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**Database Types and Comparison**

There are many databases out in the market, each serving a unique purpose. The way they are categorized and compared also vary. The main types of databases are hierarchical, network, and NoSQL. In the following paragraphs, there will be an overview of each type as well as a comparison of column-based versus row-based databases.

First, there is a hierarchical database that is based off a tree structure, which can also be said to be based off a parent-child structure/relationship. This means that there is a one-to-many relationship between the data elements stored in the database. [1] That said, it is a very popular choice for storing file systems and for storing information pertaining to geography. It is also useful in applications that require better performance standards such as those related to banking or telecommunications. Microsoft also makes excellent use of the hierarchical database system in it Windows Registry, a part of the Windows operating system. Scalability can be an issue with this type of database since it’s not possible to just add data to a child table without adding it to the parent table. This gets more complicated if there needs to be a new record in a child table, but the child and the parent tables are unrelated. However, speed is better here since the parent and child tables are stored close together, making navigation easy and access time shorter. On the downside, however, complex relationships are not advised and there is very little flexibility in what the hierarchical database can be used for. It also contains more redundancy than other types and there is no DML or DDL available. [2]

The second type is a network database system, which it’s based on the hierarchical database system, but it allows you to have multiple parents rather than being restricted to the original one parent to multiple children. This, in turn, allows for more complex relationships that weren’t allowed in the hierarchical database. The data in a network database system is represented graphically instead of as a tree structure. Users get more efficient access to the data. However, it should be noted that the flexibility of a network database system is only there when designing the database. After the data is populated, it is no longer as flexible. Some pros of a network database system include the simplicity in designing the database, less restrictions on the relationships allowed, and faster data access. There are a few cons, such as the complexity in implementing this type of database, its lack of flexibility in changing the structure after the data has been populated, and it is harder to use certain operations such as deletions, insertions, and updates because it involves a lot of adjustments in the pointers. [3]

Another type of database is the NoSQL database system. This type of database does not store data in relational tables. Rather, it uses other methods of storing the data, such as JSON files. Having a NoSQL databases gave companies a way to store a ton of data without having to structure it. It allowed companies to better utilize their resources, namely the developers. Around the time that NoSQL databases started getting traction in the market, cloud computing was also gaining traction at the same time. This allowed companies to scale outward rather than scaling upward, allowing them to have more flexibility in managing and utilizing their data. There are four types of no SQL databases that are available, and they are document, key value, wide column, and graph databases. NoSQL is best for use when dealing with large quantities of data, when the development process is Agile and very fast paced, and when the data is either structured or unstructured. While relationships can be stored in NoSQL databases, they are stored differently as compared to relational databases. [4]

Last is the comparison between row-based and column-based databases. Row-based databases, also known as row-oriented databases, are traditional databases that store data row by row on the disk. This is the best choice in terms of performance, especially when dealing with queries that require multiple columns in the same row/record. This is most often seen in online transaction processing application. The data is also stored according to unique keys that serve as unique identifiers for each record. Column-based databases, on the other hand, store all the data for one column on the disk. This means that the user doesn’t have to go through a bunch of necessary details to get to the information they want. Pros and cons of row based databases include easy data manipulation, slow data aggregation, and more storage space required. Pros and cons of column based databases include poor performance in data manipulation, better for analytical processing, and less space is required to store the data.

Overall, there are many benefits to each type of database. It really depends on the company and the purpose for which they need the database. Based off of that they can choose from different vendors that best serve their purpose.

**Works Cited**

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