Comparison Between MongoDB and SQL

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Introduction to SQL and MongoDB

SQL (Structured Query Language):

- Relational Database Management System (RDBMS).
- Uses structured tables with rows and columns.
- Common SQL databases: MySQL, PostgreSQL, Oracle, SQL Server.

MongoDB (NoSQL Database):

- NoSQL document-oriented database.
- Stores data in JSON-like BSON format.
- Ideal for handling unstructured or semi-structured data.

Structural Differences

SQL (MySQL, PostgreSQL) vs. MongoDB (NoSQL):

- Structure: Tables with rows and columns | JSON/BSON documents
- Schema: Fixed schema with defined fields | Dynamic schema with flexible fields
- Relationships: Strongly enforced with foreign keys | Flexible, non-relational
- Scalability: Vertical (scale-up) | Horizontal (scale-out)

Performance & Scalability Comparison

SQL vs. MongoDB:

- Performance: Optimized for structured data | Optimized for large-scale unstructured data
- Query Language: Uses SQL (SELECT, JOIN, etc.) | Uses Mongo Query Language (MQL)
- Transactions: Strong ACID compliance | BASE (Eventually Consistent)
- Scalability: Vertical scaling | Horizontal scaling

When to Use Each?

Use SQL when:

- You need structured, relational data.
- Transactions require strict consistency (e.g., Banking).
- You need complex queries with JOINs.

Use MongoDB when:

- You need a flexible schema for dynamic data.
- Handling large-scale unstructured data (Big Data, IoT, Social Media).
- High-speed read and write operations.

Conclusion:

- SQL is ideal for structured, relational data.
- MongoDB is better suited for flexible, high-speed applications.
- Choose based on your project requirements.