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NoSQL Database: Characteristics, Types and Applications

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 NoSQL Database: Characteristics, Types and Applications title banner

What is a NoSQL Database?

A non-relational database that stores data in non-tabular relations, a NoSQL database management system is a thing of the 21st century. Referring to non-SQL or non-relational databases, a NoSQL Database can store data in both traditional and non-traditional structural languages.

Perhaps this is why it is also referred to as 'not only SQL'. Before relational databases, large data used to be stored in database management systems (DBMS) that had a few drawbacks such as functional complications and slower recovery of data.

However, the emergence of SQL databases soon curbed these limitations and instead led to the development of relational database management system (RDBMS). This type of data storage led to the arrangement of data in the form of tables.

Yet, there was a need for a more flexible and simpler form of data storage. Therefore, NoSQL databases emerged that enhanced the way data was stored, making databases more flexible and simpler for large organizations.

Let us now understand the way a NoSQL database works. To begin with, one needs to note that NoSQL databases must be used when a large amount of data needs to be stored. Moreover, it does not require to be stored in a structured way that sets it free from any tabular form.

(Must read - [Introduction to NoSQL](#))

Characteristics of NoSQL Database

Although there are different ways that can be incorporated to understand how NoSQL databases work, we will now look at some of the most common features that define a basic NoSQL database.

1. Complex-free working

Unlike SQL databases, NoSQL databases are not complicated. They store data in an unstructured or a semi-structured form that requires no relational or tabular arrangement. Perhaps they are easier to use and can be accomplished by all.

(Suggest blog: SQL: [Applications and Commands](#))

2. Independent of Schema

Secondly, NoSQL databases are independent of schemas which implies that they can be run over without any predetermined schemas.

That said, they are far more efficient to work with and perhaps this particular feature works well for young programmers and organizations handling large amounts of heterogeneous data that requires no schemas to structure it.

(Must check: [SQL vs NoSQL](#))

3. Better Scalability

One of the most prominent features of such a database is that it has high scalability that makes it suitable for large amounts of data.

Needless to mention that the contemporary data scientists often prefer to work with NoSQL databases due to this feature since it allows them to accommodate humongous data without rupturing its efficacy.

4. **Flexible to accommodate**

Since such databases can accommodate heterogeneous data that requires no structuring, they are claimed to be flexible in terms of their usage and reliability.

For beginners intending to try their hands in the field, NoSQL databases are easy to handle yet very useful.

(Read also: [Top sites to learn SQL](#))

5. **Durable**

If durability is not one of its most striking features, then what is? NoSQL databases are highly durable as they can accommodate data ranging from heterogeneous to homogeneous.

Not only can they accommodate structured data, but they can also incorporate unstructured data that requires no query language. Undoubtedly, these databases are durable and efficient.

(Must check: [Introduction to MySQL](#))

Types of NoSQL Databases

As we have gained some useful insights from the features of the NoSQL databases as to how they work, let us now jump on to the various NoSQL database types to understand the concept in a better manner.

To begin with, NoSQL databases can be divided into 4 types. They are as follows -

1. **Document Database**

As the title itself indicates, the document database stores data in the form of documents. This implies that data is grouped into files that make it easier to be recognized when it is required for building application software.

One of the major benefits of a document database is that it allows the developer to store data in a particular format of documents according to the same format they follow for their applications.

It is a semi-structured and hierarchical NoSQL database that allows efficient storage of data. Especially when it comes to user profiles or catalogs, this type of NoSQL database works very well. A typical NoSQL database example is MongoDB.

(Also read - [Hadoop vs MongoDB](#))

2. **Key-Value Database**

Termed to be the simplest form of NoSQL database of all other types, the key-value database is a database that stores data in a schema-less manner. This type of database stores data in the key-value format.

Herein, a data point is categorized as a key to which a value (another data point) is allotted. For instance, a key data point can be termed as 'age' while the value data point can be termed as '45'.

This way, data gets stored in an organized manner with the help of associative pairing. A typical example of this type is Amazon's Dynamo database.

"Hundreds of thousands of AWS customers have chosen DynamoDB as their key-value and document database for mobile, web, gaming, ad tech, IoT, and other applications that need low-latency data access at any scale."- [Amazon's Dynamo](#)

3. **Column-oriented Database**

Another type of NoSQL database is the column-oriented database. This type of database stores data in the form of columns that segregates information into homogenous categories.

This allows the user to access only the desired data without having to retrieve unnecessary information.

When it comes to data analytics in social media networking sites, the column-oriented database works very efficiently by showcasing data that is prevalent in the search results.

Since such types of databases accommodate large amounts of data, it is better to filter out information. This is exactly what the column-oriented database does. A typical example of a column-oriented NoSQL database is [Apache HBase](#).

4. **Graph Database**

The 4th type of NoSQL database is the graph database. Herein, data is stored in the form of graphical knowledge and related elements like edges, nodes, etc.

Data points are placed in such a manner that nodes are related to edges and thus, a network or connection is established between several data points.

This way, one data point leads to the other without the user having to retrieve individual data points. In the case of software development, this type of database works well since connected data points often lead to networked data storage.

This, in turn, makes the functioning of software highly effective and organized. An example of the graph NoSQL database is Amazon Neptune.

“[Amazon Neptune](#) is a fast, reliable, fully managed graph database service that makes it easy to build and run applications that work with highly connected datasets. “

Applications of NoSQL Databases

1. **Data Mining**

When it comes to data mining, NoSQL databases are useful in retrieving information for data mining uses. Particularly when it's about large amounts of data, NoSQL databases store data points in both structured and unstructured formats leading to efficient storage of big data.

Perhaps when a user wishes to mine a particular dataset from large amounts of data, one can make use of NoSQL databases, to begin with. Data is the building block of technology that has led mankind to such great heights.

Therefore, one of the most essential fields where NoSQL databases can be put to use is data mining and data storage.

(Also read - [Top 10 Data Mining Tools](#))

2. **Social Media Networking Sites**

Social media is full of data, both structured and unstructured. A field that is loaded with tons of data to be discovered, social media is one of the most effective applications of NoSQL databases.

From comments to posts, user-related information to advertising, [social media marketing](#) requires NoSQL databases to be implemented in certain ways to retrieve useful information that can be helpful in certain ways.

Social media sites like Facebook and Instagram often approach open-source NoSQL databases to extract data that helps them keep track of their users and the activities going on around their platforms.

3. **Software Development**

The third application that we will be looking at is [software development](#). Software development requires extensive research on users and the needs of the masses that are met through software development.

However, a developer must be able to scan through data that is available.

Perhaps NoSQL databases are always useful in helping software developers keep a tab on their users, their details, and other user-related data that is important to be noted. That said, NoSQL databases are surely helpful in software development.

Summing Up

To sum up, there are plenty of NoSQL databases out there to assist in data mining for one purpose or the other. However, a true NoSQL database is identified by its features like scalability, flexibility, and efficiency to accommodate data.

(Related blog: [SQL project ideas](#))

Even though NoSQL databases are of 4 types - document, key-value, column-oriented, and graph, they are majorly non-relational databases that help in data storage of usually large amounts of data.



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