

# Consistent Hashing - Discussion Topics

## Algorithm & Design

1. Why does modulo hashing fail in distributed systems?
  - Calculate the percentage of keys remapped when adding/removing nodes
  - Impact on cache hit rates and database performance
2. How do virtual nodes improve load distribution?
  - Trade-offs between number of vnodes and memory usage
  - Handling heterogeneous hardware with different capacities
3. Compare consistent hashing with rendezvous hashing
  - When would you choose one over the other?
  - Implementation complexity differences

## Real-World Scenarios

4. Design a distributed cache using consistent hashing
  - How to handle hot keys that receive disproportionate traffic?
  - Replication strategy for fault tolerance
5. How does Cassandra use consistent hashing for data partitioning?
  - Token ranges and vnode configuration
  - Impact on read/write performance
6. What happens during a network partition in a consistent hash ring?
  - Split-brain scenarios
  - Consistency vs availability trade-offs

## Implementation Challenges

7. How do you synchronize ring metadata across nodes?
  - Gossip protocols vs centralized coordination
  - Handling temporary inconsistencies
8. Describe a data migration strategy when adding nodes
  - Background migration vs lazy migration
  - Minimizing impact on live traffic
9. How would you implement weighted consistent hashing?
  - Supporting servers with different capacities
  - Dynamic weight adjustment

## Advanced Topics

10. What is jump consistent hashing and when would you use it?
  - Memory efficiency compared to ring-based approach
  - Limitations and use cases