Caleb Stark, 6/2/2024

Assignment 1.3, Basic Comparison of Relational vs. NoSQL Databases

“In the context of relational databases, what are relationships?”

Relationships are how tables can relate to each other. Within a relational database, you utilize keys to link different databases, inserting the foreign key on one database that can prompt a primary key in a different database. Let's say you have a table of employees and what they are trained on, for example, 1-1. Now, inside that table, you have a foreign key, the employee ID. That ID could then be used in a different table, for example, 1-2, to pull up their personal information. This would clarify what each table can be used for and the separation of information for different privilege levels. (Chapple, 2021)

Example 1-1 Example 1-2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name | Function Trained in | Employee ID |  | Employee ID | Full Name | Phone # |
| Lucas | Pulling | 0034242 |  | 0034242 | Lucas A Penny | 999-999-9999 |
| Sara | Putting | 8792422 |  | 8792422 | Sara L Jackson | 555-555-5555 |

“What are the advantages of relational databases?”

Relational databases utilize interconnected tables with primary and foreign keys to relate data between different tables. The advantages that come along with this model are quick, effective searching of information, enhanced data security due to the ability to limit access to different tables, strong data integrity, and normalization requiring specific characteristics to align before implementing it into your database. (Pedamkar, 2023)

“What are the advantages of NoSQL databases?”

NoSQL databases are great for storing large quantities of data and files. This database style allows users to insert different file types and different data storage methods directly into the database, making it very easy to store data. The ability to store complete files without a need to change then also allows for the storage of large quantities of data to be very quick. NoSQL is also very scalable, requiring just the addition of more systems to add additional capacity to the database. (Foote, 2022)

”What are the disadvantages of relational databases? “

Rational databases are only easily scalable in readability, with the write portion being a much more complex and extensive process. It can be challenging to change the database's structure once it has been established. There may be issues with the server that houses the database, maybe a single point of failure, or would require a complex backup system that would increase the complexity of the system. (Singh)

”What are the disadvantages of NoSQL databases?”

With NoSQL-type databases, there is no standard setup, causing issues when attempting to learn a new database and having to start basically from scratch learning how the systems interact with each other. NoSQL also lacks ACID properties, meaning the quality of the transferred data may be inaccurate compared to the most current data stored within the database. With the missing ACID properties, you could transfer money from one account, and the send goes through, but an error occurs, and the money is never received by the other account, resulting in lost money and needing to contact the financial institution. The atomicity property of ACID would require that the entire transaction be null and void if an error occurred at any step of the process. Another disadvantage to using a NoSQL database is the lack of JOINs to connect tables, making an interconnected database. (Foote, 2022)

“Identify at least two features of MySQL and two features of MongoDB, and describe what they are and how they are used.”

Data efficiency is very high in a MySQL database, allowing it to be very quick; it does this by ensuring data is consistent and not redundant. This allows the system to find exactly what you request and make changes without choosing between multiple options appearing as duplicates. My SQL is also platform-independent, allowing it to run on many different OS and work with many different programming languages. This allows developers from many different backgrounds to easily approach MySQL without having to learn a whole new programming language or switch to a different OS. (TutorialsPoint)

MongoDB has many great features as a NoSQL database. The first I wanted to touch on was load balancing; MongoDB has a built-in load balancer that attempts to equally spread out the data in the database around to various shards to ensure that the requests being made of the database can be spaced out around multiple servers and can handle multiple sessions without running into bottlenecks. MongoDB also supports ad-hoc queries in real-time, allowing you to make queries of the database at the moment that may not have been preset as part of the schema, allowing for a very versatile way to pull analytics in real-time. (MongoDB)

# References

Chapple, M. (2021, June 11). *Database Relationships*. Retrieved from Lifewire: https://www.lifewire.com/database-relationships-p2-1019758

Foote, K. D. (2022, November 17). *NoSQL Databases Advantages and Disadvantages*. Retrieved from Dataversity: https://www.dataversity.net/nosql-databases-advantages-and-disadvantages/

MongoDB. (n.d.). *MongoDB Features.* Retrieved from MongoDB: https://www.mongodb.com/resources/products/capabilities/features

Pedamkar, P. (2023, July 2023). *Relational Database Advantages*. Retrieved from Educba: https://www.educba.com/relational-database-advantages/

Singh, P. (n.d.). *Advantages and Disadvantages of RDBMS.* Retrieved from Internsshala Trianings: https://trainings.internshala.com/blog/advantages-and-disadvantages-of-rdbms/

TutorialsPoint. (n.d.). *MySQL Features.* Retrieved from TutorialsPoint: https://www.tutorialspoint.com/mysql/mysql-features.htm