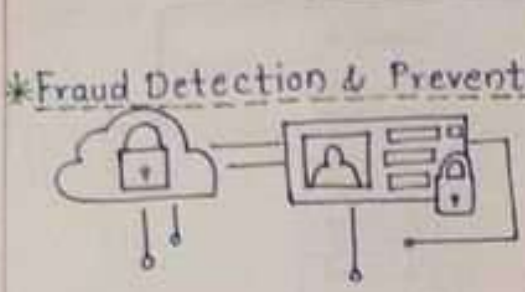
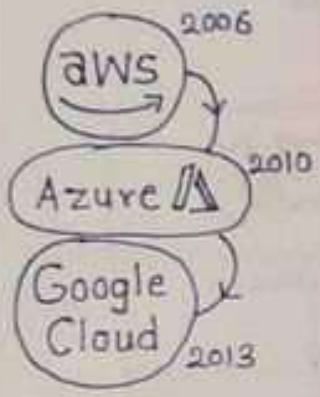
Cloud Computing Tutorial

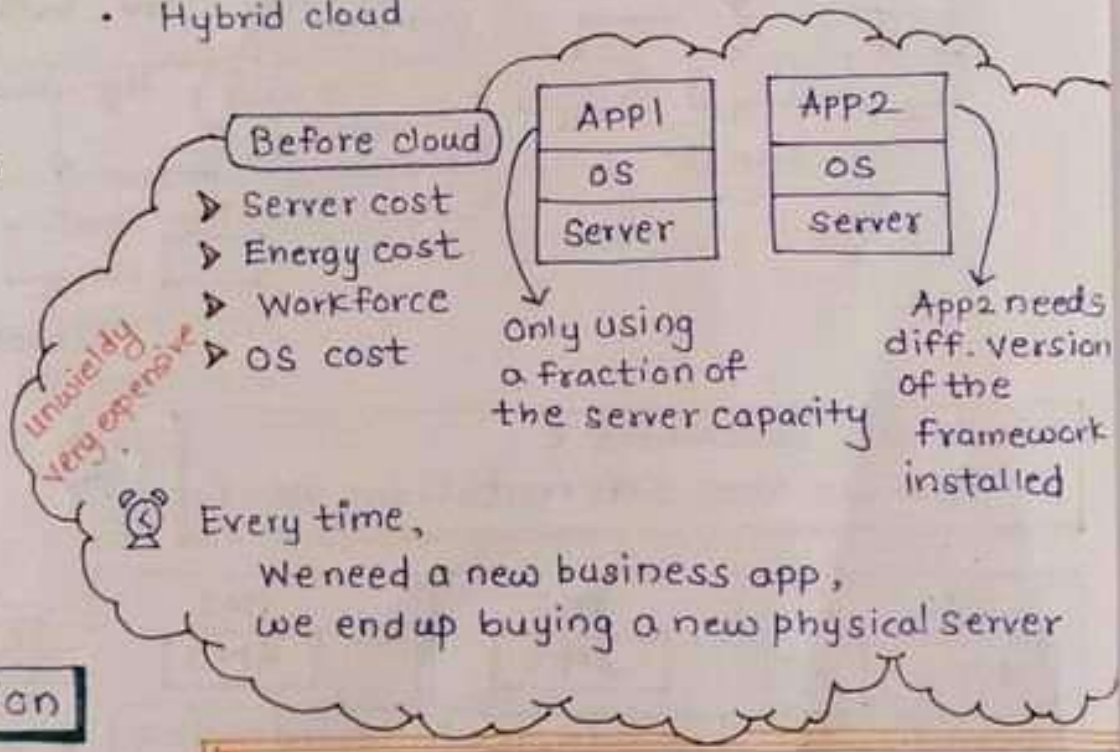
SUN, Oct 17



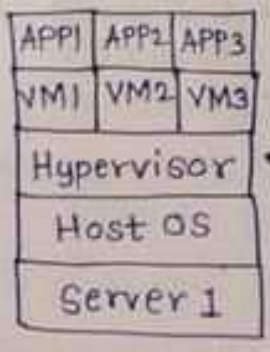
Cloud related Service

- Infrastructure as a service (IaaS)
- Platform as a service (PaaS)
- Software as a service (SaaS)
- Private cloud
- Public cloud
- Hybrid cloud





Virtualization

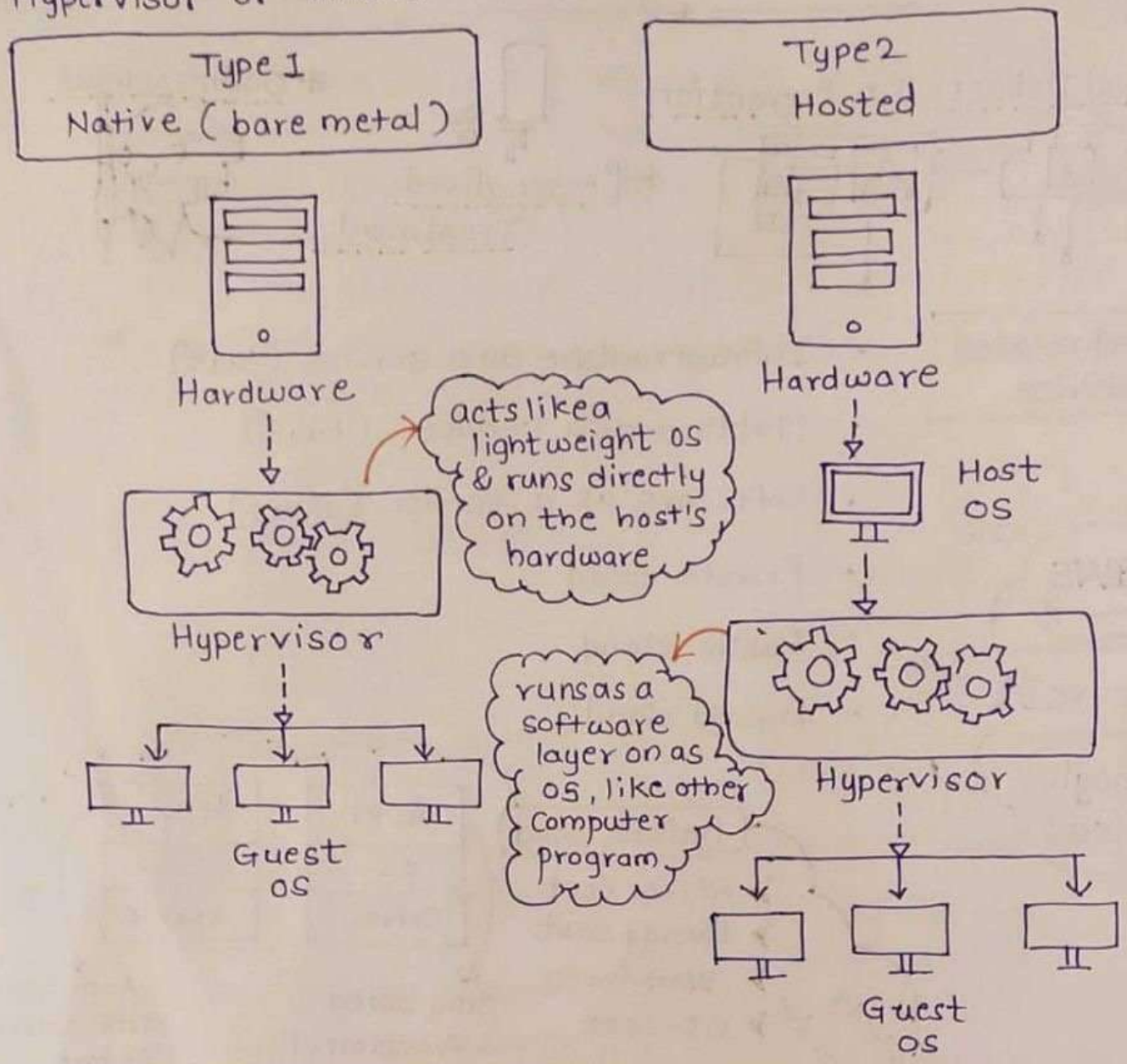


Hypervisors make it possible to use more of a system's available resources and provide greater IT mobility since the guest VMs are independent of the host hardware. This means they can be easily moved between different servers

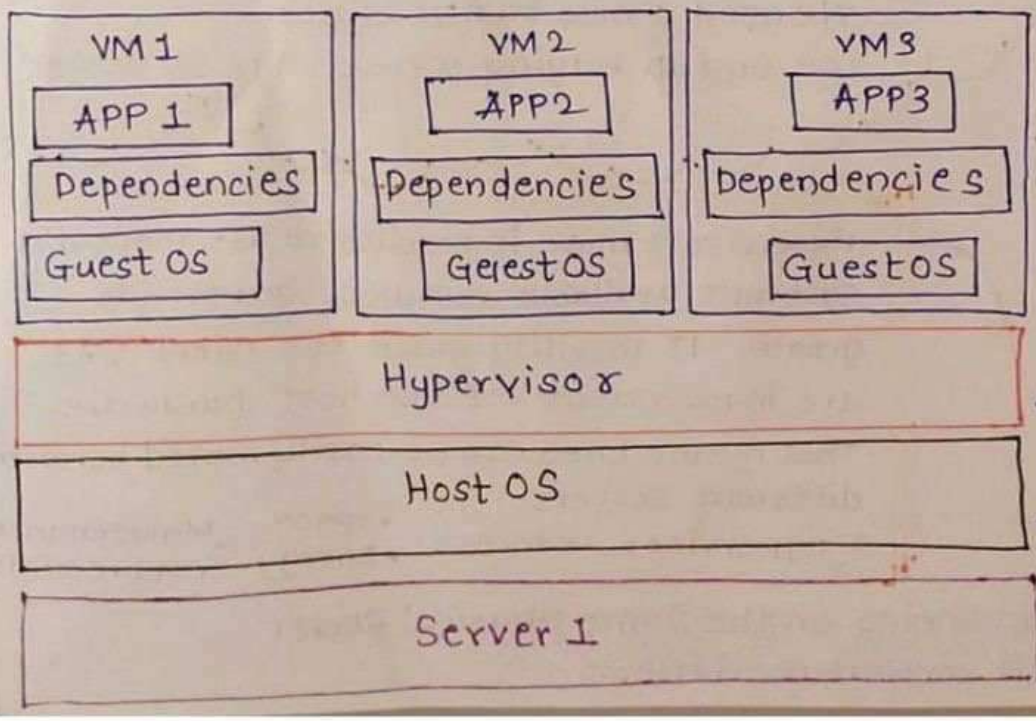
a hypervisor reduces : • space • energy • Maintenance requirements

In reality, Apps are running on the same physical server but on a dedicated virtual machine.

Hypervisor or Virtual Machine Monitor (VMM)



What are containers &
How are they different from VMs &



Downsides

- Wasted server resou
  - disk space
  - memory
  - processor
- Admin time to keep OS up to date
- OS license cost
- VM bootup consumes time

Containers Virtualizes the operating system

→ abstraction at the operating system level

→ Multiple containers can run on the same machine

→ can share the host operating system kernel.

→ container does not require its own operating system.

- The amount of disk space, RAM, processor time and other server resources that are saved.

→ container, packages your application code and it's dependencies together.

---

* Benefits of cloud computing

Reduce costs

✓ Cloud reduces both capex and opex.

✓ organization no longer have to spend huge amount of money on physical servers, related IT infrastructure specialized IT workforce server rooms or data centers.

Setup & configure the server — Server room secured! — Servers — connect it to UPS & n/w

organizations faced with a large initial capital expenditure (Capex)

antivirus software — dB server — proper cooling system

Maintenance — any other dependencies

- disaster recovery
- failover system

pay as you go

You will pay for what you use.

Cloud resources are metered

Scalability

scale up ⇧

scale down ⇩

Never run out of resources.

Accessibility

accessed from virtually anywhere and anytime.

Business continuity

any crisis do not result in data loss

Automatic Updates

Increased collaboration

Self service

Risk of cloud computing

- Loss of cloud data and services
- Data security
- Compliance and legal risks
- cost concerns

⇨ SLA's
Service Level Agreement

Local and international regulations
GDPR, HIPAA

What is a Public Cloud.
Benefits, Limitations & Usecases.

public cloud
- Physical servers, storage, networking etc are procured and owned by the cloud service.
- No setup & maitenance worries
- Most common type of cloud
- Anyone can use a public cloud Individuals and organisations

examples: Microsoft Azure, Amazon AWS

Multi-tenancy
Multi organisations share cloud resources.

Manage the cloud services and resources using cloud provider web portal.

pay-as-you-go like water or electricity bills

Benefits
- No upfront capex
- pay as you go
- No maintenance
- Highly scalable
- Highly reliable

Limitations
- Low visibility and control
- compliance and legal risks
- cost concerns

usecase
- Unlimited scalability
- varying peak demands
- Fast growing businesses
- Backup and disaster recovery solutions.

Private Cloud

- located on-premise | can be hosted by a third party service provider.
- resources are used by one business or organisations.

private to a specific organisation

→ easy to customise a private cloud

→ used by government agencies
financial institutions

Benefits

Better security
Better control
Predictable costs
Legal compliances

Limitations

Limited scalability
Huge initial capex
Limited access

Use case

Highly regulated business
Tech companies that require complete control
Large companies that require custom solutions.

Hybrid Cloud

- cloud Bursting
  - private cloud : security sensitive & business-critical operat°
  - public cloud : High-volume & lower security needs.

combination of private + public

Regular Demand — App continue to run in your own private cloud.

Spike in Demand — Burst through to the public cloud.

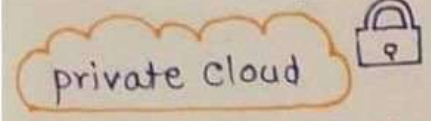
Benefits

Best of both the worlds
Better Control
Cost-effective

Limitations

Low visibility and control
Additional complexity
Compliance and legal risks
cost concerns

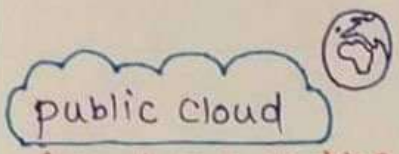
Use Case



Inside organization's corporate n/w

The organisation that owns the private cloud must purchase the cloud hardware

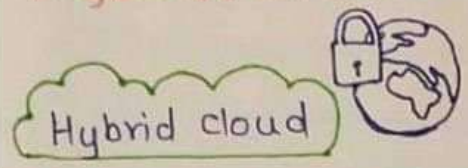
single-tenancy



Anywhere on the Internet

Cloud service provider (Amazon or Microsoft) provides the infrastructure.

Multi-tenancy



Inside corporate n/w

or

Anywhere on the internet

private cloud – Your organisation provides the hardware

Cloud service provider provides for the public cloud.

single-tenancy + Multi-tenancy.

Infrastructure as a Service IaaS

Platform as a Service PaaS

Software as a Service SaaS

Containers as a service CaaS

Functions as a Service FaaS

↓

Serverless Computing

↙

laas

Application

Data

Runtime

Middleware

OS

You manage

Virtualization

servers

storage

Networking

CSP Manages

On Premise

Application

Data

Runtime

Middleware

OS

Virtualization

Servers

Storage

Networking

You manage

IaaS ➡ Hardwar as a Service (HaaS)

Computational or Storage

↓ web application host & run

↓ install SQL server oracle

Infrastructure Teams

Software Development Teams

Benefits

If your new product launch, well and good. If it doesn't shut things down and stop paying.

→ Reduce financial risk

→ Deployment speed

→ Geographical advantages

→ Unlimited scalability.

Paas

Applications

Data

} You manage

Runtime

Middleware

OS

Virtualization

Servers

Storage

Networking

} CSP (Cloud Service providers) Manages

⇨ platform for software Development ----▷

Data driven web app

- ◊ ASP.NET Core or Java
- ◊ SQL Server or Oracle
- ◊ Web Server

Windows Azure

AWS Elastic Beanstalk

Google App Engine

Paas Benefits = Iaas + PaaS Benefits

- Reduce financial Risk
- Deployment speed
- Geographic location adv.
- Auto scaling
- Reduce development time
- Support global team
- Develop for multiplatform
- Affordability

SaaS

- Application
- Data
- Runtime
- Middleware
- OS
- Virtualization
- Servers
- Storage
- Networking

CSP manages

⇨ Individuals

⇨ Small, Medium & Large Organisat°

SaaS Apps ↘

M NETFLIX prime

Dropbox Office 365

Google Drive

→ Customer Relationship Management
→ Financial Management
→ Sales Management
→ Human Resource Management
→ Billing
→ Entertainment ...

- Very easy to get started
- Accessibility
- Automatic updates
- Flexible usage-based pricing
- Reduced financial risk
- Affordability

By moving to cloud, you are improving Security

Encryption ↘

Auditing ↑

Two-factor authenticat° ↓

Reviewing and rotating access keys and credentials

pragimtech.com/courses/learn-cloud-computing-From-scratch/