IN-MEMORY DATABASE

THE IN-MEMORY DATABASE DEFINED

- An in-memory database is a type of purpose-built database that relies primarily on memory for data storage, in contrast to databases that store data on disk or SSDs. In-memory databases are designed to attain minimal response time by eliminating the need to access disks. Because all data is stored and managed exclusively in main memory, it is at risk of being lost upon a process or server failure. In-memory databases can persist data on disks by storing each operation in a log or by taking snapshots.
- In-memory databases are ideal for applications that require microsecond response times and can have large spikes in traffic coming at any time such as gaming leaderboards, session stores, and real-time analytics.

USE CASES

Real-time bidding

- Real-time bidding refers to the buying and selling of online ad impressions. Usually the bid has to be made while the user is loading a webpage, in 100-120 milliseconds and sometimes as little as 50 milliseconds. During this time period, real-time bidding applications request bids from all buyers for the ad spot, select a winning bid based on multiple criteria, display the bid, and collect post ad-display information. In-memory databases are ideal choices for ingesting, processing, and analyzing real-time data with submillisecond latency.

Gaming leaderboards

- A relative gaming leaderboard shows a gamer's position relative to other players of a similar rank. A relative gaming leaderboard can help to build engagement among players and meanwhile keep gamers from becoming demotivated when compared only to top players. For a game with millions of players, in-memory databases can deliver sorting results quickly and keep the leaderboard updated in real time.

Caching

- A cache is a high-speed data storage layer which stores a subset of data, typically transient in nature, so that future requests for that data are served up faster than is possible by accessing the data’s primary storage location. Caching allows you to efficiently reuse previously retrieved or computed data. The data in a cache is generally stored in fast access hardware such as RAM (Random-access memory) and may also be used in correlation with a software component. A cache's primary purpose is to increase data retrieval performance by reducing the need to access the underlying slower storage layer.

IN-MEMORY DATABASES ON AWS

Amazon Elasticache for Redis

- Amazon ElastiCache for Redis is a blazing fast in-memory data store that provides submillisecond latency to power internet-scale, real-time applications. Developers can use ElastiCache for Redis as an in-memory nonrelational database. The ElastiCache for Redis cluster configuration supports up to 15 shards and enables customers to run Redis workloads with up to 6.1 TB of in-memory capacity in a single cluster. ElastiCache for Redis also provides the ability to add and remove shards from a running cluster. You can dynamically scale out and even scale in your Redis cluster workloads to adapt to changes in **demand.**

Amazon ElastiCache for Memcached

- Amazon ElastiCache for Memcached is a Memcached-compatible in-memory key-value store service that can be used as a cache or a data store. It delivers the performance, ease-of-use, and simplicity of Memcached. ElastiCache for Memcached is fully managed, scalable, and secure - making it an ideal candidate for use cases where frequently accessed data must be in-memory. It is a popular choice for use cases such as Web, Mobile Apps, Gaming, Ad-Tech, and E-Commerce.