Distributed Systems: Question Papers

SET-1

Q1 (2 Marks each)

a) Define remote procedure call (RPC).

b) What is an election algorithm?

c) Define checkpointing in distributed systems.

d) Define web proxy caching.

e) What is Service-Oriented Architecture (SOA)?

f) Why is naming important in distributed coordination systems?

Q2

a) Differentiate between distributed system transparency and design goals. Explain any four types of transparency with their limitations. [6M]

b) Explain the differences between threads and software agents. Explain how virtualization and code migration influence process execution in distributed systems. [6M]

Q3

a) Explain Lamport logical clocks and derive the rules for updating timestamps during local events, message sending, and message receiving. [6M]

b) Differentiate data-centric and client-centric consistency models. Explain how replica management and consistency protocols help maintain consistency across replicas. [6M]

Q4

a) Compare CORBA, DCOM, and GLOBE architectures with respect to communication, naming, and object interoperability. [6M]

b) Explain the working of the two-phase commit protocol and analyze the reasons for its blocking behavior. [6M]

Q5

a) Explain about SOAP and REST with respect to communication mechanisms, message formats, interface definitions, and protocol requirements. [6M]

b) Differentiate CDN and web proxy caching in terms of content distribution, request processing, and replication mechanisms. [6M]

Q6

a) Describe about Apache Hadoop, Amazon Elastic MapReduce, and Apache Pig based on architecture, processing capabilities, and programming abstractions. [6M]

b) Compare grid computing and cloud computing in terms of resource allocation, service delivery, scalability, and resource ownership. [6M]

Q7

Discuss the design principles of scalable web-based systems. Explain load balancing, server replication, caching, and session management in distributed web environments. [12M]

SET-2

Q1 (Compulsory, 2 Marks each)

a) What is code migration?

b) Differentiate between a name, an identifier, and an address.

c) Mention any two features of the GLOBE architecture.

d) What is HTTP? Mention its role in web-based systems.

e) Differentiate between Hadoop and Amazon Elastic MapReduce.

f) What is the purpose of the two-phase commit protocol?

Q2

a) Differentiate RPC, RMI, and message-oriented communication. Why is stream-oriented communication unsuitable for every type of distributed application? [6M]

b) Explain the client-server, peer-to-peer, and hybrid architectural styles. How do architectural styles differ from system architectures? [6M]

Q3

a) Describe about flat naming, structured naming, and attribute-based naming. Why is name resolution a distinct operation from name representation? [6M]

b) Compare centralized, distributed, and token-based mutual exclusion algorithms and explain their differences in message overhead and fault tolerance. [6M]

Q4

a) Explain about process resilience and reliable group communication with respect to failure handling and message delivery guarantees. [6M]

b) Compare checkpointing and message logging techniques in terms of recovery mechanisms, advantages, and limitations. [6M]

Q5

a) Explain the major design goals of distributed file systems and analyze the role of transparency, scalability, and fault tolerance. [6M]

b) Distinguish between NFS and AFS based on architecture, caching mechanisms, consistency, and file access. [6M]

Q6

a) Illustrate the MapReduce programming model and explain the functions of the Map and Reduce phases in distributed data processing. [6M]

b) Describe the architecture of distributed coordination-based systems and explain the importance of naming and security in coordination. [6M]

Q7

Explain the role of HTTP cookies, sessions, and state management in distributed web applications. Analyze the limitations of maintaining client state across multiple servers. [12M]