NoSQL Databases:

NoSQL databases term is used to refer to any non-relational database [1]. NoSQL databases are schema-less which makes them different than the relational ones. The name of NoSQL is an abbreviation for “Not Only SQL database” which means that u can also use formats and techniques rather than the known ones for basic relational SQL database. The main types of data insertion into the NoSQL databases are documents [1]. People use the term of “NoSQL” with different meanings. As stated above, some people refer to the term as “Not Only SQL databases” which means that they are non-relational, schema-based databases. Some other people refer to the term as systems that avoid using join operations [2]. The two main reasons people tend to switch from using normal relational databases into NoSQL databases are the flexibility and the performance aspects [3]. Since that NoSQL databases are non-relational, they tend to be more flexible than the normal relational databases since that the programmers do not need to follow the known rigid structure of the relational databases. There are multiple types of NoSQL databases such as key-value pair, graphs based, document oriented and wide column oriented are the main 4 types of NoSQL databases. Since that there are several types of NoSQL databases of course there are different types of DBMS that implement such databases. Some examples of the wide column-oriented databases are “Cassandra”, “Hadoop”. There was a comparison between using Cassandra and Hadoop and normal MySQL DBMS that was made comparing several features according to B George et al [3]. Table (1) demonstrates the comparison details.

Table1. Comparison between Cassandra, Hadoop, and MySQL DBMS.

Features (Feat.)

1. Persistence (1)
2. Replication (2)
3. High Availability (3)
4. Transactions (4)
5. Rack-locality awareness (5)
6. Implementation Language (6)
7. Influences / sponsors (7)
8. License type (8)

Table

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As stated above, Cassandra is an open-source distributed management system used for storing huge amounts of data providing a highly available service with no single point of failure [4]. Apache Cassandra was developed by Facebook a decade ago. Cassandra was meant to provide a database management system for the NoSQL databases. Cassandra uses key-value pairs also known as documents. The main features that make Apache Cassandra unique are as follows [4]:

* **Decentralized**: No single point of failure
* **Scalability**: When new machines are added to the system, the read and write throughput increase.
* Fault Tolerant.
* **MapReduce Support**: Cassandra has Hadoop integration, with MapReduce support which is known to be used for big data.
* **Query Language**: Using CQL (Cassandra Query Language)
* **Tunable Consistency**
* **Supports replication and multi data center replication:**  Cassandra is a distributed system designed for deploying large numbers of nodes across several data centers.

In our project, we used Oracle PLSQL to implement a relational database. As stated above, relational databases have more rigid structures and rules to be followed. NoSQL databases are much more flexible to be used since some of the DBMS used for implementing NoSQL databases such as Apache Cassandra provide amazing features that are stated above. For the language used in both, in our project we used a SQL language which is somehow similar to a language used in NoSQL databases implemented with Cassandra, CQL (Cassandra Query Language).

References.

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