RDS [RELATIONAL DATABASE SERVICE]

* It is an web service that makes it easy to setup and maintain databases in aws cloud. It provides cost-efficient, resizable capacity for databases.
* The main advantage of rds is it can be resized. You can resize cpu, memory, storage whenever you want.
* You can use regular databases in RDS like mysql, mariaDB, postgre SQL, Microsoft SQL, oracle and Amazon aurora DB.
* You can setup your databases in different AZ. It will replicate the entire DB. In case, if your db in an AZ is failed.
* After creating an RDS DB, it gives an endpoint. With this endpoint you can connect to your DB from EC2 instance.

CREATE AN RDS DB [MYSQL]

* Go to RDS, select MYSQL.
* **Select Production (or) test**.
* **License Model** = general-public license (only one license is there for Mysql).
* **DB engine version** = Select version of Mysql to create DB.
* **DB instance class** = Select any instance class (based on your requirement).
* **Multi AZ** = Yes (or) No (It will replicate your DB instance in another AZ for failover).
* **Storage Type** = General (or) IOPS.
* **Allocate Storage** = 5 GB to 6 TB (you can extend this size later).
* **DB Instance Identifier** = Type a name for your DB Instance (unique).
* **Master Username** = An User name to login to your DB for the first time.
* **Master Password** = Type a password for the master user to login to DB.
* Click next, To go to configure advanced settings page.
* **VPC =** Choose a VPC, if you want to host your DB instance in a vpc.
* **DB subnet group** = Select the DB subnet group that you Created.

DB subnet group is just to launch an DB instance in your network and AZ you specified.

Each DB subnet should have two subnets in two AZ.

If you use default vpc, no need of this. RDS automatically creates an Db subnet group.

* **Public Accessible** = Yes (or) No (if you want instances resides in outside of your vpc to connect to DB, select YES). It will give public ip, you can connect with that ip.
* **Security group** = Select your security group.
* **Availability Zone** = Select an AZ (if you selected multi-AZ, you can't see options here).
* **Database Name** = Type a database name to create an initial DB in your DB instance.
* **DB Port** = 3306.
* **DB parameter Group** = default (it is based on the version you choose for Mysql).
* **DB option group** = default (it enables any additional functions for your DB instance. such as, oracle (or) memcached support).
* **Enable IAM authentication** = Yes (or) No (To enable access for IAM users to DB instance).
* **Backup retention period** = 7(days). It will take automatic for every 7 days (1-35).
* **Backup window** = select time and time period (it will take backup at the time we mentioned for the time period we mentioned).
* **Enable monitoring** = Yes (or) No.
* **Auto minor version upgrade** = Yes (or) No (for small version upgrades. updates are available automatically).
* **Maintenance Window** = set day, time and time period (For upgrades).
* Click, Launch DB Instance.
* You can modify any settings of a DB instance even after creating. By clicking, modify.
* Now, we created an RDS instance. We have to connect to RDS from EC2. To do that, note the security group ID which you are using for EC2.
* Add a rule in Mysql security group, with port 3306, select ec2 security group ID and select Mysql and save.
* Now, you can connect to mysql db from an EC2 instance with RDS Endpoint.
* If you want to connect to RDS from anywhere, just select anywhere in the source field. After this, you can connect to RDS with any instance from the internet.

CREATION OF DB SNAPSHOT

* You can create a storage volume snapshot for a DB instance. It will back-up the entire database instance, not just the databases in that DB instance.
* To create a snapshot. Go to RDS

**Click DB instances.**

**Select your DB instance.**

**Click Actions.**

**Click take DB snapshot.**

**Type a name for snapshot, Click YES.**

* To restore DB from a snapshot. Go to RDS

**Click Snapshots.**

**Choose snapshot (to restore).**

**Choose restore snapshot.**

**Type a DB identifier name.**

**Choose restore DB instance.**

* You can copy the Db snapshots across aws regions, different aws accounts.
* To copy a snapshot. Go to RDS.

**Click snapshots.**

**Choose snapshot (to copy).**

**Click Actions.**

**Choose copy.**

**Type a name for copy.**

**Select region to copy.**

**Select encryption (if you want).**

**Choose, Copy snapshot.**

* To share a snapshot. Go to RDS.

**Click snapshots.**

**Choose snapshot.**

**Click Actions.**

**Choose share.**

**Choose public (or) private.**

**Choose private.**

**Type an aws id to share. And Save.**

* Write a policy to give copy permissions to IAM user to Copy the snapshot from shared snapshot.

UPGRADING A MYSQL DB

* You can upgrade the mysql version in aws. but, you can't do major upgrades like 5.5 to

5.7. You have to do minor upgrades like 5.5 to 5.6 and 5.6 to 5.7.

* There are two types to upgrade a mysql db.
* 1. Before you do upgrade. Create a snapshot of your database and create a db instance from that snapshot and do upgrades on that db and use it as your master.
* 2. Create a read replica for your db, upgrade the read replica, check everything is up to date and make read replica as master DB.
* To create read replica. GO to RDS.

**Click instances.**

**Choose your DB instance.**

**Click Actions.**

**Choose read replica.**

**Type a DB instance name.**

**Check other settings are same and Click Create.**

* After the read replica status is available.

**Go to instances.**

**Select your read replica instance.**

**Choose modify.**

**Upgrade the mysql version.**

**Click Modify instance.**

* After updating read replica, check everything is working fine (or) not. If it’s working fine, make it master DB.
* To promote read replica,

**Select your read replica instance.**

**Click actions.**

**Select promote read replica.**

**Click continues and Yes.**

**Now, it is the master DB.**

RDS EVENT NOTIFICATIONS

* RDS uses SNS to provide notifications when an RDS event occurs. These notifications can be in any form like sms, email and call or http endpoint.
* AWS categorizes these events; you can select any categories and apply SNS notifications. For suppose, if you select a backup category and applied SNS. The notification will come to you whenever there is a backup occurs.
* RDS uses ARN for an SNS topic to identify the subscription. ARN automatically creates, when you create a subscription.
* Create an aws subscription, subscription mail will come to your mail, confirm that mail. After confirmation you subscription is activated. Now, you will receive notifications.
* To create an Event subscription.

**Go to RDS.**

**Select Event subscriptions.**

**Click Create event.**

**Type a name for the event.**

**Click Create Topic.**

**Type a name to topic.**

**Enter mails to receive event notifications.**

**Select Source Type (instances, db security grp, db parameter grp, option grp).**

* In event categories,

**Select the categories you want.**

**Select your DB instances.**

**You can select all categories and all DB instances (or) specific. Click Save.**

* You can edit this event subscription later, if you want to make some changes.

DATABASE LOG FILES

* Mysql error logs are generated by default. You can monitor mysql error log, slow query and the general log. You can view these logs in aws console, cli, API.
* You can access error logs in mysql-error-log file in aws console. Mysql-error-log is flushed every 5 minutes. These log files also have timestamp to know when log entries were written. It only save log files for 24 hours, after that it will delete those log files older than 24 hours and new files will be added.
* Mysql writes error logs only on startup, shutdown and when error occurs. If there are no error logs, it means that no error encountered.
* You can view and download the logs,

**Go to RDS.**

**Select DB instance.**

**Click details icon (box-symbol),**

**Click, record events and logs.**

**You can see error-logs, size, written with view, watch, downloads options.**

**Select a log-file. Click to view (or) watch (or) download that log file.**

* Slow-logs and general-logs will save in a file. You can see those logs in that path.