Introduction to Redis

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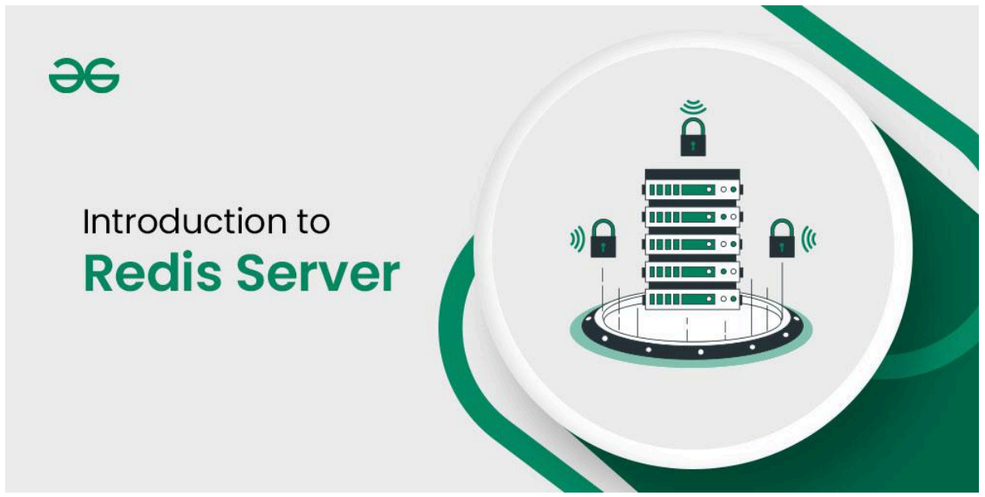
Redis is an in-memory data structure that is used for faster access to data. It is used to store data that needs to be accessed frequently and fast. It is not used for storing large amounts of data. If you want to store and retrieve large amounts of data you need to use a traditional database such as MongoDB or MYSQL. Redis provides a variety of data structures such as sets, strings, hashes, and lists.

- The Redis server is a program that runs and stores data in memory.
- You can just connect to that server and can use it to store and retrieve data faster.
- For that reason, Redis is not used for persistent storing of data as complete data will be lost if the system crashes.
- Redis is scalable as you can run multiple instances of the server.
- It is often used as a cache that stores data temporarily and provides faster access to frequently used data.



Important Topics for Redis Server

- When to use Redis Server?
- Advantages of Redis Server
- Disadvantages of Redis Server

When to use Redis Server?

> *Consider you have a MySQL database and you are constantly querying the database which reads the data from the secondary storage, computes the result, and returns the result.*

If the data in the database is not changing much you can just store the results of the query in redis-server and then instead of querying the database which is going to take 100-1000 milliseconds, you can just check whether the result of the query is already available in redis or not and return it result which is going to be much faster as it is already available in the memory.

Note: In a messaging app, Redis can be used to store the last five messages that the user has sent and received using the built-list data structure provided in Redis.

Advantages of Redis Server

1. **High Performance:**
   - Redis excels in terms of performance due to its in-memory nature. It can deliver extremely fast read and write operations, making it suitable for scenarios where low-latency is critical.

2. **Simple and Easy-to-Use API:**
   - Redis has a straightforward API that consists of simple and intuitive commands, making it easy for developers to use and integrate into their applications.

3. **Data Structures:**
   - Redis supports a variety of data structures, including strings, lists, sets, hashes, and more. This versatility allows developers to model their data more effectively, choosing the right data structure for the task at hand.

4. **Atomic Operations:**
   - Redis supports atomic operations on these data structures, making it a great fit for scenarios that require consistency and reliability in multi-step operations.

5. **Persistence Options:**
   - While Redis is an in-memory database, it provides persistence options such as snapshots and append-only files. This allows users to configure the level of durability needed for their specific use case.

6. **Replication and High Availability:**
   - Redis supports master-slave replication, enabling the creation of replicas of the master server. This provides high availability and fault tolerance in case the master node fails.

Disadvantages of Redis Server

- **Persistence Mechanism Complexity:**
  - Redis is an in-memory database, and while it supports persistence, the mechanisms for achieving this (such as snapshots and append-only files) can be complex and may impact performance.
- **Limited Query Capability:**
  - Redis is not a full-fledged relational database and lacks the complex querying capabilities of traditional databases. It primarily operates on key-value pairs and offers basic data structures like strings, lists, sets, and hashes.
- **Memory Usage:**
  - Redis stores data in memory, and the amount of data it can handle is limited by the available system memory. Large datasets may require significant memory resources, which can be a potential constraint.
- **Single-Threaded Nature:**
  - Redis traditionally uses a single-threaded event-loop architecture. While this design simplifies certain aspects of the system, it may limit performance on multi-core systems. However, recent versions of Redis have introduced multi-threading in some parts to address this limitation.
- **No Built-in Security Features:**
  - Redis initially lacked built-in security features, and it was recommended to be run in trusted environments.
  - While newer versions include authentication mechanisms, it's essential to configure and manage these security features properly.

How to Start Redis Server?

To start the Redis server on your machine you need the run the below command in the terminal :

redis-server

The above command will start the server on port 6379 which is the default port for the Redis server.

You can connect to the redis-server and use it to retrieve and store data using the below command.

redis-cli

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Redis Cache

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