Abram Denzlinger

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1.3 Assignment: Basic Comparison of Relational vs. NoSQL Databases

In the context of relational databases, what are relationships? Describe at least two, and provide an example of their use.

* In the context of relational databases, relationships are logical connections between 2 or more tables of data. These relationships typically involve the use of a “primary key” and a “foreign key.” In a defined relationship, a primary key is a unique identifier for each record in one table. When that identifier is also present in another column of the related table, it is called the foreign key.
* A “one to many (1:n)” relationship is when a single record in the first table can be associated with one or more records in another table, but a record in the second table can only be associated to one record in the first table. An example of a relational database would be a Customer table and an Orders table. Each record in the Customer table might have a unique ‘CustomerID’ field as the Primary key. Each order in the Orders table might have a unique ‘OrderID’. One customer can have many orders, but each order only has 1 customer associated. Hence, one to many.
* A “many to many (m:n)” relationship is when the first table can be associated with many records in another table, and a record in the second table can be associated to many records in the first table. In a many to many relationship, typically a third table is needed to join the 2 tables. An example would be how a Student table might relate to a Courses table. Each student can take many courses, and each course has many students who enroll. An administrator may create a junction table called ‘Enrollments’ to connect the data. In the junction table, each record may get a unique ‘EnrollmentID’ assigned as the Primary key.

What are the advantages of relational databases? What are the advantages of NoSQL databases?

* Relational databases have distinct advantages over other types of databases. Some of them are: data accuracy through reduced duplication and redundancy, data integrity through data typing and validity checks, and flexibility enabling the same data to be used for any number of purposes.
* NoSQL databases also have distinct advantages over other types of databases. Some of them are: they more scalable, more flexible, and often provide superior performance to traditional relational databases

What are the disadvantages of relational databases? What are the disadvantages of NoSQL databases?

* Some disadvantages of relational databases are: they are not ideal for unstructured data sources, they can become complex as the scale increases, and performance can suffer.
* Some disadvantages of NoSQL databases are: complex joins can be more challenging, and tooling and expertise are limited compared to SQL databases.

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

* A unique feature of MySQL compared to other relational databases is that it is open source. This enables organizations to deploy it without taking additional licensing expenses.
* Another unique feature of MySQL is its storage engine software. It is optimized for the task that is being performed, and enhances performance.
* A unique feature of MongoDB is its document-oriented data model. This enables the user to store complex and hierarchical data in a single record. Documents in the same collection do not have to have similar fields, which maximizes flexibility and scalability for the user.
* Another unique feature of MongoDB is that records can be queried through an API or through a query language, which gives added flexibility for the developer.