CLOUD COMPUTING CASE STUDIES

Paper 1

Question 1 (10 Marks):

Case Study: Imagine a small e-commerce company that is looking to migrate its on-premises infrastructure to the cloud. They are considering the adoption of various cloud service models. Analyze the advantages and disadvantages of Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) for this company. Suggest which service model(s) would be most suitable for their needs and explain why.

Answer:

Advantages and disadvantages of IaaS, PaaS, and SaaS:

- IaaS: Allows more control and flexibility over infrastructure but requires more management. Suitable for companies with specific server requirements.
- PaaS: Simplifies application deployment and development but may limit customization. Suitable for companies focused on software development.
- SaaS: Offers ready-to-use software but may have limited customization. Suitable for companies looking for hassle-free software access.

Based on the case, the e-commerce company may benefit from a combination of IaaS for infrastructure control and SaaS for specific e-commerce software.

Question 2 (10 Marks):

Case Study: A multinational corporation has a highly distributed data center network spanning multiple regions. They are facing challenges related to network latency and data access speed. Explain how the concepts of Edge and Fog Computing can help address these challenges. Provide examples of real-world scenarios where these concepts are applied.

Answer:

Edge Computing brings processing closer to the data source, reducing latency. Fog Computing extends this concept to include network edge devices like routers and switches. Examples include autonomous vehicles and IoT devices that require low latency and real-time processing.

Question 3 (10 Marks):

Case Study: A startup is considering deploying its applications on a hybrid cloud infrastructure. Explain what a hybrid cloud is and the advantages it offers. Discuss the key considerations and challenges the startup should be aware of when implementing a hybrid cloud strategy.

Answer:

A hybrid cloud combines public and private cloud resources, providing flexibility and scalability. Advantages include cost-effectiveness, data security, and workload flexibility. Challenges include data integration, security, and management complexity.

Question 4 (10 Marks):

Case Study: A company is exploring the adoption of a multi-cloud strategy for its IT infrastructure. Describe what a multi-cloud strategy is and why companies might opt for it. Discuss the potential benefits and risks associated with a multi-cloud approach.

Answer:

A multi-cloud strategy involves using multiple cloud providers for various services or applications. Reasons include avoiding vendor lock-in, optimizing costs, and leveraging the strengths of different providers. Benefits include flexibility and resilience, but risks include complexity and potential data transfer costs.

Question 5 (10 Marks):

Case Study: A large data center is planning to implement a Leaf-Spine network architecture. Explain the key characteristics and advantages of a Leaf-Spine network design. How does it differ from traditional network architectures like the three-tier model?

Answer:

Leaf-Spine architecture provides a high-bandwidth, low-latency network with predictable performance. It is more scalable and fault-tolerant than the three-tier model. Unlike the three-tier model, Leaf-Spine has a fixed number of hops for any communication, reducing latency and improving performance.

Paper 2

Question 1 (10 Marks):

Case Study: A small software development company is considering adopting cloud computing to improve its development and testing processes. Analyze the advantages and challenges of using cloud-based development and testing environments for this company. Provide recommendations on which cloud service models (IaaS, PaaS, or SaaS) would be most suitable for their needs.

Answer:

Advantages of cloud-based development and testing environments include scalability, cost-efficiency, and rapid provisioning. Challenges include security and data privacy. Recommendations for the company may involve using a combination of IaaS and PaaS for flexibility and control.

Question 2 (10 Marks):

Case Study: A healthcare organization is looking to implement an Electronic Health Records (EHR) system in a multi-tenant cloud environment. Explain the concept of multi-tenant clouds and their benefits. Discuss the security considerations and compliance requirements that the healthcare organization should address when implementing EHR in such an environment.

Answer:

Multi-tenant clouds serve multiple users, providing cost savings and resource sharing. Security considerations for EHR in a multi-tenant cloud include data isolation, encryption, and compliance with healthcare regulations (e.g., HIPAA).

Question 3 (10 Marks):

Case Study: A financial institution is exploring the use of Edge and Fog Computing for real-time data analysis and decision-making. Provide examples of how Edge and Fog Computing can enhance financial services and explain the potential challenges associated with their implementation in this context.

Answer:

Edge and Fog Computing can enable real-time fraud detection, personalized financial recommendations, and low-latency trading. Challenges include data synchronization, security, and device management.

Question 4 (10 Marks):

Case Study: A large e-commerce platform experiences fluctuations in website traffic during peak shopping seasons. Describe the concept of load balancing and how it can help ensure website availability and performance during high traffic periods. Provide examples of load balancing techniques and their benefits.

Answer:

Load balancing distributes incoming network traffic across multiple servers or resources to improve availability and performance. Techniques include Round Robin, Least Connections, and Weighted Load Balancing. Benefits include enhanced fault tolerance and scalability.

Question 5 (10 Marks):

Case Study: A startup is evaluating different cloud service models (IaaS, PaaS, SaaS) for its initial IT infrastructure. Explain each of these service models and their suitability for the startup's various IT needs, such as hosting a website, developing a mobile app, and managing employee email. Provide recommendations for the startup.

Answer:

IaaS provides infrastructure resources like virtual machines, suitable for hosting a website. PaaS offers a platform for app development, ideal for mobile app development. SaaS offers ready-to-use software like email services. Recommendations may involve a mix of these service models based on specific needs.