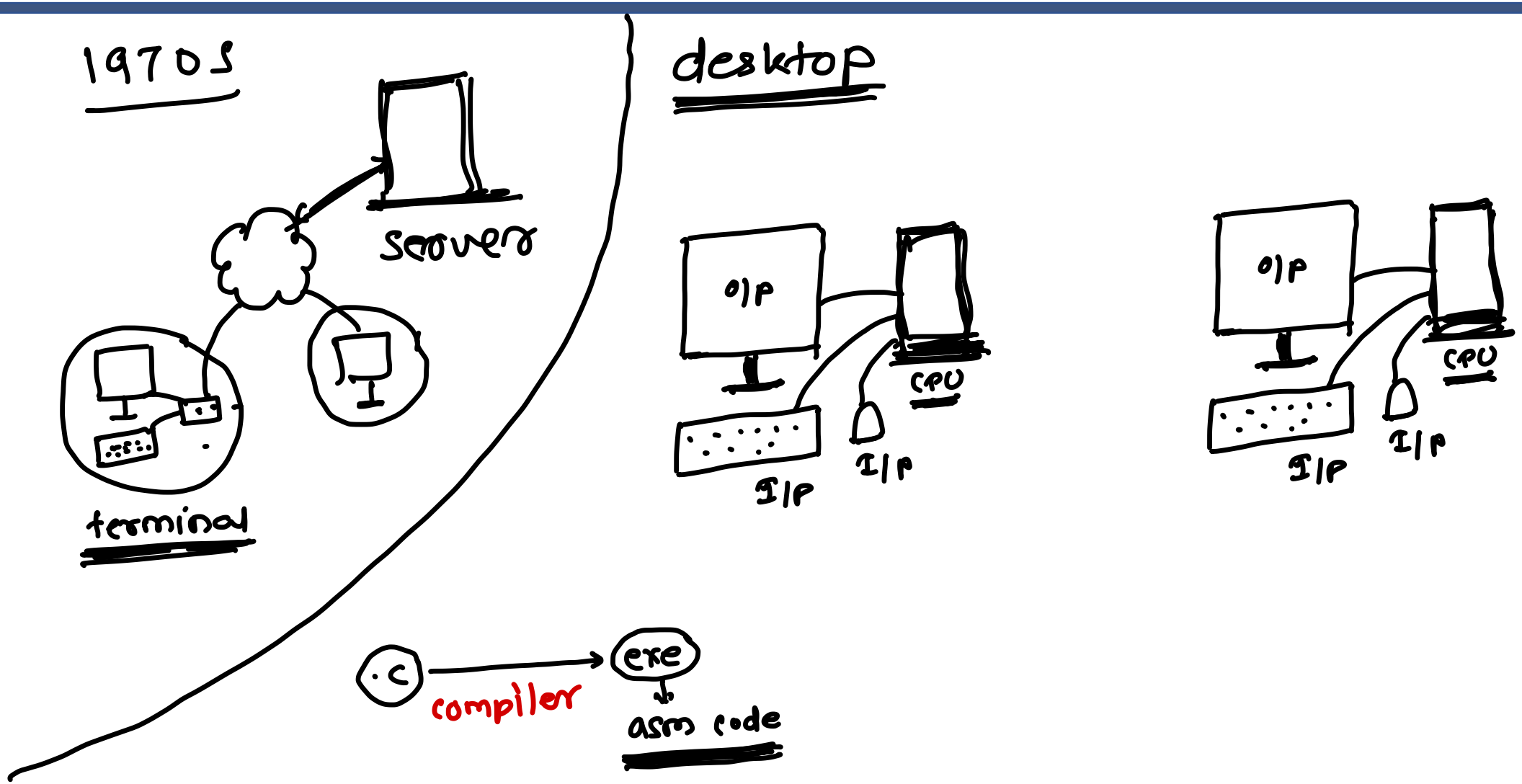
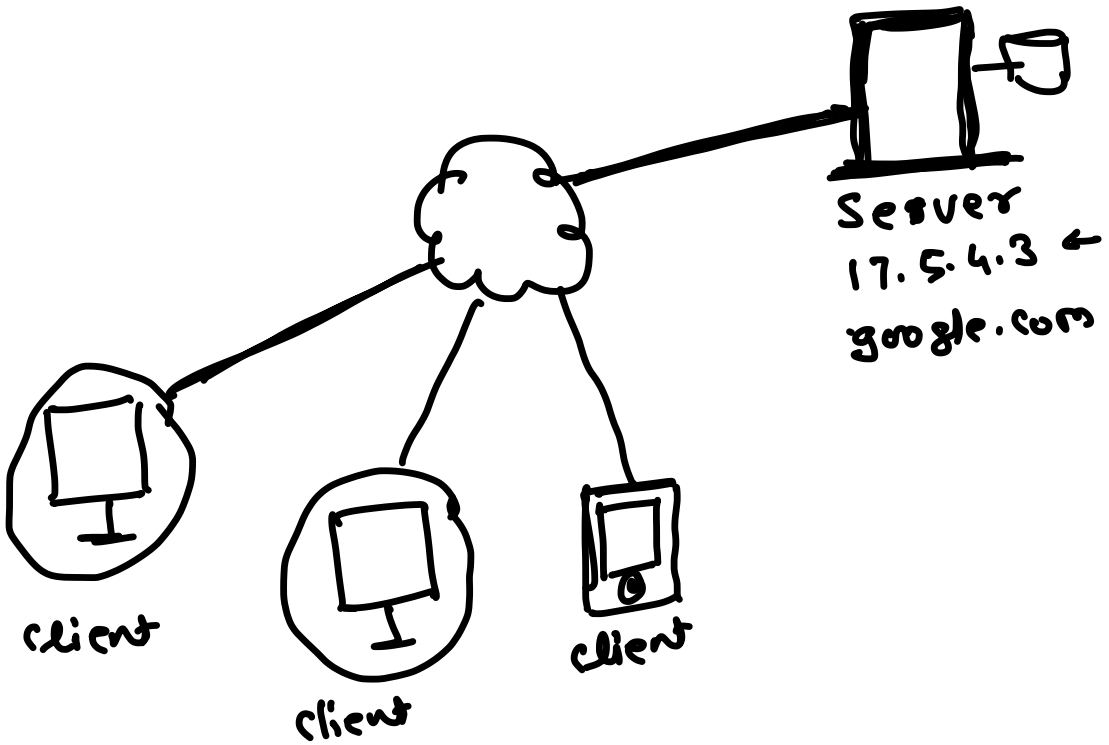
Cloud Computing

Computing Models

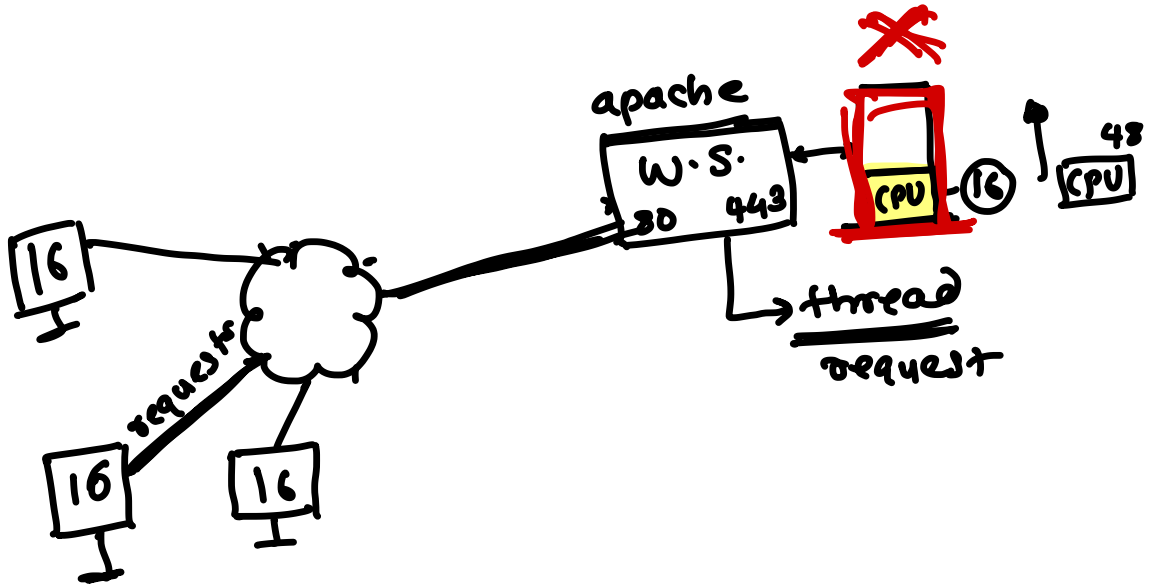
- Desktop Computing
- Client-Server Computing
- Cluster Computing
- Grid Computing
- Cloud Computing


1970s
server
terminal
desktop
o/p
CPU
I/P
I/P
o/p
CPU
I/P
I/P
.c
compiler
exe
asm code

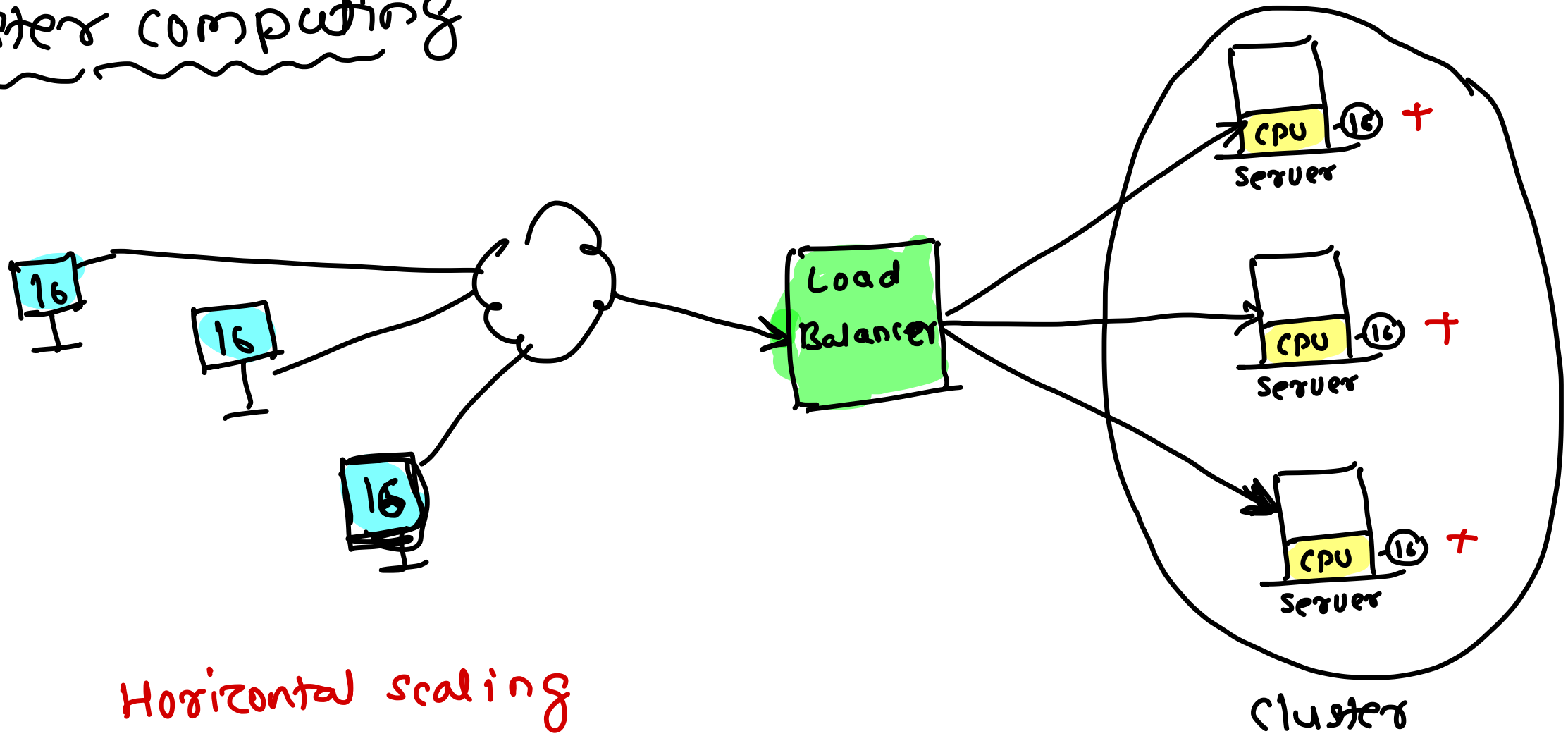
Client-Server computer



Vertical scaling

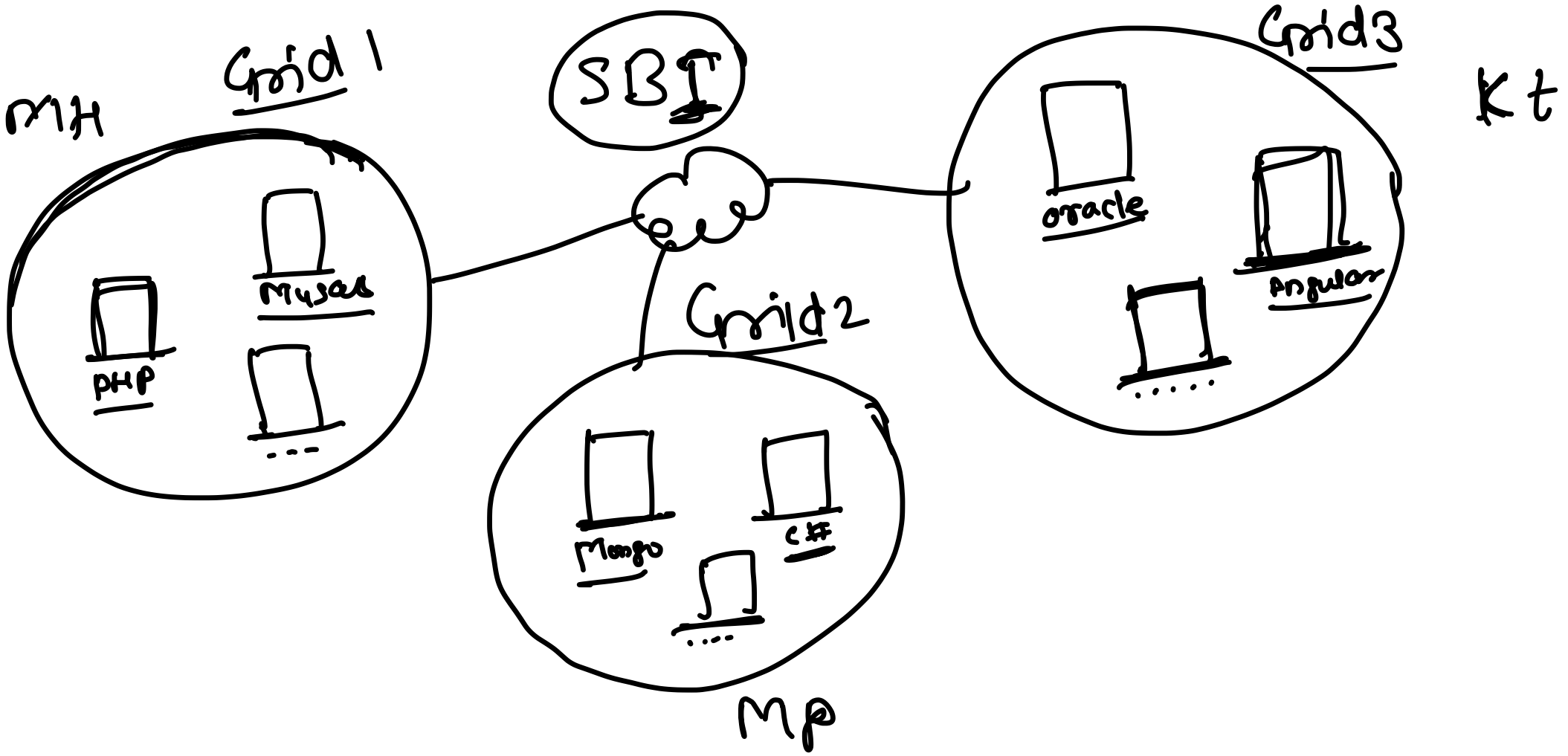


Cluster computing



Horizontal scaling

Grid Computing



What is Cloud ?

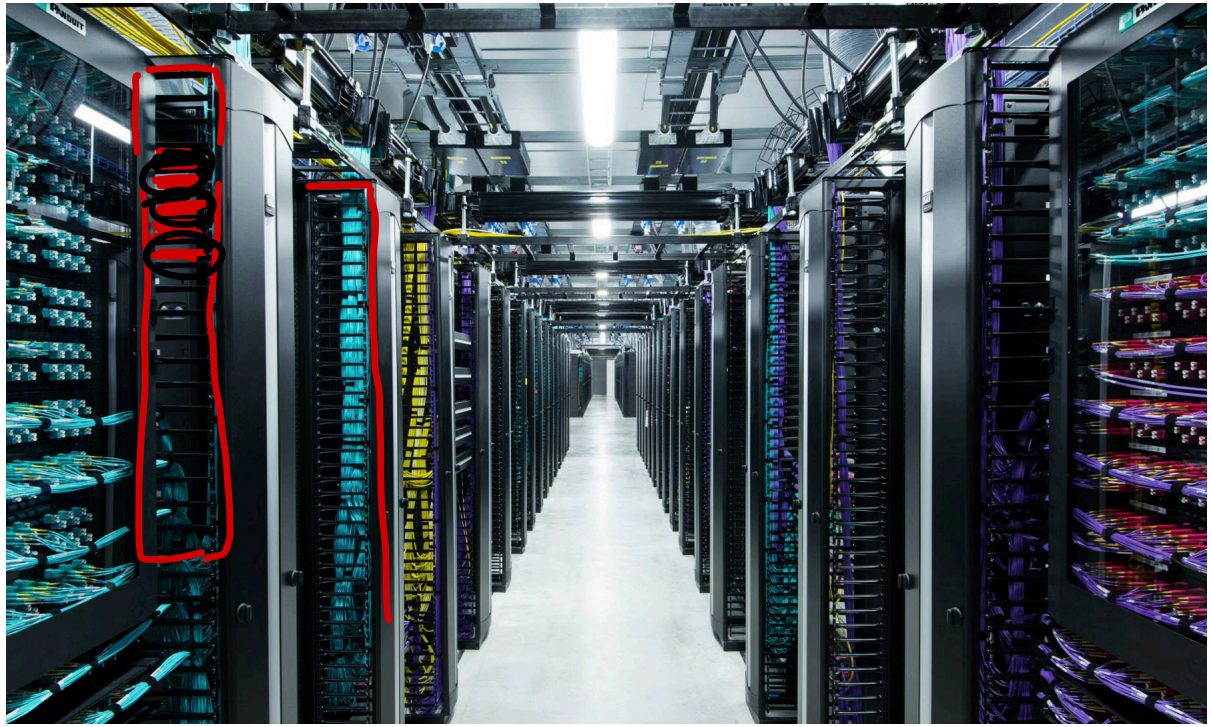
- The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer.
- Is the delivery of on-demand computing resources – everything from data centers over the internet on a pay for use basis
- Cloud computing is an umbrella term used to refer to Internet based development and services
- In addition, the platform provides on demand services, that are always on, anywhere, anytime and any place.
- Pay for use and as needed, elastic
  - scale up and down in capacity and functionalities
- The hardware and software services are available to
  - general public, enterprises, corporations and businesses markets etc

Data Center

- Where your IT devices and applications are located
- For a non-technical person it is the cloud where the user's files/data is stored
- Components
  - Servers (compute)
  - Security
  - WAN
  - Storage
  - File Sharing

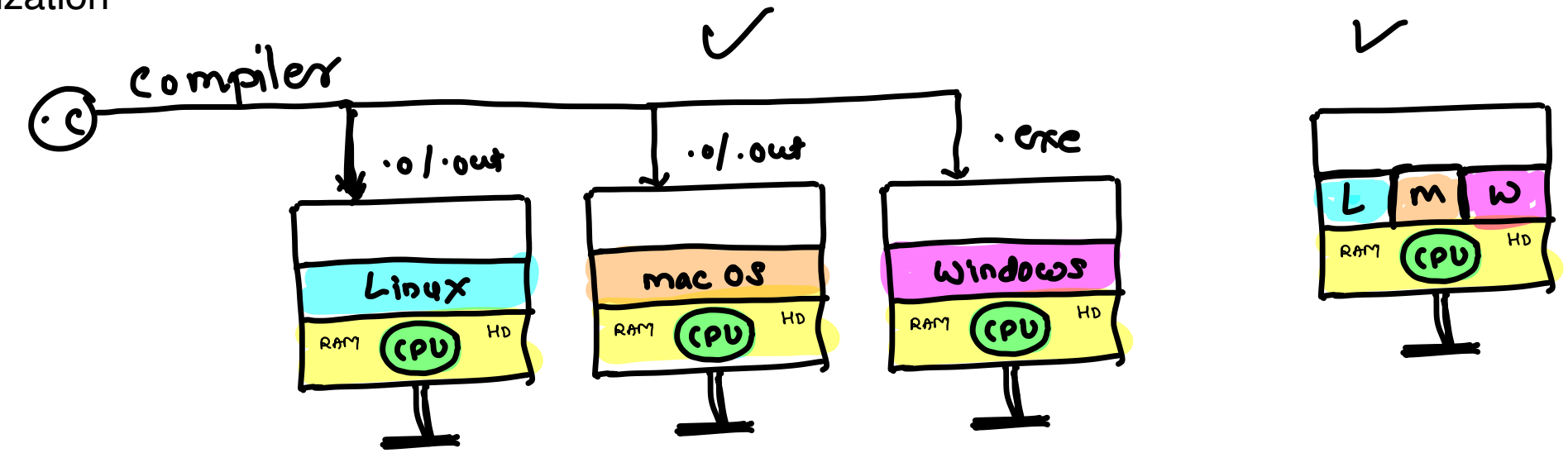
AWS

Rack Server
- 120 Cores
- 128 TB - HD
- 64 TB - RAM



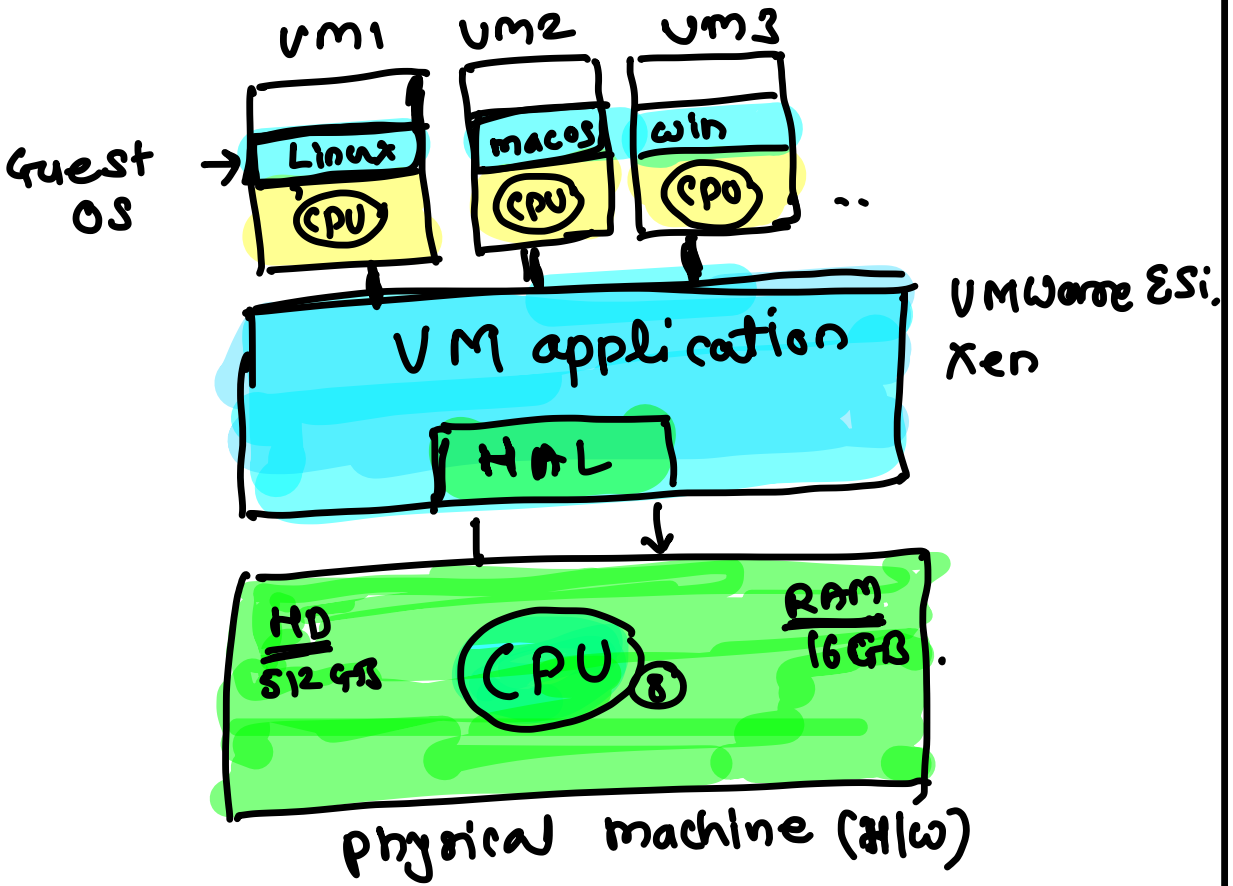
Virtualization

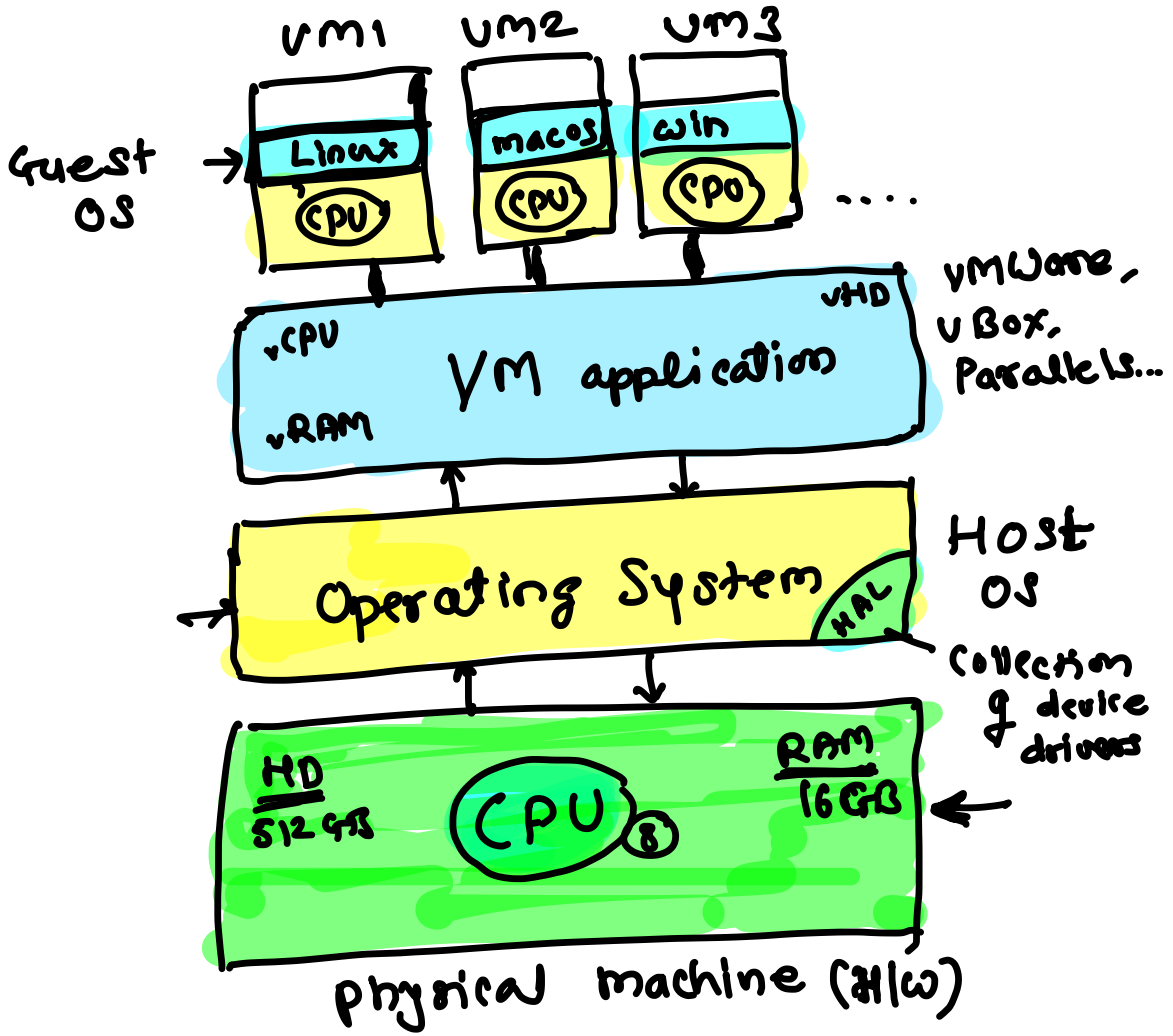
- Refers to the act of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, storage devices, and computer network resources
- Types
  - Virtualization using VM
    - Type – I
    - Type – II
  - Containerization



type I - cloud providers

type II - developers, testers . .

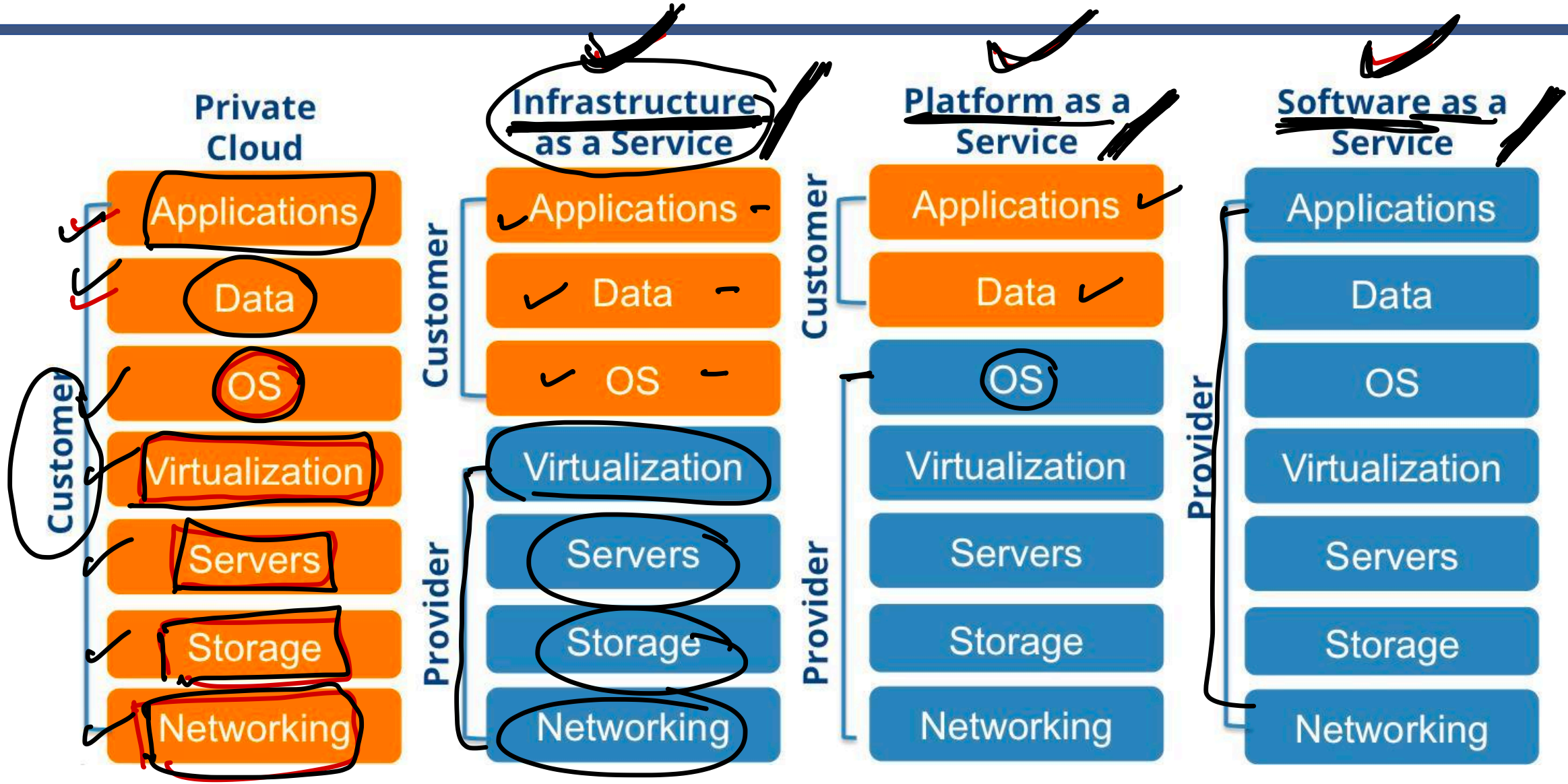




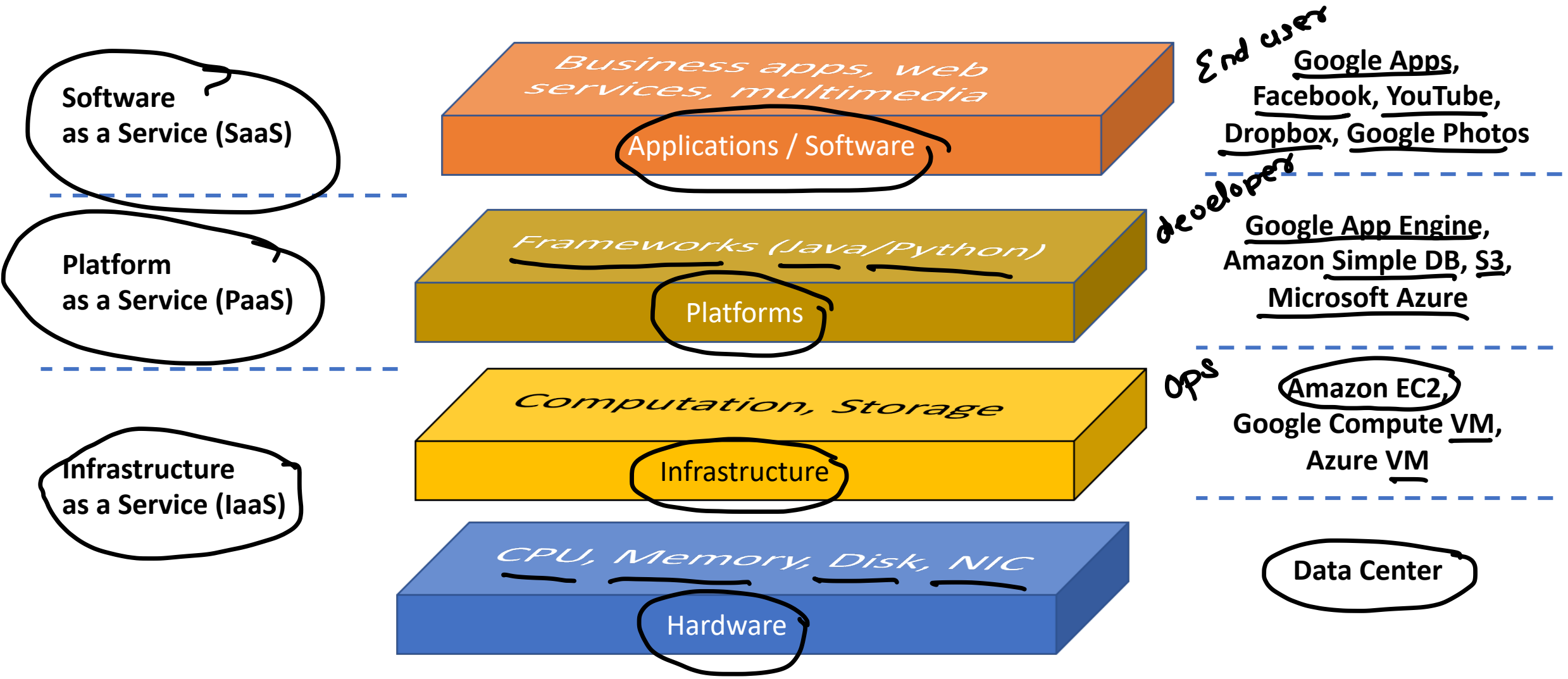
Cloud Computing Characteristics

- **On-demand self-service**
  - A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider
- **Broad network access**
  - Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms
- **Resource pooling**
  - The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand
- **Rapid elasticity**
  - Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand
- **Measured service**
  - Resource usage can be monitored, controlled and reported, providing transparency for the provider and consumer

Service Models

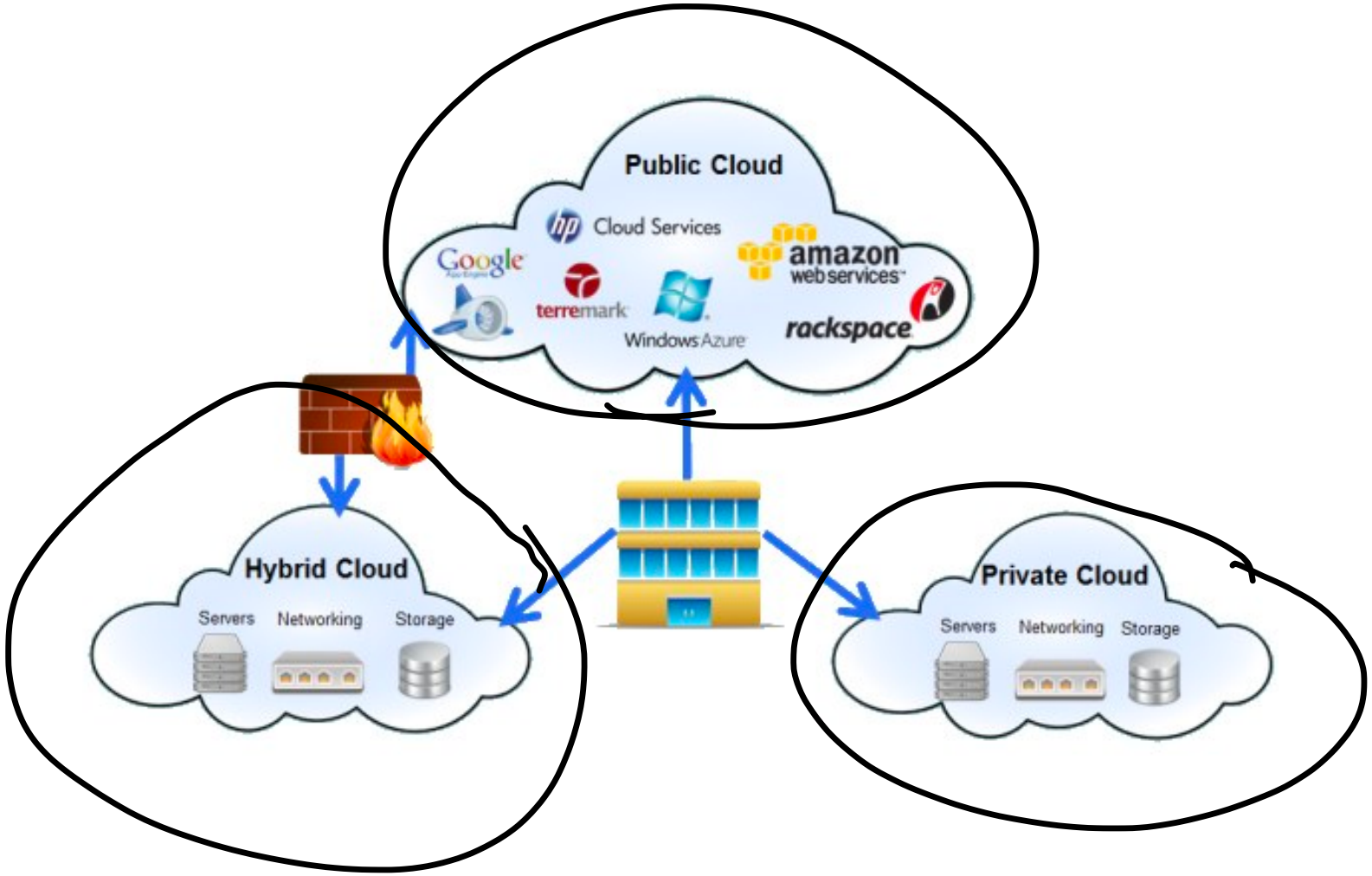


Service Models



Deployment models

- Private Cloud
- Public Cloud
- Hybrid Cloud



Cloud Services

- Compute: used to create the Virtual Machine (CPU) : EC2
- Storage: used to provide the storage : S3
- Database: RDBMS + No SQL : RDS
- Security and Identity Management : IAM
- Media Services : Streaming
- Machine Learning :
- Cost Management
- Application Integration

Advantages

- Lower computer costs
- Improved performance
- Reduced software costs
- Instant software updates
- Improved document format compatibility
- Unlimited storage capacity
- Increased data reliability
- Universal document access
- Latest version availability

Disadvantages

- Requires a constant Internet connection
- Does not work well with low-speed connections
- Features might be limited
- Stored data might not be secure
- Stored data can be lost
- Each cloud systems uses different protocols and different APIs

Cloud Vendors

- AWS ✓
- Google Compute ✓
- Azure ✓
- Others
  - Rackspace ✓
  - digital Ocean
  - Linode