BOSSCODER ACADEMY

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HLD - 4

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Storage Paradigm

Storage Paradigm refers to the fundamental approach used for data storage and retrieval. Different storage paradigms include:

- File-based Storage: Storing data in files, such as images, videos, and documents.

- Object Storage: Storing data as objects, often used for unstructured or semi-structured data.
- Blob Storage: Specialized for storing binary large objects like images and videos.

Choosing the right storage paradigm depends on factors such as data structure, volume, access patterns, performance requirements, and cost considerations.

Blob Storage

Blob Storage, short for Binary Large Object storage, is designed to store unstructured binary data like images, videos, audio files, and documents. It is well-suited for scenarios where data does not fit into traditional database tables due to its varying size and structure. Blob storage is often used in cloud storage services and can efficiently handle large media files and other unstructured data.

Time Series DB

Time Series Database (TSDB) is optimized for handling time-stamped data points, commonly found in monitoring, logging, IoT devices, and financial applications. TSDB efficiently manages time-series data, allowing for high-speed writes and fast retrieval based on timestamps. This type of database is crucial for analyzing trends, forecasting, and monitoring various metrics over time.

Quadtree

points in two-dimensional space. It recursively divides a space into four quadrants until each quadrant contains a limited number of points or reaches a predefined depth. Quadtree is commonly used in computer graphics, geographic information systems (GIS), and collision detection algorithms.

Database Replication

Database replication is the process of copying and synchronizing data from a primary database (master) to one or more secondary databases (replicas). Replication improves system availability, scalability, and fault tolerance by distributing data across multiple nodes. Read-heavy workloads can be directed to replica databases, reducing the load on the primary database and improving overall performance.

Polling and Streaming

Polling is a method where clients periodically send requests to the server to check for updates or new data. It can result in high network traffic and latency.

In contrast, streaming provides a continuous flow of data from the server to the client without the need for frequent requests, enabling real-time updates and reducing latency.

Rate Limiting

Rate limiting is a technique used to control the rate of incoming requests from clients to prevent system overload and abuse. It sets a threshold for

malicious activities like DoS attacks.

DOS Attacks (Denial of Service)

Denial of Service (DoS) attacks aim to disrupt or deny access to a service by overwhelming it with a large volume of malicious traffic. DoS attacks make a service temporarily or permanently unavailable to legitimate users, affecting availability and reliability.

DDoS (Distributed Denial of Service)

Distributed Denial of Service (DDoS) attacks involve multiple distributed sources attacking a target simultaneously, making it more challenging to mitigate. Attackers often use botnets to coordinate and amplify the attack, further increasing the scale and impact.

Long Polling

Long Polling is a variation of the traditional polling method where the server holds the client's request open until new data is available or a timeout occurs. This approach is used to provide real-time updates and reduce the latency between data updates and client notifications. Long polling is suitable for applications where real-time communication is necessary, but the server cannot push data actively.

Publisher/Subscriber Pattern

The Publisher/Subscriber (Pub/Sub) pattern facilitates communication between different components of a system. Publishers send messages

enables the decoupling of components, making systems more scalable, maintainable, and extensible.

Understanding these high-level design topics allows architects and designers to make informed decisions about system architecture, data storage, communication patterns, and security measures. These considerations are crucial for building robust, scalable, and efficient systems to meet the demands of modern applications and services.

Assessment: https://www.bosscoderacademy.com/blog/hld-4-assessment