Jacob Isdell

CSD 310

Module 1.3

08/18/2024

**Relational Databases vs NoSQL Databases**

In relational databases, relationships are ways that tables can be connected together. For instance there might be a one-to-many relationship. A one-to-many relationship means that a single record in a table may be related to multiple records. A way to consider this if there might be one person who plays games, a gamer. That gamer will have an id. The gamer can play multiple different games within the games table, and their id will appear in the games table for each game they play.

Another example of a relationship would be a many-to-many relationship. In this type of relationship, multiple records on one table can be related to multiple records in another. Using our gamer example from before, we would have multiple gamers that play multiple different games.

According to Microsoft’s 2022 article “SQL vs. NoSQL data”, relational databases “have a fixed schema, use SQL (Structured Query Language) to manage data, and support ACID guarantees: atomicity, consistency, isolation and durability.” By having a fixed schema, relational databases are able to maintain data integrity with various requirements. They can also be queried with SQL, structured query language, which allows the data to be manipulated and/or used for analysis. Disadvantages include lack of real-time data and complexity. Since relational databases are more geared towards batch processing, they don’t support real-time updates to data (GeeksforGeeks, 2023). Relational databases can be difficult to set up and manage, and that complexity can make them a hard sell for some people. (GeeksforGeeks, 2023)

NoSQL databases “excel in their ease-of-use, scalability, resilience, and availability characteristics.” (Microsoft 2022) These advantages make NoSQL databases a great option for spinning up a quick database to try out a new project, but it can also be a great choice for an organization that is growing quickly. A few disadvantages of NoSQL databases are the lack of maturity and the learning curve when moving from a relational database. (GeeksforGeeks, 2024) Both of these disadvantages come from the relative new-ness of the databases.

Two features of MySQL that stand out are stored procedures and SQL queries themselves. Stored procedures allow for a user to store certain procedures to be run whenever they are called. This greatly improves reusability, and can speed up data analysis. SQL queries are powerful tools themselves because they allow for the data in the database to be consumed in multiple ways.

Two features of MongoDB that stand out are the ability to embed a document inside another document and the JSON-like layout of the data. Embedding documents inside other documents reduces the complicated joins that SQL has. This is also why the JSON-like layout of the data is beneficial, JSON is fairly easy to read by humans, and that helps reviewing the data a bit easier.

**References**

Microsoft. (2022, April 6). *SQL vs. NoSQL data.* <https://learn.microsoft.com/en-us/dotnet/architecture/cloud-native/relational-vs-nosql-data>

GeeksForGeeks. (2023, May 2). *Advantages and Disadvantages of SQL.* <https://www.geeksforgeeks.org/advantages-and-disadvantages-of-sql/>

GeeksForGeeks. (2024, May 29). *Advantages and Disadvantages of using SQL vs. NoSQL Databases.* <https://www.geeksforgeeks.org/what-are-the-advantages-and-disadvantages-of-using-sql-vs-nosql-databases/#advantages-and-disadvantages-of-nosql-databases>