Unit 8

Hands-on with Database Design

Discussion Forum – Alternatives to SQL

NoSQL databases are gaining popularity in recent years because of their claim to efficiently manage large volumes of data, support horizontal scalability, and be schema-agnostic (Fowler, 2015). Two main points stand out from a survey by Couchbase regarding relational databases: inflexible schemas and a lack of scalability (Lazzar, 2012). Problems NoSQL databases resolve because they adhere to Basically Available-Soft state-Eventual consistency (BASE) (Chandra, 2015). BASE differs from the traditional ACID principle (Atomic, Consistent, Isolated, Durable) in the degree of transaction support required of data. For instance, time-sensitive use cases requiring all-or-nothing commits are supported best by relational databases. Those that accept eventual consistency benefit from NoSQL databases (given their distributed nature).

Since NoSQL databases are non-relational and schema-agnostic, graph databases are interesting NoSQL databases because they maintain a graph of relations among *corresponding* data. In graph databases, relationships are first-class citizens and may contain data (much like an association class in UML). Such relationships allow users to think about the semantics of *how* data relates to other data—relational databases think about data sets, so users focus more on *schema* than *relations.*

NoSQL databases are not yet as mature as relational databases (6+ years versus 40+ years) (Chandra, 2015). Moreover, there exists no single query language for NoSQL databases. Neo4j introduced their Cypher query language--being adopted by more organisations (Francis et al., 2018); Couchbase has its query language called N1QL to traverse JSON documents (Ostrovsky et al., 2015); and Microsoft has extended standard T-SQL to support NoSQL-style graph queries

using traditional relational structures (Microsoft, 2019). Overall, NoSQL databases are an essential tool in an organisation's data strategy, best suited for decentralised applications, multi-structure data, dynamic schemas. (Raj et al., 2018). Selection of *which* style of NoSQL to utilise (document, graph, key-value) ultimately will depend on the business use cases of data.

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