International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 03 | March - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

No SQL Data Base

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Dr. Brindha Tirugnanasambandam1 M.A.M School of Engineering Siruganur Tiruchirapalli-621105Are nosql databases affected by schema

Abstract : Nosql databases are schemaless databases in data modeling and do not support traditional databases meaning schema design can be changed at runtime to support analytically tasks. Nosql is used to store similar information with various multiple schemas thus making data evolution also eliminates restriction in schema. Here we analyse the document store, column store, key - value store. Common queries are performed to analyses the impact of query performance in terms of response time speed up factor read and write latency and database size.

Key words : Nosql database document store key value store graph store

The nosql databases have grown stronger based on data models they are classified as document column key value and graph stores. They have homogenous logical model key value pair thus having a different layer physical model. Despite their differences in the physical model no SQL share certain characteristics no sql stores allow weak consistent transaction models by reducing strict ACID properties. Nosql databases allow for easy replication and horizontal data partitioning across local and remote servers.

As traditional databases no SQL has 3 levels of abstraction namely conceptual logical and physical databases. No SQL data modeling defines an application workflow to capture all interactions with ER and the database. The application queries are supported by logical data model.

In traditional relational databases a fitting in database alleviate the burden of formal schema definition by allowing schema flexibility and promoting redundancy. In Nosql databases same information is stored in schemas. The impact of schema on No SQL stores is complex and multifaceted topic. There is fixed schema which has a greater flexibility and scalability which leads to challenges in data modelling validation and consistency and performance.

Nosql data modelling

The section has different nosql databases from a modelling perspective and secondly has challenges during nosql data modeling

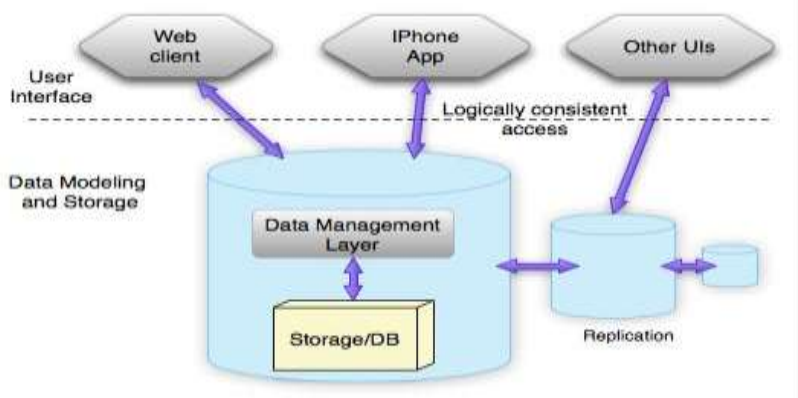

Figure 1 No SQL data modeling

Nosql categories and modelling

A collection of tools in a data model and relationships constraints and semantics. The following are discussed

The document store column store and key value store

There is an analogy between relational and nosql models. There is a set of collection of entities in as documents in mongo databases cassandra stores data in key space as one or more column oriented databases.

Document store

A document store is the one which stores and retrieves data as documents as JSON or BSON format. The popular stores are mongodatabases couch databases which are used for building scalable high performance applications offering replication and dynamic schema.

The store is a MONGODATABASE called BSON binary Json. BSON flexible efficient binary representation like documents. Data is stored in collections in mongodatabase. Documents are not required to a fixed schema. Each document is a collection is a BSON object that contain multiple arrays fields and objects. A flexible indexing is used. Secondary indexes are supported by mongo databases including nested fields multikeys on arrays. Joins are not supported by mongo databases

Column stores These are database storage structure that arrange data in column than rows and has advantage over row based databases thus handling large volumes of data when a highly scalable high performance databases is to be constructed using powerful tool database is developed by developer. The popular stores are widecolumn store named Cassandra hbase vertica

A key space is a top level contains in cassandra in a traditional relational database system. One or more column families are like tables in a relationship database in key space containing a name value and a timestamp.

Partitioning is used in cassandra where data is partitioned based on row key which stores data. Modeling if document store

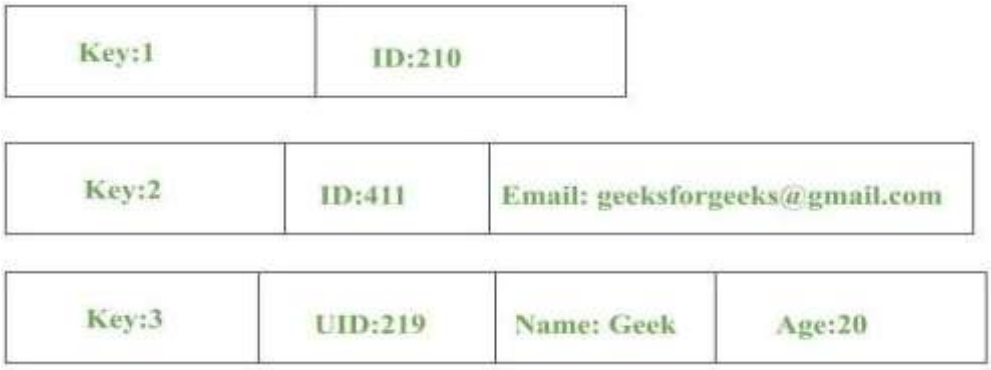

Figure 2 mongo databases

Mongo databases

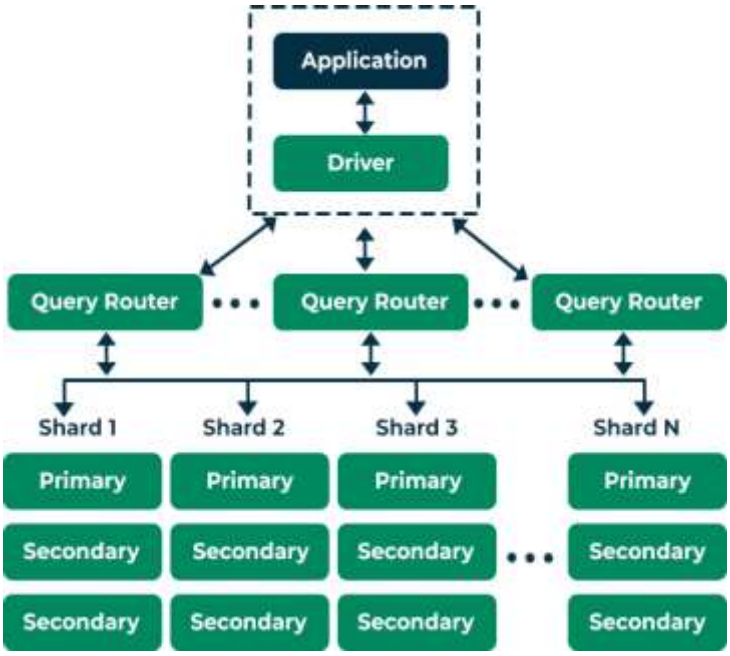

Figure 3 Mongo databases

Modelling of column store Cassandra

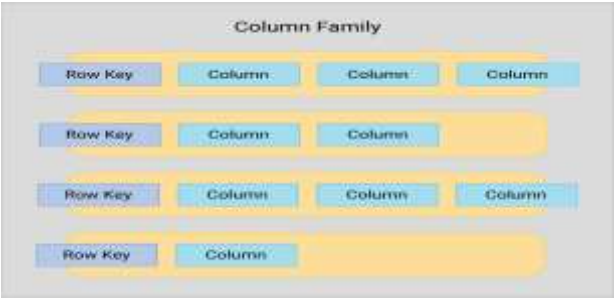

Figure 4 Modelling of column store Cassandra

Key value store

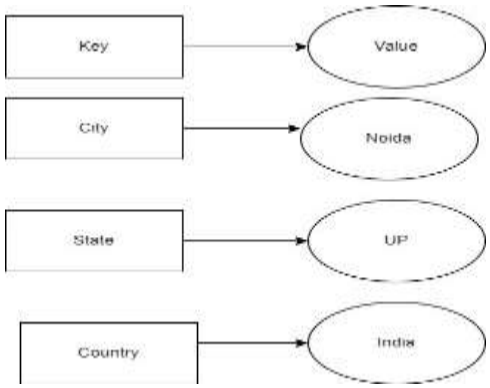

Figure 5 key value store

No sql store No sql databases is a key value store based on simple key value pair. Each piece has a unique key value store used for caching session management and high performance storage and retrieval operations. A fast read and write is accomodated by high speed data access. Key value stores provide high low latency to databases for high availability and scalability. The key value stores are redis, memcached Amazon dynamodb riak. Redis is in memory key value store for durability option an associated key value is unique key also supports various data structure which includes hashes lists and stored sets allowing fast read and write. Data is recovered using disk persistance to be recovered using disk failure .

Data modelling of NO sql ISSUES AND CHALLENGES

MODELLING OF nosql is done before kept in databases. A data model is a graphical representation with real world entity. Data modelling is not done easily as it is heterogeneous and data model is consistent durable and API. The various issues in nosql data modelling are lack of data modelling standard. Denormalization lack of a common data model too many schema design options.

Role of nosql schema data base Schema design is still in nosql database. The approach to schema design is different in traditional relational database as the schema is not predefined. The flexibility if no sql are data structures careful consideration of schema design ensures optimal performance has an impact on speeed and efficiency of retrieving the data. There is an effecient queriying and data retrieval

Analysis of influence of schema in Nosql

Create schema design for three different document column key value store Initial ER model is in nosql then implemented on various data stores such as mongo database cassandra and redis

Crud based queries are developed and executed on alternative structures and a series of test cases are applied on nosql data stores.

1 The initial model

2 The designing of schema alternatives

3 Implementation of data structures

4 Performance analysis Modeling if document store Mongo databases
Modelling of column store Cassandra Turist information system
In a hotel management system the data set includes 3 entities city (E1) Hotel(E2)

And room (E3) With 85 cities 100 hotels and 13000 rooms has a unique I'd. The ER model shows the connection between hotel city and rooms 1 to many relationship between city and hotel

Designing schema alternatives - A possible structures alternatives is designed for document column key value stores. These is a mapping to be understood in nosql data models.

Nosql data stores and ER model - A general example of ER model is depicted with 2 entities E1 and E2 with attributes A1 A2 A3 and An and B1 B2 B3 and BN The relationship is either 1:N N :1 or M: N

Document stores mongo databases uses reference and embedding to establish relationship between entities embedding is done during data modelling of document stores for a 1:1 type of relationship. Create collection E and embed E1 and E 2 or create E2 as a collection embed E 2 to E1. The type named 1 :N and M: N relationship. Column stores cassandra The 1:1 relationship is created in a single column family with Columns representing attributes of both entities

Key value store redis - a unique key is set up by embedding one entity to another. Designing of schema alternatives - Possible schema for document stores

a) Complete referencing

b) complete embedding

c) Mix of referencing and embedding

Conclusion

The paper determines nosql databases for efficient querying and data retrieval. Analysis on no sql data modeling influence the performance and size of data base.

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