

Distributed Systems

Important Question Bank

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Distributed Systems

Unit– 1

- 1) What is a distributed system? How distributed systems project a single system image?
- 2) Differentiate Distributed operating system and Network operating system.
- 3) Why is scalability an important feature in the design of a distributed system? Discuss some of the guiding principles for designing a scalable distributed system.
- 4) What is the main difference between stateless and stateful servers? Which servers are used in distributed applications?
- 5) Discuss briefly the various issues related to distributed system design.
- 6) What is a Distributed System? State any three advantages and disadvantages of distributed systems with respect to centralized systems.
- 7) Compare the distributed computing models.

Unit– 2

- 1) Differentiate LAN and WAN. Also explain bridge, router, repeater, gateway and switch.
- 2) Compare OSI and TCP-IP reference model.
- 3) Explain layer and frame format of ATM model.
- 4) Why traditional network protocol is not suitable for distributed system? Explain VMTP and FLIP protocol for DS.
- 5) How does VMTP protocol handle lost messages, flow control, group communication and maintain transparency.

Unit– 3

- 1) Explain features and issues in message passing system.
- 2) Explain message format of IPC.
- 3) What is ordered message delivery? Compare the various ordering semantics for message passing. Explain how these semantics is implemented.
- 4) State the relative merits and demerits of various process addressing mechanism.
- 5) What is failure in IPC? How can we handle them?
- 6) Write and explain the algorithm of constructing a DFS spanning tree with a specified root.
- 7) What is datagram? Explain the mechanism of handling multiple datagrams in IPC.
- 8) In group communication, what are the various message ordering schemes? Explain CBCAST scheme..

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9) What is non idempotent routine? How such routine creates problem with message passing? Also explain its solution with example.

10) Explain group communication mechanism.

11) What is atomic broadcast? Explain Group Communication Mechanism

Unit– 4

1) Explain RPC and its features and limitation. OR Draw and explain RPC architecture.

2) What is RMI? What are the main features of Java RMI? Discuss the various components and process of RMI execution

3) Compare RPC and RMI with respect to implementation.

4) Distinguish different RPC communication protocol. Suggest one example where each protocol is used.

5) Explain RPC implementation. Also explain various methods of generating stubs.

6) Explain Static and Dynamic RPCs.

Unit– 5

1) How computer clocks are implemented? Also explain drifting of clock.

2) What is Logical clock? Explain how logical clocks are implemented in a DS. Discuss its significance in a distributed system.

3) With the help of diagram explain distributed algorithm for mutual exclusion.

4) Enumerate the various issues in clock synchronization. Classify the clock synchronization algorithm and explain Berkeley algorithm with an example.

5) What is a Deadlock? List and explain four necessary conditions for deadlock to occur. Discuss various deadlock prevention strategies. Discuss various dead lock detection algorithms in distributed systems.

6) Discuss and compare various election algorithms.

7) Short note on Global state.

8) Why mutual exclusion is more complex in distributed systems? Categorize and compare mutual exclusion algorithms.

9) A distributed system has four nodes, N1, N2, N3 and N4, each having its own clock. Their clocks tick at 500, 550, 580, and 610 times per millisecond, respectively. This distributed system uses an external clock synchronization mechanism in which all four nodes receive the real time every 60 seconds from an external time source to read just their clock. Calculate the maximum clock skew which can occur in the system.

10) Explain synchronization with respect to distributed systems

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Unit– 6

- 1) How the problem is specified using formal model? Specify the problem of mutual exclusion using formal model specification.
- 2) How the process is specified using formal model? Define the process execution and admissibility using formal model specification.

Unit– 7

- 1) Discuss the issues in designing load balancing algorithm.
- 2) What is process migration? What are the main steps involved in process migration? Explain how freezing of the migrating process is carried out. Explain advantages of process migration.
- 3) What are threads? Enumerate the major differences between threads and processes. Discuss thread synchronization.
- 4) How does process migration take s place in heterogeneous system?
- 5) What are various issues in designing Load-Sharing algorithms?
- 6) What is Load Balancing? Explain any one algorithm of load balancing.
- 7) What are the fundamental issues in resource management in distributed system?
- 8) Discuss load estimation policy and Process transfer policy in load balancing algorithms.

Unit– 8

- 1) Compare message passing and distributed shared memory.
- 2) Explain types of DSM and among them explain various types of hardware DSM.
- 3) Discuss various issues in designing and implementing DSM system.
- 4) List and explain various consistency models used in DSM.
- 5) Define Thrashing in DSM. Also explain methods for solving thrashing in DSM.
- 6) Explain the DSM system architecture. How does granularity affect DSM system performance?
- 7) Write the advantages of distributed shared memory. Define HDSM and explain Ring based multi-processor.

Unit– 9

- 1) What are desirable features of a good naming system?
- 2) Describe the method of object locating mechanism.
- 3) Describe the basic concepts related to object naming in distributed system.

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- 4) Define and Explain: Name space, Name resolution, Name Server, Name Agent, Context, Name cache.
- 5) Write Short note on: DNS (can include case study)
- 6) What is a name server? What is namespace? Explain the name resolution.
- 7) Explain the DNS name service and bind implementation of DNS.
- 8) What is Name Cache? What are its types? Explain any one approach to implement it.