MySQL, MongoDB, Elasticsearch, and Redis

MySQL

What is MySQL

It is an open-source relational database management system. ‘My’ name is derived from the daughter of MySQL founder and SQL stands for Structured Query Language. It is open-source under GNU General Public License. It is written in C and C++.

Features of MySQL

- Being a relational database management system, it is based on SQL queries to access and manage records of the table.
- It is easy to use as you just have to have basic knowledge of SQL queries
- It is secure as it has a solid data security layer that projects sensitive data from crackers
- Follows the working of client/server architecture
- It is free to download
- It is scalable as it can store a large amount of data up to 50 million rows or more
- Considered to be one of the very fast database languages
- It is highly flexible as it supports a large no. of embedded applications
- Runs on many operating systems
- Allows transactions to roll-back, commit and recovery
- Highly efficient as very low memory leakage problem
- Supports partitioning thus can handle large databases
- Has GUI support called MySQL Workbench

Disadvantages of MySQL

- Is not efficient for very large databases
- There are few stability issues
- Doesn’t handle transactions very efficiently, prone to data-corruption
- Doesn’t have good developing and debugging tool compared to paid databases
- Doesn’t support SQL check constraints

References

- https://en.wikipedia.org/wiki/MySQL
- https://www.javatpoint.com/mysql-features
- https://www.careerride.com/MySQL-disadvantages.aspx

MongoDB

What is MongoDB

It is a cross-platform document-oriented database program. It is a NoSQL database program that uses JSON-like documents with optional schemas.

Features of MongoDB

- Supports ad hoc queries such as range query, field query, and regular expression searches
- Any field can be indexed in document
- Supports master save replication
- Can run over multiple servers. Data duplication is done to retrieve data in case of hardware failure
- Has automatic load balancing configuration
- Map-reduce and aggregation tools are supported
- Provides high performance and stores files of any size easily without complicating your stack

Disadvantages of MongoDB

- Uses high memory for data storage
- The limit for document size is 16MB
- The transaction is not supported except at record level
- It is NoSQL so capabilities of relational databases are lost
- Joins are not supported
- Difficult to secure properly without an Enterprise License

References

- https://en.wikipedia.org/wiki/MongoDB
- https://www.javatpoint.com/mongodb-features
- https://acodez.in/mongodb-nosql-database/#Disadvantages_of_MongoDB
- https://www.quora.com/What-are-the-disadvantages-of-MongoDB

Elasticsearch

What is Elasticsearch

Elasticsearch is a distributed, open-source search and analytics engine for all types of data, including textual, numerical, geospatial, structured, and unstructured.

Where we use Elasticsearch

- Application search
- Website search
- Enterprise search
- Logging and log analytics
- Infrastructure metrics and container monitoring
- Application performance monitoring
- Geospatial data analysis and visualization
- Security analytics
- Business analytics

Working of Elasticsearch

- Raw data flows from a variety of sources which include web applications, logs and system metrics
- Raw data is parsed, normalized and enriched through the process of data ingestion before data is indexed
- Once data is indexed, the user can run complex queries on data
- From Kibana, powerful visualization of data can be created

Why use Elasticsearch

- Elasticsearch is fast, excels at full-text search and also a near real-time search platform and hence well suited for time-sensitive use cases
- Elasticsearch is distributed by nature as stored documents are distributed across different containers called shards. So in case of hardware failure, documents can easily be retrieved
- Elasticsearch has a lot of built-in features that make storing and searching very efficient
- Simplifies data ingestion, visualization, and reporting

References

- https://www.elastic.co/what-is/elasticsearch

Redis

What is Redis

Redis stands for Remote Dictionary Server is an in-memory **data structure store**, used as a database, cache and message broker. It supports data structures such as strings, hashes, lists, sets, sorted sets with range queries, bitmaps, hyperloglogs, geospatial indexes with radius queries and streams.

Advantages of Redis

- Stores data as key and value pair and up to 1GB data can be stored per entry
- Uses its own hashing mechanism called Redis Hashing
- Supports data replication
- Can withstand failures and provide uninterrupted service
- Has APIs in all popular programming languages
- The high-performance messaging system can be developed with Redis
- Allows insertion of large amount of data into its cache very easily
- Having a very small memory requirement, Redis can be installed in Raspberry Pi and ARM devices
- Simple protocols
- Support transactions

Disadvantages of Redis

- Since the whole dataset resides in RAM, it can be costly
- Clustering solutions are to be implemented in-house so requires a considerable effort
- Memory fragmentation issues
- Clients must know cluster topology, causing overhead configuration on clients
- Keys management requires a considerable effort

References

- https://en.wikipedia.org/wiki/Redis
- https://redis.io/topics/introduction
- https://dzone.com/articles/10-traits-of-redis
- https://www.quora.com/What-are-the-disadvantages-of-Redis