Advanced Databases - Report on NoSQL DBs

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1. Document stores

A document store is a type of data storage that stores field-value pairs and doesn't have a defined schema. Since it stores document-oriented information, a document store is optimized to work with XML or JSON documents.

The advantages of a document store are its popularity, flexibility, easy to develop and can be distributed and resilient. The disadvantages are its primitive data handling and the relations and complexity are at the code level.

Considering the main characteristics, a document store is useful when the data is received in different ways and isn’t structured.

2. Graph DBMS

A graph database is a type of data storage that stores nodes and relationships instead of tables, or documents. The data structures are nodes and edges, which represents the relationships between nodes.

The advantages of a graph database are its better problem-solving, flexibility and can handle complex queries quickly and responsively while SQL requires complex joins. The disadvantages are that graphs are inappropriate for transactional-based systems and there is no standardized query language.

Considering the main characteristics, a graph DBMS is useful when solving problems or developing algorithms using graph theory, such as shortest path or finding relations in a network.

3. Time Series DBMS

A time series database is a type of data storage optimized for handling time series data, where each entry is associated with a timestamp

The advantages of a time series database are its efficient query of various time series with high transaction volumes, allows fast insertion and retrieval and offers a low latency and high availability. Also, the write is real-time, can’t be updated and the data can be read from a range. The disadvantages are that the time series data structure produces a large overhead, is inappropriate for transactional-based systems and the data is usually inmutable.

Considering the main characteristics, a time series DBMS is useful when we need to store a large amount of data along the time axis. Some use cases are: operational metrics data, financial market and sensors of Internet of things environments that are continually capturing metrics for specific purposes.

4. Event stores

An event store is a type of data storage that is optimized to store immutable event records and the data is updated based on events.

The advantages of an event store are its importance on knowing when the data changed and by who and the possibility to reconstruct temporal queries using the historical states of the entities. The disadvantages are that event stores have a complicated configuration, high disk space usage and complex handling for long-living entities.

Considering the main characteristics, an event store is useful when we need to store a series of immutable events over time. Some use cases are: event-driven applications and rebuilding a system as it was at a point in time.

5. Spatial DBMS

A spatial database is a type of data storage that is optimized to store spatial data and its relationship. The data model can be represented by the data type like points, lines and polygons and the relationships like proximity, adjacency and containment.

The advantages of spatial databases are the capability to store spatial data efficiently, support to spatial operations like area, length, union and intersection and cen reduce complexity on the client side. The disadvantages are spatial databases have some inflexibility and requires some expertise to use well.

Considering the main characteristics, spatial databases are useful when we need to store complex spatial relationships and can be used with other types of data.