

# NOSQL With & Without ACID Properties

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**Abstract**-Present databases (SQL databases) has schema. Present databases don't provide flexibility to developers related to schema and scalability and storage. As cloud computing is evolving and begin complex, organizations are finding new ways to store the massive amounts of data that are collected. That's why organizations needs such technology which provides scalability and flexibility i.e. NOSQL technologies. In market many popular NOSQLs databases are available. Some of NOSQLs follows ACID Properties and some of NOSQLs doesn't. This paper will explain various NOSQL Databases and a technique to retrieve data.

**Keywords**-NOSQL, Mongoddb, RethinkDB, GraphQL, Neo4j, Marklogic, OrientDB.

## I. INTRODUCTION

A NOSQL database provides a system to save and retrieval of data other than tabular relations used in relational databases. Not all NOSQL databases doesn't maintain ACID properties and Joins . it supports BASE properties (Basically Available, Soft state, Eventual consistency) which is compliance with the CAP (Consistency, Availability, Partition tolerance) theorem But some NOSQL databases supports ACID properties and joins (Mark Logic, CouchDB, OrientDB etc.).

## II. NOSQLs

### 2.1) RethinkDB

RethinkDB is free and distributed document-oriented NOSQL Database. It is designed to facilitate pushing real time updates for query results to application, to real-time feeds to your facts. It makes building real-time apps dramatically easier. It dramatically make less the time and effort essential to construct scalable real-time apps.

It is different from MongoDB & It offers a number of other advantages over MongoDB –

- 1) It is an advanced query language that supports table joins, subqueries, and massively parallelized distributed computation.
- 2) It is a stylish and powerful operations and observing API that integrates with the query language and makes scaling RethinkDB dramatically easier.

- 3) It is a simple and beautiful administration UI that lets you shard and replicate in a few clicks, and offers online documentation and query language suggestions.

It also supports map-reduce queries. It apply a range sharding algorithm parameterized. Using this algo on the table's primary key to partition the data. It uses own query language which is ReQL (i.e. RethinkDB query language).ReQL is based on 3 key principles –

- 1) ReQL embeds into your programming language.
- 2) All ReQL queries are chainable.
- 3) All queries execute on the server.

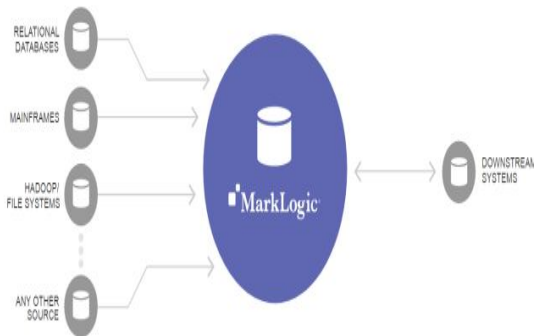
### 2.2) MongoDB

MongoDB is free and open source and document-oriented NOSQL Database. MongoDB was invented by 10gen and was initially released in 2009. It supports ACID transactions at the document level. Today it does not support multi-document transactions. Data in MongoDB is saved in BSON documents – JSON-style data structures. The document model maps to the objects in your application code, making data easy to work with it. Map Reduce can be utilized for batch processing of data and combined operations. The aggregation operations enable users to obtain the kind of results for which the SQL GROUP BY clause is used. it is able to run over multiple servers, stabilize the load or duplicating data to keep the system up and running in case of hardware failure. It uses GridFS as a specification for storing large files. It has many features – ad hoc queries, load balancing, file storage, aggregation, capped collections etc.

### 2.3) MarkLogic

MarkLogic is enterprise NOSQL database. It is a multi-model NOSQL database that has evolved from its XML database roots to also natively store JSON documents and RDF triples, the data model for semantics. it uses a distributed, scale-out architecture that can handle hundreds of billions of documents and hundreds of Terabytes of data. it maintains ACID consistency for transactions. It integrates data silos. It supports 360 view. A 360 view is designed to let enterprises inspect and perform discovery around various sides of an entity, to support a wide diversity of purposes such as customer retention, improving departmental operations, or assessing the potency of a newly launched product or service.

it manages all data types like structured, unstructured, graph. it also supports robust security model consisting of Common Criteria certification, and enterprise-grade high availability and disaster recovery.



### 2.4) OrientDB

OrientDB is an open source NOSQL database which is written in Java. It is a multi-replica(model) db, help to provide graph, document, key/value, and object models, but the relationships are managed as in graph databases with direct connections between records. It supports schema-less, schema-full and schema-mixed modes. it can embed documents and you can also join documents like a Relational Database. It doesn't take the costly JOIN, instead of uses direct, super-fast links taken from the Graph Database world. it uses various indexing mechanisms based upon B-tree and Extendible hashing, the last one is known as "hash index". Each record contains Surrogate key. it provides SQL queries without extensions of SQL join, manage trees, and graphs of connected documents. it supports Sharding, Dynamic Triggers, Custom Data Types, SQL, Additional Constraint Types, Reactive Model etc. it's query language which is based upon SQL.

### 2.5) Neo4j

Neo4j is a graph database management system. it is invented by Neo Technology Inc. It supports an ACID-compliant transactional database with inhabitant graph storage and processing. Everything is stored in the form of either an edge, a node, or an attribute in neo4j. Every junction(node) and edge can have any number of attributes. Both the junctions(nodes) and edges can be labeled. Tags(labels) can be used to small searches. Cypher query language is supported by neo4j. Neo4j also supports fraud detection. It detects and mitigates three types of fraud:

- 1) First-party bank fraud
- 2) Insurance fraud
- 3) E-commerce fraud

## III. TECHNIQUE

### 3.1) GraphQL

GraphQL is a data query language. It is invented by Facebook in 2012 before being publicly released in 2015. It gives substitutions to REST and ad-hoc web service architectures. It is a query language which provides mechanism for your API, and a server-side runtime for executing queries by using a type system you define for your data. it is query a string that is fired to a server to be converted and satisfied, which then returns JSON back to the client. it isn't bound by any specific database or storage engine and is instead backed by your existing code and data. It wraps REST API.

<pre> {   hero {     name     friends {       name       homeWorld {         name         climate       }       species {         name         lifespan         origin {           name         }       }     }   } }         </pre>	<pre> type Query {   hero: Character }  type Character {   name: String   friends: [Character]   homeWorld: Planet   species: Species }  type Planet {   name: String   climate: String }  type Species {   name: String   lifespan: Int   origin: Planet }         </pre>
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<pre> 1 { 2   allFilms { 3     films { 4       title 5       openingCrawl 6     } 7   } 8 }         </pre>	<pre> {   "data": {     "allFilms": {       "films": [         {           "title": "A New Hope",           "openingCrawl": "It is a period of         },         {           "title": "The Empire Strikes Back",           "openingCrawl": "It is a dark time         },         {           "title": "Return of the Jedi",           "openingCrawl": "Luke Skywalker has         },         {           "title": "The Phantom Menace",           "openingCrawl": "Turmoil has engulf         },         {           "title": "Attack of the Clones",         }       ]     }   } }         </pre>	<p>Documentation Explorer</p> <p>Search the schema ...</p> <p>A GraphQL schema provides a root type for each kind of operation.</p> <p>ROOT TYPES</p> <p>query: Root</p>
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## IV. CONCLUSION

This paper describes various NOSQL Databases. This paper also describes that some NOSQL Databases supports ACID properties and some doesn't follow ACID properties. In market both type of NOSQL Databases are available. A technique is also described in this paper which helps us to retrieve data from database in easy manner.

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