Grokking the Modern System Design Interview

System Design interviews now determine the seniority level at which youre hired across E

First Edition

PREFACE

This book was automatically generated from the Educative course: **Grokking the Modern System Design Interview** .

Course Overview

The ultimate guide to the System Design Interview developed by FAANG engineers. Master distributed system fundamentals, and practice with real-world interview questions \ mock interviews.

What You'll Learn

System Design interviews now determine the seniority level at which youre hired across Engineering and Product Management roles. Interviewers expect you to demonstrate technical depth, justify design choices, and build for scale. This course helps you do exactly that. Tackle carefully selected design problems, apply proven solutions, and navigate complex scalability challengeswhether in interviews or real-world product design.

Start by mastering a bottom-up approach: break down modern systems, with each component modeled as a scalable service. Then, apply the RESHADED framework to define requirements, surface constraints, and drive structured design decisions. Finally, design popular architectures using modular building blocks, and critique your solutions to improve under real interview conditions.

About This Generated Book

This content has been automatically processed and formatted from the original Educative interactive course.

- Total Chapters: 41
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How to Use This Book

This book is structured to follow the original course progression. Each chapter corresponds to a major section of the course, with individual lessons presented as sections within each chapter.

For the best learning experience, consider accessing the original interactive course on Educative.io, which includes:

- Interactive coding environments
- Hands-on exercises and quizzes

- Real-time feedback and hints
- Practical projects and assessments

Happy Learning!

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CHAPTER 1

SYSTEM DESIGN INTERVIEWS

Explore what System Design interviews involve, including essential preparation strategies, fundamental concepts, key resources, and tips to perform well.

1 Getting Ready for the System Design Interview

A **System Design interview** is a technical evaluation of a candidate's ability to build robust and scalable systems. Unlike coding interviews, which typically involve a single solution, System Design interviews are open to discussion and involve multiple possible solutions that can be re-iterated.

For many software engineers, System Design Interview questions remain a mysterious challenge. Most engineers have never actually worked on large-scale systems before, so explaining how to build one seems daunting. Since System Design interview questions are often open-ended, it can be difficult to know the best way to prepare.

However, as someone who has participated in hundreds of System Design interviews, I can assure you there is a correct way to approach these questions. With the right mindset and preparation, you can feel confident and ready to tackle any System Design question that comes your way.

It is important to note that System Design questions not only test the technical knowledge of the candidate but also their ability to approach a problem, think critically, and make trade-offs. Therefore, preparing for a System Design interview is not only about understanding the technical details but also about understanding the problem, breaking it down, and finding the most optimal solution.

Figure 1.1: System Design interviews

1.1 Author's background in System Design

Hi, I'm Fahim ul Haq, the co-founder of Educative and co-author of this course. In April 2008, I joined an internal team at Microsoft working on a large-scale project to build a distributed storage solution. Amazon launched its Simple Storage Service in 2006, and Google launched its PaaS solution, Google App Engine, the same month I joined the team, so we were in the early land grab of cloud computing. Less than two years later, that project was launched to the world as a new product category: Microsoft Azure.

When I joined the Azure team, I came from working on Exchange. I understood server storage and client management, but not at this scale and certainly not distributed across the world. It required a lot of learning on the job.

Today, the lessons I and other cloud engineers learned in those early days are codified into the System Design discipline. For many companies, the System Design Interview is instrumental in the developer interview process, which means it is vital for landing a job and setting your career on a good trajectory.

What I learned through hundreds of System Design Interviews

By the time I started Educative, I had participated in hundreds of interview loops as both interviewee and interviewer. As Educative has scaled, I have participated in hundreds more. The experience of working on web-scale systems at Facebook and Microsoft taught me two key skills for approaching the System Design Interview:

1. How to learn the fundamentals of distributed systems quickly and apply these principles in solving real-world problems

2. How to evaluate candidates while interviewing for System Design

Here's the counterintuitive part: in the System Design Interview, companies are not actually trying to test your experience with System Design. Successful candidates rarely have much experience working on large-scale systems, and interviewers know this. Again , this discipline has only been around for about fifteen years, and like everything else in software engineering, it is evolving rapidly.

> **Note:** The key is to prepare for the System Design interview with the intent to apply that knowledge.

Our System Design course is equally useful for people already working and those preparing for interviews. In this chapter, we will highlight the different aspects of a System Design interview and some helpful tips for those who are preparing for an upcoming interview. We encourage learners to read this chapter even if they aren't preparing for an interview because some of the topics covered in this chapter can be applied broadly.

1.2 How do System Design interviews differ from other interviews?

Just like with any other interview, we need to approach the System Design interviews strategically. System Design interviews are different from coding interviews. There's rarely any coding required in this interview.

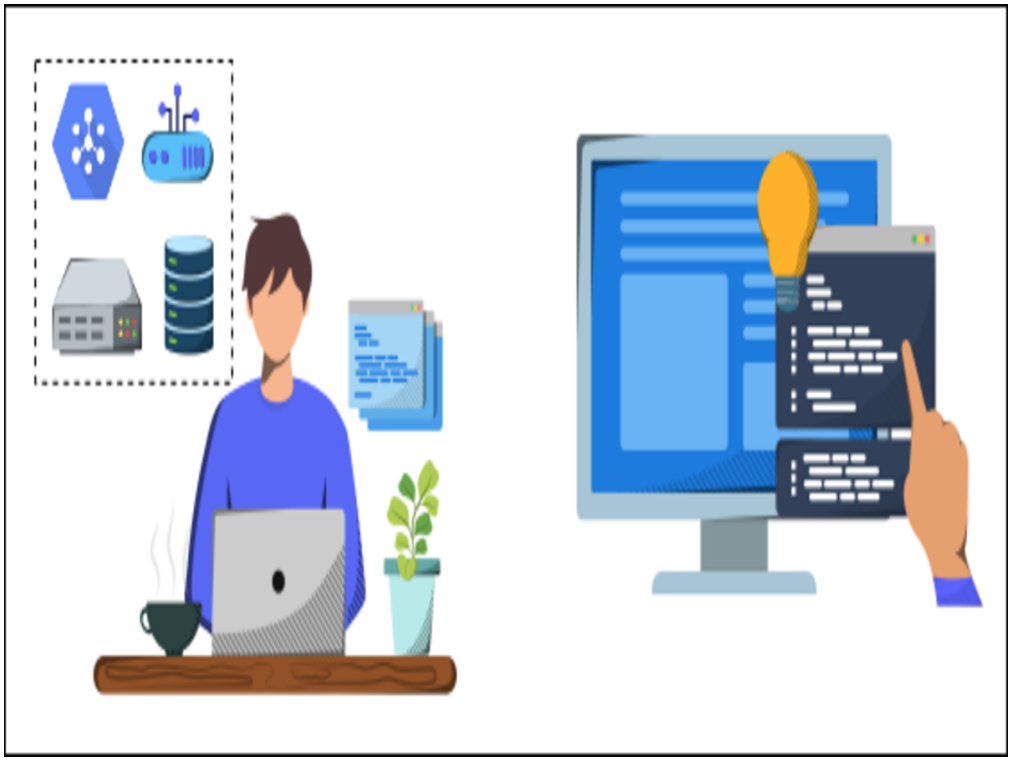


Figure 1.2: Other interviews versus a system design interviews

A System Design interview takes place at a much higher level of abstraction. We figure out the requirements and map them onto the computational components and the high-level communication protocols that connect these subsystems.

The final answer doesn't matter. What matters is the process and the journey that a good applicant takes the interviewer through.

> **Note:** As compared to coding problems in interviews, System Design is more aligned with the tasks we'll complete on our jobs.

1.3 How do we tackle a design question?

Design questions are open ended, and they're intentionally vague to start with. Such vagueness mimics the reality of modern day business.

Interviewers often ask about a well-known problem—for example, designing WhatsApp. Now , a real WhatsApp application has numerous features, and including all of them as requirements for our WhatsApp clone might not be a wise idea due to the following reasons:

- First, we'll have limited time during the interview.
- Second, working with some core functionalities of the system should be enough to exhibit our problem-solving skills.

We can tell the interviewer that there are many other things that a real WhatsApp does that we don't intend to include in our design. If the interviewer has any objections, we can change our plan of action accordingly.

Here are some best practices that we should follow during a System Design interview:

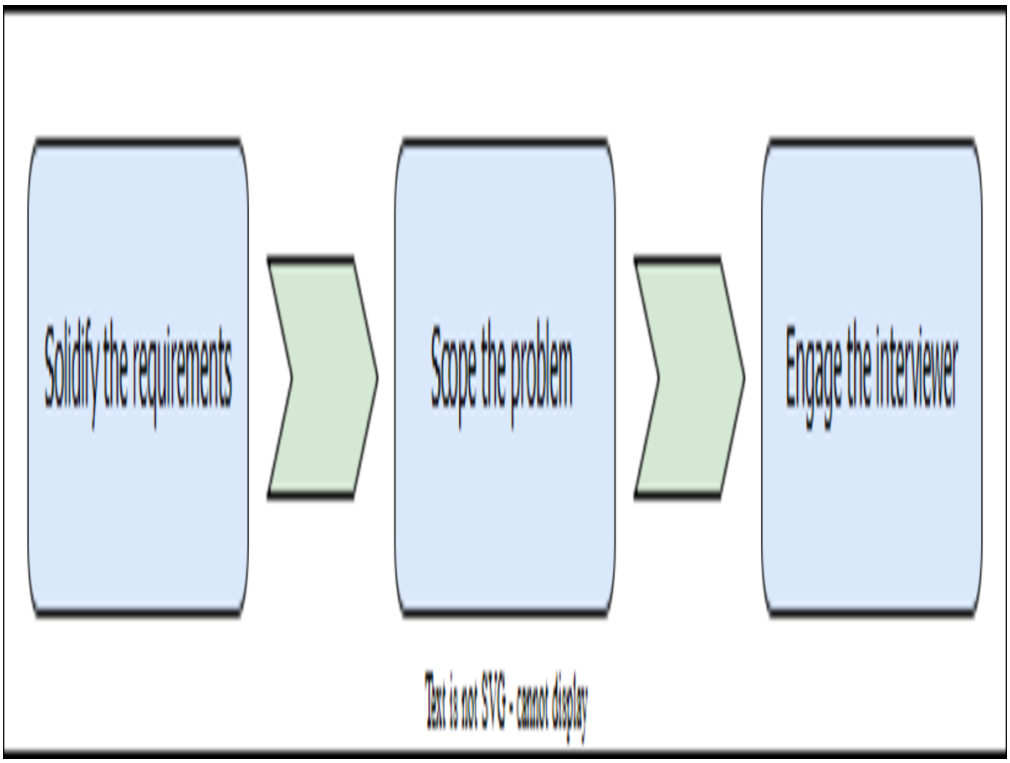


Figure 1.3: Best practices for the System Design interview

- An applicant should ask the right questions to solidify the requirements.
- Applicants also need to scope the problem so that they're able to make a good attempt at solving it within the limited time frame of the interview. System Design interviews are usually about 35 to 40 minutes long.
- Communication with the interviewer is critical. It's not a good idea to silently work on the design. Instead , we should engage with the interviewer to ensure that they understand our thought process.

Present the high-level design

At a high level, components could be frontend, load balancers, caches, data processing, and so on. The System Design explains how these components fit together.

An architectural design often represents components as boxes. The arrows between these boxes represent who talks to whom and how the boxes or components fit together collectively.

1.4 Possible questions for every System Design interview

System Design interviews often include questions related to how a design might evolve over time as some aspect of the system increases by some order of magnitude—for example, the number of users, the number of queries per second, and so on. It 's commonly believed in the systems community that when some aspect of the system increases by a factor of ten or more, the same design might not hold and might require change.

Designing and operating a bigger system requires careful thinking because designs often don't linearly scale with increasing demands on the system.

> **Quiz: Question 1:** Another question in a System Design interview might be related to why we don't design a system that's already capable of handling more work than necessary or predicted.
> **Answer:** The cost associated with complex projects is a major reason why we don't do that.

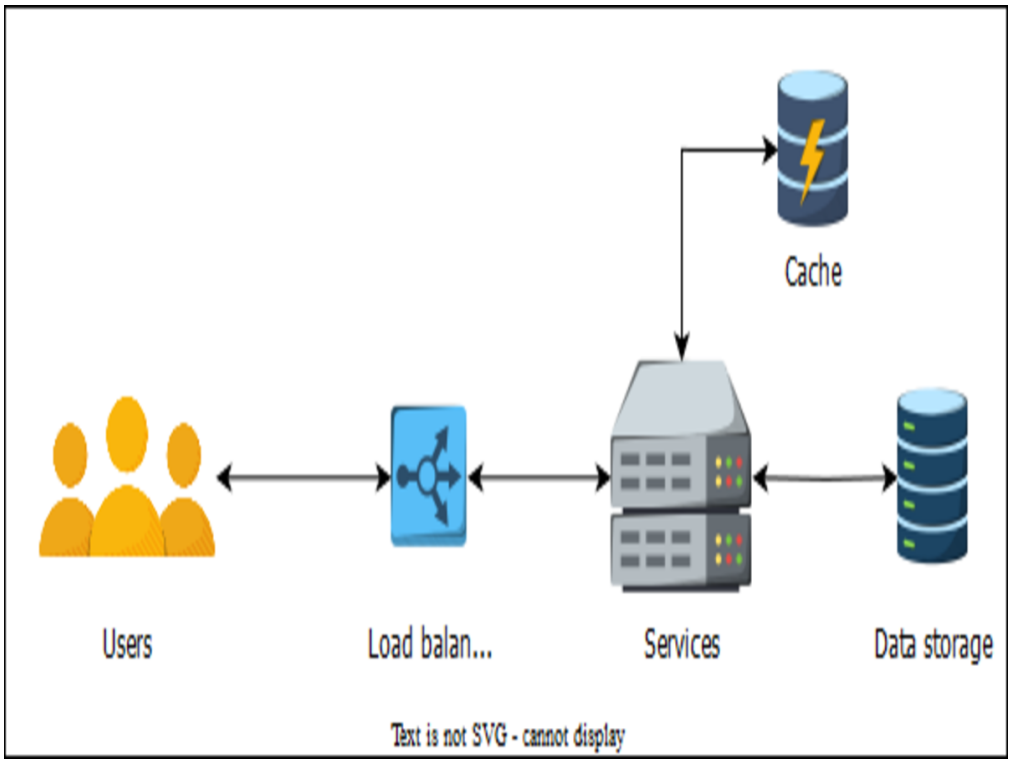


Figure 1.4: A sample design

Design challenges

Things will change, and things will break over time because of the following:

- There's no single correct approach or solution to a design problem.
- A lot is predicated on the assumptions we make.

The responsibility of the designer

As designers, we need to provide fault tolerance at the design level because almost all modern systems use off-the-shelf components, and there are millions of such components. So , something will always be breaking down, and we need to hide this undesirable reality from our customers.

1.5 Who is eligible for a System Design interview?

Traditionally, mid-to-senior level candidates with more than two years of experience get at least one System Design interview. For more senior applicants, two or three System Design interviews are common. Recently , large companies have also put forth System Design questions to some junior candidates. It 's never too early to learn System Design to grow or even expedite our careers.

1.6 Theory and practice

Most of the theory of System Design comes from the domain of distributed systems. Getting a refresher on these concepts is highly recommended. Educative has an excellent course on distributed systems that we can use to refresh our knowledge of distributed systems concepts.

Distributed systems give us guideposts for mature software principles. These include the following:

- Robustness (the ability to maintain operations during a crisis)
- Scalability
- Availability
- Performance
- Extensibility
- Resiliency (the ability to return to normal operations over an acceptable period of time post-disruption)

Such terminology also acts as a lingua franca between the interviewer and the candidate.

As an example, we might say that we need to make a trade-off between availability and consistency when network components fail because the CAP theorem indicates that we can't have both under-network partitions. Such common language helps with communication and shows that we're well-versed in both theory and practice.

When does the System Design interview occur in the hiring process?

In FAANG+ (Facebook, Apple, Amazon, Netflix, Google, Microsoft, etc.), the hiring process involves several technical and non-technical interview rounds. The System Design interview usually comes after coding interview rounds and before behavioral interviews. A typical occurrence of a System Design interview in the hiring process is depicted below:

> **Remember:** In a System Design interview, It's a candidate's job to exhibit their skills to the interviewer.

2 Key Concepts to Prepare for the System Design Interview

In a System Design Interview, interviewers ask the candidate to design a web-scale application. For example, they might ask to design platforms like Instagram, YouTube, or Uber backend.

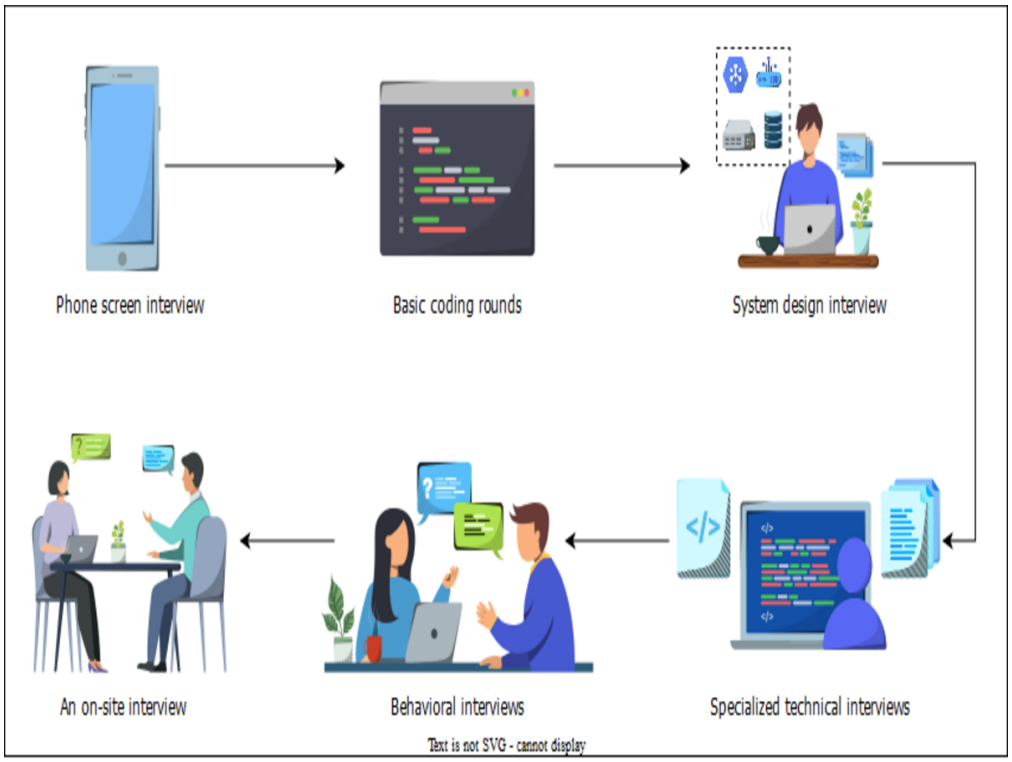


Figure 1.5: System Design interview, among other technical and nontechnical interviews

Unlike a coding interview question, System Design Interviews are free-form discussions with no right or wrong answer. Instead , the interviewer is trying to evaluate the candidate's ability to discuss the different aspects of the system and assess the solution based on the requirements that might evolve during the conversation.

The best way to imagine the conversation is that we and our colleagues are asked to design a large-scale system. We have hashed out the details on the whiteboard, and we understand the requirements, scope, and constraints before proposing a solution.

So, how do we design a system in an interview if we have never built one in real life? To crack the System Design interview, we'll need to prepare in four areas:

1. Fundamental concepts in System Design interview
2. Fundamentals of distributed system
3. The architecture of large-scale web applications
4. Design of large-scale distributed systems

Each of these dimensions flows into the next.

2.1 Why is it important to prepare strategically?

How we prepare for an interview at Amazon will probably differ from how we'd prepare for one at Slack. While the overall interview process shares similarities across various companies, there are also distinct differences that we must prepare for. This is one of the reasons why preparing strategically is so important. We 'll feel more confident in the long run if we're intentional and thorough when creating an interview prep plan.

If we don't know the fundamentals, we won't be prepared to architect a service; if we don't know how to put those systems together, we won't be able to design a specific solution; once we've designed large-scale systems, we can apply the lessons learned to enhance our base knowledge.

Let's look at each of these dimensions.

Preparing for the System Design interview

2.2 System Design interview

Fundamental concepts in System Design interview

- PACELC theorem
- Heartbeat
- AJAX polling/HTTP short-polling
- HTTP long-polling
- WebSockets
- Server-sent events (SSEs)

Fundamentals of distributed system

- Durability
- Replication
- Partitioning
- Consensus

The architecture of large-scale web applications

- HTTP & REST
- Caching
- CDNs
- N-Tier applications

Design of large-scale distributed systems

2.3 Fundamental concepts in System Design interview

In this lesson, we'll explore some concepts that are important for the System Design interview.

PACELC theorem

The CAP theorem doesn't answer the question: "What choices does a distributed system have when there are no network partitions?". The PACELC theorem answers this question.

The PACELC theorem states the following about a system that replicates data:

- if statement: A distributed system can tradeoff between availability and consistency if there's a partition.
- else statement: When the system normally runs without partitions, the system can tradeoff between latency and consistency.

The first three letters of the theorem, PAC, are the same as the CAP theorem. The ELC is the extension here. The theorem assumes we maintain high availability by replication. When there's a failure, the CAP theorem prevails. If there isn't a failure, we still have to consider the tradeoff between consistency and latency of a replicated system.

Examples of a PC/EC system include BigTable and HBase. They 'll always choose consistency, giving up availability and lower latency. Examples of a PA/EL system include Dynamo and Cassandra. They choose availability over consistency when a partition occurs. Otherwise , they choose lower latency. An example of a PA/EC system is MongoDB. In the case of a partition, it chooses availability but otherwise guarantees consistency.

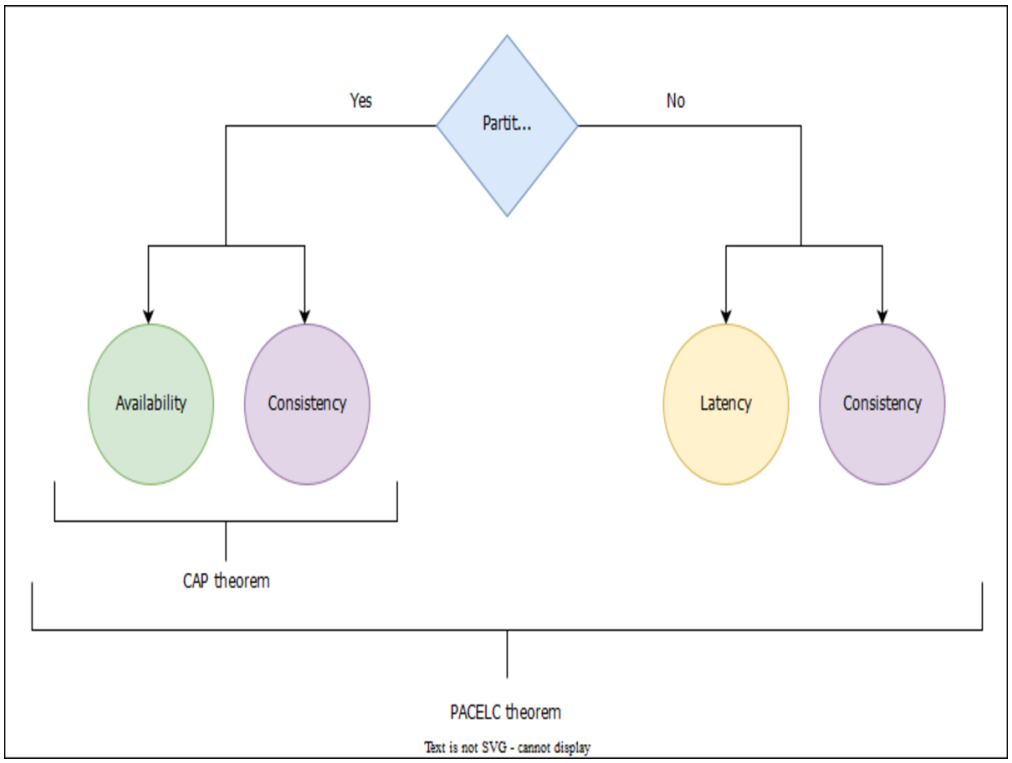


Figure 1.6: The flow of the PACELC theorem

Heartbeat

A **heartbeat message** is a mechanism that helps us detect failures in a distributed system. If there's a central server, all servers periodically send a heartbeat message to it to show that it's still alive and functioning. If there's no central server, all servers randomly select a set of servers and send that set a heartbeat message every few seconds. This way, if there are no heartbeat messages received for awhile, the system can suspect there might be a failure or a crash.

AJAX polling

Polling is a standard technique used by most AJAX apps. The idea is that the client repeatedly polls a server for data. The client makes a request and waits for the server to respond with data. If no data is available, the server returns an empty response.

HTTP long-polling

With long-polling, the client requests information from the server, but the server may not respond immediately. This technique is sometimes called **hanging GET**. If the server doesn't have any available data for the client, it'll hold the request and wait until there is data available instead of sending an empty response. Once the data becomes available, a full response is sent to the client. The client immediately re-requests information from the server so that the server will almost always have an available waiting request that it can use to deliver data in response to an event.

WebSockets

WebSocket provides full-duplex communication channels over a single TCP connection. It provides a persistent connection between a client and a server. Both parties can use this connection to start sending data at any time. The client establishes a connection through a WebSocket handshake. If the process succeeds, the server and client can begin exchanging data in both directions at any time.

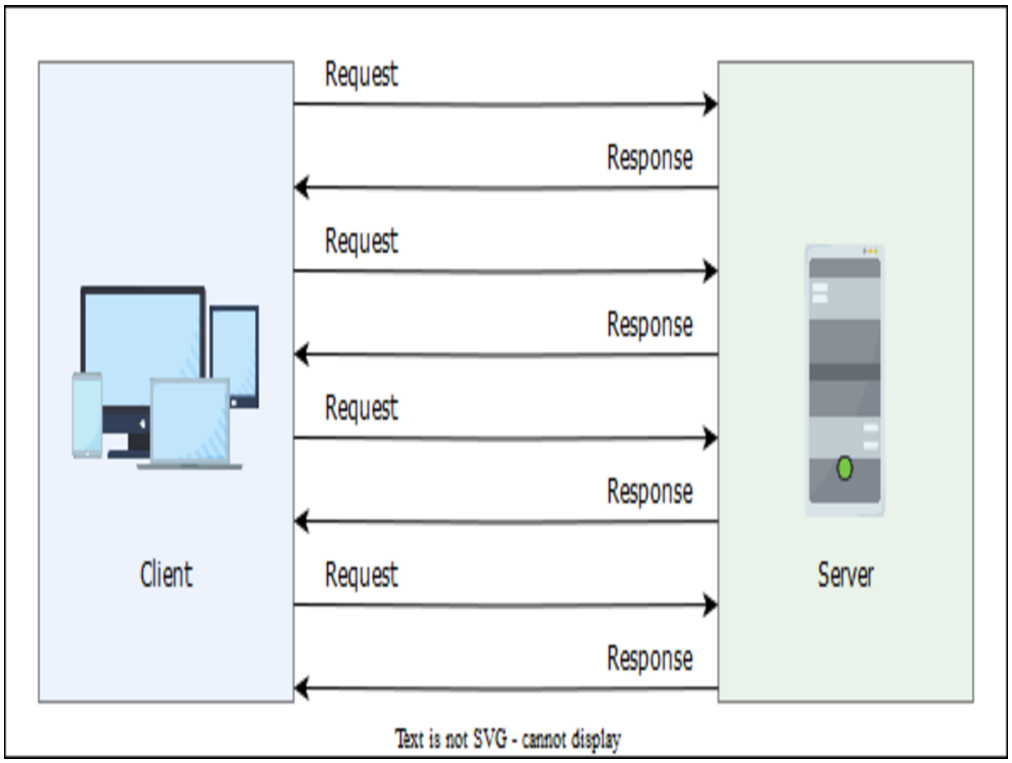


Figure 1.7: AJAX polling

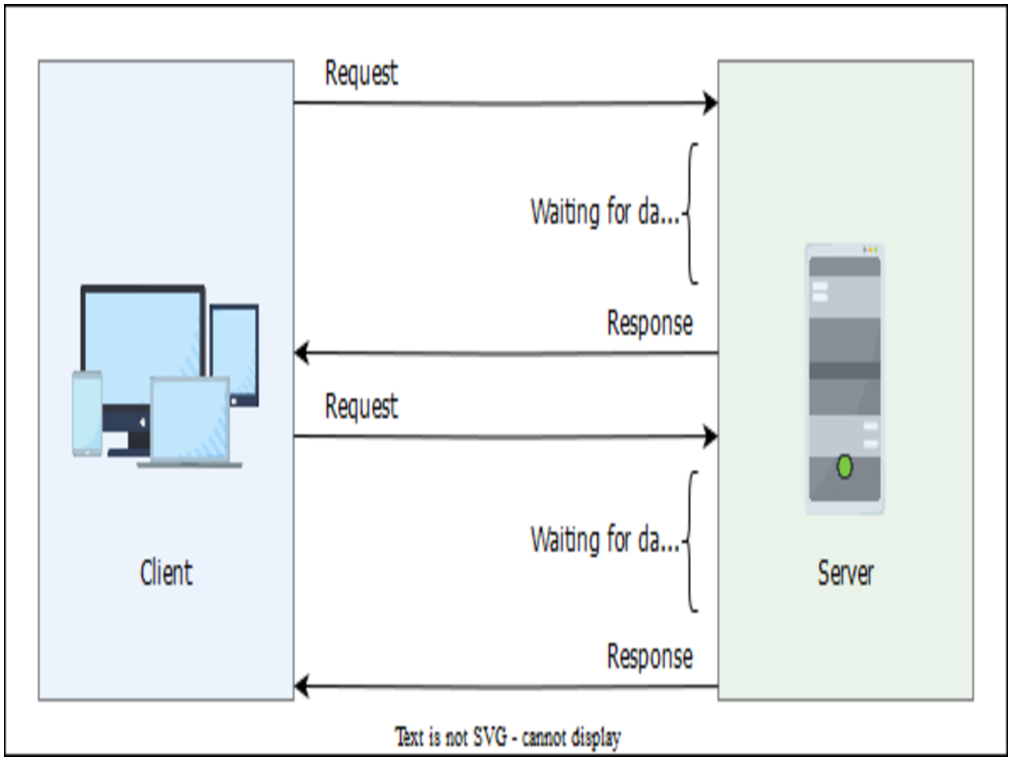


Figure 1.8: HTTP long-polling

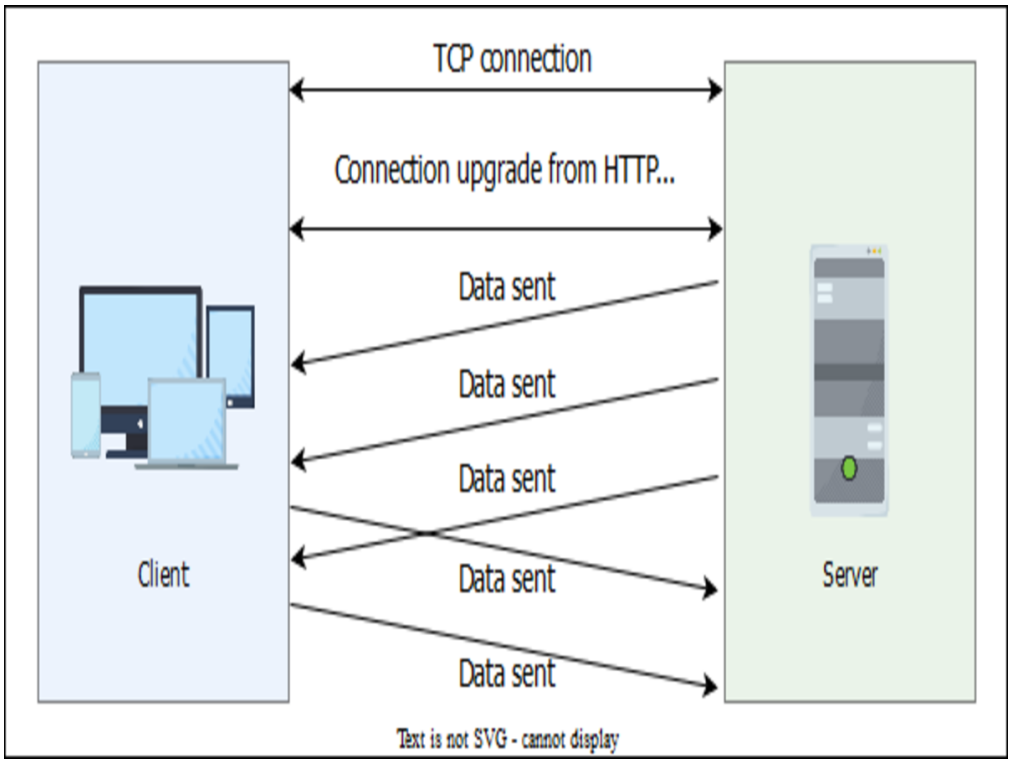


Figure 1.9: Full-duplex communication using WebSockets

Server-sent events (SSEs)

A client can establish a long-term connection with a server using SSEs. The server uses this connection to send data to a client. If the client wants to send data to the server, it would require the use of another technology or protocol.

Fundamentals of distributed system

Like with anything else, it is important to start with the basics. The fundamentals of distributed systems can give us the framework of what's possible and what's not in a given system.

We can understand the limitations of specific architectures and the trade-offs needed to achieve particular goals (e.g., consistency vs. write throughput). At the most basic level, we must start with the strengths, weaknesses, and purposes of distributed systems. We need to be able to discuss topics like:

Data durability and consistency We must understand the differences and impacts of storage solution failure and corruption rates in read-write processes.

Replication Replication is the key to unlocking data durability and consistency. It deals with backing up data but also with repeating processes at scale.

Partitioning Also called sharding; partitions divide data across different nodes within our system. As replication distributes data across nodes, partitioning distributes processes across nodes, reducing the reliance on pure replication.

Consensus One of our nodes is in Seattle, another is in Beijing, and another is in London. There is a system request at 7:05 a.m. Pacific Daylight Time. Given the travel time of data packets, can this be recorded and properly synchronized in the remote nodes, and can it be concurred? This is a simple problem

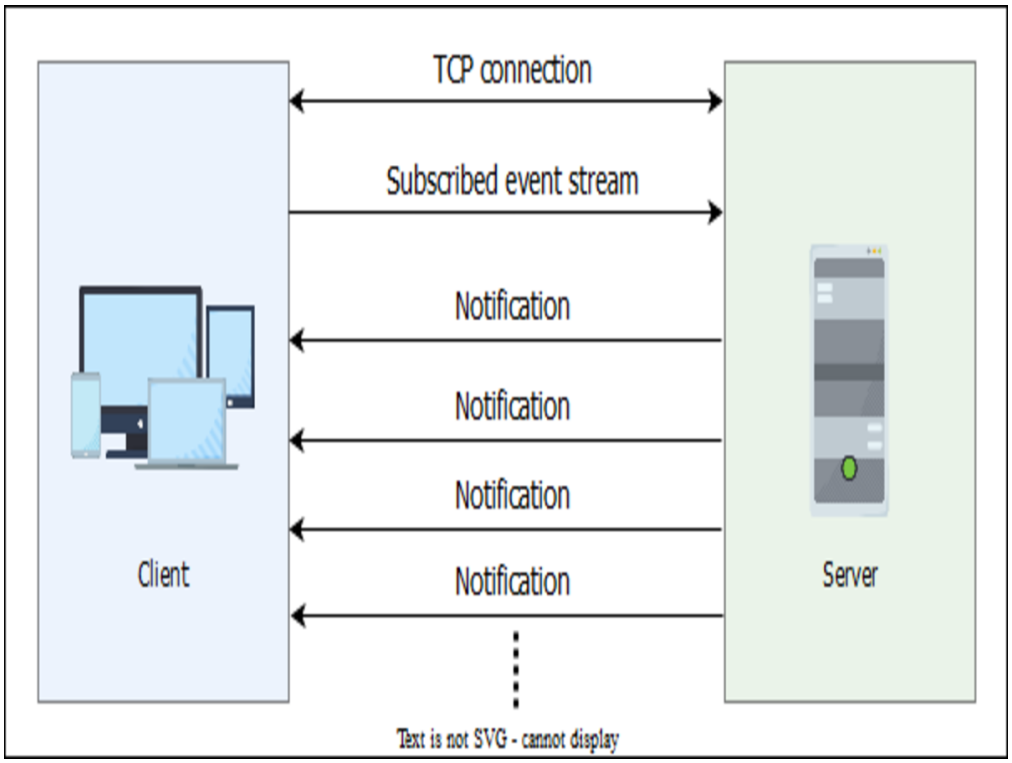


Figure 1.10: Server-sent events (SSE)

of consensus—all the nodes need to agree, which will prevent faulty processes from running and ensure consistency and replication of data and processes across the system.

Distributed transactions Once we've achieved consensus, now transactions from applications need to be committed across databases, with fault checks performed by each involved resource. Two -way and three-way communication to read, write, and commit are shared across participant nodes.

The architecture of large-scale web applications

We already know that most large-scale applications are web applications. Even if it's not, the major consumer platforms like Netflix, Twitter, and Amazon, enterprises are moving away from on-premises systems like Exchange to cloud solutions from Microsoft, Google, and AWS. That 's why it's good to understand the architecture of such systems.

We need to learn about topics such as:

N-tier applications Processing happens at various levels in a distributed system. Some processes are on the client, some on the server, and others on another server—all within one application. These processing layers are called **tiers**, and understanding how those tiers interact with each other and the specific processes they are responsible for is part of System Design for the web.

HTTP and REST HTTP is a foundational protocol on which the entire internet runs. It is the system through which we send every email, stream every Netflix movie, and browse every Amazon listing. REST is a set of design principles to directly interact with the API that is HTTP, allowing efficient, scalable systems with components isolated from each other's assumptions. Using these principles and open API makes it easier for others to build on our work or extend our capabilities with extensions to their own apps and services.

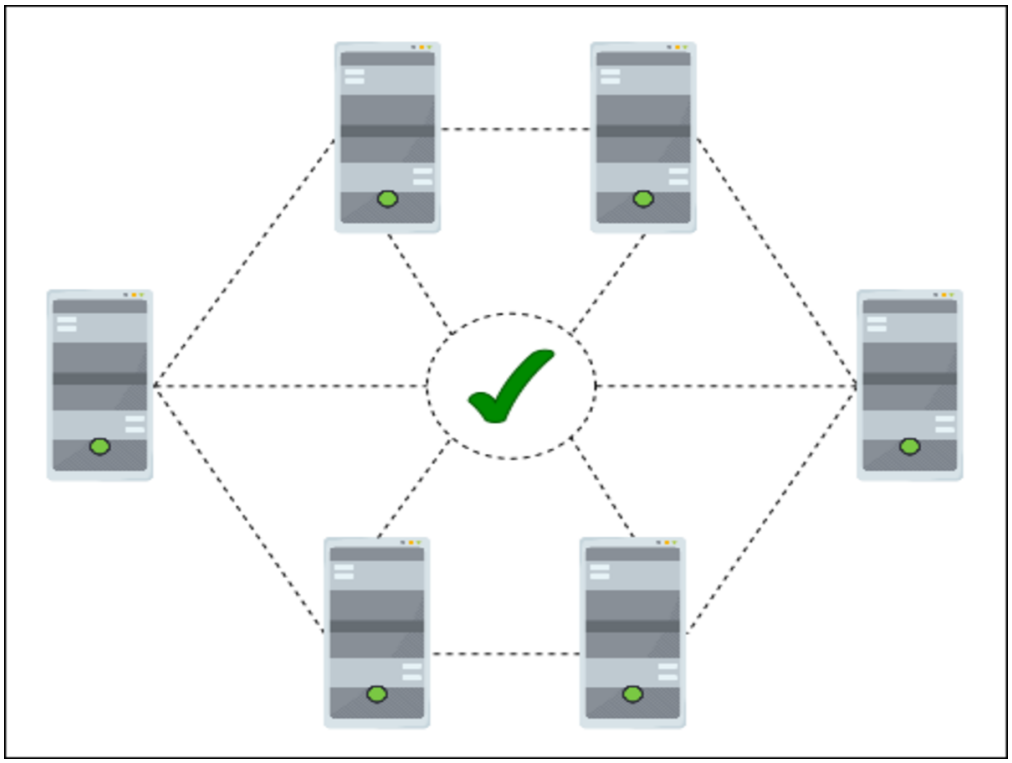


Figure 1.11: Consensus in System Design

DNS and load balancing If we have 99 simultaneous users, load-balancing through DNS routing can ensure that servers A, B, and C each handle 33 clients, rather than server A being overloaded with 99 and servers B and C sitting idle. Routing client requests to the right server, the right tier where processing happens, helps ensure system stability. We need to know how to do this.

Caching A cache makes our most frequently requested data and applications accessible to most users at high speeds. The questions for our web application are what needs to be stored in the cache, how we direct traffic to the cache, and what happens when we don't have what we want in the cache.

Stream processing Stream processing applies uniform processes to the data stream. If an application has continuous, consistent data passing through it, then stream processing allows efficient use of local resources within the application.

Design of large-scale distributed systems

This can seem like a lot, but it honestly takes only a few weeks of prep—less if we have a solid foundation to build on.

Once we know the basics of distributed systems and web architecture, it is time to apply this learning and design real-world systems. Finding and optimizing potential solutions to these problems will give us the tools to approach the System Design interview with confidence.

Once we are ready to practice our skills, we can take on some sample problems from real-world interviews, and tips and approaches to build ten different web services.

2.4 Summary

The world is more connected than ever, with almost all devices utilizing System Design and distributed systems.

Technical interviews, especially at big tech companies, are leaning more and more toward System Design interview questions. We should be well prepared to tackle any questions that come our way. Common System Design interview questions include creating a URL shortener with web crawlers, understanding the CAP theorem, discussing SQL and NoSQL databases, identifying use cases for various data models, addressing latency issues, constructing algorithms and data structures, and so on.

Consumers and businesses alike are online, and even legacy programs are migrating to the cloud. Distributed systems are the present and future of the software engineering discipline. As System Design Interview questions make up a bigger part of the developer interview, having a working knowledge of distributed systems will pay dividends in our career.

3 Resources to Prepare for a System Design Interview

Substantial preparation is necessary to increase our odds of getting the job we apply for. Depending on a candidate's seniority and proficiency, different candidates need different times for interview preparation. For an average candidate, three to four months might be required to prepare for a System Design interview.

3.1 This course

This course helps readers learn or brush up on their system design skills. We 've carefully curated some traditional and fresh design problems to cover the substantial depth and breadth of the system design. The following activities might expedite the preparation and add variety and further depth to a candidate's knowledge.

3.2 Technical blogs/System Design interview articles

Many companies regularly publish the technical details of their significant work in the form of technical blogs.

> **Quiz: Question 1:** Why are companies eager to share the technical details of their work?
> **Answer:** The reason for such sharing is to excite the technical community about the fact that the company is solving hard problems. They also hope to motivate more people to join their company. Such public blogs can also help to advertise company products to B2B customers. Additionally, such material helps the company train potential future workers on their own time. Lastly, the main reason is to let the learner know that the company has deep expertise in the specific domain or subject matter.
>
> **Note:** There's a fine line between what can be held back by a company due to a competitive edge and what can be made public.

We can study these blogs to gain insight into the company's challenges or problems and the changes it made in the design to cope with them.

> **Note:** Staying informed about these innovations is important for professionals, and even more crucial for an applicant.

Some important technical blogs are Engineering at Meta, Meta Research, AWS Architecture Blog, Amazon Science Blog, Netflix TechBlog, Google Research, Engineering at Quora, Uber Engineering Blog, Databricks Blog, Pinterest Engineering, BlackRock Engineering, Lyft Engineering, and Salesforce Engineering.

We at Educative are open to sharing technical knowledge with our learners. Our comprehensive repository of blogs comprises interview prep guides, FAANG-specific insights, and in-depth technical blogs. FAANG-specific System Design interview articles include Google, Microsoft, Netflix, Amazon, and Meta.

A few other guides and articles related to technical concepts are given in the following sections.

System Design interview guides

- A beginner's guide to System Design Interviews at FAANG/MAANG
- System Design interview guide: Tips from an industry expert
- Simplify System Design interviews with the RESHADED approach

System Design interview technical insights

- 25 essential System Design Interview Questions in 2024
- A complete guide to System Design caching
- Insights in System Design: Throughput loss due to high fan-in
- Understanding the Causal Consistency Model
- Understanding the Sequential Consistency Model

- Amazon System Design case study: How Amazon scales for Prime Day

We should always take non-peer-reviewedA peer-reviewed material could be a research paper that was critiqued by at least three domain expert researchers, and all points were fixed to reviewers' satisfaction before publishing in a reputable conference. material with a grain of salt. Think about what blogs say critically and with technical acumen to decide if what they say makes sense or not. If it doesn't make sense, that could be an excellent opportunity to discuss the issue with peers.

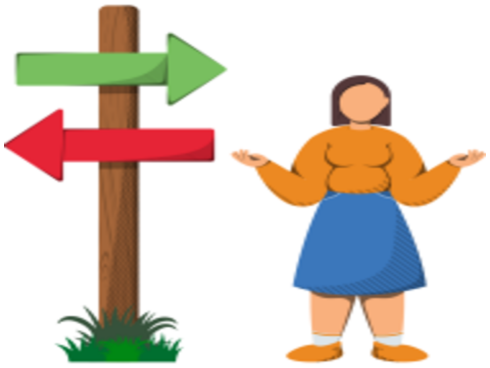
> **Note:** You can explore Educative's blogs to find more technical articles like this one to help you ace System Design interviews.

3.3 Ask why a system works

By asking themselves the right questions, candidates can think through dense and ambiguous situations.

- Learn how popular applications work at a high level—for example, Instagram, Twitter, and so on.
- Start to understand and ask why some component was used instead of another—for example, Firebase versus SQL.
- Build serious side projects. Start with a simple product and then improve and refine it.
- Build a system from scratch, and get familiar with all the processes and details of its construction.

We can clone a popular application without tutorials.



4 The right direction

System design deals with components at a higher level, and we need to avoid going into the trenches.

> We should focus less on mechanics and more on trade-offs.

For example, discussing whether to use the Room library instead of raw SQLite isn't helpful because the Room library is a mere wrapper around SQLite. A better discussion might be about using traditional databases like MySQL or NoSQL stores like MongoDB. The second discussion will help us pinpoint trade-offs between the two.

We should start with high-level stuff because the low-level details will automatically come up.

4.1 Mock interviews

Mock interviews are a great way to prepare for System Design interviews. They involve pairing up with a friend and allowing them to ask questions. If it's not possible to use a friend, another strategy is to record ourselves and play the role of both interviewer and interviewee. With this approach, we can critique ourselves or ask a knowledgeable friend for feedback.

Note: It's a good idea to get experience by sitting in real interviews in tech companies. Once you've been through an interview or two, you'll be better able to evaluate what went right and what didn't. However, if you don't have that opportunity, you can get a feel of a real interview by practicing with our personalized System Design mock interviewer.

5 The Dos and Donts of the System Design Interview

5.1 What to do during the interview

We stress that a candidate should make an effort to avoid looking unoriginal. The interviewer has probably asked the same question to many candidates. Reproducing a run-of-the-mill design might not impress the interviewer.
At the same time, an interview can be a stressful situation. Having a plan to attack the problem might be a good strategy. Depending on the candidate, there can be multiple strategies to attack a design problem. We suggest the following technique.

5.2 Strategize, then divide and conquer

We recommend including the following activities somewhere in the interview:
Component type 'LazyLoadPlaceholder' not yet supported.

Ask refining questions

We need to understand the design problem and its requirements. To do this, we can put on our product manager hat and prioritize the main features by asking the interviewer refining questions. The idea is to go on a journey with the interviewer about why our design is good. These interviews are designed to gauge if we're able to logically derive a system out of vague requirements.
We should ensure that we're solving the right problem. Often, it helps to divide the requirements into two groups:

- Requirements that the clients need directly—for example, the ability to send messages in near real-time to friends.
- Requirements that are needed indirectly—for example, messaging service performance shouldn't degrade with increasing user load.

  Note: Professionals call these functional and nonfunctional requirements.

Handle data

We need to identify and understand data and its characteristics in order to look for appropriate data storage systems and data processing components for the system design.
Some important questions to ask ourselves when searching for the right systems and components include the following:

- What's the size of the data right now?

- At what rate is the data expected to grow over time?
- How will the data be consumed by other subsystems or end users?
- Is the data read-heavy or write-heavy?
- Do we need strict consistency of data, or will eventual consistency work?
- What's the durability target of the data?
- What privacy and regulatory requirements do we require for storing or transmitting user data?

Discuss the components

At some level, our job might be perceived as figuring out which components we'll use, where they'll be placed, and how they'll interact with each other. An example could be the type of database—will a conventional database work, or should we use a NoSQL database?

There might be cases where we have strong arguments to use NoSQL databases, but our interviewer may insist that we use a traditional database. What should we do in such a case?

Component type 'SpoilerEditor' not yet supported.

> **Note:** We often abstract away the details of the components as boxes and use arrows to show the interactions between them. It might help to define the user-facing APIs at a high level to further understand system data and interaction requirements.

Front-end components, load balancers, caches, databases, firewalls, and CDNs are just some examples of system components.

Discuss trade-offs

Remember that there's no one correct answer to a design problem. If we give the same problem to two different groups, they might come up with different designs.

These are some of the reasons why such diversity exists in design solutions:

- Different components have different pros and cons. We'll need to carefully weigh what works for us.

- Different choices have different costs in terms of money and technical complexity. We need to efficiently utilize our resources.

- Every design has its weaknesses. As designers, we should be aware of all of them, and we should have a follow-up plan to tackle them.

We should point out weaknesses in our design to our interviewer and explain why we haven't tackled them yet. An example could be that our current design can't handle ten times more load, but we don't expect our system to reach that level anytime soon. We have a monitoring system to keep a very close eye on load growth over time so that a new design can be implemented in time. This is an example where we intentionally had a weakness to reduce system cost.

Something is always failing in a big system. We need to integrate fault tolerance and security into our design.

5.3 What not to do in an interview

Here are a few things that we should avoid doing in a system design interview:

- Don't write code in a system design interview.
- Don't start building without a plan.
- Don't work in silence.
- Don't describe numbers without reason. We have to frame it.
- If we don't know something, we don't paper over it, and we don't pretend to know it.

  Note: If an interviewer asks us to design a system we haven't heard of, we should just be honest and tell them so. The interviewer will either explain it to us or they might change the question.

6 Let AI Evaluate your System Design Interview Preparation

Use our interactive AI tool to revise your concepts and get additional tips to ace your system design interview.

6.1 Steps in designing systems

Let's determine the key steps in designing systems. From the list provided below, identify the correct sequence of steps to build large-scale distributed systems. It 's also important to briefly describe each of the steps. Here are the steps (not in the correct order):

- Identify shortcomings in the initial design
- Determine system requirements and constraints
- Discuss trade-offs and improve iteratively
- Recognize components
- Generate design

Use the AI assessment widget below to submit your solution and get an interactive response.
Get the order of the steps correct and receive some bonus tips to ace your interview!
Component type 'Notepad' not yet supported.

6.2 Revision assistant

Got time? We want to ensure you retain this chapter's key takeaways. Here's an exercise to help revise the key concepts. From the previous three lessons, summarize your learnings by answering these three questions:

1. What is a system design interview?
2. How do we prepare for success?
3. How do we perform well?

Our AI revision assistant will guide you along the way. Use the text area given below to provide a response to these questions.

Component type 'Notepad' not yet supported.

CHAPTER 2

INTRODUCTION

Get familiar with System Design and the course structure, including prerequisites that set the foundation for mastering System Design interviews.

1 Introduction to Modern System Design

Section content for "Introduction to Modern System Design" is being generated.

Section Details:

- Section ID: 6516310599270400
- Section Slug: introduction-to-modern-system-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Course Structure for Modern System Design

Section content for "Course Structure for Modern System Design" is being generated.

Section Details:

- Section ID: 6462916757028864
- Section Slug: course-structure-for-modern-system-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 3

ABSTRACTIONS

Grasp the fundamentals of abstractions in distributed systems, focusing on network abstraction, consistency, and failure models crucial for System Design.

1 Why Are Abstractions Important?

Section content for "Why Are Abstractions Important?" is being generated.

Section Details:

- Section ID: 6539129789087744
- Section Slug: why-are-abstractions-important
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Network Abstractions: Remote Procedure Calls

Section content for "Network Abstractions: Remote Procedure Calls" is being generated.

Section Details:

- Section ID: 6670339758620672
- Section Slug: network-abstractions-remote-procedure-calls
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Spectrum of Consistency Models

Section content for "Spectrum of Consistency Models" is being generated.

Section Details:

- Section ID: 5131359030345728
- Section Slug: spectrum-of-consistency-models
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 The Spectrum of Failure Models

Section content for "The Spectrum of Failure Models" is being generated.

Section Details:

- Section ID: 5023279047245824

- Section Slug: the-spectrum-of-failure-models
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 4

NON-FUNCTIONAL SYSTEM CHARACTERISTICS

Take a look at the key non-functional characteristics like availability, reliability, scalability, and fault tolerance in System Design.

1 Availability

Section content for "Availability" is being generated.

Section Details:

- Section ID: 5983424656965632
- Section Slug: availability
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Reliability

Section content for "Reliability" is being generated.

Section Details:

- Section ID: 5173989319639040
- Section Slug: reliability
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Scalability

Section content for "Scalability" is being generated.

Section Details:

- Section ID: 5991400583200768
- Section Slug: scalability
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Maintainability

Section content for "Maintainability" is being generated.

Section Details:

- Section ID: 6540133490229248

- Section Slug: maintainability
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Fault Tolerance

Section content for "Fault Tolerance" is being generated.

Section Details:

- Section ID: 6693927511392256
- Section Slug: fault-tolerance
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Let AI Evaluate Your Understanding of Non-Functional Requirements

Section content for "Let AI Evaluate Your Understanding of Non-Functional Requirements" is being generated.

Section Details:

- Section ID: 6669534840487936
- Section Slug: let-ai-evaluate-your-understanding-of-non-functional-requirements
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 5

BACK-OF-THE-ENVELOPE CALCULATIONS

Learn how to estimate resource needs like servers, storage, and bandwidth using back-of-the-envelope calculations for System Design.

1 Put Back-of-the-envelope Numbers in Perspective

Section content for "Put Back-of-the-envelope Numbers in Perspective" is being generated.

Section Details:

- Section ID: 5711642666467328
- Section Slug: put-back-of-the-envelope-numbers-in-perspective
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Examples of Resource Estimation

Section content for "Examples of Resource Estimation" is being generated.

Section Details:

- Section ID: 4766860129599488
- Section Slug: examples-of-resource-estimation
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 6

BUILDING BLOCKS

Explore the essential building blocks required for modern System Design, which will form the foundation for scalable systems later in the course.

1 Introduction to Building Blocks for Modern System Design

Section content for "Introduction to Building Blocks for Modern System Design" is being generated.

Section Details:

- Section ID: 6061247618875392
- Section Slug: introduction-to-building-blocks-for-modern-system-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 7

DOMAIN NAME SYSTEM

Discover how DNS works and its role in System Design, including detailed insights into its design and functionality.

1 Introduction to Domain Name System (DNS)

Section content for "Introduction to Domain Name System (DNS)" is being generated.

Section Details:

- Section ID: 5728619204182016
- Section Slug: introduction-to-domain-name-system-dns
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 How the Domain Name System Works

Section content for "How the Domain Name System Works" is being generated.

Section Details:

- Section ID: 4570386150981632
- Section Slug: how-the-domain-name-system-works
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 8

LOAD BALANCERS

Take a closer look at load balancers, their placement, and algorithms, including local and global load balancers and different tiers of load balancers.

1 Introduction to Load Balancers

Section content for "Introduction to Load Balancers" is being generated.

Section Details:

- Section ID: 4521972679049216
- Section Slug: introduction-to-load-balancers
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Global and Local Load Balancing

Section content for "Global and Local Load Balancing" is being generated.

Section Details:

- Section ID: 5238392749293568
- Section Slug: global-and-local-load-balancing
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Advanced Details of Load Balancers

Section content for "Advanced Details of Load Balancers" is being generated.

Section Details:

- Section ID: 6596709789990912
- Section Slug: advanced-details-of-load-balancers
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 9

DATABASES

Explore databases and their types, data replication, partitioning, and trade-offs essential for designing distributed systems.

1 Introduction to Databases

Section content for "Introduction to Databases" is being generated.

Section Details:

- Section ID: 4901035478351872
- Section Slug: introduction-to-databases
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Types of Databases

Section content for "Types of Databases" is being generated.

Section Details:

- Section ID: 6521598450597888
- Section Slug: types-of-databases
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Data Replication

Section content for "Data Replication" is being generated.

Section Details:

- Section ID: 5241733675220992
- Section Slug: data-replication
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Data Partitioning

Section content for "Data Partitioning" is being generated.

Section Details:

- Section ID: 6254160546103296

- Section Slug: data-partitioning
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Trade-offs in Databases

Section content for "Trade-offs in Databases" is being generated.

Section Details:

- Section ID: 5531655174881280
- Section Slug: trade-offs-in-databases
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 10

KEY-VALUE STORE

Learn how to design a scalable key-value store, focusing on replication, versioning, and fault tolerance.

1 System Design: The Key-value Store

Section content for "System Design: The Key-value Store" is being generated.

Section Details:

- Section ID: 4747701493432320
- Section Slug: system-design-the-key-value-store
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Design of a Key-value Store

Section content for "Design of a Key-value Store" is being generated.

Section Details:

- Section ID: 5610927277211648
- Section Slug: design-of-a-key-value-store
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Ensure Scalability and Replication

Section content for "Ensure Scalability and Replication" is being generated.

Section Details:

- Section ID: 5256346714243072
- Section Slug: ensure-scalability-and-replication
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Versioning Data and Achieving Configurability

Section content for "Versioning Data and Achieving Configurability" is being generated.

Section Details:

- Section ID: 5979802812547072

- Section Slug: versioning-data-and-achieving-configurability
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Enable Fault Tolerance and Failure Detection

Section content for "Enable Fault Tolerance and Failure Detection" is being generated.

Section Details:

- Section ID: 5842597234343936
- Section Slug: enable-fault-tolerance-and-failure-detection
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 11

CONTENT DELIVERY NETWORK (CDN)

Discover CDN design, content caching strategies, consistency, and techniques for efficient content delivery.

1 System Design: The Content Delivery Network (CDN)

Section content for "System Design: The Content Delivery Network (CDN)" is being generated.

Section Details:

- Section ID: 6624266925899776
- Section Slug: system-design-the-content-delivery-network-cdn
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Introduction to a CDN

Section content for "Introduction to a CDN" is being generated.

Section Details:

- Section ID: 5560114131501056
- Section Slug: introduction-to-a-cdn
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a CDN

Section content for "Design of a CDN" is being generated.

Section Details:

- Section ID: 5883973992972288
- Section Slug: design-of-a-cdn
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 In-depth Investigation of CDN: Part 1

Section content for "In-depth Investigation of CDN: Part 1" is being generated.

Section Details:

- Section ID: 5267936226312192

- Section Slug: in-depth-investigation-of-cdn-part-1
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 In-depth Investigation of CDN: Part 2

Section content for "In-depth Investigation of CDN: Part 2" is being generated.

Section Details:

- Section ID: 5382114350727168
- Section Slug: in-depth-investigation-of-cdn-part-2
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Evaluation of CDN's Design

Section content for "Evaluation of CDN's Design" is being generated.

Section Details:

- Section ID: 5971383947624448
- Section Slug: evaluation-of-cdns-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

7 Quiz on CDN's Design

Section content for "Quiz on CDN's Design" is being generated.

Section Details:

- Section ID: 6624605451583488
- Section Slug: quiz-on-cdns-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 12

SEQUENCER

Learn how to design a sequencer for generating unique IDs, focusing on causality and consistency in distributed systems.

1 System Design: Sequencer

Section content for "System Design: Sequencer" is being generated.

Section Details:

- Section ID: 6499939719053312
- Section Slug: system-design-sequencer
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Design of a Unique ID Generator

Section content for "Design of a Unique ID Generator" is being generated.

Section Details:

- Section ID: 5216880444309504
- Section Slug: design-of-a-unique-id-generator
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Unique IDs with Causality

Section content for "Unique IDs with Causality" is being generated.

Section Details:

- Section ID: 5836711686307840
- Section Slug: unique-ids-with-causality
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 13

DISTRIBUTED MONITORING

Explore a distributed monitoring systems basics, types, and metrics for effective monitoring.

1 System Design: Distributed Monitoring

Section content for "System Design: Distributed Monitoring" is being generated.

Section Details:

- Section ID: 6310983387840512
- Section Slug: system-design-distributed-monitoring
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Introduction to Distributed Monitoring

Section content for "Introduction to Distributed Monitoring" is being generated.

Section Details:

- Section ID: 4721220683038720
- Section Slug: introduction-to-distributed-monitoring
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Prerequisites of a Monitoring System

Section content for "Prerequisites of a Monitoring System" is being generated.

Section Details:

- Section ID: 6071737539624960
- Section Slug: prerequisites-of-a-monitoring-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 14

MONITOR SERVER-SIDE ERRORS

Learn how to design a monitoring system and visualize it for tracking server-side errors in real-time.

1 Design of a Monitoring System

Section content for "Design of a Monitoring System" is being generated.

Section Details:

- Section ID: 5485445638520832
- Section Slug: design-of-a-monitoring-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Detailed Design of a Monitoring System

Section content for "Detailed Design of a Monitoring System" is being generated.

Section Details:

- Section ID: 6718061809238016
- Section Slug: detailed-design-of-a-monitoring-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Visualize Data in a Monitoring System

Section content for "Visualize Data in a Monitoring System" is being generated.

Section Details:

- Section ID: 5232629720285184
- Section Slug: visualize-data-in-a-monitoring-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 15

MONITOR CLIENT-SIDE ERRORS

Discover how to design a system to monitor client-side errors, ensuring robust and reliable applications.

1 Focus on Client-side Errors in a Monitoring System

Section content for "Focus on Client-side Errors in a Monitoring System" is being generated.

Section Details:

- Section ID: 4768611427680256
- Section Slug: focus-on-client-side-errors-in-a-monitoring-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Design of a Client-side Monitoring System

Section content for "Design of a Client-side Monitoring System" is being generated.

Section Details:

- Section ID: 4769741293486080
- Section Slug: design-of-a-client-side-monitoring-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 16

DISTRIBUTED CACHE

Unpack the design of a distributed cache, focusing on high-level and detailed designs and evaluating its performance.

1 System Design: The Distributed Cache

Section content for "System Design: The Distributed Cache" is being generated.

Section Details:

- Section ID: 5053577315221504
- Section Slug: system-design-the-distributed-cache
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Background of Distributed Cache

Section content for "Background of Distributed Cache" is being generated.

Section Details:

- Section ID: 5353674067148800
- Section Slug: background-of-distributed-cache
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 High-level Design of a Distributed Cache

Section content for "High-level Design of a Distributed Cache" is being generated.

Section Details:

- Section ID: 5103962818084864
- Section Slug: high-level-design-of-a-distributed-cache
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Detailed Design of a Distributed Cache

Section content for "Detailed Design of a Distributed Cache" is being generated.

Section Details:

- Section ID: 4731033765543936

- Section Slug: detailed-design-of-a-distributed-cache
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of a Distributed Cache's Design

Section content for "Evaluation of a Distributed Cache's Design" is being generated.

Section Details:

- Section ID: 6094096892690432
- Section Slug: evaluation-of-a-distributed-caches-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Memcached versus Redis

Section content for "Memcached versus Redis" is being generated.

Section Details:

- Section ID: 5441771256938496
- Section Slug: memcached-versus-redis
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 17

DISTRIBUTED MESSAGING QUEUE

Examine the design of a distributed messaging queue, addressing requirements, design considerations, and performance evaluations.

1 System Design: The Distributed Messaging Queue

Section content for "System Design: The Distributed Messaging Queue" is being generated.

Section Details:

- Section ID: 5148400467312640
- Section Slug: system-design-the-distributed-messaging-queue
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Distributed Messaging Queues Design

Section content for "Requirements of a Distributed Messaging Queues Design" is being generated.

Section Details:

- Section ID: 5806944861814784
- Section Slug: requirements-of-a-distributed-messaging-queues-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Considerations of a Distributed Messaging Queues Design

Section content for "Considerations of a Distributed Messaging Queues Design" is being generated.

Section Details:

- Section ID: 6191662786674688
- Section Slug: considerations-of-a-distributed-messaging-queues-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Design of a Distributed Messaging Queue: Part 1

Section content for "Design of a Distributed Messaging Queue: Part 1" is being generated.

Section Details:

- Section ID: 6330012742975488

- Section Slug: design-of-a-distributed-messaging-queue-part-1
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Design of a Distributed Messaging Queue: Part 2

Section content for "Design of a Distributed Messaging Queue: Part 2" is being generated.

Section Details:

- Section ID: 4953511267139584
- Section Slug: design-of-a-distributed-messaging-queue-part-2
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Evaluation of a Distributed Messaging Queues Design

Section content for "Evaluation of a Distributed Messaging Queues Design" is being generated.

Section Details:

- Section ID: 4654974423793664
- Section Slug: evaluation-of-a-distributed-messaging-queues-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

7 Quiz on the Distributed Messaging Queues Design

Section content for "Quiz on the Distributed Messaging Queues Design" is being generated.

Section Details:

- Section ID: 5261732032806912
- Section Slug: quiz-on-the-distributed-messaging-queues-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 18

PUB-SUB

Learn the design of a pub-sub system, focusing on how to implement and optimize this communication pattern in distributed systems.

1 System Design: The Pub-sub Abstraction

Section content for "System Design: The Pub-sub Abstraction" is being generated.

Section Details:

- Section ID: 4996814243889152
- Section Slug: system-design-the-pub-sub-abstraction
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Introduction to Pub-sub

Section content for "Introduction to Pub-sub" is being generated.

Section Details:

- Section ID: 5155663642099712
- Section Slug: introduction-to-pub-sub
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Pub-sub System

Section content for "Design of a Pub-sub System" is being generated.

Section Details:

- Section ID: 5367894619193344
- Section Slug: design-of-a-pub-sub-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 19

RATE LIMITER

Explore the design of a rate limiter, covering essential algorithms and considerations for managing traffic and ensuring system stability.

1 System Design: The Rate Limiter

Section content for "System Design: The Rate Limiter" is being generated.

Section Details:

- Section ID: 4770834422169600
- Section Slug: system-design-the-rate-limiter
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Rate Limiters Design

Section content for "Requirements of a Rate Limiters Design" is being generated.

Section Details:

- Section ID: 5887506125422592
- Section Slug: requirements-of-a-rate-limiters-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Rate Limiter

Section content for "Design of a Rate Limiter" is being generated.

Section Details:

- Section ID: 5287353329647616
- Section Slug: design-of-a-rate-limiter
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Rate Limiter Algorithms

Section content for "Rate Limiter Algorithms" is being generated.

Section Details:

- Section ID: 5447913559293952

- Section Slug: rate-limiter-algorithms
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Quiz on the Rate Limiters Design

Section content for "Quiz on the Rate Limiters Design" is being generated.

Section Details:

- Section ID: 6564352194248704
- Section Slug: quiz-on-the-rate-limiters-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 20

BLOB STORE

Learn how to design a blob store, focusing on scalability, storage, and performance evaluation.

1 System Design: A Blob Store

Section content for "System Design: A Blob Store" is being generated.

Section Details:

- Section ID: 4862646238576640
- Section Slug: system-design-a-blob-store
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Blob Store's Design

Section content for "Requirements of a Blob Store's Design" is being generated.

Section Details:

- Section ID: 5129194917068800
- Section Slug: requirements-of-a-blob-stores-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Blob Store

Section content for "Design of a Blob Store" is being generated.

Section Details:

- Section ID: 4910790825476096
- Section Slug: design-of-a-blob-store
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Design Considerations of a Blob Store

Section content for "Design Considerations of a Blob Store" is being generated.

Section Details:

- Section ID: 4593802865541120

- Section Slug: design-considerations-of-a-blob-store
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of a Blob Store's Design

Section content for "Evaluation of a Blob Store's Design" is being generated.

Section Details:

- Section ID: 5348783000387584
- Section Slug: evaluation-of-a-blob-stores-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Quiz on the Blob Store's Design

Section content for "Quiz on the Blob Store's Design" is being generated.

Section Details:

- Section ID: 6060039001604096
- Section Slug: quiz-on-the-blob-stores-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 21

DISTRIBUTED SEARCH

Step through distributed search design in stages, with a special focus on indexing, scaling, and replication.

1 System Design: The Distributed Search

Section content for "System Design: The Distributed Search" is being generated.

Section Details:

- Section ID: 5400897294696448
- Section Slug: system-design-the-distributed-search
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Distributed Search System's Design

Section content for "Requirements of a Distributed Search System's Design" is being generated.

Section Details:

- Section ID: 5706146547761152
- Section Slug: requirements-of-a-distributed-search-systems-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Indexing in a Distributed Search

Section content for "Indexing in a Distributed Search" is being generated.

Section Details:

- Section ID: 6595902341120000
- Section Slug: indexing-in-a-distributed-search
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Design of a Distributed Search

Section content for "Design of a Distributed Search" is being generated.

Section Details:

- Section ID: 6573171574046720

- Section Slug: design-of-a-distributed-search
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Scaling Search and Indexing

Section content for "Scaling Search and Indexing" is being generated.

Section Details:

- Section ID: 5899429382455296
- Section Slug: scaling-search-and-indexing
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Evaluation of a Distributed Search's Design

Section content for "Evaluation of a Distributed Search's Design" is being generated.

Section Details:

- Section ID: 4962799423324160
- Section Slug: evaluation-of-a-distributed-searchs-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 22

DISTRIBUTED LOGGING

Understand the importance and design of a distributed logging service, emphasizing capturing and analyzing logs across distributed systems.

1 System Design: Distributed Logging

Section content for "System Design: Distributed Logging" is being generated.

Section Details:

- Section ID: 6747547922333696
- Section Slug: system-design-distributed-logging
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Introduction to Distributed Logging

Section content for "Introduction to Distributed Logging" is being generated.

Section Details:

- Section ID: 5621964999229440
- Section Slug: introduction-to-distributed-logging
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Distributed Logging Service

Section content for "Design of a Distributed Logging Service" is being generated.

Section Details:

- Section ID: 4835612456124416
- Section Slug: design-of-a-distributed-logging-service
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 23

DISTRIBUTED TASK SCHEDULER

Examine the design of a task scheduler addressing issues like prioritizing, task idempotency, queuing, and resource capacity optimization.

1 System Design: The Distributed Task Scheduler

Section content for "System Design: The Distributed Task Scheduler" is being generated.

Section Details:

- Section ID: 6152021643624448
- Section Slug: system-design-the-distributed-task-scheduler
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Distributed Task Scheduler's Design

Section content for "Requirements of a Distributed Task Scheduler's Design" is being generated.

Section Details:

- Section ID: 6681764793942016
- Section Slug: requirements-of-a-distributed-task-schedulers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Distributed Task Scheduler

Section content for "Design of a Distributed Task Scheduler" is being generated.

Section Details:

- Section ID: 4969977353863168
- Section Slug: design-of-a-distributed-task-scheduler
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Design Considerations of a Distributed Task Scheduler

Section content for "Design Considerations of a Distributed Task Scheduler" is being generated.

Section Details:

- Section ID: 4856850956156928

- Section Slug: design-considerations-of-a-distributed-task-scheduler
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of a Distributed Task Scheduler's Design

Section content for "Evaluation of a Distributed Task Scheduler's Design" is being generated.

Section Details:

- Section ID: 5231625754902528
- Section Slug: evaluation-of-a-distributed-task-schedulers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 24

SHARDED COUNTERS

Get familiar with sharded counters and their importance, starting from high-level design and then pivoting to detailed System Design.

1 System Design: The Sharded Counters

Section content for "System Design: The Sharded Counters" is being generated.

Section Details:

- Section ID: 6071347163955200
- Section Slug: system-design-the-sharded-counters
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 High-level Design of Sharded Counters

Section content for "High-level Design of Sharded Counters" is being generated.

Section Details:

- Section ID: 6126387596886016
- Section Slug: high-level-design-of-sharded-counters
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Detailed Design of Sharded Counters

Section content for "Detailed Design of Sharded Counters" is being generated.

Section Details:

- Section ID: 5076411916484608
- Section Slug: detailed-design-of-sharded-counters
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Quiz on the Sharded Counters' Design

Section content for "Quiz on the Sharded Counters' Design" is being generated.

Section Details:

- Section ID: 5659634509021184

- Section Slug: quiz-on-the-sharded-counters-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 25

CONCLUDING THE BUILDING BLOCKS DISCUSSION

Wrap up the discussion on building blocks, evaluate your understanding using AI, and learn the RESHADED approach to tackle unseen System Design problems.

1 AI Evaluation of Building Blocks in E-Commerce Platform

Section content for "AI Evaluation of Building Blocks in E-Commerce Platform" is being generated.

Section Details:

- Section ID: 5469233437868032
- Section Slug: ai-evaluation-of-building-blocks-in-e-commerce-platform
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 AI Evaluation of Building Blocks in Online Education System

Section content for "AI Evaluation of Building Blocks in Online Education System" is being generated.

Section Details:

- Section ID: 6068850835718144
- Section Slug: ai-evaluation-of-building-blocks-in-online-education-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Wrapping Up the Building Blocks Discussion

Section content for "Wrapping Up the Building Blocks Discussion" is being generated.

Section Details:

- Section ID: 4682017479852032
- Section Slug: wrapping-up-the-building-blocks-discussion
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 The RESHADED Approach for System Design

Section content for "The RESHADED Approach for System Design" is being generated.

Section Details:

- Section ID: 4564800009142272

- Section Slug: the-reshaded-approach-for-system-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 26

DESIGN YOUTUBE

Learn YouTube System Design, starting with requirements, high-level and detailed design, evaluation of the design, and handling real-world complexities.

1 System Design: YouTube

Section content for "System Design: YouTube" is being generated.

Section Details:

- Section ID: 5360542734090240
- Section Slug: system-design-youtube
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of YouTube's Design

Section content for "Requirements of YouTube's Design" is being generated.

Section Details:

- Section ID: 5574324458618880
- Section Slug: requirements-of-youtubes-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of YouTube

Section content for "Design of YouTube" is being generated.

Section Details:

- Section ID: 5334361548783616
- Section Slug: design-of-youtube
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Evaluation of YouTube's Design

Section content for "Evaluation of YouTube's Design" is being generated.

Section Details:

- Section ID: 4932171382390784

- Section Slug: evaluation-of-youtubes-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 The Reality Is More Complicated

Section content for "The Reality Is More Complicated" is being generated.

Section Details:

- Section ID: 5471711817891840
- Section Slug: the-reality-is-more-complicated
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Quiz on YouTube's Design

Section content for "Quiz on YouTube's Design" is being generated.

Section Details:

- Section ID: 6669179066777600
- Section Slug: quiz-on-youtubes-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 27

DESIGN QUORA

Explore the System Design of Quora incrementally by starting with key requirements and challenges in building a scalable Q\A platform.

1 System Design: Quora

Section content for "System Design: Quora" is being generated.

Section Details:

- Section ID: 5132399700869120
- Section Slug: system-design-quora
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Quora's Design

Section content for "Requirements of Quora's Design" is being generated.

Section Details:

- Section ID: 6254998790340608
- Section Slug: requirements-of-quoras-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Initial Design of Quora

Section content for "Initial Design of Quora" is being generated.

Section Details:

- Section ID: 6337842040537088
- Section Slug: initial-design-of-quora
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Final Design of Quora

Section content for "Final Design of Quora" is being generated.

Section Details:

- Section ID: 6323245837451264

- Section Slug: final-design-of-quora
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of Quoras Design

Section content for "Evaluation of Quoras Design" is being generated.

Section Details:

- Section ID: 5580185650331648
- Section Slug: evaluation-of-quoras-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 28

DESIGN GOOGLE MAPS

Walk through the System Design of Google Maps, focusing on API design, scalability, finding optimal routes, and ETA computation.

1 System Design: Google Maps

Section content for "System Design: Google Maps" is being generated.

Section Details:

- Section ID: 5138720050642944
- Section Slug: system-design-google-maps
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Google Maps' Design

Section content for "Requirements of Google Maps' Design" is being generated.

Section Details:

- Section ID: 5704949308850176
- Section Slug: requirements-of-google-maps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of Google Maps

Section content for "Design of Google Maps" is being generated.

Section Details:

- Section ID: 6659265711833088
- Section Slug: design-of-google-maps
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Challenges of Google Maps' Design

Section content for "Challenges of Google Maps' Design" is being generated.

Section Details:

- Section ID: 4659727862071296

- Section Slug: challenges-of-google-maps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Detailed Design of Google Maps

Section content for "Detailed Design of Google Maps" is being generated.

Section Details:

- Section ID: 6026783136940032
- Section Slug: detailed-design-of-google-maps
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Evaluation of Google Maps' Design

Section content for "Evaluation of Google Maps' Design" is being generated.

Section Details:

- Section ID: 6335210467098624
- Section Slug: evaluation-of-google-maps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 29

DESIGN A PROXIMITY SERVICE / YELP

Take a closer look at the System Design of a proximity service like Yelp, addressing requirements like searching, scaling, and dynamic segments.

1 System Design: Yelp

Section content for "System Design: Yelp" is being generated.

Section Details:

- Section ID: 5264443638546432
- Section Slug: system-design-yelp
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Yelps Design

Section content for "Requirements of Yelps Design" is being generated.

Section Details:

- Section ID: 4552284171665408
- Section Slug: requirements-of-yelps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of Yelp

Section content for "Design of Yelp" is being generated.

Section Details:

- Section ID: 5027439944400896
- Section Slug: design-of-yelp
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Design Considerations of Yelp

Section content for "Design Considerations of Yelp" is being generated.

Section Details:

- Section ID: 5518783229198336

- Section Slug: design-considerations-of-yelp
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Quiz on Yelp's Design

Section content for "Quiz on Yelp's Design" is being generated.

Section Details:

- Section ID: 6678825089368064
- Section Slug: quiz-on-yelps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 30

DESIGN UBER

Understand how to design Uber, address requirements for ride-sharing platforms, detailed design, and fraud detection.

1 System Design: Uber

Section content for "System Design: Uber" is being generated.

Section Details:

- Section ID: 6344806557286400
- Section Slug: system-design-uber
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Ubers Design

Section content for "Requirements of Ubers Design" is being generated.

Section Details:

- Section ID: 6376322179268608
- Section Slug: requirements-of-ubers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 High-level Design of Uber

Section content for "High-level Design of Uber" is being generated.

Section Details:

- Section ID: 5429357153091584
- Section Slug: high-level-design-of-uber
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Detailed Design of Uber

Section content for "Detailed Design of Uber" is being generated.

Section Details:

- Section ID: 6683135341494272

- Section Slug: detailed-design-of-uber
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Payment Service and Fraud Detection in Uber Design

Section content for "Payment Service and Fraud Detection in Uber Design" is being generated.

Section Details:

- Section ID: 6353616188735488
- Section Slug: payment-service-and-fraud-detection-in-uber-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Evaluation of Ubers Design

Section content for "Evaluation of Ubers Design" is being generated.

Section Details:

- Section ID: 5469445371199488
- Section Slug: evaluation-of-ubers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

7 Quiz on Uber's Design

Section content for "Quiz on Uber's Design" is being generated.

Section Details:

- Section ID: 6590232799739904
- Section Slug: quiz-on-ubers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 31

DESIGN TWITTER

Learn Twitter System Design, covering aspects like user interaction, API design, caching, storage, and client-side load balancing.

1 System Design: Twitter

Section content for "System Design: Twitter" is being generated.

Section Details:

- Section ID: 4687773419700224
- Section Slug: system-design-twitter
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Twitters Design

Section content for "Requirements of Twitters Design" is being generated.

Section Details:

- Section ID: 5920537112477696
- Section Slug: requirements-of-twitters-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 High-level Design of Twitter

Section content for "High-level Design of Twitter" is being generated.

Section Details:

- Section ID: 6194554750894080
- Section Slug: high-level-design-of-twitter
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Detailed Design of Twitter

Section content for "Detailed Design of Twitter" is being generated.

Section Details:

- Section ID: 6156135136755712

- Section Slug: detailed-design-of-twitter
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Client-side Load Balancer for Twitter

Section content for "Client-side Load Balancer for Twitter" is being generated.

Section Details:

- Section ID: 5379128533975040
- Section Slug: client-side-load-balancer-for-twitter
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Quiz on Twitter's Design

Section content for "Quiz on Twitter's Design" is being generated.

Section Details:

- Section ID: 6740284133605376
- Section Slug: quiz-on-twitters-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 32

DESIGN NEWSFEED SYSTEM

Master newsfeed System Design, covering aspects like functional and non-functional requirements, storage schemas, newsfeed generation, and publishing.

1 System Design: Newsfeed System

Section content for "System Design: Newsfeed System" is being generated.

Section Details:

- Section ID: 4943636425080832
- Section Slug: system-design-newsfeed-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Newsfeed Systems Design

Section content for "Requirements of a Newsfeed Systems Design" is being generated.

Section Details:

- Section ID: 5590893725220864
- Section Slug: requirements-of-a-newsfeed-systems-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Newsfeed System

Section content for "Design of a Newsfeed System" is being generated.

Section Details:

- Section ID: 5697004751028224
- Section Slug: design-of-a-newsfeed-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Evaluation of a Newsfeed Systems Design

Section content for "Evaluation of a Newsfeed Systems Design" is being generated.

Section Details:

- Section ID: 5660564772093952

- Section Slug: evaluation-of-a-newsfeed-systems-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 33

DESIGN INSTAGRAM

Explore Instagrams System Design, covering API design, storage schema, and timeline generation using pull, push, and hybrid approaches.

1 System Design: Instagram

Section content for "System Design: Instagram" is being generated.

Section Details:

- Section ID: 5206574926921728
- Section Slug: system-design-instagram
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Instagrams Design

Section content for "Requirements of Instagrams Design" is being generated.

Section Details:

- Section ID: 5571545748996096
- Section Slug: requirements-of-instagrams-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of Instagram

Section content for "Design of Instagram" is being generated.

Section Details:

- Section ID: 5160831733465088
- Section Slug: design-of-instagram
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Detailed Design of Instagram

Section content for "Detailed Design of Instagram" is being generated.

Section Details:

- Section ID: 6638179708305408

- Section Slug: detailed-design-of-instagram
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Quiz on Instagrams Design

Section content for "Quiz on Instagrams Design" is being generated.

Section Details:

- Section ID: 5987143142342656
- Section Slug: quiz-on-instagrams-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 34

DESIGN A URL SHORTENING SERVICE / TINYURL

Decode the System Design of a URL shortening service like TinyURL, emphasizing requirements like encoding, scalability, and high readability.

1 System Design: TinyURL

Section content for "System Design: TinyURL" is being generated.

Section Details:

- Section ID: 6627189651144704
- Section Slug: system-design-tinyurl
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of TinyURL's Design

Section content for "Requirements of TinyURL's Design" is being generated.

Section Details:

- Section ID: 5146211836755968
- Section Slug: requirements-of-tinyurls-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design and Deployment of TinyURL

Section content for "Design and Deployment of TinyURL" is being generated.

Section Details:

- Section ID: 5753981720068096
- Section Slug: design-and-deployment-of-tinyurl
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Encoder for TinyURL

Section content for "Encoder for TinyURL" is being generated.

Section Details:

- Section ID: 5084162431647744

- Section Slug: encoder-for-tinyurl
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of TinyURL's Design

Section content for "Evaluation of TinyURL's Design" is being generated.

Section Details:

- Section ID: 6451282881019904
- Section Slug: evaluation-of-tinyurls-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Quiz on TinyURL's Design

Section content for "Quiz on TinyURL's Design" is being generated.

Section Details:

- Section ID: 6050864745152512
- Section Slug: quiz-on-tinyurls-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 35

DESIGN A WEB CRAWLER

Explore the System Design of a web crawler, including its key components, such as a crawler, scheduler, HTML fetcher, storage, and crawling traps handler.

1 System Design: Web Crawler

Section content for "System Design: Web Crawler" is being generated.

Section Details:

- Section ID: 4695113376989184
- Section Slug: system-design-web-crawler
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of a Web Crawler's Design

Section content for "Requirements of a Web Crawler's Design" is being generated.

Section Details:

- Section ID: 6454882160082944
- Section Slug: requirements-of-a-web-crawlers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of a Web Crawler

Section content for "Design of a Web Crawler" is being generated.

Section Details:

- Section ID: 6632099624255488
- Section Slug: design-of-a-web-crawler
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Design Improvements of a Web Crawler

Section content for "Design Improvements of a Web Crawler" is being generated.

Section Details:

- Section ID: 5983505204379648

- Section Slug: design-improvements-of-a-web-crawler
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of Web Crawler's Design

Section content for "Evaluation of Web Crawler's Design" is being generated.

Section Details:

- Section ID: 6142975511363584
- Section Slug: evaluation-of-web-crawlers-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 36

DESIGN WHATSAPP

Take a look at WhatsApp System Design with an emphasis on its API design, high security, and low latency of client-server messages.

1 System Design: WhatsApp

Section content for "System Design: WhatsApp" is being generated.

Section Details:

- Section ID: 6538438514049024
- Section Slug: system-design-whatsapp
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of WhatsApps Design

Section content for "Requirements of WhatsApps Design" is being generated.

Section Details:

- Section ID: 5023065490063360
- Section Slug: requirements-of-whatsapps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 High-level Design of WhatsApp

Section content for "High-level Design of WhatsApp" is being generated.

Section Details:

- Section ID: 6728651831246848
- Section Slug: high-level-design-of-whatsapp
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Detailed Design of WhatsApp

Section content for "Detailed Design of WhatsApp" is being generated.

Section Details:

- Section ID: 6731604231192576

- Section Slug: detailed-design-of-whatsapp
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of WhatsApps Design

Section content for "Evaluation of WhatsApps Design" is being generated.

Section Details:

- Section ID: 4861549654573056
- Section Slug: evaluation-of-whatsapps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Quiz on WhatsApps Design

Section content for "Quiz on WhatsApps Design" is being generated.

Section Details:

- Section ID: 4877609447456768
- Section Slug: quiz-on-whatsapps-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 37

DESIGN TYPEAHEAD SUGGESTION

Discover the typeahead suggestion System Design, covering aspects like efficient data structures and assemblers for updating suggestions.

1 System Design: The Typeahead Suggestion System

Section content for "System Design: The Typeahead Suggestion System" is being generated.

Section Details:

- Section ID: 4981044919140352
- Section Slug: system-design-the-typeahead-suggestion-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of the Typeahead Suggestion Systems Design

Section content for "Requirements of the Typeahead Suggestion Systems Design" is being generated.

Section Details:

- Section ID: 6369391511339008
- Section Slug: requirements-of-the-typeahead-suggestion-systems-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 High-level Design of the Typeahead Suggestion System

Section content for "High-level Design of the Typeahead Suggestion System" is being generated.

Section Details:

- Section ID: 6376843531255808
- Section Slug: high-level-design-of-the-typeahead-suggestion-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Data Structure for Storing Prefixes

Section content for "Data Structure for Storing Prefixes" is being generated.

Section Details:

- Section ID: 6110217372172288

- Section Slug: data-structure-for-storing-prefixes
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Detailed Design of the Typeahead Suggestion System

Section content for "Detailed Design of the Typeahead Suggestion System" is being generated.

Section Details:

- Section ID: 5464491722801152
- Section Slug: detailed-design-of-the-typeahead-suggestion-system
- Status: Content pending generation

Use the section content generation API to create the content for this section.

6 Evaluation of the Typeahead Suggestion Systems Design

Section content for "Evaluation of the Typeahead Suggestion Systems Design" is being generated.

Section Details:

- Section ID: 6626894497185792
- Section Slug: evaluation-of-the-typeahead-suggestion-systems-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

7 Quiz on the Typeahead Suggestion Systems Design

Section content for "Quiz on the Typeahead Suggestion Systems Design" is being generated.

Section Details:

- Section ID: 5201949791617024
- Section Slug: quiz-on-the-typeahead-suggestion-systems-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 38

DESIGN A COLLABORATIVE DOCUMENT EDITING SERVICE / GOOGLE DOCS

Understand the System Design of Google Docs, using different techniques to address storage, collaborative editing, and concurrency issues.

1 System Design: Google Docs

Section content for "System Design: Google Docs" is being generated.

Section Details:

- Section ID: 5540995072000000
- Section Slug: system-design-google-docs
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Requirements of Google Docs Design

Section content for "Requirements of Google Docs Design" is being generated.

Section Details:

- Section ID: 5975395656007680
- Section Slug: requirements-of-google-docs-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 Design of Google Docs

Section content for "Design of Google Docs" is being generated.

Section Details:

- Section ID: 5921693154934784
- Section Slug: design-of-google-docs
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 Concurrency in Collaborative Editing

Section content for "Concurrency in Collaborative Editing" is being generated.

Section Details:

- Section ID: 6200295243120640

- Section Slug: concurrency-in-collaborative-editing
- Status: Content pending generation

Use the section content generation API to create the content for this section.

5 Evaluation of Google Docs Design

Section content for "Evaluation of Google Docs Design" is being generated.

Section Details:

- Section ID: 5489039691481088
- Section Slug: evaluation-of-google-docs-design
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 39

SPECTACULAR FAILURES

Learn how to avoid failures and outages by discussing case studies of real-world, large-scale distributed systems like Facebook, AWS, etc.

1 Introduction to Distributed System Failures

Section content for "Introduction to Distributed System Failures" is being generated.

Section Details:

- Section ID: 6503055815606272
- Section Slug: introduction-to-distributed-system-failures
- Status: Content pending generation

Use the section content generation API to create the content for this section.

2 Facebook, WhatsApp, Instagram, Oculus Outage

Section content for "Facebook, WhatsApp, Instagram, Oculus Outage" is being generated.

Section Details:

- Section ID: 5214324309622784
- Section Slug: facebook-whatsapp-instagram-oculus-outage
- Status: Content pending generation

Use the section content generation API to create the content for this section.

3 AWS Kinesis Outage Affecting Many Organizations

Section content for "AWS Kinesis Outage Affecting Many Organizations" is being generated.

Section Details:

- Section ID: 5243362298298368
- Section Slug: aws-kinesis-outage-affecting-many-organizations
- Status: Content pending generation

Use the section content generation API to create the content for this section.

4 AWS Wide Spread Outage

Section content for "AWS Wide Spread Outage" is being generated.

Section Details:

- Section ID: 6672582694141952

- Section Slug: aws-wide-spread-outage
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 40

CONCLUDING REMARKS

Reflect on key takeaways, highlight unique aspects of each Design Problem, and get pointers on the next steps to master System Design.

1 Conclusions

Section content for "Conclusions" is being generated.

Section Details:

- Section ID: 5067216508157952
- Section Slug: conclusions
- Status: Content pending generation

Use the section content generation API to create the content for this section.

CHAPTER 41

RECOVERED LESSONS

1 No Sections Available

This chapter contains no sections.