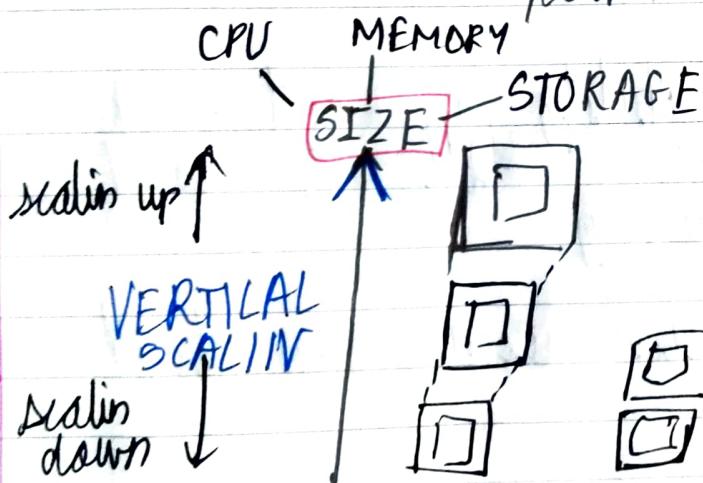
→ to review performance, telemetry data for your services so you can perform read. op's

These are the 4 MAIN services delivered by cloud computing over the internet

other characteristics Cloud Computing fulfills

① Scalability → Addin more power via

→ More CPU, mem, faster storage  
More no. of machines



Scaling → process of addin or removin resources

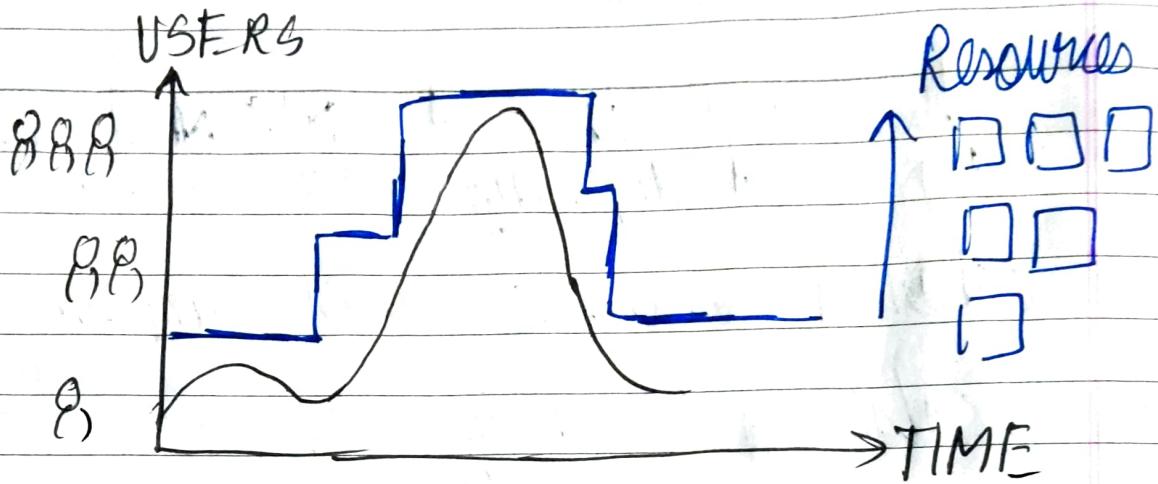
Eg:- RAM is 64 GB (size)

↑ No. of 8 GB RAM devices to 8 (horiz.)

size  
vertical  
amt. of instances of the resource  
horiz.

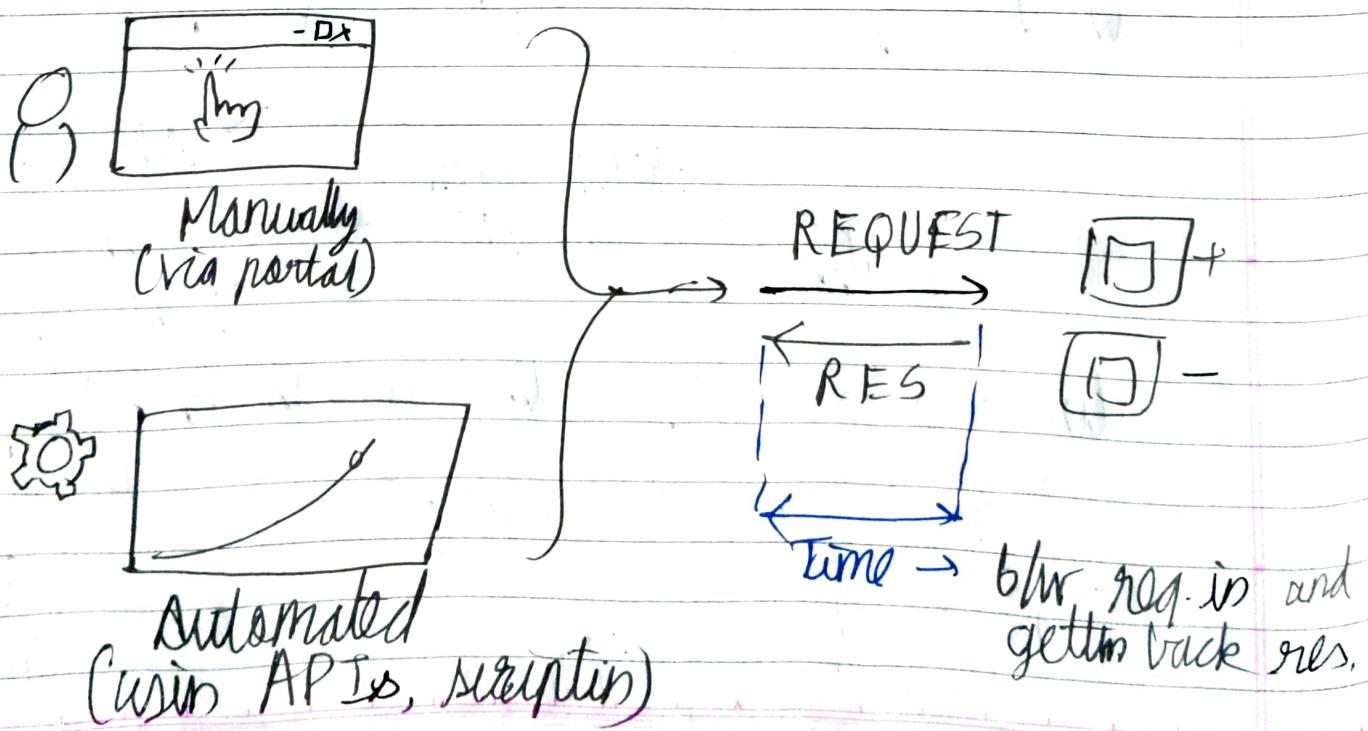
② Elasticity :- dynamic allocation/removal of resources as reqd.  
aka auto-scaling

e.g. - adding/removing resources as user workload for that day changes.



③ Agility → The ability to react quickly i.e. ability to allocate & deallocate (scale) resources quickly!

NOTE: 2 ways to provision resources in cloud



blw req. in and gettin back res.

CloudvsOn-PremiseSee  
Mth  
hr

day

week

month

Cloud responds with the resource you req'd very fast  
∴ It is agile

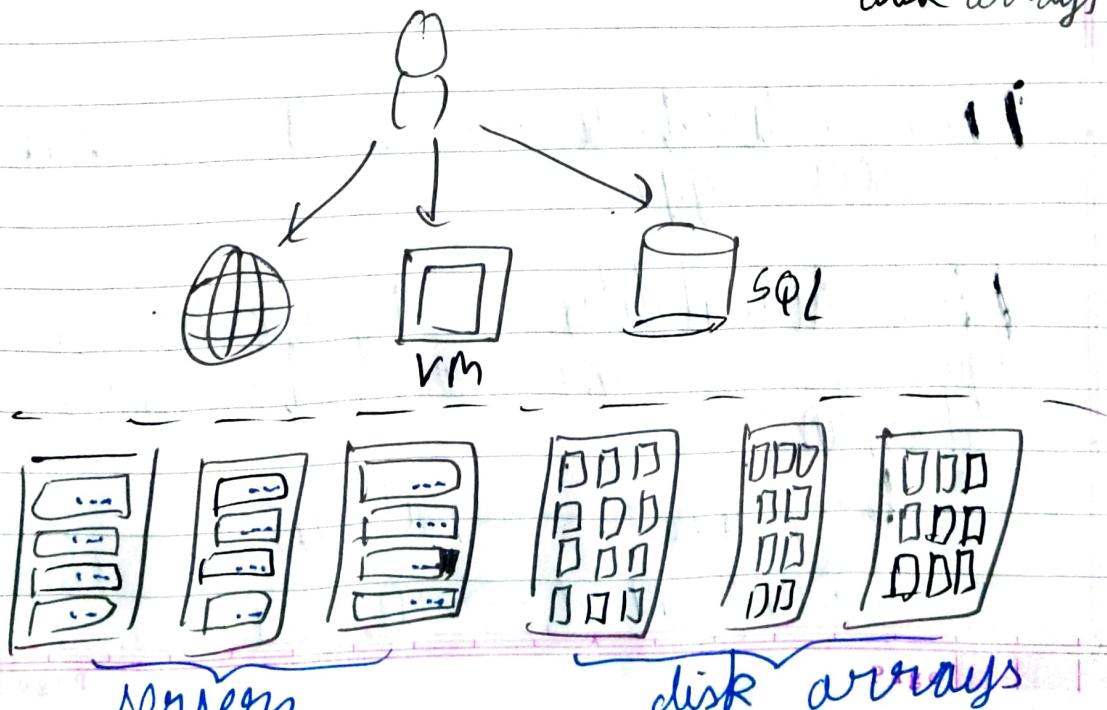
(4)

Fault Tolerance → Whenever there is any service or comp. failures on servers or when your data in disk array crashes → you get immediately assigned another one. s.t. ~~Pattern~~ no data is lost.

Fault tolerance → ability of sys to remain up & running during comp & service failures.

NOTE : Whenever you purchase a web app, VM or SQL db from a service, regardless of the service or you choose or interface you work with, ~~you~~ under the hood services run on  servers (do computers)

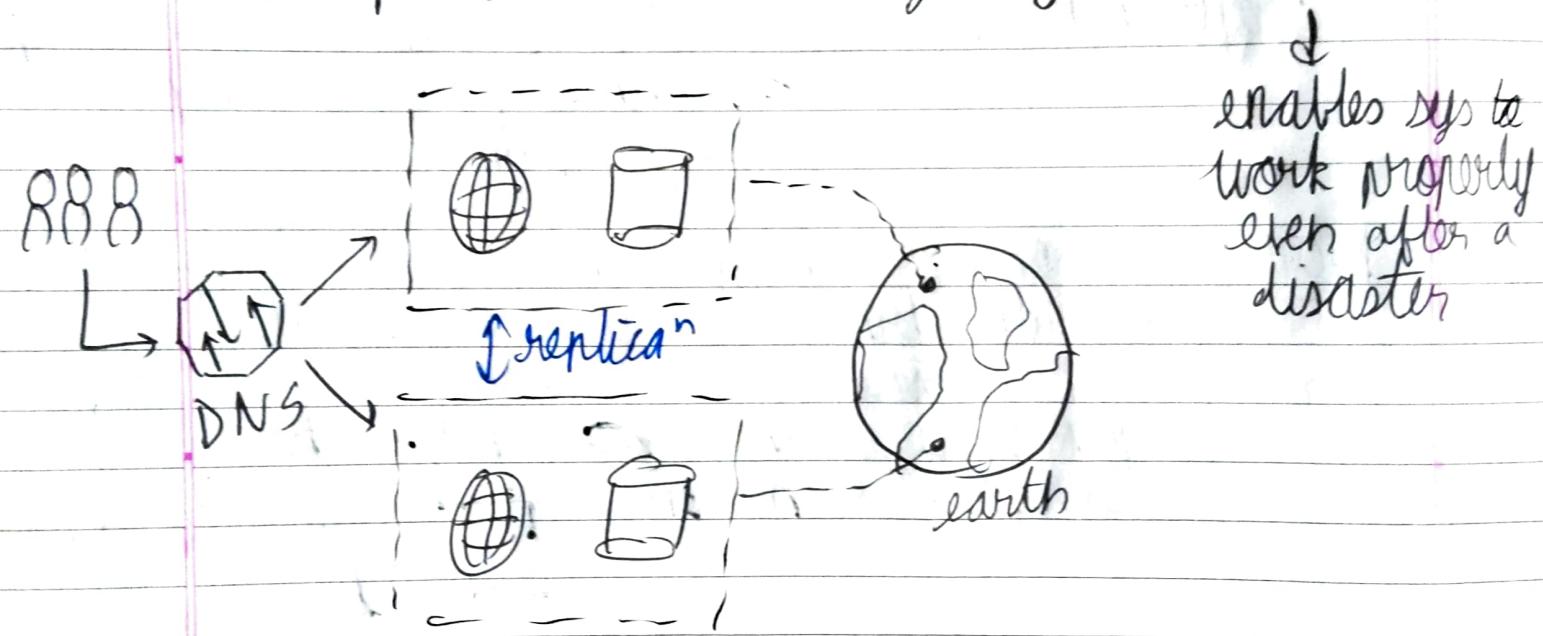
 disk arrays (store data)



Localized failures do not interrupt your service  
 as most of the time in the cloud all  
 the services have circuit ~~seg~~ fault-tolerance  
 sys (immune to localized failures)

- ⑤ Disaster → Failure of a v. big slab  
 Recovery → disrupt of services caused by natural  
 or human-induced causes  
 e.g. - power grid failures, storms.

Setup disaster recovery by "replica"



DNS redirects users to the working version of your app.

- ⑥ High Availability → Metric that measures uptime (sys being accessible to users) vs  
downtime
- planned → patching  
 → unplanned → sys. failures

(alt)

availability - calc of uptime wrt a specific time period e.g. 1 yr, lifetime of service

uptime  
uptime + downtime

Dependin upon client you calc alt per yr / month / day.

Alt.	Year
99%	3.65 days
99.9%	8.77 hrs
99.99%	52.6 mins

Alt → measure of uptime for users / services

High alt → ability of sys to keep services running for extended period of time with r. lit downtime.

⑦

⑥ Global Reach

Ability to reach audiences around the globe.



more customer base for your app.

Cloud services can have a presence in various regions across the globe, which your customer can access, giving you a presence in those regions even tho you may not have any infra in that region

⑧

Customer latency caps. → Cloud services hve the ability to deploy resources in datacenters around the globe which addresses any customer latency issues

## Cloud services

~~Cloud~~ gives amazing latencies to services to react to cust ac's when the service are local to the cust.

Modern optic fibres + local service → faster than cloud.

(9)

Predictive cost consider'n → The ability for users to predict costs that they'll incur for a particular cloud service.

i) Cost for indiv services are made avail. and tools are provided to predict cost

ii) can perform analysis based on planned growth.

(10)

Technical skill reqmts & consider'n → A user can be an expert in the app they wanna run w/o requiring skills to build & maintain underlying hardware & software for workloads (as cloud provides it all) infra

(11)

↑ Productivity →

i) On prem. data centers require →

hardware setup,  
aka "racking & stacking"  
software patching

ii) Cloud Computing (CC) elims.

need for many of these tasks, allowing IT teams to spend time focussin

other time-consumin IT management chores

on achievin more imp business goals

(12)

Security → Cloud providers (CPs) offer a broad set of policies, tools, controls, expert tech skills → provide better security than most orgs.

- We get strengthened security to protect

- 1) data
- 2) apps
- 3) infra

} protected against potential threats