

A Framework for System Design Interviews

• 4 Step Process -

- Step 1 - Understand the design and establish design interview

- What specific features are we going to build?
- How many users does the product have?
- How fast the company anticipate to scale up?
What are the anticipated scales in 3, 6 months and a year?
- What is the company's technology stack? What existing services you might leverage to simplify the design?

- Step 2 - Propose high-level design and get buy-in

- Come up with an initial blueprint for the design. Ask for feedback. Treat your interviewer as a teammate and work together.
- Draw box diagram with key components on the whiteboard or paper. This might include clients, APIs, web server, data stores, CDN, message queues etc.
- Do back-of-the-envelope calculations to evaluate if your blueprint fits the scale constraints. Think out loud. Communicate with your interviewer if back-of-the-envelope is necessary before diving into it.

- Step 3 - Design Deep Dive

- Agreed on the overall goals and feature scope.
- Sketched out a high-level blueprint for the overall design.
- Obtained feedback from interviewer on the high level design.
- Have some initial ideas about areas to focus on in deep dive based on feedback.

- Step 4 - Wrap Up

- The interviewer might want you to identify system bottlenecks and discuss potential improvements. Never say your design is perfect and nothing can be improved.
- It could be useful to give the interviewer a recap of your design.
- Error cases (server failure, network loss etc.) are interesting to talk about.
- Operation issues are worth mentioning. How to monitor logs? How to rollout the system?
- How to handle the next scale curve. For eg. - If current design supports 1 million users, how to support 10 million servers.
- Propose other refinements you need if you have more time.

- Dos

- Always ask for clarification. Do not assume your assumption is correct?

- Understand the requirement of the problem.
- There is neither right answer nor the best answer. Solution designed for a startup is different from an established company.
- Let the interviewer know what you're thinking.
- Suggest multiple approaches if possible.
- Once you agree with your interviewer on the blueprint, go into details on each component. Design the most critical components first.
- Bounce ideas off the interviewer. A good interviewer works with you as a teammate.
- Never give up.

- Don'ts

- Don't jump into a solution without clarifying the requirements and assumptions.
- Don't go into too much detail on a single component in the beginning. Give the high-level design first.
- Time Allocation for each step
 - Step 1 - Understand the problem and establish design scope : 3-10 minutes.
 - Step 2 - Propose high level design - and get buy-in : 10-15 minutes.
 - Step 3 - Design deep dive : 10-25 minutes.
 - Step 4 - Wrap : 3-5 minutes.

