

2.4.3 Types and Applications of NoSQL Data Stores

1. Key–Value Store

- Data is stored in schema-less format using key-value pairs. Key can be URL, file path, REST call, SQL query and value can be String, JSON, BLOB etc.
- Applications: dictionary, image store, lookup tables, cache query.
- Examples: Redis, Amazon Dynamo, Azure Table Storage (ATS), Memcache.

Amazon DynamoDB

- Developers create a database table which is stored at multiple servers with replication across multiple zones.
- For consistent and fast performance, the data are stored in the key–value store and then moved to RDBMS.

2. Column Family Store/Wide Column Store

- Store data tables as section of columns rather than rows which is efficient for sparse matrix systems.
- Column stores are used in OLAP systems for their ability to rapidly aggregate column data with high performance and highly scalable architecture.
- Examples: BigTable, Apache Cassandra, HBase

Google BigTable

- It represents sparse data table as section of columns.
- Data is stored in a distributed, persistent, multi-dimensional sorted map indexed by a row key, column key and a timestamp.

3. Document Store

- Document store is more complex than key-value store.
- It stores, retrieves, and manages document-oriented semi-structured information like hierarchical tree-like data structures.
- Examples: MongoDB, CouchBase, and CouchDB.

MongoDB

- It changed the data model from relational to document based, to achieve speed, manageability, agility, schema free horizontally scalable JOIN free scalability.
- Relational databases like MySql or Oracle work well with indexes, dynamic queries and updates. MongoDB works similarly but can index an embedded field.
- Data is stored in JSON documents. JSON model seamlessly maps to native programming languages and allows dynamic schema which helps the data model to evolve. RDBMS have fixed schema that limits the evolution of data model over time.

4. Graph Store

- Designed for data whose relations are represented as a graph with interconnected elements.
- Use graph database to store their data.
- Applicable in in social networks and rule-based engines like Facebook, LinkedIn, Twitter, YouTube, and Flickr.
- Examples: Neo4j, AllegroGraph, TeradataAster.

Neo4j

- Data can be shared among multiple connected domains.
- It stores, processes, and allows querying connections efficiently for 'join' like navigation operations to quickly traverse millions of connections per second per core. Traditional databases compute such relationships expensively at query time.
- Accessing already persistent connections is extremely fast. The property graph contains nodes (entities) that are connected and can hold any number of key- value pairs (attributes).
- Nodes contain labels that represent roles, relationships, metadata, index and constraints.