Amazon RDS

Amazon RDS

- Amazon Relational Database Service (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 automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups.
- It frees you to focus on your applications so you can give them the fast performance, high availability, security and compatibility they need.

Amazon RDS

- Amazon RDS is available on several database instance types - optimized for memory, performance or I/O - and provides you with six familiar database engines to choose from, including Amazon Aurora, PostgreSQL, MySQL, MariaDB, Oracle Database, and SQL Server.
- You can use the AWS Database Migration Service to easily migrate or replicate your existing databases to Amazon RDS.

Amazon RDS - Benefits

- You can scale your database's compute and storage resources with only a few mouse clicks or an API call, often with no downtime.
- Many Amazon RDS engine types allow you to launch one or more Read Replicas to offload read traffic from your primary database instance.
- When you provision a Multi-AZ DB Instance, Amazon RDS synchronously replicates the data to a standby instance in a different Availability Zone (AZ).
- Amazon RDS has many other features that enhance reliability for critical production databases, including automated backups, database snapshots, and automatic host replacement

Amazon RDS - Benefits

- You can choose between two SSD-backed storage options: one optimized for high-performance OLTP applications, and the other for cost-effective general-purpose use.
- Amazon RDS also lets you run your database instances in Amazon Virtual Private Cloud (Amazon VPC), which enables you to isolate your database instances and to connect to your existing IT infrastructure through an industry-standard encrypted IPsec VPN.
- Many Amazon RDS engine types offer encryption at rest and encryption in transit.

Amazon RDS – Use Cases

- Web and mobile applications that are built to operate at very large scale need a database with high throughput, massive storage scalability, and high availability. Amazon RDS fulfils the needs of such highly demanding applications with room for future growth.
- Amazon RDS provides a managed database offering helping ecommerce companies meet PCI compliance and focus on building high quality customer experiences without worrying about managing the underlying database.
- Mobile and Online games need a database platform with high throughput and availability. Amazon RDS manages the database infrastructure so game developers don’t have to worry about provisioning, scaling, or monitoring database servers.

Amazon RDS – Multi AZ

- Database snapshots are user-initiated backups of your instance stored in Amazon S3 that are kept until you explicitly delete them. You can create a new instance from a database snapshots whenever you desire. Although database snapshots serve operationally as full backups, you are billed only for incremental storage use.
- Amazon RDS Multi-AZ deployments provide enhanced availability and durability for database instances, making them a natural fit for production database workloads. When you provision a Multi-AZ database instance, Amazon RDS synchronously replicates your data to a standby instance in a different Availability Zone (AZ).

Amazon RDS – Read Replicas

- Amazon RDS Read Replicas provide enhanced performance and durability for database (DB) instances.
- This feature makes it easy to elastically scale out beyond the capacity constraints of a single DB instance for read-heavy database workloads
- You can create one or more replicas of a given source DB Instance and serve high-volume application read traffic from multiple copies of your data, thereby increasing aggregate read throughput.
- Read replicas can also be promoted when needed to become standalone DB instances.
- Read replicas are available in Amazon RDS for MySQL, MariaDB, PostgreSQL and Oracle as well as Amazon Aurora.

Amazon RDS - Read Replicas

- For the MySQL, MariaDB, PostgreSQL, and Oracle database engines, Amazon RDS creates a second DB instance using a snapshot of the source DB instance. It then uses the engines' native asynchronous replication to update the read replica whenever there is a change to the source DB instance. The read replica operates as a DB instance that allows only read-only connections; applications can connect to a read replica just as they would to any DB instance. Amazon RDS replicates all databases in the source DB instance.

Multi AZ vs Read Replicas

Multi-AZ Deployments	Read Replicas
Synchronous replication – highly durable	Asynchronous replication – highly scalable
Only database engine on primary instance is active	All read replicas are accessible and can be used for read scaling
Automated backups are taken from standby	No backups configured by default
Always span two Availability Zones within a single Region	Can be within an Availability Zone, Cross-AZ, or Cross-Region
Database engine version upgrades happen on primary	Database engine version upgrade is independent from source instance
Automatic failover to standby when a problem is detected	Can be manually promoted to a standalone database instance

RDS - Notification

- Amazon RDS uses the Amazon Simple Notification Service (Amazon SNS) to provide notification when an Amazon RDS event occurs. These notifications can be in any notification form supported by Amazon SNS for an AWS Region, such as an email, a text message, or a call to an HTTP endpoint.
- You can subscribe to an event category for a DB instance, DB snapshot, DB parameter group, or DB security group. For example, if you subscribe to the Backup category for a given DB instance, you are notified whenever a backup-related event occurs that affects the DB instance. If you subscribe to a configuration change category for a DB security group, you are notified when the DB security group is changed. You also receive notification when an event notification subscription changes.

RDS - Snapshot

- Amazon RDS creates a storage volume snapshot of your DB instance, backing up the entire DB instance and not just individual databases. Creating this DB snapshot on a Single-AZ DB instance results in a brief I/O suspension that can last from a few seconds to a few minutes, depending on the size and class of your DB instance. Multi-AZ DB instances are not affected by this I/O suspension since the backup is taken on the standby.

RDS - Logs

- You can monitor the MySQL error log, slow query log, and the general log. The MySQL error log is generated by default; you can generate the slow query and general logs by setting parameters in your DB parameter group.
- You can monitor the MySQL logs directly through the Amazon RDS console, Amazon RDS API, AWS CLI, or AWS SDKs. You can also access MySQL logs by directing the logs to a database table in the main database and querying that table. You can use the mysqlbinlog utility to download a binary log.
- You can configure your Amazon RDS MySQL DB instance to publish log data to a log group in Amazon CloudWatch Logs.

RDS – Reserved Instances

- Amazon RDS Reserved Instances give you the option to reserve a DB instance for a one or three year term and in turn receive a significant discount compared to the On-Demand Instance pricing for the DB instance.
- You can choose between three payment options when you purchase a Reserved Instance. With the All Upfront option, you pay for the entire Reserved Instance with one upfront payment. This option provides you with the largest discount compared to On-Demand Instance pricing. With the Partial Upfront option, you make a low upfront payment and are then charged a discounted hourly rate for the instance for the duration of the Reserved Instance term. The No Upfront option does not require any upfront payment and provides a discounted hourly rate for the duration of the term.
- All Reserved Instance types are available for Aurora, MySQL, MariaDB, PostgreSQL, Oracle and SQL Server database engines.