SQL Vs NoSQL

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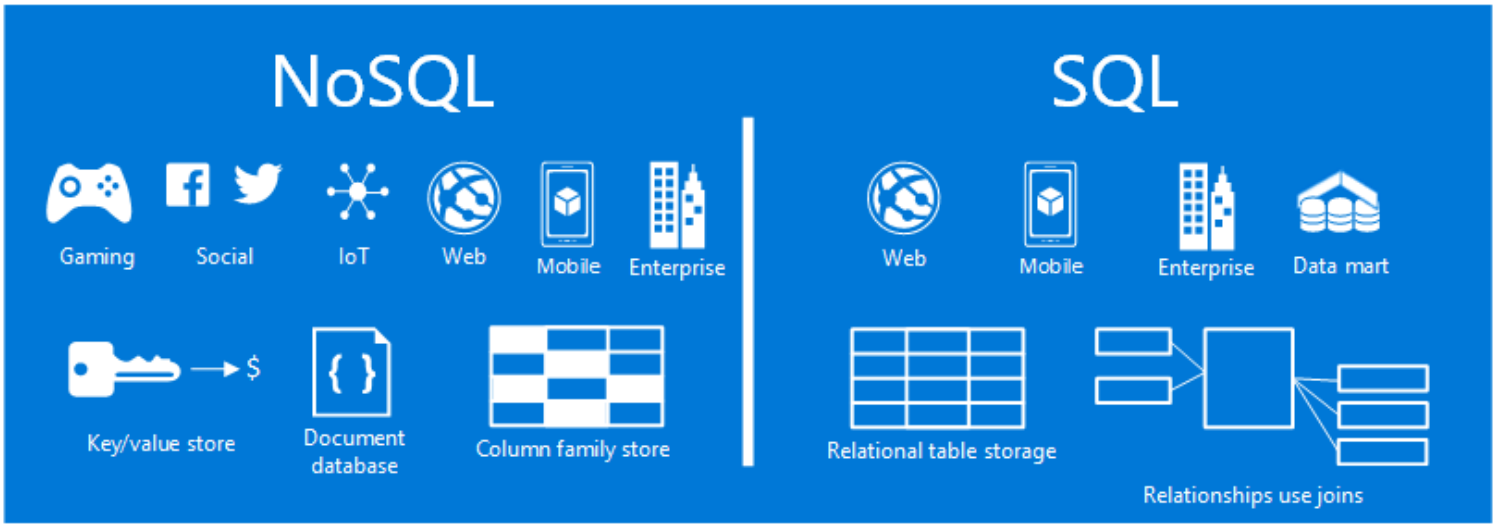


(Barooah, 2020)

Relational Vs. Non-Relational (SQL Vs. NoSQL)

There are 4 main differences between SQL and NoSQL databases. The main differences between the two databases are the database management system type, scalability, schema type and types of data storage.

SQL which stands for Standard Query Language is a Relational Database system. Which means it stores and provides access to data points that are related to one another. While NoSQL meaning Not Only SQL, are non-relational databases that do not use fixed or defined schema of rows and columns that are used in relational databases.

The difference in scalability between SQL and NoSQL is the direction of scale. SQL databases scale vertically. This type of databases can increase the load on a single server by increasing the CPU, RAM, or SSD. NoSQL however, scales horizontally. This means more traffic can be handled by sharding meaning database separation or adding more servers in the database.

SQL databases have a predefined schema which makes changes the system difficult and disruptive. NoSQL database use a dynamic schema for unstructured data which means fields can be added as needed. The final main difference between SQL and NO SQL is the contents the database stores. SQL store tables of data while NoSQL can store a range of unstructured data types such as JSON, documents, key-value pairs and graph databases.

The differences between the databases aid in being able to determine what type of database is being used or needs to be used. The difference on database management system, scalability, schema type, and the types of data stored. These are key factors and must be taken into consideration when deciding on a database.

(Login et al., 2020)

Three NoSQL Twitter Features

Features of Twitter that could be NoSQL are tweeting images, reacting to direct messages and following users.

Twitter Features How To

How to send a tweet. First press the Create a Tweet button. Once the window pops up enter text, images, or emojis to the tweet. Lastly press the publish button to display your thoughts to the world and the data is sent back to the database for viewing at a later date..

How to react to a direct message with an emoticon. Select the icon that looks like an envelope on the bottom of the screen. Next, select the message you would like to respond to. Once the recipient is found from the recently contacted database, find the message that will be reacted to from the message history data. Once found, hold down on the message until all emoticons are pulled and displayed. Select the desired emoticon and the message history is updated.

To follow a user from your timeline, First click the profile picture. Once the profile loads select the blue button that says follow. This will add them to your followers database. The follow can be confirmed because the button will change from a light blue follow to a dark blue unfollow.

Twitter Features Pros/Cons

The scalability of NoSQL databases allows the users to have no limit on how many tweets they can have or post. This also means there is no limit to the amount of other content that can be added to this site as well. This is importing because Tweeting and direct messages are the essential parts of twitter. They are the primary uses of communication. Not following a pre-planned schema allows tweets to now have to only use words or use words when only wanting to post an image or emoticon. It also

allows for recreating to direct messages without the need of sending the recipient a worded response as well. The availability of NoSQL means tweets, messages, and followers are still viewable even when offline.

The cons of a database of this capacity is that queries can take much longer because there is no pre-defined schema and lots of information to go through. Due to the amount of users and capacity nothing that is removed from this database or social media site is ever truly gone. Meaning someone could have saved it and reposted or stolen and posted to another site. Because there is no limit on how many tweets can be produced the makers of twitter put a limit on the characters that can be used. Emotions cons can take up more characters than regular letters. These are not major cons compared to the many pros there are however cons none the less.

("Facebook announces new global agency roster and diversity push", 2020)

One Relational Facebook Feature

A relational feature from Facebook would be the process of logging in.

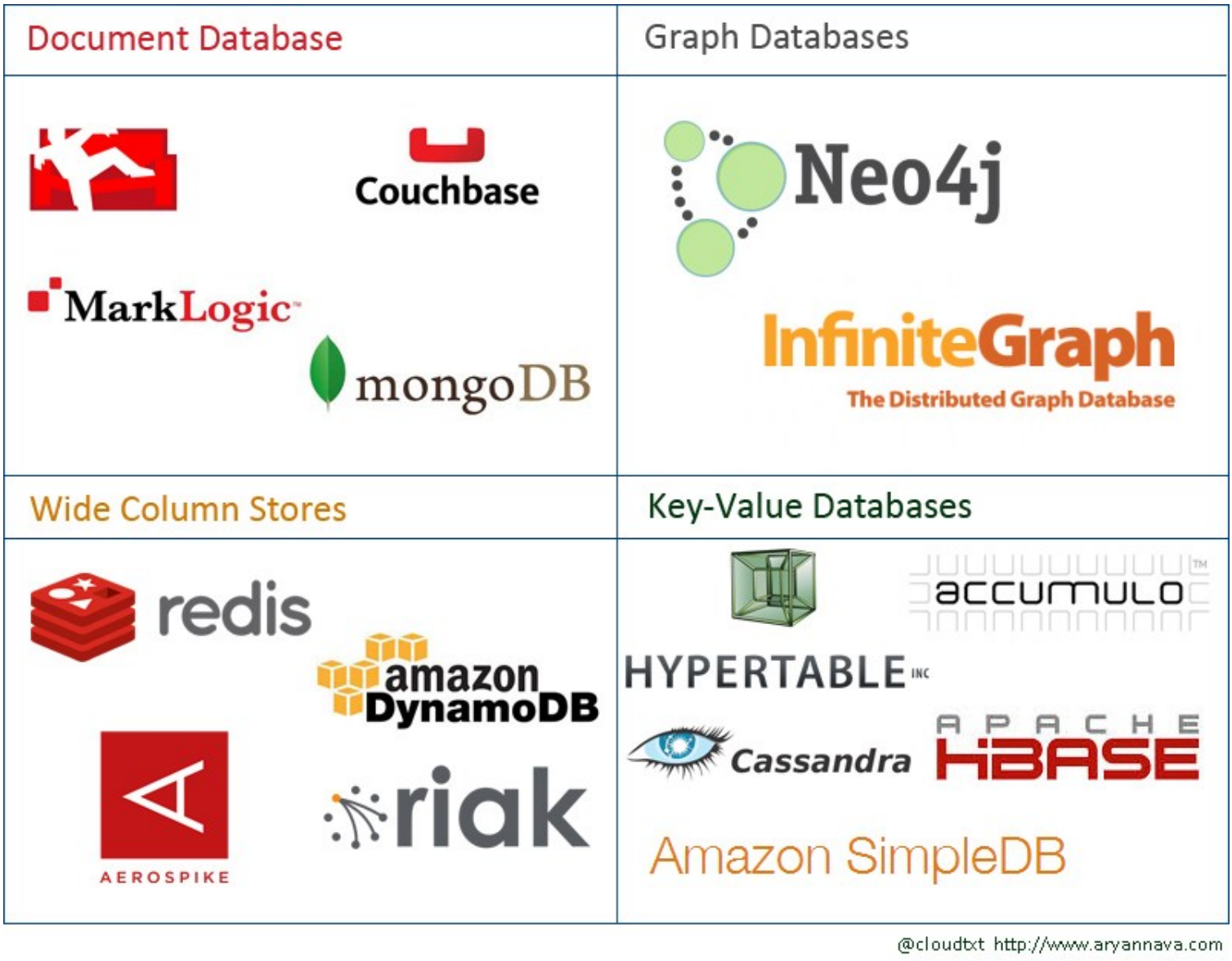
Facebook Feature How To

The user enters their email address or phone number and password into the required fields. A connection attempt is made to the database using the information entered. If the information is correct the user will be greeted with their welcome screen.

If now, However the user will be alerted of the error and asked to try again.

Facebook Feature Pros/Cons

The pro of this features is it keeps everyone's information private and personalized. The log in connects to you to your personal database of information and friend profiles that you like. You are not forced to look and talk to the same people as everyone else. The con of this feature is if the login information is ever changed such as deleting an email account or changing phone numbers the user will lose access to this information forever unless updated every time.

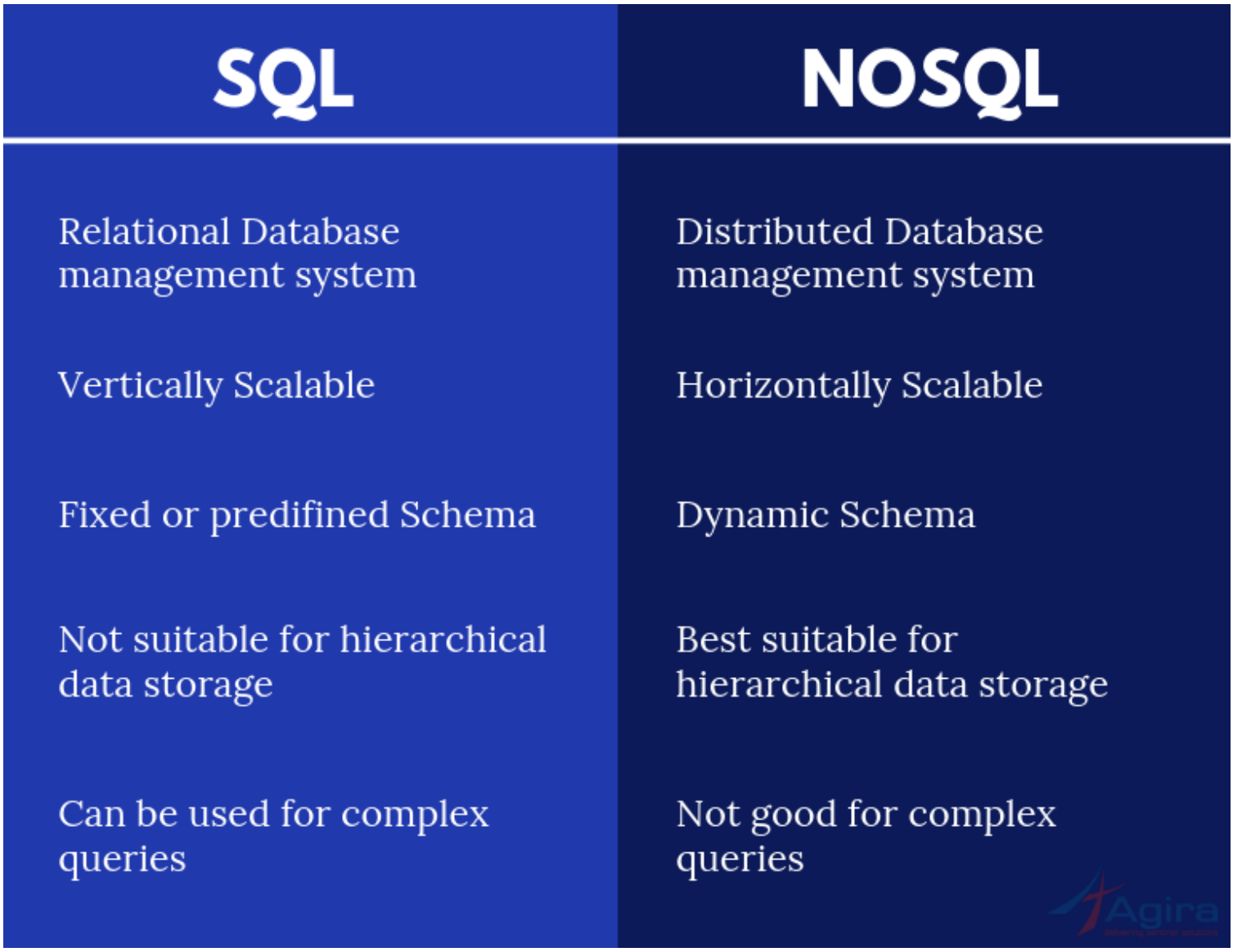


("Difference between SQL and NoSQL | NoSQL vs SQL", 2020)

Four NoSQL Database Types

Four types of non-relational databases are Document, Key-Value, Wide-Column and Graph. Document databases have a variety of field value types and powerful query language. They are can be used in a variety of cases and can also be used a general-purpose database. Key-Value databases are great for small amounts of data and don't require complex queries to retrieve them. They are mostly used in cases of storing settings or caching. Wide-Column store databases store large amounts

if data and can predict the query pattern that will be used. Wide-column stores are used mostly for storing internet of Things data and user profile data. Graph databases store data to navigate relationships to look for patterns. A Graph database is used mostly in cases of social networks, fraud detection and engines that utilizes recommendations.



(Technologies, 2020)

Five NoSQL Databases

Five NoSQL Databases Pros/Cons

mongoDB is a Document Database that stores data in flexible documents. The fields can vary between documents and the structure of the data can be changed over time. The major pros of mongoDB are it cost, manageability and flexibility. The cost of mongoDB is a major pro for because the database is free to use. The database does not require an

admin. Due to the user-friendly interface the database can be used by developers and administrators alike which makes manageability very simple. The flexibility of the database is a pro because it can grow and change in fields and structure based on the user's needs. The cons of MongoDB are the high memory usage and limited data size.

redis is a key-value database Redis database pros are quick key lookups, easy caching and is used with some of the most known programming languages. Being that this is a key-pair value as expected this database is excellent at quickly return result keys. The key and value pairs can also be up to 512 MB. A major con of redis is the writing and deleting of huge amounts of data may result in performance decrease.

Cassandra was released by Facebook as a free open source wide-column database. The pros of the database are scalability, command features and the data security. Apache Cassandra is considered highly scalable due to its design it can be scaled up to larger databases in a simple and easy fashion. The read and Writes for Cassandra can be done from any node and the design of the database speeds up commands such as Read and write. Two major cons of this database are data refreshes and No join support. The Cassandra database is not optimized to update or delete data from the

database. This database also does not support join or subqueries which can affect performance.

Apache HBase is a wide-column database that uses the Google BigQuery model. Which is a serverless and highly scalable data storage. The pros of this database are sharding, schema type, storage size. Hbase gives the programmer or user options for sharding tables such as automatic and configurable. No concept of fixed columns in HBase. Apache Hbase is used to work with larger datasets. A con of Apache Hbase is that it is sorted only on key.

("The most popular database for modern apps", 2020)

Weather App (Two NoSQL Solutions)

The two NoSQL databases that could be used for weather apps would be MongoDB and Microsoft SQL Server. The scalability allows for years of

weather data to be saved with different attributes to be searched. They can also record and save images of tracking which can better regulate server weather means and help detect them sooner.

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