System Design

Absolute Basics

Contents

[Article I. How to Attempt A System Design Question? 2](#_Toc59783431)

[Article II. Horizontal vs Vertical Scaling of Systems 2](#_Toc59783432)

[Article III. The Pizza Parlour Analogy 2](#_Toc59783433)

[Article IV. Building Blocks of a System 2](#_Toc59783434)

[Section 4.01 Load Balancing 2](#_Toc59783435)

[(a) Definition and Benefits 2](#_Toc59783436)

[(b) Dealing with Redundancy in Load Balancers 2](#_Toc59783437)

[(c) Load Balancing Algorithms 2](#_Toc59783438)

[Section 4.02 Caching 2](#_Toc59783439)

[Section 4.03 Sharding/Data Partitioning 2](#_Toc59783440)

[Section 4.04 Indexes 2](#_Toc59783441)

[Section 4.05 Messaging Queues 2](#_Toc59783442)

[Section 4.06 Proxies 2](#_Toc59783443)

[Section 4.07 Databases and CAP Theorem 2](#_Toc59783444)

[Article V. Touch Points 2](#_Toc59783445)

[Section 5.01 HTTP Request v/s HTTP Long-Polling v/s Web Sockets v/s Server-sent Events 2](#_Toc59783446)

[Section 5.02 Monoliths v/s Microservices 2](#_Toc59783447)

[Section 5.03 HDFS Hadoop 2](#_Toc59783448)

[Section 5.04 How to avoid single points of failure? 2](#_Toc59783449)

[Section 5.05 Event-Driven Services 2](#_Toc59783450)

[Section 5.06 Storing Passwords in Databases? 2](#_Toc59783451)

[Section 5.07 What happens when you type a URL in the Browser and hit Enter? 2](#_Toc59783452)

# How to Attempt A System Design Question?

# Horizontal vs Vertical Scaling of Systems

# The Pizza Parlour Analogy

# Building Blocks of a System

## Load Balancing

### Definition and Benefits

### Dealing with Redundancy in Load Balancers

### Load Balancing Algorithms

#### Least Connection Method

#### Least Response Time Method

#### Least Bandwidth Method

#### Round Robin Method

#### Weighted Round Robin

#### IP Hash

#### Consistent Hashing

## Caching

### Definition and types

### Content Distributed Network/ CDN

### Cache Invalidation

### Cache Eviction Policy

## Sharding/Data Partitioning

### Horizontal v/s Vertical v/s Distributed Partitioning

### Partitioning Criteria

#### Key/Hash-based Partitioning

#### List Partitioning

#### Round Robin Partitioning

#### Composite Partitioning

### Sharding v/s Partitioning

### Problems of Sharding

## Indexes

### Definition and types

### When not to use Indexing?

## Messaging Queues

### Definition

### Evident Problem

### Solution Mechanism

### Kafka-explained

## Proxies

### Definition and types

## Databases and CAP Theorem

### CAP Theorem

### SQL-type Databases

### NoSQL-type Databases

#### Distributed Consensus and Replication Strategies

### SQL v/s NoSQL Comparisons

# Touch Points

## HTTP Request v/s HTTP Long-Polling v/s Web Sockets v/s Server-sent Events

### HTTP Request

### HTTP AJAX Polling

### Web Sockets

### Server-Side Events

## Monoliths v/s Microservices

## HDFS Hadoop

## How to avoid single points of failure?

## Event-Driven Services

## Publisher-Subscriber Model

## Storing Passwords in Databases?

## What happens when you type a URL in the Browser and hit Enter?