



Tech Buyer Guidance



Databases Demystified. A Guide to Types and Uses

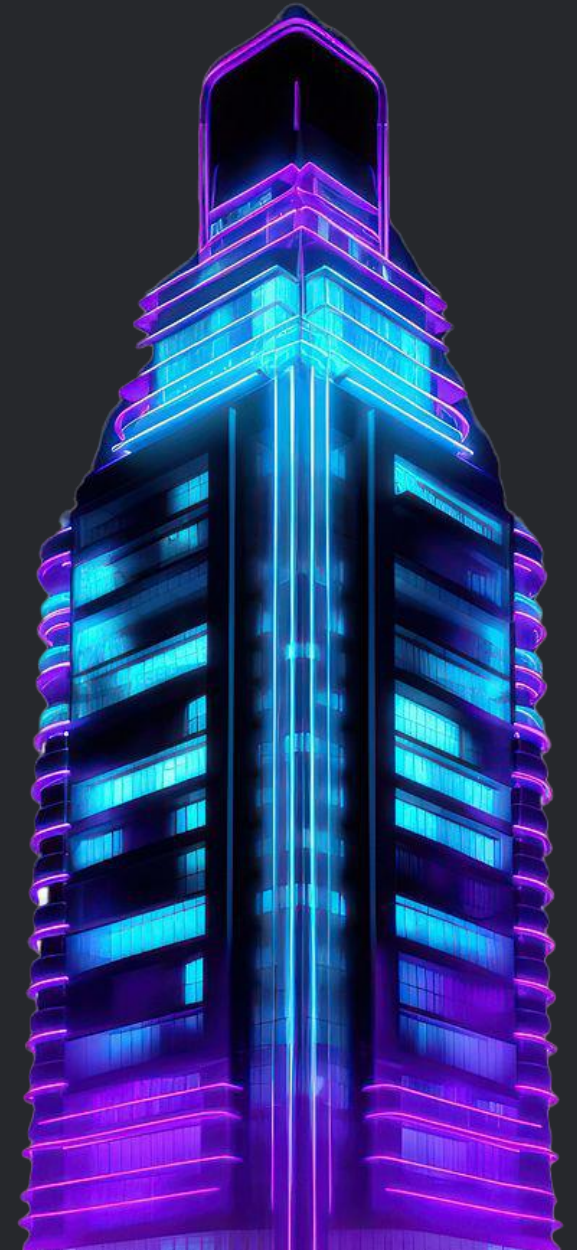
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MARCH 2024



Databases are foundational elements in the tech ecosystem, crucial for managing various data types efficiently. Beyond the traditional relational and NoSQL databases, specialised databases like Time-Series, Spatial, and Document-oriented databases cater to specific needs, enhancing data processing and analysis capabilities.

This Ecosystem Insights discusses database categories, offering insights into their functionalities and examples of vendors and products.



#1 Relational Databases (RDBMS)

Utilise tables to store data, emphasising relationships among data. They support Structured Query Language (SQL) for data manipulation.

Examples

- > **Oracle Database**
Feature-rich and scalable, suitable for enterprise-level applications
- > **MySQL**
An Oracle-owned, open-source option popular for web applications
- > **Microsoft SQL Server**
Known for robust data management and analysis features
- > **PostgreSQL**
Offers advanced functionalities, including support for JSON and GIS data





#2 NoSQL Databases

Designed for unstructured data, offering flexibility in data modelling. NoSQL databases are scalable and cater to various data types.

Examples

Document-Oriented

MongoDB (flexible JSON-like documents), Couchbase (optimised for mobile and web development)

Key-Value Stores

Redis (in-memory store used for caching), Amazon DynamoDB (managed, scalable database service)

Wide-Column Stores

Cassandra (handles large data across many servers), Google Bigtable (high-performance service)

Graph Databases

Neo4j (manages data in graph structures), Amazon Neptune (managed graph database service)



#3 In-Memory Databases

Store data in RAM instead of on disk, speeding up data retrieval. Ideal for real-time processing and analytics.

Examples

- 01 **Redis**
Versatile in-memory data structure store, supporting various data types
- 02 **SAP HANA**
Accelerates real-time decisions with its high-performance in-memory capabilities
- 03 **Oracle TimesTen**
Tailored for real-time applications requiring quick data access



#4 NewSQL Databases

Blend the scalability of NoSQL with the ACID guarantees of RDBMS, suitable for modern transactional workloads.

Examples

- **Google Spanner**
Offers global-scale transactional consistency
- **CockroachDB**
Ensures survivability, scalability, and consistency for cloud services
- **VoltDB**
Combines in-memory speed with NewSQL's transactional integrity





#5 Distributed Databases

Designed for unstructured data, offering flexibility in data modelling. NoSQL databases are scalable and cater to various data types.

Examples

Cassandra

Ensures robust support for multi-datacentre clusters

CouchDB

Focuses on ease of use and horizontal scalability

Riak KV

Prioritises availability and fault tolerance

#6 Object-oriented Databases

Store data as objects, mirroring object-oriented programming paradigms. They seamlessly integrate with object-oriented languages.

Examples

db4o

Targets Java and .NET applications, offering an object database solution

ObjectDB

A powerful Java-oriented object database

Versant Object Database

Manages complex objects and relationships in enterprise environments





#7 Time-Series Databases

Optimised for storing and managing time-stamped data. Ideal for applications that collect time-based data like IoT, financial transactions, and metrics.

Examples

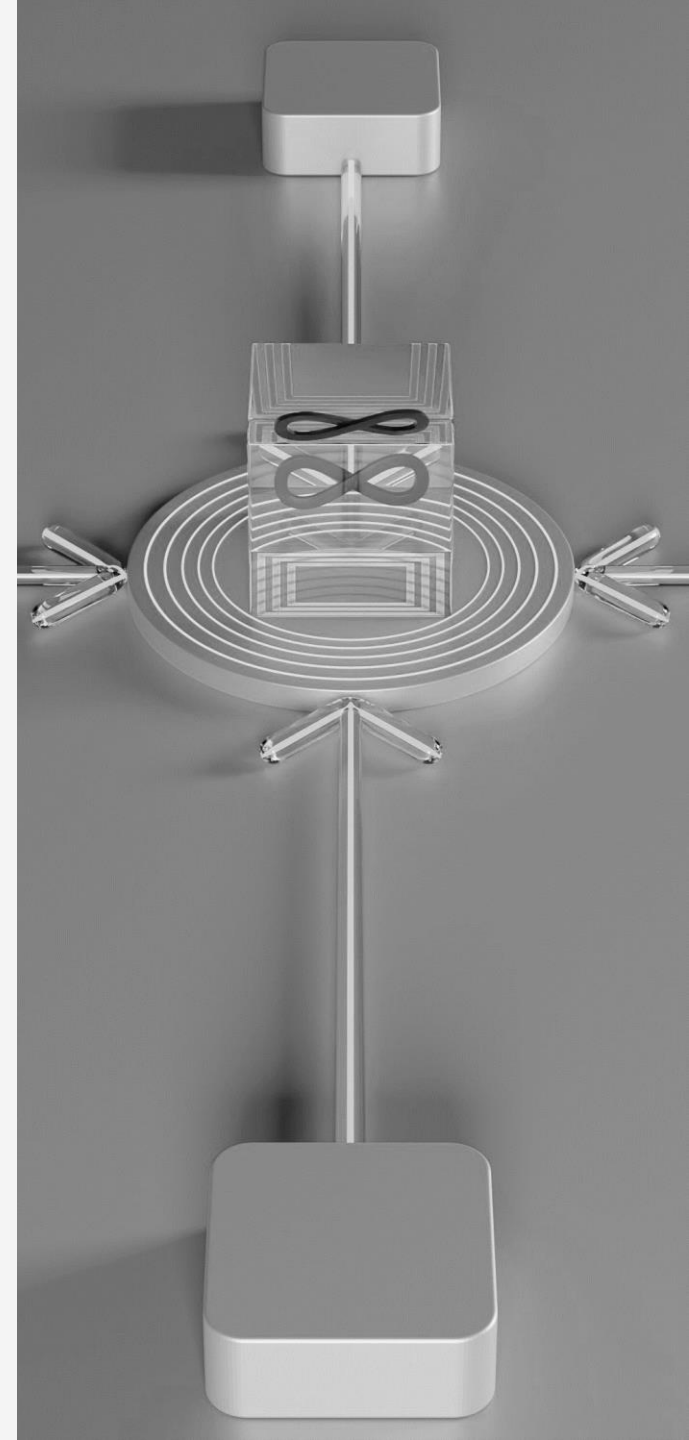
- 01 InfluxDB**
Open-source database optimised for fast, high-availability storage and retrieval of time-series data in fields like monitoring, analytics, and IoT
- 02 TimescaleDB**
An open-source time-series SQL database engineered for fast ingest and complex queries
- 03 Prometheus**
A powerful time-series database used for monitoring and alerting, with a strong focus on reliability

#8 Spatial Databases

Specialised in storing and querying spatial data like maps and geometry. They support spatial indexes and queries for efficient processing of location-based data.

Examples

- > **PostGIS**
An extension to PostgreSQL, adding support for geographic objects and allowing location queries to be run in SQL
- > **MongoDB**
Offers geospatial indexing and querying for handling location-based data efficiently
- > **Oracle Spatial and Graph**
Provides a set of functionalities for managing spatial data and performing advanced spatial queries and analysis





#9 Document Databases

Store data in document formats (e.g., JSON, XML), focusing on the flexibility of data representation. They are schema-less, making them suitable for unstructured and semi-structured data.

Examples

MongoDB

Leading document database, offering high performance, high availability, and easy scalability

CouchDB

Designed for the web, offering a scalable architecture and easy replication features

Firebase Firestore

A flexible, scalable database for mobile, web, and server development from Firebase and Google Cloud Platform



Ecosystem Opinion



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“Understanding the nuances and capabilities of different database types is crucial for selecting the right database that aligns with your application's needs.”

From the structured world of RDBMS to the flexible nature of NoSQL, the precision of Time-Series, the geographical prowess of Spatial databases, and the document-oriented approach of Document databases, the landscape is rich and varied. Each database type offers unique features and functionalities, catering to specific data storage and retrieval requirements, enabling developers and businesses to build efficient, scalable, and robust applications.



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