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Back To Course Home

Grokking Modern System Design Interview for Engineers & Managers

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Search Course

System Design Interviews

Introduction

Abstractions

Non-functional System Characteristics

- Availability
- Reliability
- Scalability
- Maintainability

Fault Tolerance

Back-of-the-envelope Calculations

- [ ]

Building Blocks

- [ ]

Domain Name System

- [ ]

Load Balancers

- [ ]

Databases

- [ ]

Key-value Store

- [ ]

Content Delivery Network (CDN)

- [ ]

Sequencer

- [ ]

Distributed Monitoring

- [ ]

Monitor Server-side Errors

- [ ]

Monitor Client-side Errors

- [ ]

Distributed Cache

- [ ]

Distributed Messaging Queue

- [ ]

Pub-sub

- [ ]

Rate Limiter

- [ ]

Blob Store

- [ ]

Distributed Search

- [ ]

Distributed Logging

- [ ]

Distributed Task Scheduler

- [ ]

Sharded Counters

- [ ]

Concluding the Building Blocks Discussion

- [ ]

Design YouTube

- [ ]

Design Quora

- [ ]

Design Google Maps

- [ ]

Design a Proximity Service / Yelp

- [ ]

Design Uber

- [ ]

Design Twitter

- [ ]

Design Newsfeed System

- [ ]

Design Instagram

- [ ]

Design a URL Shortening Service / TinyURL

- [ ]

Design a Web Crawler

- [ ]

Design WhatsApp

- [ ]

Design Typeahead Suggestion

- [ ]

Design a Collaborative Document Editing Service / Google Docs

- [ ]

Spectacular Failures

- [ ]

Concluding Remarks

- [ ]

Course Certificate

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Reliability

Learn about reliability, how to measure it, and its importance.

We'll cover the following

What is reliability?#

Reliability, R, is the probability that the service will perform its functions for a specified time. R measures how the service performs under varying operating conditions.

We often use **mean time between failures (MTBF)** and **mean time to repair (MTTR)** as metrics to measure R.

$$MTBF = \frac{Total\ Elapsed\ Time - Sum\ of\ Downtime}{Total\ Number\ of\ Failures}$$

$$MTTR = \frac{Total\ Maintenance\ Time}{Total\ Number\ of\ Repairs}$$

(We strive for a higher MTBF value and a lower MTTR value.)

Reliability and availability#

Reliability and availability are two important metrics to measure compliance of service to agreed-upon service level objectives (SLO).

The measurement of availability is driven by time loss, whereas the frequency and impact

of failures drive the measure of reliability. Availability and reliability are essential because they enable the stakeholders to assess the health of the service.

Reliability (`R`) and availability (`A`) are two distinct concepts, but they are related. Mathematically, `A` is a function of `R`. This means that the value of `R` can change independently, and the value of `A` depends on `R`. Therefore, it's possible to have situations where we have:

- low `A`, low `R`
- low `A`, high `R`
- high `A`, low `R`
- high `A`, high `R` (desirable)

Availability as a function of reliability

Availability

Next

Scalability

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