|  | SQL Databases | NoSQL Databases |
| --- | --- | --- |
| Data Storage Model | Tables with fixed rows and columns | Document: JSON documents, Key-value: key-value pairs, Wide-column: tables with rows and dynamic columns, Graph: nodes and edges |
| Development History | Developed in the 1970s with a focus on reducing data duplication | Developed in the late 2000s with a focus on scaling and allowing for rapid application change driven by agile and DevOps practices. |
| Examples | Oracle, MySQL, Microsoft SQL Server, and PostgreSQL | Document: MongoDB and CouchDB, Key-value: Redis and DynamoDB, Wide-column: Cassandra and HBase, Graph: Neo4j and Amazon Neptune |
| Primary Purpose | General purpose | Document: general purpose, Key-value: large amounts of data with simple lookup queries, Wide-column: large amounts of data with predictable query patterns, Graph: analyzing and traversing relationships between connected data |
| Schemas | Rigid | Flexible |
| Scaling | Vertical (scale-up with a larger server) | Horizontal (scale-out across commodity servers) |
| Multi-Record ACID Transactions | Supported | Most do not support multi-record ACID transactions. However, some — like MongoDB — do. |
| Joins | Typically required | Typically not required |
| Data to Object Mapping | Requires ORM (object-relational mapping) | Many do not require ORMs. MongoDB documents map directly to data structures in most popular programming languages. |