Memcache and Redis are two solutions of caching, which can increase the performance of applications. Redis is short for remote directory server, which stores data in the memory and uses key-value data store. Memcache is a open-source, high-performance, distributed memory object caching system. It also uses Key-value data store.

Similarities between memcache and Redis:

They both store data in the memory

They both are No-sql data store, uses key-value data store

They are both open souce.

Difference between memcache and Redis:

1. Redis has multiple data type: Strings, List, Sets, Sorted sets, hashes and etc. However, Memcache mainly uses strings to store data.
2. Redis has two ways to maintain persistency: RDB(Redis database) – take snapshot of the current state and back up the data, AOF(append only file) – remember all the operation that is received by the server. However, Memcache can not maintain the persistency natively.
3. Redis's keys and values can be up tp 512MB, but memcache only supports 250 bytes key and 1MB values.
4. Memcache can only use LRU to evict the data, but Redis offers multiple solution.
5. Memcache doesn't support replication without third party software.
6. Redis has clustering features that can ensure high availability of service.
7. In a certain circumstance, Memcache has a better performance of multithread speed.

In conclusion, even though memcache has better multithread performance, redis supports larger database, and more features that suitable for daily work.

AWS Elasticache

Elasticache also store data in the memory, and suitable for caching. In the meantime, elasticache is compatible with both Memcache and Redis. The benefits of elasticache: accelerate application performance, ease backend database load, and build low-latency data stores.

Vertical Scaling vs Horizontal Scaling

First we need to understand the concept of scaling: when the demand for an application is increasing beyond the capacity, we use scaling to solve the problem.

Vertical scaling and horizontal scaling they both adding computing resources to the infrastructure. The difference is implementation and performance.

Vertical scaling also known as scaling up, adding more CPU/RAM to current machine.

Horizontal scaling also known as scaling out, adding more machines to resources.

Horizontal scaling is more used in Non-relational database, where as Vertical scaling is more often used in relational database.

Hierarchical data store

Hierarchical data store is more often used in non-relational database. It is a tree-like structure, which has a parent node and several child nodes. For example, relational database has tables, whereas the hierarchical data store has multiple branches that can be used in a reporting-to-manager scenario. Comparing to relational database, hierarchical

data store is easier to use, is ideal to use in cases like website drop-down or computer folders. It is also easier to add or modify data without interfering with others.

BASE – basically available, soft state, eventually consistency
ACID – Atomicity, consistency, isolation, durability
ACID promotes consistency over availability, BASE promotes availability over consistency. Which means BASE scales very well to rapid data changes.
Basically available means the system is guaranteed to be available in event of failure, soft sates means the state of data could change without application interactions, eventual consistency means the system will be eventually consistent after the application input.(not guaranteed at transaction level)

View and stored procedure in SQL tuning
View represents a virtual table, which can also be queried like other tables using SELECT method, we can also use JOIN on view and tables. The purpose of view is to display data.

Stored procedure is an encapsulation of logic that is called from an application. Often been used to perform INSERT, DELETE, and UPDATE statements. To display the data in stored procedures, we need to use EXECUTE method.