Circuit Breaker & Resilience - Discussion Topics

Architecture & Design

1. **When should you use circuit breaker vs retry vs both?**

   - Transient vs persistent failures

   - Combining patterns effectively

   - Order of pattern application

2. **How do you determine the right failure threshold for a circuit breaker?**

   - Balancing sensitivity vs stability

   - Service-specific considerations

   - Monitoring and tuning approaches

3. **What are the trade-offs between thread pool isolation and semaphore-based bulkheads?**

   - Resource overhead

   - Timeout handling

   - Use cases for each approach

Real-World Scenarios

1. **Design resilience patterns for a payment processing system**

   - Which patterns are critical?

   - Fallback strategies for financial transactions

   - Idempotency considerations

2. **How would you handle a cascading failure in a microservices architecture?**

   - Detection and alerting

   - Automatic vs manual intervention

- Recovery strategies

3. **What happens when your circuit breaker opens during peak traffic?**

- Capacity planning implications

- Fallback capacity requirements

- User experience considerations

Implementation Challenges

1. **How do you test resilience patterns effectively?**

- Chaos engineering approaches

- Simulating failures in staging

- Load testing with failure injection

2. **What metrics should you monitor for circuit breakers?**

- State transitions

- Failure rates and patterns

- Latency distributions

3. **How do you handle circuit breaker state in a distributed system?**

- Local vs shared state

- Consistency across instances

- Coordination challenges

Advanced Topics

1. **How do you implement graceful degradation without losing critical functionality?**

- Feature prioritization

- Partial response strategies

- User communication during degradation

2. **What's the relationship between circuit breakers and rate limiting?**

- Complementary patterns

- When to use each

- Combined implementation strategies

3. **How do you handle retry storms in a distributed system?**

- Jitter strategies

- Backpressure mechanisms

- Coordinated retry policies