GENERAL

distributed system multiple choice questions with answers

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Introduction

Distributed systems have become the backbone of modern computing, powering everything from cloud services and microservices architectures to peer to peer networks and real time analytics. As the complexity of these systems grows, so does the need for rigorous assessment tools that can gauge a candidate's understanding of core concepts, design patterns, and best practices. Multiple choice questions (MCQs) offer a scalable, objective, and efficient way to evaluate knowledge across a wide range of topics within distributed computing.

In this guide, we present a curated collection of high quality distributed system MCQs complete with detailed answers and explanations. Whether you're a student preparing for an exam, an instructor designing a curriculum, or a hiring manager screening candidates, this resource will help you assess both foundational and advanced knowledge in a clear and engaging way.

Why Use Multiple Choice Questions for Distributed Systems?

- Objectivity – Answers are graded automatically, reducing bias.
- Coverage – A single MCQ can test several concepts simultaneously.
- Scalability – Ideal for large classes or interview panels.
- Immediate Feedback – Learners can see correct answers and explanations right away.
- Versatility – Questions can be tailored to beginner, intermediate, or advanced levels.

Key Topics Covered in Distributed Systems MCQs

1. Architecture and Design Patterns
2. Consistency Models
3. Fault Tolerance and Replication
4. Consensus Algorithms
5. Scalability and Load Balancing
6. Security and Access Control
7. Performance Metrics and Monitoring
8. Data Partitioning and Sharding
9. Service Meshes and Observability
10. Cloud Native Practices

Sample MCQs with Answers and Explanations

1. Architecture and Design Patterns

- A monolithic application where all components run in a single process.
- A distributed system composed of loosely coupled services that communicate over a network.
- A peer to peer overlay network used for file sharing.
- A hierarchical tree of processes controlled by a central scheduler.

In a distributed system, what is the primary benefit of using a "Service Oriented Architecture" (SOA) over a tightly

coupled approach?

- Reduced network latency.
- Increased code reuse and flexibility.
- Elimination of all security concerns.
- Guarantee of strong consistency.

2. Consistency Models

- Eventual Consistency
- Read Your Writes Consistency
- Linearizability (Strong Consistency)
- Monotonic Reads

In a system that uses “Eventual Consistency,” what is the expected time to convergence after a write operation?

- Instantaneous.
- Bound by a fixed timeout.
- Unbounded, but guaranteed in the long run.
- Never converges.

3. Fault Tolerance and Replication

- Primary–Replica with synchronous replication.
- Primary–Replica with asynchronous replication.
- Master–Master with write to all.
- Single point of truth with no replication.

What is the primary purpose of a “quorum” in distributed consensus?

- To enforce a maximum number of nodes.
- To determine the majority needed to commit an operation.
- To randomize node selection for load balancing.
- To encrypt data at rest.

4. Consensus Algorithms

- Raft
- PBFT (Practical Byzantine Fault Tolerance)
- Chord
- Gossip Protocol

In Paxos, what role does the “acceptor” play?

- Proposes values to the network.
- Decides whether to accept a proposal.
- Represents the user interface.
- Monitors network latency.

5. Scalability and Load Balancing

- Round Robin
- Least Connections
- Weighted IP Hash

- Sticky Sessions

What is “horizontal scaling”?

- Adding more CPUs to a single machine.
- Adding more memory to a single machine.
- Adding more machines to a cluster.
- Increasing the frequency of the CPU clock.

6. Security and Access Control

- HTTP/1.1
- FTP
- HTTPS (TLS/SSL)
- SMTP

What does “Zero Trust” architecture emphasize?

- Trusting all internal traffic by default.
- Verifying every request regardless of origin.
- Using only hardware firewalls.
- Disabling all authentication mechanisms.

7. Performance Metrics and Monitoring

- Throughput (requests per second).
- Latency (time to complete a request).
- CPU utilization.
- Disk I/O.

Which tool is commonly used for distributed tracing?

- Prometheus
- Grafana
- Jaeger
- Docker Compose

8. Data Partitioning and Sharding

- It eliminates the need for any routing logic.
- It distributes data evenly across nodes and handles node churn gracefully.
- It guarantees strong consistency across all shards.
- It reduces network traffic to zero.

In a “range partitioning” scheme, how are keys distributed?

- Randomly across all nodes.
- Based on the hash of the key.
- By dividing the key space into contiguous ranges.
- By using the first letter of the key.

9. Service Meshes and Observability

- Ingress Gateway
- Sidecar Proxy

- Control Plane
- Data Plane

What is the primary purpose of observability in distributed systems?

- To enforce security policies.
- To provide real time insights into system behavior.
- To manage user accounts.
- To limit network bandwidth.

10. Cloud Native Practices

- Deployment
- Service
- Horizontal Pod Autoscaler
- Ingress

What is the benefit of using a “stateless” service in a cloud environment?

- It reduces the need for external storage.
- It guarantees strong consistency.
- It eliminates all network latency.
- It requires manual scaling.

How to Use These MCQs Effectively

1. Curriculum Integration – Align questions with learning objectives for each module.
2. Adaptive Testing – Use difficulty tiers to challenge learners at appropriate levels.
3. Immediate Feedback – Provide explanations after each question to reinforce concepts.
4. Analytics Tracking – Record answer patterns to identify common misconceptions.
5. Continuous Updating – Refresh questions to reflect evolving technologies such as serverless, edge computing, and AI driven orchestration.

Conclusion

Mastering distributed systems requires a deep understanding of architecture, consistency, fault tolerance, and many other nuanced topics. Well crafted multiple choice questions can serve as a powerful tool to assess, reinforce, and expand knowledge across these domains. By incorporating the questions and strategies outlined above, educators and recruiters alike can create engaging, data driven assessments that accurately reflect a candidate’s or student’s proficiency in distributed computing.

Start integrating these MCQs into your

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