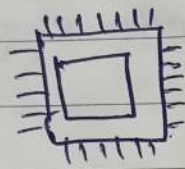# Cloud Computing
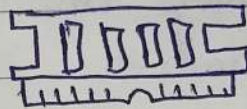
① **Compute** : CPU (CPU will do calculation and
                          conclude the results)

② **Memory** : RAM (Very fast memory which will
      allow us to store and retrieve info
      quickly).



CPU   +   RAM   = Brain

③ **Storage** : Data
   we use database to store data in structured
   way

④ **Network** : Routers , switch , DNS server
      (ntg but cables, routers & servers connected
       with each other).

⑧ * **Routers** :- A networking device that
   forwards data packets between computer
   networks. They know where to send your
   packets on the internet.

Switch :- Takes a packet & send it to the correct server / client on your network.
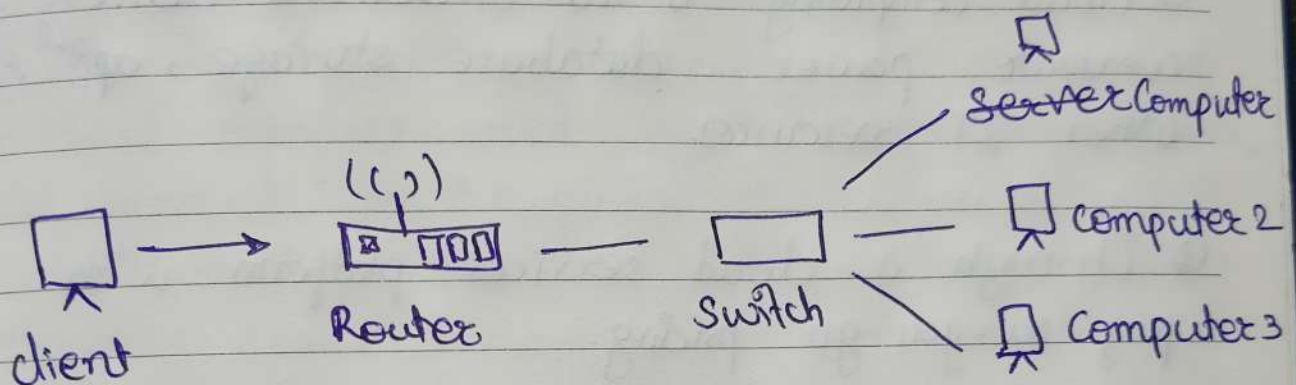
Problems with Traditional IT Approach

① Pay for the rent for the data center
② Pay for power supply, cooling, maintenance
③ Adding & replacing hardware takes time
④ Scaling is limited
⑤ Hire 24/7 team to monitor the infrastructure
⑥ How to deal with disasters? (earthquake, power shutdown, etc.)
⑦

S1ⁿ :- Cloud

What is Cloud Computing?

① Cloud computing is the on demand delivery of compute power, database storage, appl^n & other IT resources.

② Through a cloud services platform with pay - as -you -go pricing.

③ You can provision exactly the right type & size of computing resources you need.

④ You can access as many resources as you need, almost instanly.

⑤ Simple way to access to servers, storage, databases & a set of application services.

⑥ Amazon web services (AWS) owns and maintains the network - connected hardware required for these applications services, while you provision & use what you need via web application.

The Deployment Models of the Cloud

① **Privite cloud** :- (Providers:- rockspace)

→ Cloud services used by a single organization, not exposed to the public.

→ Comple control
→ Security for sensitive applⁿs.
→ Meet specific business needs.

② **Public Cloud** :- [Providers :→ Microsoft Azure,
                                    Google Cloud,
                                    AWS]

→ Public cloud resources owned & operated by third-party cloud service provider delivered over the internet.

③ **Hybrid Cloud** :-

→ keep Some servers on premises & extend some appl's capabilites to the cloud.
→ Control over sensitive assets in your private inprastructure.

→ flexibility & cost-effectiveness of the public cloud.

* <mark>The 5 Characteristics of Cloud Computing:→</mark>

① On-demand self service
② Broad Network Access
③ Multi-tenancy & resource Pooling
④ ~~Rad~~ Rapid Elasticity & scalability
⑤ Measured service

<mark>Six Advantages of Cloud Computing :→</mark>

① Trade Capital expense (CAPEX) for operational expense (OPEX)
   → Pay on demand: don't own infrastructured.
   → Reduced total cost of ownership (TCO) & operational Expense (OPEX).

② Benefit from massive economics scale.
   → Prices are reduced as AWS is more efficient due to large scale.

③ Stop guessing capacity :-
→ scale based on actual measured usage.

④ Increase speed & agility

⑤ Stop spending money running & maintaining data centers.

⑥ Go global in minutes: leverage the AWS infrastructure.

Types of Cloud Computing :→

① Infrasture as a service (Iaas) :- [EC2]
→ Provide building blocks of cloud IT
→ Provides networking, computers, data storage, etc
→ Highest level of flexibility.
→ Easy parallel with traditional on-premises IT.

② Platform as a service (Paas) :-
→ Removes the need for your organization to manage the underlying infrastructure.
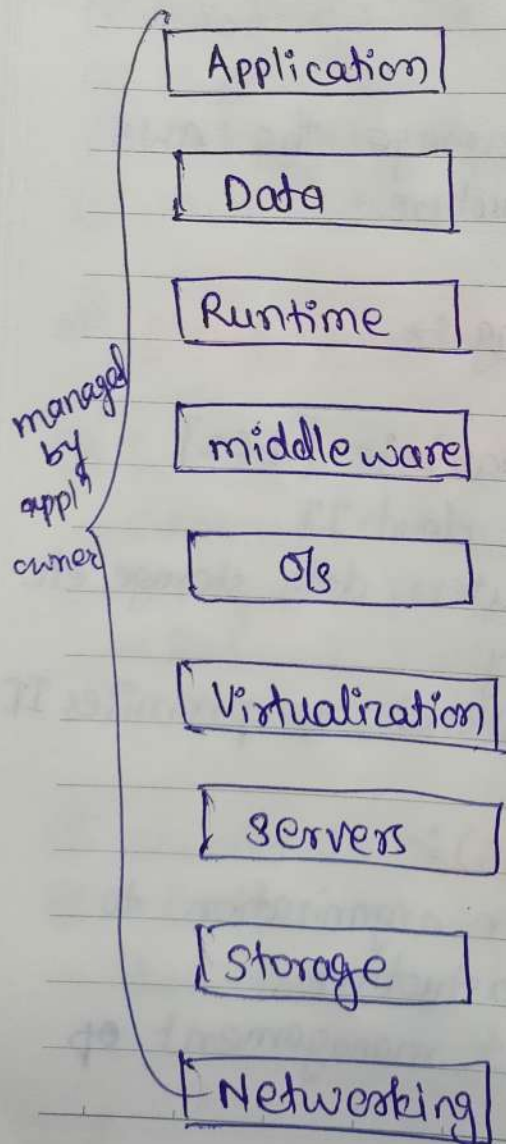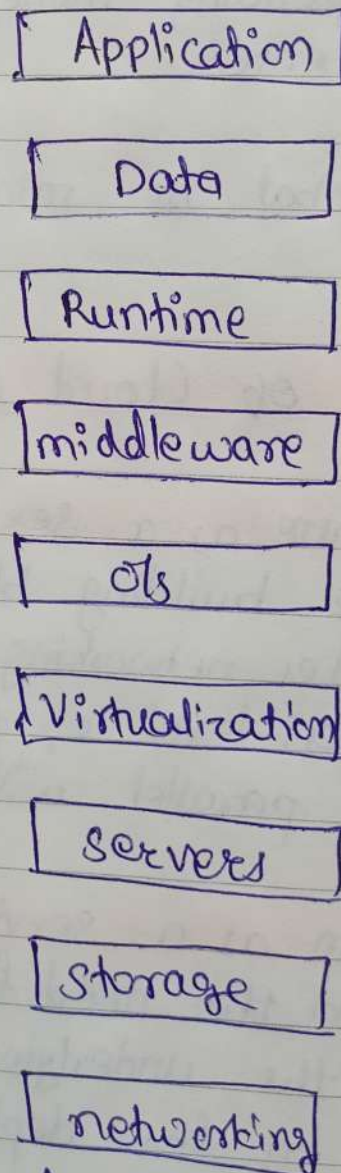→ Focus on the deployment & management of your applications.

③ <mark>Software as a Service (SaaS)</mark> :-
→ completed product that is run & managed
✷ by the service provider.

On - Premises   IaaS (EC2)

```
                                    ┌──────────────┐
                                    │ Application  │
     ┌──────────────┐               └──────────────┘
     │ Application  │
     └──────────────┘               ┌──────────────┐
                                    │    Data      │
     ┌──────────────┐               └──────────────┘
     │    Data      │
     └──────────────┘               ┌──────────────┐
                                    │   Runtime    │
     ┌──────────────┐               └──────────────┘
     │   Runtime    │
     └──────────────┘               ┌──────────────┐
                                    │ middleware   │
     ┌──────────────┐               └──────────────┘
     │ middleware   │
     └──────────────┘               ┌──────────────┐
                                    │     OS       │
     ┌──────────────┐               └──────────────┘
     │     OS       │
     └──────────────┘               ┌──────────────┐
                                    │Virtualization│
     ┌──────────────┐               └──────────────┘
     │Virtualization│
     └──────────────┘               ┌──────────────┐
                                    │   Servers    │
     ┌──────────────┐               └──────────────┘
     │   Servers    │
     └──────────────┘               ┌──────────────┐
                                    │   Storage    │
     ┌──────────────┐               └──────────────┘
     │   Storage    │
     └──────────────┘               ┌──────────────┐
                                    │  networking  │
     ┌──────────────┐               └──────────────┘
     │  Networking  │
     └──────────────┘
```

managed by appl owner

} AWS

GCP, Azure, Rackspace, Digital ocean, Linode provider

PaaS (Elastick   Saas [Recognition for
        Beanstalk)   ML]

| Application | | Application |

| Data | | Data |
                         | Runtime |
| Runtime | | middleware |

| middleware | | o|s |

| o|s | | Virtualization |

| Virtualizatio | | Servers |

| Servers | | Storage |

| storage | | Networking |

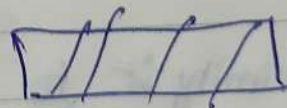| networking | | // |

        managed by   Managed
      AWS   by
                             AWS

[Heroku, Google app engine
(GCP), windows azure
(Microsoft) provides this
    services]

[Google apps (GMail),
  Dropbox, Zoom]

Pricing of the Cloud

★ AWs has three pricing fundamentals, following the Pay-as-you-go pricing model.

① Compute:- Pay for compute time.

② Storage :- Pay for data stored in the cloud.

③ Data transfer OUT for the Cloud:-
Data transfer IN is free.

How To choose an AWs Region ?

① Compliance:- with data governance & legal req.
data never leaves a region without explicit permission.

② Proximity to customers :- reduced latency.

③ Available services within a Region: new services and new features aren't available in every region.

④ Pricing:- pricing varies region to region & is transparent in the service pricing page

AWS Availability Zone :→

→ Each region has many availability zones.
 (usually 3, min is 3, max is 6)
 ex :-

      ap - southeast - 2a
      ap - southeast → 2b
      ap - southeast - 2c

→ Each availability zone (AZ) is one or more
 discrete data centers with reductant power,
 networking & connectivity.

→ They are seperate from each other, so that
 they are isolated from disasters.

→ They are connected with high bandwidth,
 ultra-low latency networking.

EC2 is a regional Service
IAM is a global service (encompasses all regions)

AWS Points of Presence (Edge locations)

→ Amazon has 400+ points of presence
(400+ edge locations & 10+ Regional catches)
in 90+ cities across 40+ countries.

* The AWS acceptable Use Policy describes
prohibited uses of the web services offered by
AWS.