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Question Bank-1
Cloud Computing

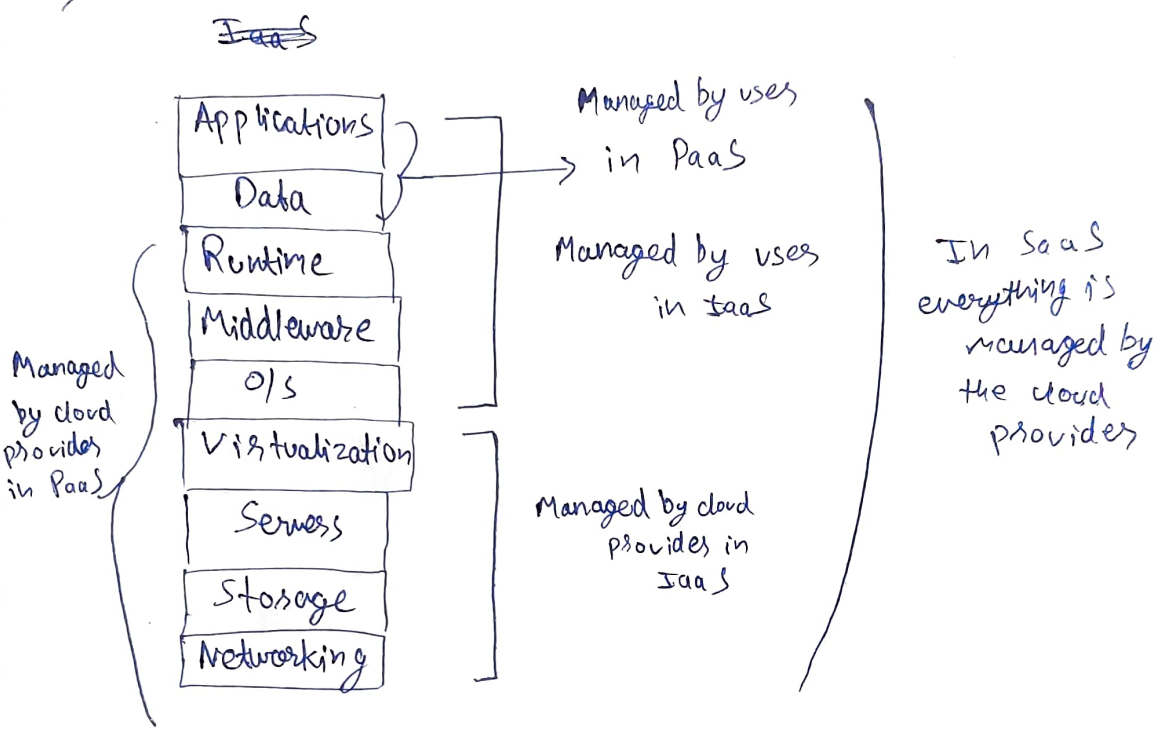
1) Compare and contrast the features and capabilities of AWS, GCP and Azure including their strengths and weaknesses in different application scenarios.

Ans)

Feature/capability	AWS	GCP	Azure
Market Share	Largest market share (~30%)	Smaller but increasing (~11%)	Second largest (~22%)
Compute Services	EC2, Lambda, ECS, EKS	Compute Engine, Cloud Run, GKE	Virtual Machines, Functions, AKS
Storage	S3, EBS, Glacier	Cloud Storage, Firestore	Blob Storage, Manage Disks
Networking	VPC, CloudFront, Route 53	VPC, Cloud CDN, Cloud Load Balancing	VNet, Azure CDN
AI/ML Services	SageMaker, Bedrock	Vertex AI, AutoML	Azure ML, OpenAI service
Big Data & Analytics	Redshift, Athena, EMR	Big Query, Dataflow, Pub/Sub	Synapse, HDInsight, DataLake
Security	Strong	High-level	Best for enterprises
Hybrid & Multi cloud	AWS Outposts, ECS Anywhere	Anthos (best for multi-cloud)	Azure Arc (best hybrid)
Pricing	Pay-as-you-go	Pay-as-you-go	Pay-as-you-go
Support	Extensive resources	Developer-friendly	Strong enterprise support

2) Compare and contrast the three main cloud service models (IaaS, PaaS, and SaaS) with respect to business contexts. Give examples of each, and explain the advantages and disadvantages of each model.

Ans)



⇒ IaaS (Infrastructure as a Service)

- Provides virtualized computing resources like servers, storage and networking
- Use case for business : when businesses need full control over the IT infrastructure without buying physical servers.
- Particularly useful when the business has sensitive and private data. IaaS is flexible but requires technical expertise.

⇒ PaaS (Platform as a Service)

- Offers a development platform with tools and frameworks
- Use case for business : PaaS is useful for businesses and developers building and deploying applications.
- PaaS simplifies app deployment by managing infrastructure, but businesses lose some control.
- It has faster development cycles and reduced overhead.

⇒ SaaS (Software as a Service)

- Delivers ready-to-use software over the internet.
- Use case : SaaS is useful when end users need software installation

3) Public vs private cloud

- Public cloud

Advantages : cost-effective (pay-per use model), high scalability, no maintenance burden on user, quick deployment

Disadvantages : Security concerns due to multi-tenancy, compliance and regulatory challenges, potential downtime or latency

- Private cloud

Advantages : Enhanced security and control, customizable infrastructure, better compliance adherence

Disadvantages: Higher costs for setup and maintenance, requires dedicated IT staff, less scalable compared to public cloud

4) Interaction with cloud services

Cloud service models work in conjunction with networking (e.g VPNs, firewalls, load balancers) and storage solutions (e.g: object storage, block storage, database services) to provide a seamless computing environment. For example, an Iaas deployment may use a cloud-based database (Paas) and a cloud hosted software solution (Saas) together.

5) Role in Digital transformation

Cloud computing accelerates digital transformation by enabling automation, big data analytics, AI/ML applications and seamless collaboration. Business benefit from cost savings, enhanced agility and the ability to innovate faster, allowing them to stay competitive in evolving markets.

6) Virtual Machine Migration

VM migration allows the transfer of virtual machines between physical servers across cloud environments. Benefits are that it enhances availability and reliability; supports disaster

recovery and enables efficient resource management.

Challenges are network latency, potential extended downtime and data consistency issues.

7) Wireless Sensor Networks and cloud integration

WSNs consist of spatially distributed sensors collecting data; which is transmitted to the cloud for storage and analysis. Benefits are real time monitoring, improved decision making, & scalability and cost-efficiency. Use cases are smart agriculture, industrial automation and environmental monitoring.

8) Innovative use cases

- Netflix: Uses AWS to scale streaming devices dynamically based on demand.
- Tesla: Leverages cloud computing for autonomous driving AI models and over-the-air updates.
- Airbnb: uses cloud services to handle dynamic scaling of its booking platform.

lessons for business : cloud capability enhances flexibility, optimizes costs and boosts innovation.

9) Cloud computing in Edge and IoT

Cloud computing supports edge computing by processing data closer to the source, reducing latency and bandwidth costs.
Benefits: faster response time, reduced cloud dependency, improved security. Use cases: smart cities, industrial IoT, healthcare devices.

10) Cloud computing in AI/ML

Cloud platforms provide AI/ML services with scalable compute power (e.g. AWS, SageMaker, Google Vertex AI, Azure Machine Learning)

Benefits include cost-effective training, faster model deployment and accessibility of pre-trained AI models.
Use cases are chatbots, fraud detection, predictive analysis and medical diagnostics.