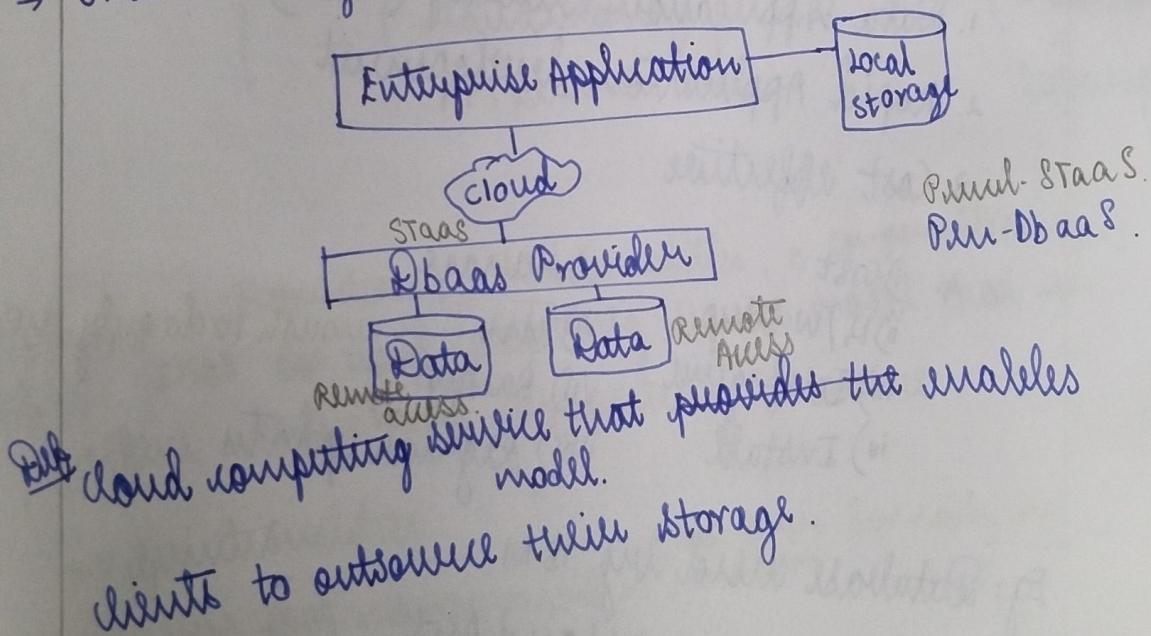


28/7/25

CO-3

Tilting as a Service	
Mgmt / Governance as a Service	
Security As a service	Integration as a service
	APP as a service.
	Process as a service
	Information as a service
	Database as a service
Storage as a service	
IAAS.	

⇒ STAaaS: Storage as a service



merits:

1. CAPEX → OPEX  
capital expenditure      operational expenditures
2. Storage scalability (scalup / scaledown)
3. Remote access.

## Disadvantage:

1. Security / privacy concerns.

this is overcome by many companies like "45 drives" by making customers to have their own ~~infrastructure~~ infrastructure (storage) in their own way.

2. Downloading of large chunks of data.
3. Dedicated "public" internet.

## ⇒ DaaS:

Cloud computing service model that frees the client from purchasing, configuring, installing, backup and regular updates of any database.

## Merits:

1. Data Application Security (IAM)

2. Rapid Application development

3. Cost effective

### A. i) Cost

ii) H/W setup

iii) Configure

iv) Install

### v) Manage

vi) User

→ enough to do only this

vii) Backup

viii) Regular updates

## Eg: Database used by IBM.

• Db2

• MongoDB

• PostgreSQL

• Redis

• Cloudant

• Elastic Cloud

• Rabbit MQ

• Cockroach db

## → Information As A Service

File Exchange → collecting information from multiple resources.

↪ "API" plays the major role for this.

Existing API

Own API

i) One Time Cost :

$$= \left\{ \begin{array}{l} \text{cost (Abstraction +} \\ \text{Building)}^2 \\ \text{Customised} \end{array} \right. \quad \begin{array}{l} \text{Generic} \end{array}$$

$$= \left\{ \begin{array}{l} \text{cost (Designing +} \\ \text{Building +} \\ \text{Testing)} \end{array} \right. \quad \begin{array}{l} \text{Own API} \end{array}$$

ii) Ongoing Cost :

$$= \left\{ \begin{array}{l} \text{cost + (Downtime} \\ \text{+ maintenance)} \\ \text{API Service} \end{array} \right. \quad \begin{array}{l} \text{API Service} \end{array}$$

$$= \left\{ \begin{array}{l} \text{cost (Downtime} \\ \text{+ maintenance} \\ \text{+ subscription)} \end{array} \right. \quad \begin{array}{l} \text{Own API} \end{array}$$

29/7/25  
Ques  
⇒ IAAS → Definition, 7 functionalities, 3 components (major)  
IAAS is a cloud computing service model that offers virtualised computing resource

\* 7 functionalities :

• VM pool management

• VM Image Repository

• Reservation

• Monitoring

• Scheduling

• QoS & SLA

• Billing Pricing.

one liner for each in exam.

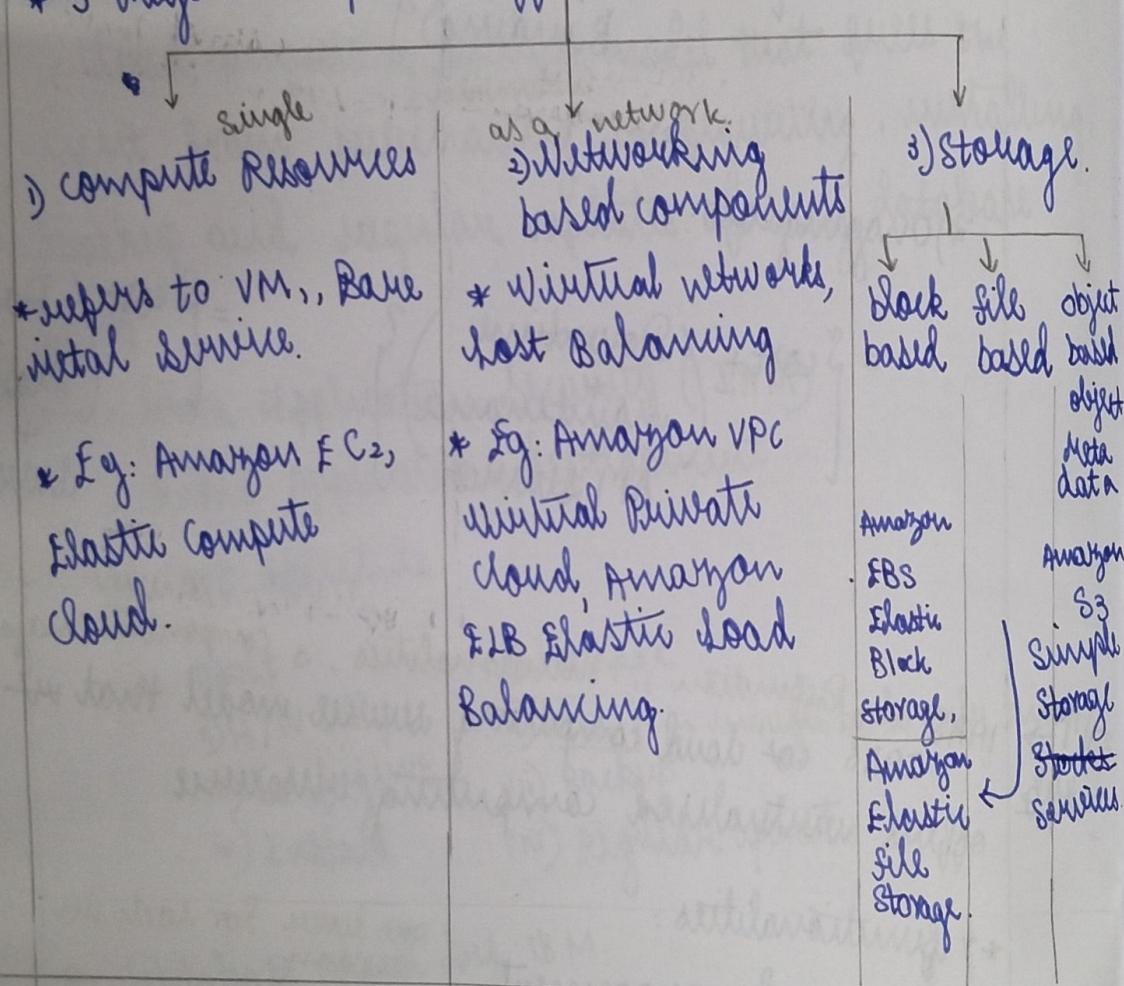
Pool - heterogeneous combo.

- VM Image ~~http~~ repository → every VM has its identified by its image. → e.g. Google spreadsheet anonymous images.

Service Level Agreement  
Quality of Service.

SLA → Bucket.

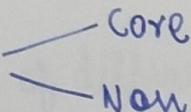
\* 3 Major Components offered:



→ BPaaS → Business Process as a Service:

Def. Horizontal vs Vertical, Micro PAAS PAAS.

~~Def.~~: BPaaS is a cloud computing service model that enables any business to outsource their business process to ~~with~~ third party service providers.

Business has  activities

Only non-core activities, they outsource.

Horizontal BaaS	Vertical BaaS
<ul style="list-style-type: none"><li>* The activities that involve interaction with outside environment</li><li>* Eg: CRM, Procurement, (order-payments) HR Management. (Pay calculations, customer support)</li><li>* Tasks can be moved on core activities</li></ul>	<ul style="list-style-type: none"><li>* The activities that form a part of the whole system at boundary level, cannot remove, it is a part of the system).</li><li>* Eg: Banking &amp; Financial services, Inventory, (loan retail) Telecommunications (Billing, revenue),</li><li>* It helps to reduce HR resources (no need people, cloud will take care)</li></ul>

- \* Merits:
  - i) automated streamlining of non-core activities
  - ii) cutting-edge at reduced cost.
  - iii) handling fluctuating business demand.

31/7/25.

## ⇒ Application as a Service:

Def

It is a cloud computing service model that offers access to softwares hosted on cloud. These softwares are commonly known as on-demand software. The soft service provider is also known as applications service provider 'ASP'. These softwares are hosted on cloud.

### \* Types: FVE2:

① Functional / specialist ASP Eg: Gmail. (one application)

② Vertical ASP Eg: G Suite

One one application is developed, they create a family of such applications such as docs, slides, drive, meet etc.

③ Enterprise ASP Eg: CRM, SAP, ERP provides integrated solution for complex enterprise need.

④ Social ASP (works only for that particular geography) other people out of that area cannot access

• Net Magic (AWS) offered at Mumbai by cloud migration, disaster recovery. getting ready to move from data center (AWS)

• Sonata S/W (Azaad) at Bangalore. crash

cloud migration

what is (2M)

• Oracle (ACP) cloud native application, what is cloud migration

## ⇒ Integration As a Service:

Def: It's a cloud computing service models that integrates application, data from different sources.

endorse  
log in  
stuck with  
in particular  
product and  
couldn't change  
to others.

## 5 Framework:

- ① Integration of different applications along with process authorisation.
- ② Integration of data from different sources into an unified view, for analysing or reviewing
- ③ Integration of application interfaces : It enables creation, managing and communication between interfaces that enables different systems to be integrated.
- ④ Workflow automation refers to set of repetitive tasks that needs to be automated by integrating the systems.

Business to Business  
⑤ B2B Integration. Offers integration services between business and external agencies.

Eg

Application Integration	AWS services	Azure services	Google Cloud services
1. Application Integration → Amazon App Sync	Amazon App Sync	Azure logic applications.	(GCP) Pub/Sub
2. Data integration → Amazon Redshift	Amazon Redshift	Azure data factory.	GCP Dataflow, GCP Dataproc.
3. API integration → Amazon API gateway	Amazon API gateway	Azure API integration	GCP Apigee
4. Workflow automation → Amazon Step Functions + Lambda	Amazon Step Functions + Lambda	Azure automation.	GCP Workflow
5. B2B Integration → Amazon transfer family	Amazon transfer family	Azure integration	GCP Interconnect.

4/8/25  $\Rightarrow$  Testing as a service

(5M)  
- 6M)

\* Definition:

It is a cloud computing service model that offers testing as a service to the clients.

\* Type [FURPS]

1. Functionality testing:

Intention: If all the functionality are implemented according to the specified requirement

Eg: AWS Code Build.

2. Performance testing:

Intention is to check the non-functional requirement with respect to external environment

Eg: AWS Cloud Watch.

3. Usability testing:

Intention is to check whether it is userfriendly and convenient

Eg: AWS Cloud Watch.

3. Security testing

Intention is to identify the security vulnerabilities.

Eg: Azure Penetration Testing Service.

4. Regression testing:

Eg: Azure pipeline

The intention is to revert to ensure that there is no negative impact of recent changes.

(2M) $\Rightarrow$	Management as a Service	Governance As a Service
Def:	<ul style="list-style-type: none"> <li>Manage + monitor</li> <li>IT resources &amp; operations</li> <li>any action done with resources (utility, migrating)</li> </ul>	whether IT resources are aligned with business objectives set of rules.
Focus:	Management of IT Resources	Compliance, Governance like tik tok allowed only in particular geographical area.
Objectives:	Infrastructure - db - software - network - security.	<ul style="list-style-type: none"> <li>Audit Management</li> <li>compliance Management</li> <li>Risk Management</li> <li>Policy Management</li> <li>Data Governance</li> </ul>

$\Rightarrow$  "Threat Intelligence"

Proactive

Reactive

Proactive:  

- \* kind of preventive mechanism, before measures taken before the threat has happened.

Reactive:  

- \* measures taken after the threat

Def: security as a service is a cloud computing service model that provides major security services

$\rightarrow$  Major Security As a Service:  
 1. IAM - Identity Access Management.  
 assigning and reassigning of privileges

Eg: Azure Active Directory

2. DLP - Data Loss Prevention:  
lost / stolen / misused "Ensure that these  
aren't happening.  
Eg: Symantec DLP

3. Email Security:  
Ensuring that security vulnerability isn't  
happening via internal resources.  
Eg: Proof Point.

4. Web Security:  
Ensuring that security vulnerability isn't  
happening via incoming traffic.  
Eg: WSO umbrella.

5. Network Security: security within the network.  
Eg: Fortinet / FortiGate.

6. IDPS (Intrusion, Detection & Prevention System)  
It doesn't allow intruders  
Eg: LogiCrate.

7. Vulnerability Scanning:  
Checking for risky mechanisms, spans on  
security breaches Eg: Rapid 7.

8. Cloud Security:  
It covers all types of security for resources.  
Eg: AWS Security Rule.

## 9. Threat Intelligence

(Proactive & reactive)

Eg: Five Eye Threat Intelligence

## 10. Endpoint Protection:

End to end encryption

Eg: Symmetric endpoint

5/8/25

CO-A

→ features of cloud mapping why it is needed  
for different applications

(2m) map the major features of cloud that dragged the popularity across diverse or diversified application.

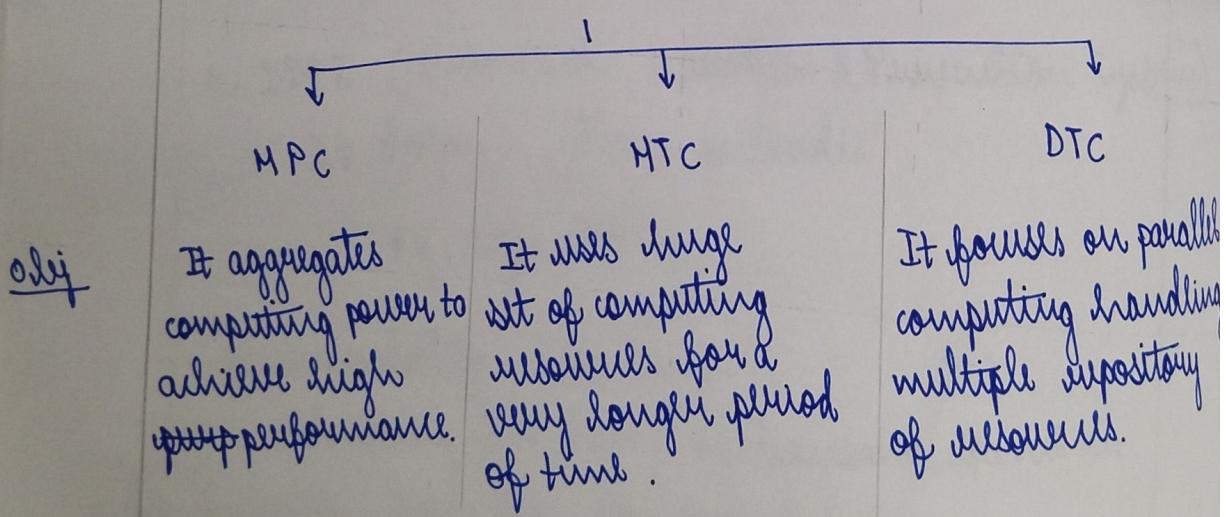
1. Availability of large scale of computing resources.
2. Storage at sustainable cost.
3. Rapid delivery of services at minimal cost.

→ classification of application (scientific application)

① HPC (High Performance Computing)

② HTC (High Throughput Computing)

③ DTC (Data Intensive Computing)



→ healthcare applications :

- (10m)
- ① ECG Analysis on cloud
  - ② Gene Expression - Cancer Diagnosis

## ECG - Electrocardiogram

It is the electronic manifestation of Myocardium (tissue related to heart).

Arrhythmias → condition where the heart beat is irregular.

S3 → Simple Storage Service  
→ which stage Yes or No

Steps	① ECG Analysis on cloud		② Care Expulsion career Diagnosis	
	Tools	Example	Tools	Example
① Data Acquisition	Data is collected from the patients with the help of sensors or wearable devices.	AWS S3	"	AWS S3
② Data uploading	upload the data into cloud. (wave)	AWS IOT Core	" (Image)	AWS DataSync, Azure data factory.
③ Data Preprocessing	Normalising of data, removal of noise	AWS Lambda	" + filter the low quality images	AWS Lambda
④ Feature extraction	Diagnose Arrhythmias from the wave form	Google Cloud ML	Care express ions has extracted to find its deviation with normal and expression	AWS ML Studio Google cloud AI Platform
⑤ Classification	classify whether the wave form has Arrhythmias or not.	Sage Maker, TensorFlow on Cloud.	whether patient has career or not	n
Regression →	find the future outcome based on pattern			

⑥ visualization	The predicted results can be visualised using cloud services.	Powell BI	Suitable Heatmap, Dendograms, gene Expression tools
⑦ Storage. (result)	The results are stored for future purpose	AWS RDS (Relational database service)	"
⑧ Alerts and notifications.	AWS SNS simple notification services	⑧ Collaboration Sharing the influences to other team.	Azure Devops

Heatmap - Suitable for image based data.

11/8/25 → social networking and media applications  
 make it specific as per the question

Cloud providers provide backend services for Facebook, LinkedIn, Instagram, suitable and interactive reviews.

Steps	Purpose	Example
1. User management (registration)	User profiles	AWS Cognito
2. Content upload	Files Photos Videos	AWS S3 Google Cloud Storage
3. Realtime communication	Chats, message	AWS Application Synchronization

4. Content Delivery	Sharing (when you post, your friends will get the notifications)	AWS cloud Front Azure CDN Content Delivery Network Google Cloud CDN
5. NewsFeed Generation	Timeline (events)	AWS Lambda
6. Database Management	Storage, Retrieval	AWS RDS Google Cloud Firestore Google Cloud Spanner
7. AI / ML Recommendation Friend recommendation, self recommendation, -ation	suggesting friends, users behavior based.	Sage Makem, Google Cloud AI Platform
8. Analytics to predict like they may like.	User behaviour study	Google Cloud, Big Query
9. Scaling Load balancing more users, then more load $\Rightarrow$ balance it	Scaling up, tracking users	AWS Auto Scaling, Google Cloud Load Balancing
10. security and Backup	Security Content, Disaster Recovery.	AWS IAM Google Cloud IAM