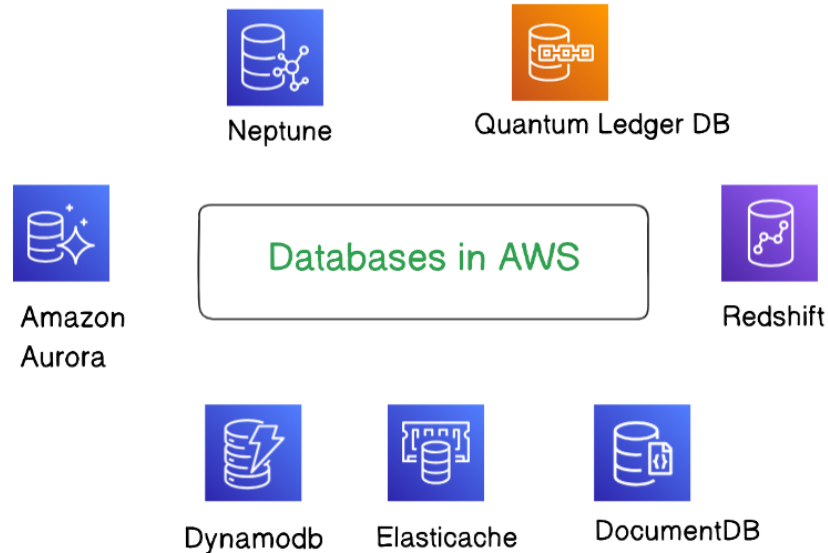# AWS Database Services

Lets learn about AWS Database Services.

First we will understand the challenges of running databases on premises:

1. Server maintenance
2. Software patching
3. Energy footprint
4. OS installation and patching

Now lets dive into advantages of databases on AWS

Advantages of databases on AWS

| Purpose-built | Performance at scale | Fully managed | Built for business-critical workloads |

AWS offers 15+ purpose-built engines to support diverse data models, including relational, key-value, document, in-memory, graph, time series, wide column, and ledger databases.

- Start small and scale as your applications grow with relational databases that are 3-5X faster than popular alternatives, or non-relational databases that give you microsecond to sub-millisecond latency.
- Free your teams from time-consuming database tasks like server provisioning, patching, and backups. AWS fully managed database services provide continuous monitoring, self-healing storage, and automated scaling to help you focus on application development.

Lets learn more about various Databases in AWS

Amazon Aurora

Aurora is a fully managed, MySQL and PostgreSQL compatible, relational database engine that combines the performance and reliability of high-end commercial databases with the simplicity and cost-effectiveness of open-source databases. Aurora gives you the performance and availability of commercial-grade databases at one-tenth the cost.
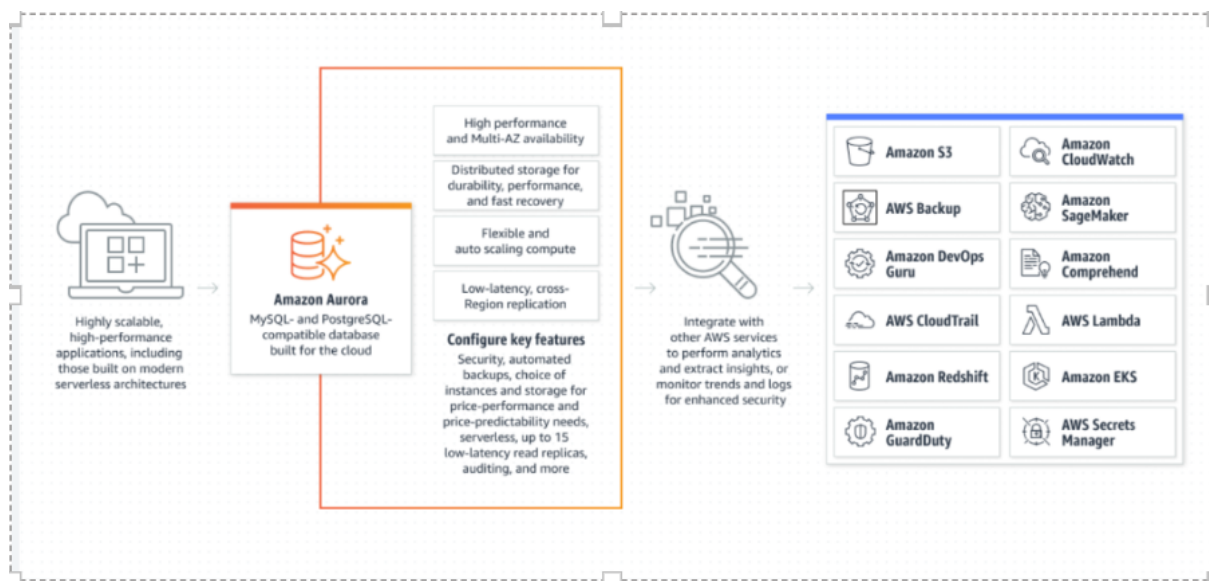

Features:

● It is only supported by regions which have minimum 3 availability zones.

● High availability of 99.99%. Data in Aurora is kept as 2 copies in each AZ

with a minimum 3 AZ's making a total of 6 copies.

● It can have up to 15 Read replicas (RDS has only 5).

● It can scale up to 128 TB per database instance.

● Aurora DB cluster comprises two instances:

○ Primary DB instance – It supports both read/write operations

and one primary DB instance is always present in the DB cluster.

○ Aurora Replica – It supports only read operation. Aurora automatically fails over to its replica in less time in case a primary DB instance is not available.
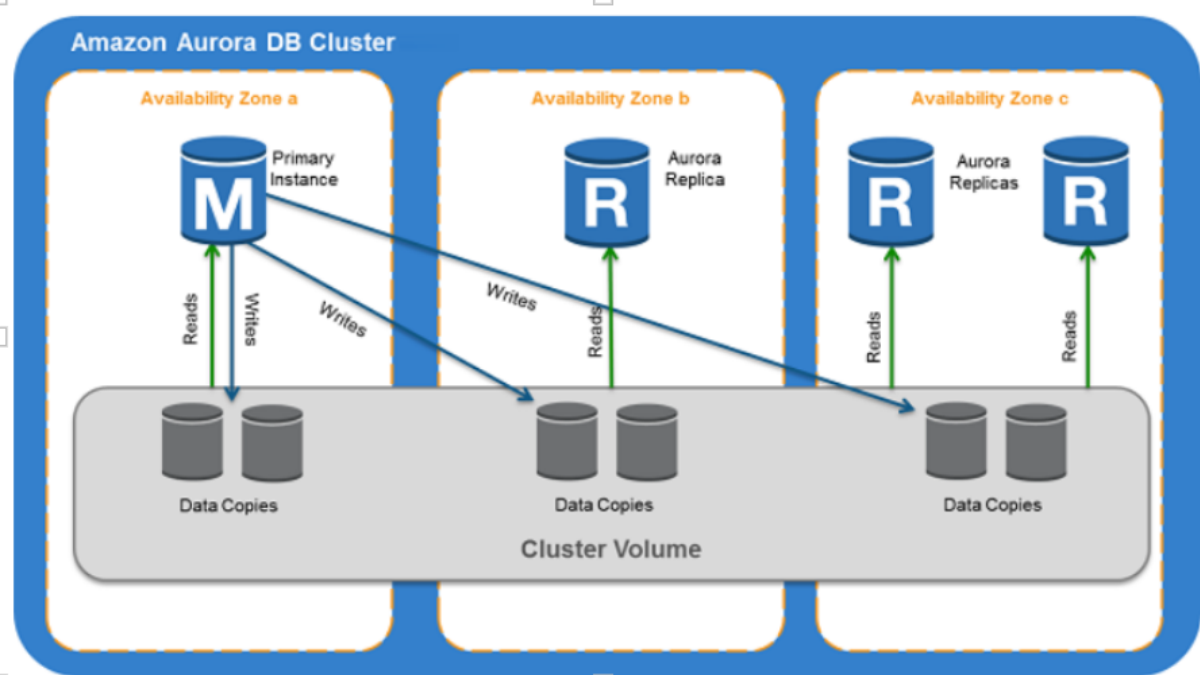
Aurora Global Database :

Amazon Aurora Global Database is designed for globally distributed applications, allowing a single Amazon Aurora database to span multiple AWS Regions. It replicates your data with no impact on database performance, enables fast local reads with low latency in each Region, and provides disaster recovery from Region-wide outages.

Aurora Serverless:

Amazon Aurora Serverless is an on-demand, autoscaling configuration for [Amazon Aurora](#). It automatically starts up, shuts down, and scales capacity up or down based on your application's needs. You can run your database in the cloud without managing any database instances.

You can also use Aurora Serverless v2 instances along with provisioned instances in your existing or new database clusters.

Amazon Relational Database Service (Amazon RDS)

Amazon RDS makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while managing time-consuming database administration tasks, freeing you up to focus on your applications and business. Amazon RDS provides you with six database engines to choose from, including

- Aurora
- Oracle
- Microsoft SQL Server
- PostgreSQL
- MySQL
- MariaDB

Amazon RDS manages backups, software patching, automatic failure detection, and recovery.

- You can turn on automated backups, or manually create your own backup snapshots. You can use these backups to restore a database. The Amazon RDS restore process works reliably and efficiently.
- You can get high availability with a primary instance and a synchronous secondary instance that you can fail over to when problems occur. You can also use read replicas to increase read scaling.

Amazon DocumentDB

DocumentDB is a fully managed document database service by AWS which supports MongoDB workloads. It is highly recommended for storing, querying, and indexing JSON Data.

Features:

● It is compatible with MongoDB versions 3.6 and 4.0.

● All on-premise MongoDB or EC2 hosted MongoDB databases can be migrated to DocumentDB by using DMS (Database Migration Service).

● All database patching is automated in a stipulated time interval.

● DocumentDB storage scales automatically in increments of 10GB and maximum up to 64TB.

● Provides up to 15 Read replicas with single-digit millisecond latency.

● All database instances are highly secure as they reside in VPCs which only allow a given set of users to access through security group permissions.

● It supports role-based access control (RBAC).

● Minimum 6 read copies of data is created in 3 availability zones making it fault-tolerant.

● Self-healing – Data blocks and disks are continuously scanned and repaired automatically.

● All cluster snapshots are user-initiated and stored in S3 till explicitly deleted.

Amazon DynamoDB

Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability. You can use Amazon DynamoDB to create a database table that can store and retrieve any amount of data, and serve any level of request traffic. Amazon DynamoDB automatically spreads the data and traffic for the table over a sufficient number of servers to handle the request capacity specified by the customer and the amount of data stored, while maintaining consistent and fast performance.

Amazon ElastiCache

ElastiCache is a fully managed in-memory data store. It significantly improves latency and performance for all read-heavy application workloads. In-memory caches are faster than disk-based databases. It works with both Redis and Memcached protocol based engines.