

# DAT 307 AMAZON RELATIONAL DATABASE SERVICE (RDS) WORKSHOP

Sameer Malik, Database Specialist Solution Architect  
[smalik@amazon.com](mailto:smalik@amazon.com)

## Contents

<b>Lab1: Creating RDS Oracle Database Instance (ETC ~10 -15 minutes)</b> .....	3
Optional: - Using AWSCLI to launch RDS Oracle Database Instance .....	14
<b>Lab 2: - Connecting to the RDS Oracle DB (ETC ~2 -5 minutes)</b> .....	14
<b>Lab 3: High Availability on RDS Oracle (Multi-AZ) (ETC ~10 -15 minutes)</b> .....	18
<b>Lab 4: Scaling the RDS Oracle DB Instance (ETC ~10 -15 minutes)</b> .....	23
<b>Lab 5: Enabling Performance Insights and logs to Cloudwatch (ETC ~10 -15 minutes)</b> ....	28
<b>Lab 6: Minor Version upgrade of RDS Oracle DB (ETC ~12 -18 minutes)</b> .....	37
<b>Lab 7: Backup and restore for RDS Oracle DB Instance (ETC ~10 -15 minutes)</b> .....	40
<b>Lab 8: Parameter Groups and Option Groups on RDS Oracle (ETC ~10 -15 minutes)</b> .....	49
<b>Lab 9: Common DBA tasks on RDS Oracle (ETC ~10 -15 minutes)</b> .....	62
<b>Lab 10: Cleaning up the RDS Oracle resources created for the labs (ETC ~5 minutes)</b> .....	67

**Abstract:**

Description: Amazon Relational Database Service (RDS) for Oracle hands-on workshop guide.

**Pre-requisites:**

1. Active AWS account with Admin privileges. (IAM user should have administrator access).
2. Pre-installed Oracle Database client tools like SQL Developer to connect to the RDS Oracle Database
3. Screenshots and steps are created using new AWS console.

Please note that we are providing credits to all the attendees to cover the cost associated with creating all the AWS resources for the duration of this workshop only. Therefore, it is very important that all the resources created as a part of this workshop needs to be deleted at the end of the lab to avoid any additional cost associated with creating those resources.

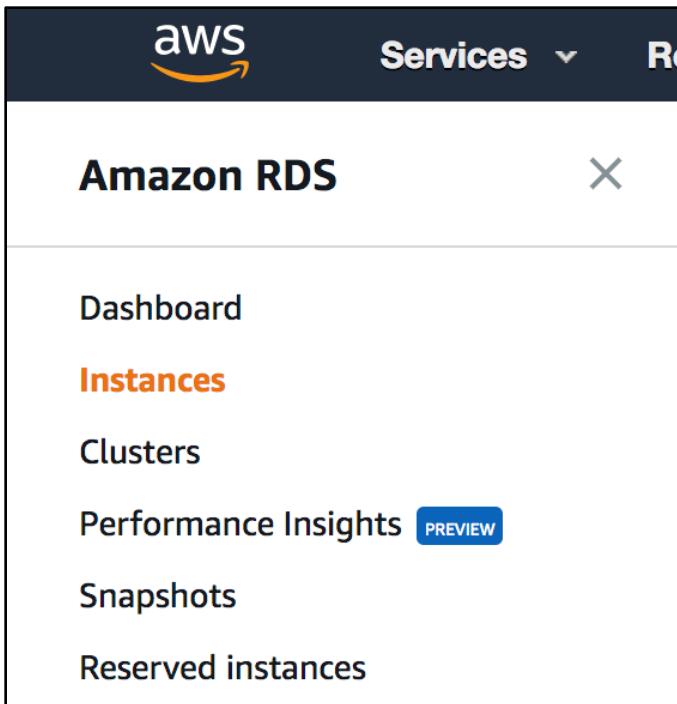
## Lab1: Creating RDS Oracle Database Instance (ETC ~10 -15 minutes)

1. All the workshop participants are required to use “Ireland” region for this workshop. Login in to your AWS console and go to RDS landing page <https://eu-west-1.console.aws.amazon.com/rds/home?region=eu-west-1#> (This is for **Ireland region**, you can find the RDS service in all supported regions in your console). The screenshots in this workshop guide are taken from the Different AWS region.



US East (N. Virginia)  
US East (Ohio)  
US West (N. California)  
US West (Oregon)  
Asia Pacific (Mumbai)  
Asia Pacific (Osaka-Local)  
Asia Pacific (Seoul)  
Asia Pacific (Singapore)  
Asia Pacific (Sydney)  
Asia Pacific (Tokyo)  
Canada (Central)  
EU (Frankfurt)  
**EU (Ireland)**  
EU (London)  
EU (Paris)  
South America (São Paulo)

2. Choose “Instances” under the Dashboard option on the left



3. Choose “Create Database” on the right

**Create database**

4. Under “Engine Options” provide following input

Engine: - Oracle

Edition: - Oracle Enterprise Edition

## Engine options

Amazon Aurora

Amazon  
Aurora

MySQL



MariaDB



PostgreSQL



Oracle

ORACLE®

Microsoft SQL Server



### Oracle

#### Edition

##### Oracle Enterprise Edition

Efficient, reliable, and secure database management system that delivers comprehensive high-end capabilities for mission-critical applications and demanding database workloads.

##### Oracle Standard Edition

Affordable and full-featured database management system supporting up to 32 vCPUs.

##### Oracle Standard Edition One

Affordable and full-featured database management system supporting up to 16 vCPUs.

##### Oracle Standard Edition Two

Affordable and full-featured database management system supporting up to 16 vCPUs.

- Under “Use cases” choose “ Dev/Test”

## Choose use case

### Use case

Do you plan to use this database for production purposes?

#### Use case

##### Production

Use [Multi-AZ Deployment](#) and [Provisioned IOPS Storage](#) as defaults for high availability and fast, consistent performance.

##### Dev/Test

This instance is intended for use outside of production or under the [RDS Free Usage Tier](#).

Billing is based on [RDS pricing](#).

[Cancel](#)

[Previous](#)

[Next](#)

6. Under **Specify DB details**, provide the following

License Model Info: - bring-your-own-license  
DB Engine Version: - Oracle 12.1.0.2.v13  
DB Instance Class: - db.r4.large  
Multi-AZ deployment: - No  
Storage Type: - General Purpose (SSD)  
Allocated storage: - 20 GB  
DB Instance Identifier: - <user defined name> e.g. reinventdb  
Master Username: - <user defined name> e.g. admin  
Master password: - <user defined secure password>

**Instance specifications**

Estimate your monthly costs for the DB Instance using the [AWS Simple Monthly Calculator](#)

DB engine  
Oracle Database Enterprise Edition

License model [Info](#)

DB engine version [Info](#)

**Free tier**  
The Amazon RDS Free Tier provides a single db.t2.micro instance as well as up to 20 GiB of storage, allowing new AWS customers to gain hands-on experience with Amazon RDS. Learn more about the RDS Free Tier and the instance restrictions [here](#).  
 Only enable options eligible for RDS Free Usage Tier [Info](#)

DB instance class [Info](#)

Multi-AZ deployment [Info](#)  
 Create replica in different zone  
Creates a replica in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.  
 No

Storage type [Info](#)

General Purpose (SSD)



Allocated storage

20



GiB

(Minimum: 20 GiB, Maximum: 32768 GiB) Higher allocated storage [may improve](#) IOPS performance.

- ⓘ Provisioning less than 100 GiB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. [Click here](#) for more details.

► Additional configuration

### Estimated monthly costs

DB Instance	175.20 USD
Storage	2.30 USD
<b>Total</b>	<b>177.50 USD</b>

Billing estimate is based on on-demand usage as described in [Amazon RDS Pricing](#). Estimate does not include costs for backup storage, IOs (if applicable), or data transfer.

Estimate your monthly costs for the DB Instance using the [AWS Simple Monthly Calculator](#)

## Settings

DB instance identifier [Info](#)

Specify a name that is unique for all DB instances owned by your AWS account in the current region.

DB instance identifier is case insensitive, but stored as all lower-case, as in "mydbinstance". Must contain from 1 to 63 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

Master username [Info](#)

Specify an alphanumeric string that defines the login ID for the master user.

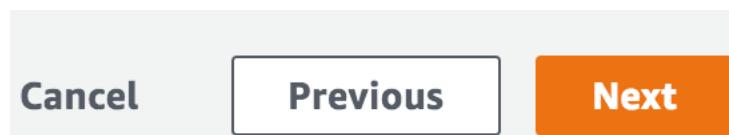
Master Username must start with a letter. Must contain 1 to 30 alphanumeric characters.

Master password [Info](#)

Confirm password [Info](#)

Master Password must be at least eight characters long, as in "mypassword". Can be any printable ASCII character except "/", "", or "@".

Click Next



### 7. Under **Configure advanced settings**

For the **Network and Security** section, choose the default values

For the **Database Options**, provide the following inputs

Database name: - <user defined DB name> e.g. MYDB

Leave other fields with the default values

For the **Encryption option**

Choose the default "Disable encryption"

For the **Backup option**

Choose "0" for Backup retention days

For the **Monitoring Option**

Choose "Disable enhanced monitoring"

For the **Performance Insights**

Choose the default "Disable Performance Insights"

### For the Log Exports Option

Choose the default and leave all boxes uncheck

### For the Maintenance Option

Choose “Disable auto minor version upgrade”

## Configure advanced settings

### Network & Security

Virtual Private Cloud (VPC) [info](#)  
VPC defines the virtual networking environment for this DB instance.

Default VPC (vpc-e0e9eb84)

Only VPCs with a corresponding DB subnet group are listed.

Subnet group [info](#)  
DB subnet group that defines which subnets and IP ranges the DB instance can use in the VPC you selected.

default

Public accessibility [info](#)

Yes  
EC2 instances and devices outside of the VPC hosting the DB instance will connect to the DB instances. You must also select one or more VPC security groups that specify which EC2 instances and devices can connect to the DB instance.

No  
DB instance will not have a public IP address assigned. No EC2 instance or devices outside of the VPC will be able to connect.

Availability zone [info](#)

No preference

VPC security groups  
Security groups have rules authorizing connections from all the EC2 instances and devices that need to access the DB instance.

Create new VPC security group

Select existing VPC security groups

## Database options

Database name

MYDB

If you do not specify a database name, Amazon RDS does not create a database.

Database port

TCP/IP port the DB instance will use for application connections.

1521

DB parameter group [info](#)

default.oracle-ee-12.1



Option group [info](#)

default:oracle-ee-12-1



Copy tags to snapshots

Character set name [info](#)

AL32UTF8



## Backup

### Backup retention period [info](#)

Select the number of days that Amazon RDS should retain automatic backups of this DB instance.

0 days ▾

 A backup retention period of zero days will disable automated backups for this DB Instance.

### Backup window [info](#)

- Select window
- No preference

## Monitoring

### Enhanced monitoring

- Enable enhanced monitoring

Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

- Disable enhanced monitoring

## Performance Insights

- Enable Performance Insights

- Disable Performance Insights

## Log exports

Select the log types to publish to Amazon CloudWatch Logs

- Alert log
- Audit log
- Listener log
- Trace log

### IAM role

The following service-linked role is used for publishing logs to CloudWatch Logs.

RDS Service Linked Role

## Maintenance

Auto minor version upgrade [Info](#)

Enable auto minor version upgrade

Enables automatic upgrades to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the DB instance.

Disable auto minor version upgrade

Maintenance window [Info](#)

Select the period in which you want pending modifications or patches applied to the DB instance by Amazon RDS.

Select window

No preference

## Deletion protection

Enable deletion protection

Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

8. Click on Create Database to start the Instance creation

Cancel

Previous

Create database

## Optional: - Using AWSCLI to launch RDS Oracle Database Instance

AWS CLI

<https://docs.aws.amazon.com/cli/latest/userguide/installing.html>

Example Command:

```
aws rds create-db-instance \
--db-instance-identifier reinventdb \
--db-name MYDB \
--allocated-storage 20 \
--storage-type gp2 \
--db-instance-class db.r4.large \
--engine oracle-ee \
--port 1521 \
--backup-retention-period 0 \
--license-model byol \
--master-user-password fjie87bna09bfe3 \
--master-username admin \
--engine-version 12.1.0.2.v13
```

## Lab 2: - Connecting to the RDS Oracle DB (ETC ~2 -5 minutes)

Users are advised to disable firewalls and VPNs where possible so that we can verify their IP address for whitelisting the connection to the newly created RDS Oracle Database instance. Please refer this website <https://checkip.amazonaws.com/> to verify the client IP address.

- Find the newly created RDS Oracle instance under the “Instances” tab and click on the DB Instance name and verify the status column to make sure it shows “available”

DB instance	▲	Engine	▼	Status	▼
 reinventdb		Oracle Enterprise Edition		 available	

- Scroll down on the screen and go to the section “Connect” and copy the endpoint from the screen. Scroll down further to go to the “Details” section for additional Instance details.

Connect	
Endpoint reinventdb.cwkjhlbdms9s.us-west-2.rds.amazonaws.com	Port 1521

Details				Modify
Configurations	Security and network	Instance and IOPS	Maintenance details	
ARN arn:aws:rds:us-west-2:862756250442:db:reinventdb	Availability zone us-west-2c	Instance Class db.r4.large	Auto minor version upgrade <b>No</b>	
Engine Oracle Enterprise Edition 12.1.0.2.v13	VPC <a href="#">vpc-e0e9eb84</a>	Storage Type General Purpose (SSD)	Maintenance window wed:08:19-wed:08:49 UTC (GMT)	
License Model Bring Your Own License	Subnet group default	Storage 20 GiB	Pending Modifications Master User Password: ****	
DB Name MYDB	Subnets <a href="#">subnet-1c59166a</a> <a href="#">subnet-7bbf3d23</a> <a href="#">subnet-12ba8e76</a>	Availability and durability	Pending maintenance none	
Username admin	Security groups <a href="#">rds-launch-wizard-26 (sg-0c119ca7823c8882c)</a> ( active )	DB instance status creating	Encryption details	
Character Set AL32UTF8		Multi AZ <b>No</b>	Encryption enabled No	
Option Group default:oracle-ee-12-1	Publicly accessible Yes	Backup and Restore		
Parameter group <a href="#">default.oracle-ee-12.1 (in-sync)</a>	Certificate authority <a href="#">rds-ca-2015 (Mar 5, 2020)</a>	Automated backups <b>Disabled</b>		
		Backup window <b>Disabled</b>		

- Start the SQL Developer -> New Connection, provide following inputs  
SQL Developer can be downloaded [here](#)

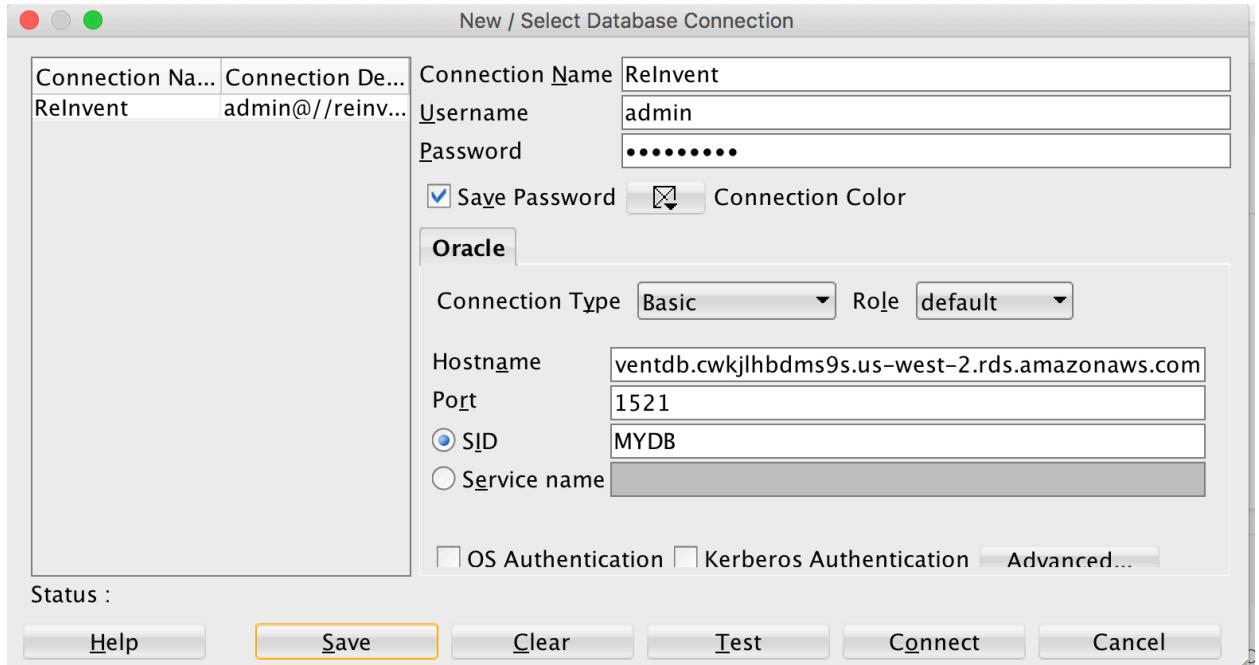
Connection name: - < User defined connection name> ReInvent

Username: - Master username provided during Database creation <admin>

Password: - Password provided for the Master Username during Database creation

Hostname: - Endpoint copied in the step #1 above

SID: - Database name provided during Database Creation <MYDB>



4. In case connection to SQL Developer fails, then do this  
Find the newly created RDS Oracle instance under the “Instances” tab

Click on Link: Security Groups under the “Security group rules” (takes you to EC2 service)

Inbound -> Edit -> Add Rule

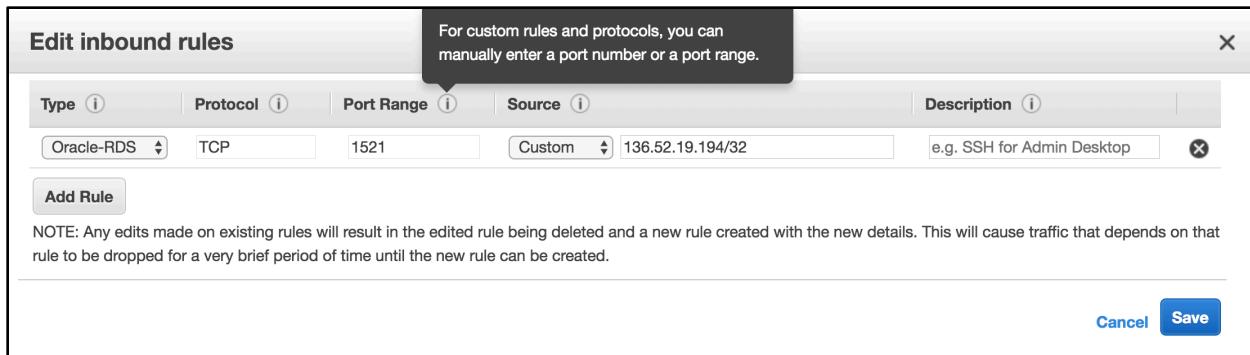
Type: Oracle-RDS

Protocol: TCP

Port Range: 1521

Source: My IP (avoid 0.0.0.0/0) refer <https://checkip.amazonaws.com/>

Save



Test connection again

## 5. Using SQL\*PLUS to connect to RDS Oracle Database Instance

Launch SQL\* PLUS client and use the following command to connect to the DB, replace the host name with the your instance endpoint and SID with the your DB name

```
sqlplus
'<username>@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=<Hostname>)(PORT=1521))(CONNECT_DATA=(SID=<SID>)))'
```

```
sqlplus 'admin@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)
(HOST= reinventdb.cwkj1hbdms9s.us-west-2.rds.amazonaws.com)(PORT=1521))
(CONNECT_DATA=(SID=MYDB)))'
```

```
8c85900aa704:Downloads smalik$ sqlplus 'admin@(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)
>      (HOST= reinventdb.cwkj1hbdms9s.us-west-2.rds.amazonaws.com)(PORT=1521))
|>      (CONNECT_DATA=(SID=MYDB)))'
```

```
SQL*Plus: Release 12.1.0.2.0 Production on Sat Nov 17 19:09:00 2018
```

```
Copyright (c) 1982, 2016, Oracle. All rights reserved.
```

```
[Enter password:
Last Successful login time: Sat Nov 17 2018 19:03:06 -08:00
```

```
Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
```

```
SQL> select name from v$database;
```

```
NAME
-----
MYDB
```

```
SQL> 
```

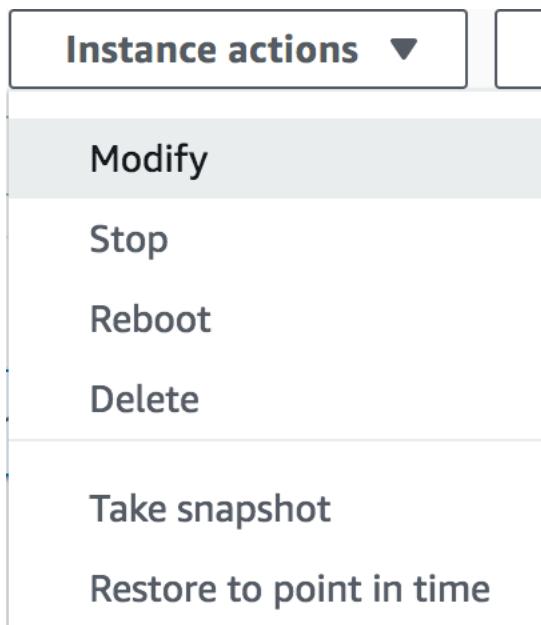
## Lab 3: High Availability on RDS Oracle (Multi-AZ) (ETC ~10 -15 minutes)

### A) Configuring the Multi-AZ on RDS Oracle Database

1. Find the newly created RDS Oracle instance under the “Instances” tab and click on the DB Instance name.

DB instance	Engine	Status
 reinventdb	Oracle Enterprise Edition	 available

2. Click on the “Instance Actions” drop down on the right side and choose “Modify”



3. On the Instance specification page, under Multi-AZ deployment choose “Yes” and leave other fields as is

## Instance specifications

### License model

License type associated with the database engine

bring-your-own-license



### DB engine version

Version number of the database engine to be used for this instance.

Oracle 12.1.0.2.v14 (default)



### DB instance class

Contains the compute and memory capacity of the DB instance.

db.r4.xlarge — 4 vCPU, 30.5 GiB RAM



### Multi-AZ deployment

Specifies if the DB instance should have a standby deployed in another availability zone.

Yes

No

Click “Continue”

Cancel

Continue

4. On the next screen under the “Scheduling of Modifications” choose “Apply immediately”

## Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
Multi-AZ deployment	No	Yes



### Potential performance impact

You may experience a significant performance impact when converting this database instance to Multi-AZ configuration. This impact will be more noticeable on database instances with large amounts of storage and write-intensive workloads.

## Scheduling of modifications

### When to apply modifications

- Apply during the next scheduled maintenance window

Current maintenance window: wed:08:19-wed:08:49

- Apply immediately

The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

5. Click on “Modify DB Instance” to continue with the modification

Cancel

Back

Modify DB Instance

You can also verify the modification is taking place by clicking the Instance name and go to Instance details page and under “Recent events” you can find the most recent events on the top

Recent events (22)	
<input type="text"/> Filter db events	
Time	System notes
Sat Nov 17 22:24:19 GMT-800 2018	Applying modification to convert to a Multi-AZ DB Instance

- Once the modify instance task is completed, this can be verified by looking at the status column for your Database instance on the Instances page. When the status column shows “available” it means the modification to the instance is completed.

Recent events (23)		<input type="button" value="C"/>
<input type="text"/> Filter db events		< 1 2 <input type="button" value=""/>
Time	System notes	
Sat Nov 17 22:34:02 GMT-800 2018	Finished applying modification to convert to a Multi-AZ DB Instance	

- Verify the Multi-AZ status for your instance on your Instance details page. Click on the Instances tab and select your instance and click to go to the Instance detail page and under the section “Availability and Durability” check the status of Multi-AZ

## Availability and durability

DB instance status

available

Multi AZ

Yes

### B) Simulating the AZ failover on RDS Oracle Database

RDS Oracle does provide customer's an option to simulate the AZ failure and High Availability by offering the option to reboot the RDS Oracle Instance with the failover option. This option will initiate AZ level failover for the Instance, the instance on the secondary AZ will become primary and the instance on the primary become secondary.

- Verify the primary and secondary AZ for the RDS Oracle Database Instance. Choose your RDS Oracle Instance from the RDS home page by clicking “Instances” and after selecting your instance click to go the Instance details page

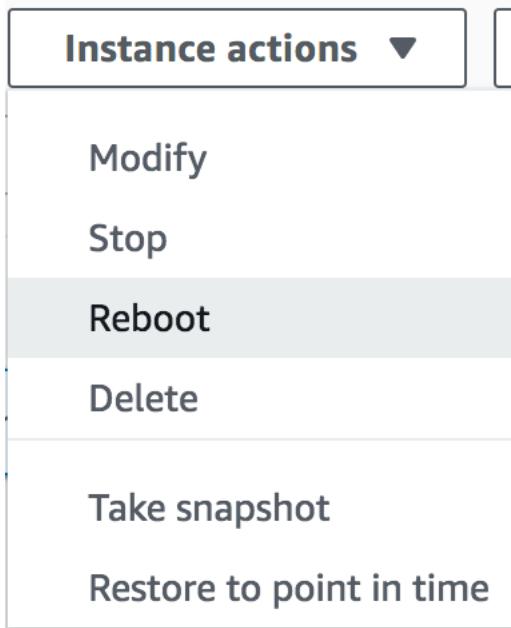
On the Instance detail page, the primary AZ for the instance is shown under the section “Security Zone”.

## Security and network

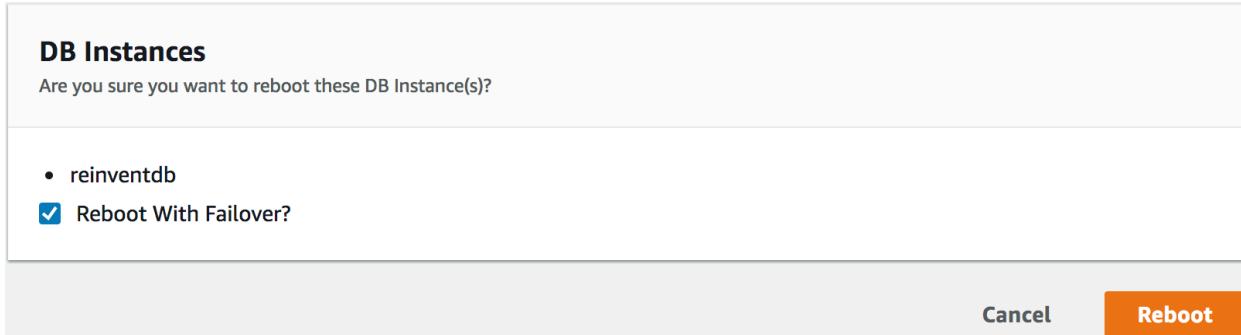
Availability zone

us-west-2c

- To initiate AZ failover, Choose your RDS Oracle Instance from the RDS home page by clicking “Instances” and after selecting your instance click to go the Instance details page and on “Instance actions” drop down choose “Reboot”



- Choose the checkbox for “Reboot with Failover” and click on the “Reboot” to initiate the failover.



- Once the RDS Oracle Database Instance is rebooted and status shows available

DB instance	▲	Engine	▼	Status	▼
reinventdb		Oracle Enterprise Edition		available	

- Verify the primary AZ for the Instance will be changed

## Security and network

### Availability zone

us-west-2b

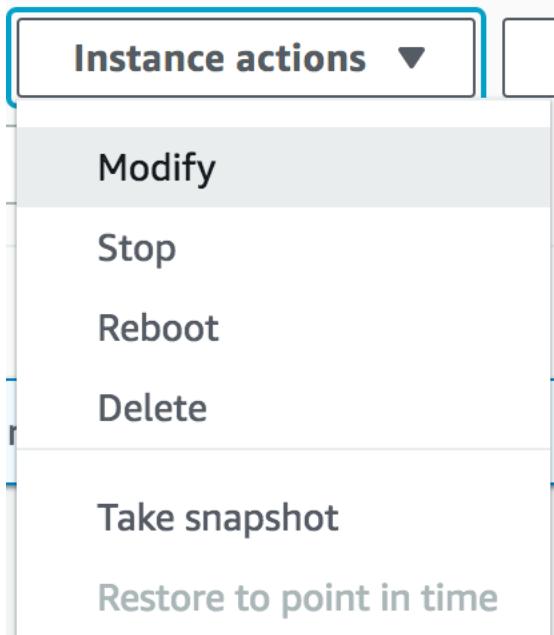
## Lab 4: Scaling the RDS Oracle DB Instance (ETC ~10 -15 minutes)

### A) Scale Compute

- Find the newly created RDS Oracle instance under the “Instances” tab and click on the DB Instance name.

DB instance	▲	Engine	▼	Status	▼
 reinventdb		Oracle Enterprise Edition		 available	

- Click on the “Instance Actions” drop down on the right side and choose “Modify”



3. On the Modify DB Instance screen change “DB instance class” to “db.r4.xlarge” and leave all other field as is.

#### DB instance class

Contains the compute and memory capacity of the DB instance.

db.r4.xlarge — 4 vCPU, 30.5 GiB RAM

Click **Continue**

**Cancel** **Continue**

4. On the next screen under “scheduling of modifications” choose “Apply Immediately”

#### Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
DB instance class	db.r4.large	db.r4.xlarge

#### Scheduling of modifications

When to apply modifications

Apply during the next scheduled maintenance window

Current maintenance window: wed:08:19-wed:08:49

Apply immediately

The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

5. Click on “Modify DB Instance” to scale the compute

**Cancel** **Back** **Modify DB Instance**

6. Check the Instance status it will show “modifying” and once the changes are done the status will change to “available”.

DB instance ▲ Engine ▼ Status ▼

**reinventdb**

Oracle Enterprise Edition

 modifying

You can also verify the modification is taking place by clicking the Instance name and go to Instance details page and under “Recent events” you can find the most recent events on the top

Recent events (5)

Filter db events

Time | System notes

Sat Nov 17 19:19:37 GMT-800 2018 | Applying modification to database instance class

- Once the status is available/storage-optimization click on the Instance name and look under “Details” section to verify that the DB Instance class has been changed

DB instance	Engine	Status
reinventdb	Oracle Enterprise Edition	available

Details

Configurations	Security and network	Instance and IOPS
ARN arn:aws:rds:us-west-2:862756250442:db:reinventdb	Availability zone us-west-2c	Instance Class db.r4.xlarge

Recent events (7)

Filter db events

Time | System notes

Sat Nov 17 19:24:25 GMT-800 2018 | Finished applying modification to DB instance class

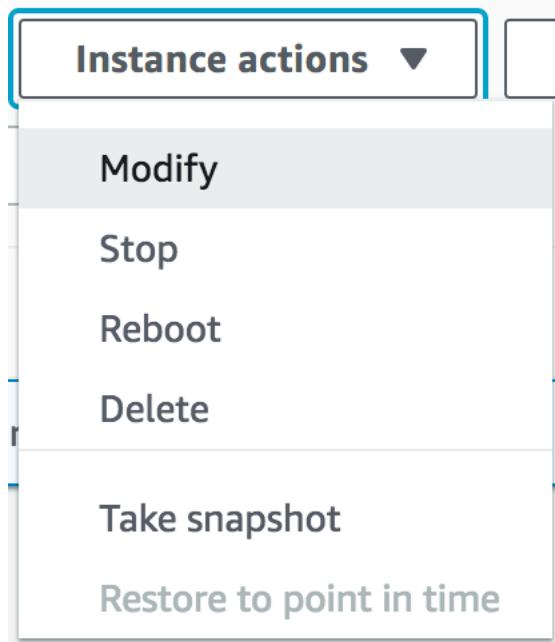
Sat Nov 17 19:21:05 GMT-800 2018 | DB instance shutdown

## B) Scale Storage

1. Find the newly created RDS Oracle instance under the “**Instances**” tab and click on the DB Instance name.

DB instance	▲	Engine	▼	Status	▼
 reinventdb		Oracle Enterprise Edition		 available	

2. Click on the “Instance Actions” drop down on the right side and choose “Modify”



3. On the Modify DB Instance screen change “Allocated Storage” to “30 GB” and leave all other field as is

Allocated storage

GB

This instance supports multiple storage ranges between 20 and 16384 GB. [See all](#)

Click Continue

Cancel Continue

4. On the next screen under “scheduling of modifications” choose “Apply Immediately”

**Summary of modifications**

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
Allocated storage	20 GiB	30 GiB

**Scheduling of modifications**

When to apply modifications

- Apply during the next scheduled maintenance window  
Current maintenance window: wed:08:19-wed:08:49
- Apply immediately  
The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

5. Click on “Modify DB Instance” to scale the storage



6. Check the Instance status it will show “modifying” and once the changes are done the status will change to “available”.

DB instance	Engine	Status
reinventdb	Oracle Enterprise Edition	modifying

You can also verify the modification is taking place by clicking the Instance name and go to Instance details page and under “Recent events” you can find the most recent events on the top

Recent events (9)	
<input type="text"/> Filter db events	
Time	System notes
Sat Nov 17 19:33:22 GMT-800 2018	Applying modification to allocated storage

7. Once the status is available click on the Instance name and look under “Details” section to verify that the DB Instance class has been changed

The screenshot shows the AWS RDS console. At the top, there's a navigation bar with tabs for 'DB instance', 'Engine', and 'Status'. Below this, a table lists the instance 'reinventdb' with details: Engine is 'Oracle Enterprise Edition' and Status is 'storage-optimization' (indicated by a green checkmark).

Below the table, the 'Details' section is expanded, showing three columns of configuration:

Configurations	Security and network	Instance and IOPS
ARN arn:aws:rds:us-west-2:862756250442:db:reinventdb	Availability zone us-west-2c	Instance Class db.r4.xlarge
Engine Oracle Enterprise Edition 12.1.0.2.v13	VPC <a href="#">vpc-e0e9eb84</a>	Storage Type General Purpose (SSD)
	Subnet group default	Storage 30 GiB

At the bottom, the 'Recent events (10)' section is shown, listing two events:

Time	System notes
Sat Nov 17 19:36:05 GMT-800 2018	Finished applying modification to allocated storage
Sat Nov 17 19:33:22 GMT-800 2018	Applying modification to allocated storage

## Lab 5: Enabling Performance Insights and logs to Cloudwatch (ETC ~10 - 15 minutes)

### A) Export RDS Oracle logs to CloudWatch

1. Select your instance from the Instance tab
2. Click on the “Instance Actions” drop down on the right side and click “Modify”

## Instance actions ▾

### Modify

Stop

Reboot

Delete

Take snapshot

Restore to point in time

3. On the details page under the “Monitoring” section select the Enable enhanced monitoring option. Under “Log Exports” section select the logs which you would like to get publish on the Cloudwatch and click continue

## Monitoring

Enhanced monitoring

Enable enhanced monitoring

Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

Disable enhanced monitoring

Monitoring Role

Default

Granularity

60 seconds

I authorize RDS to create the IAM role rds-monitoring-role.

## Log exports

Select the log types to publish to Amazon CloudWatch Logs

- Alert log
- Audit log
- Listener log
- Trace log

### IAM role

The following service-linked role is used for publishing logs to CloudWatch Logs.

RDS Service Linked Role

## Performance Insights

- Enable Performance Insights  
 Disable Performance Insights

Retention period [Info](#)

Default (7 days) ▾

Click “Continue”

**Cancel**

**Continue**

4. Under “Scheduling of Modifications” choose Apply Immediately and click Modify DB Instance.

## Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
Enable Enhanced Monitoring	Yes	Yes
Granularity	0	60
Monitoring Role		rds-monitoring-role (arn:aws:iam::862756250442:role/rds-monitoring-role)
Enable Performance Insights	No	Yes
Performance Insights KMS Key		alias/aws/rds

## Scheduling of modifications

When to apply modifications

Apply during the next scheduled maintenance window

Current maintenance window: wed:08:19-wed:08:49

Apply immediately

The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

Click on “Modify DB Instance”

**Modify DB Instance**

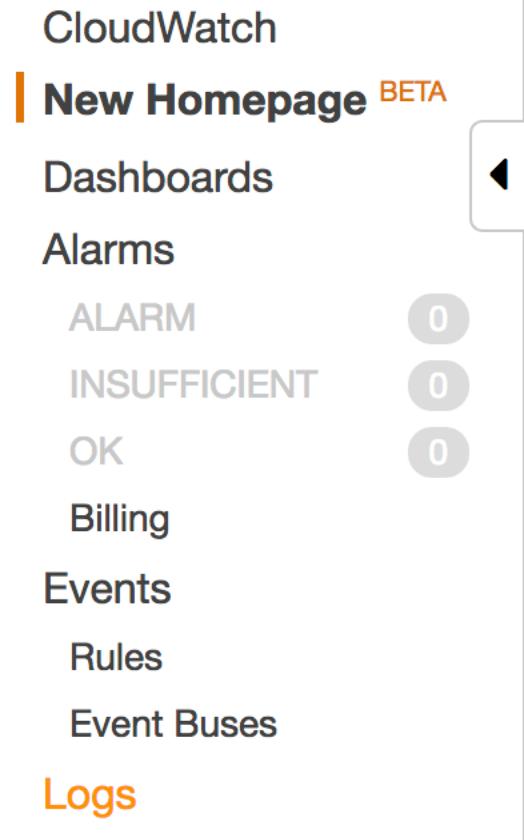
## B) View RDS Oracle logs on CloudWatch

1. On the AWS console home page type CloudWatch in the search box and click on CloudWatch

cloudwatch

CloudWatch  
Monitor Resources and Applications

2. On the CloudWatch home page click on “Logs” on the left-hand side



3. On the Filter bar type /aws/rds/instance/<yourinstancename> and hit enter button. Replace the <yourinstancename> with RDS instance you created.

The screenshot shows the CloudWatch Logs interface. A filter bar at the top contains the text '/aws/rds/instance/reinvent'. Below the filter bar, a section titled 'Log Groups' is expanded, showing four log groups: '/aws/rds/instance/reinventdb/alert', '/aws/rds/instance/reinventdb/audit', '/aws/rds/instance/reinventdb/listener', and '/aws/rds/instance/reinventdb/trace'. Each log group is preceded by a circular checkbox.

- Select the file you want to view and click on the corresponding line item

The screenshot shows a user interface for viewing log streams. At the top, there is a header with a checked checkbox and the text "Log Streams". Below this, another row has a checked checkbox and the text "reinventdb". The main area displays a table with two columns: "Time (UTC +00:00)" and "Message". The table lists several log entries from November 17, 2018, at various times between 07:09:14 and 07:24:15. Each entry provides a detailed description of a redo log operation.

Time (UTC +00:00)	Message
2018-11-17	
07:09:14	Sat Nov 17 07:09:14 2018 TT01: Standby redo logfile selected for thread 1 sequence 4933 for destination LOG_ARCHIVE_DEST_2
07:14:14	Sat Nov 17 07:14:14 2018 Thread 1 advanced to log sequence 4934 (LGWR switch) Current log# 2 seq# 4934 mem# 0: /rdsdbdata/db/MYDB_A/onlinelog/o1_
07:14:14	Sat Nov 17 07:14:14 2018 Archived Log entry 4598 added for thread 1 sequence 4933 ID 0xad389b8d dest 1:
07:14:14	Sat Nov 17 07:14:14 2018 TT01: Standby redo logfile selected for thread 1 sequence 4934 for destination LOG_ARCHIVE_DEST_2
07:19:14	Sat Nov 17 07:19:14 2018 Thread 1 advanced to log sequence 4935 (LGWR switch) Current log# 3 seq# 4935 mem# 0: /rdsdbdata/db/MYDB_A/onlinelog/o1_
07:19:14	Sat Nov 17 07:19:14 2018 Archived Log entry 4600 added for thread 1 sequence 4934 ID 0xad389b8d dest 1:
07:19:15	Sat Nov 17 07:19:15 2018 TT01: Standby redo logfile selected for thread 1 sequence 4935 for destination LOG_ARCHIVE_DEST_2
07:24:15	Sat Nov 17 07:24:15 2018 Thread 1 advanced to log sequence 4936 (LGWR switch) Current log# 4 seq# 4936 mem# 0: /rdsdbdata/db/MYDB_A/onlinelog/o1_

### C) Enabling and accessing Performance Insights

- We have already enabled the Performance insights for this instance with the previous modification. Accessing Performance Insights require “**AmazonRDSFullAccess**” permissions from AWS Identity and Access Management (IAM).
- To access the Performance Insight Dashboard for specific RDS Database Instance is to go to the Instance page and select the desired Instance name and under the “current activity” column you will see the average number of sessions in last 5 minutes. Click on the “sessions” and it will take you to the Performance Insights Dashboard for that specific Instance.

The screenshot shows the AWS RDS Instances page. It lists a single instance named "reinventdb". The instance is running the "Oracle Enterprise Edition" engine and is currently "available". The "CPU" usage is shown as 0.67%, and the "Current activity" is 0.03 Sessions. The "DB instance" column is the primary key for sorting the list.

DB instance	Engine	Status	CPU	Current activity
reinventdb	Oracle Enterprise Edition	available	0.67%	0.03 Sessions

- Another way to access Performance Insights, go to the RDS homepage and click on the Performance Insights tab on the left-hand side

## Amazon RDS

X

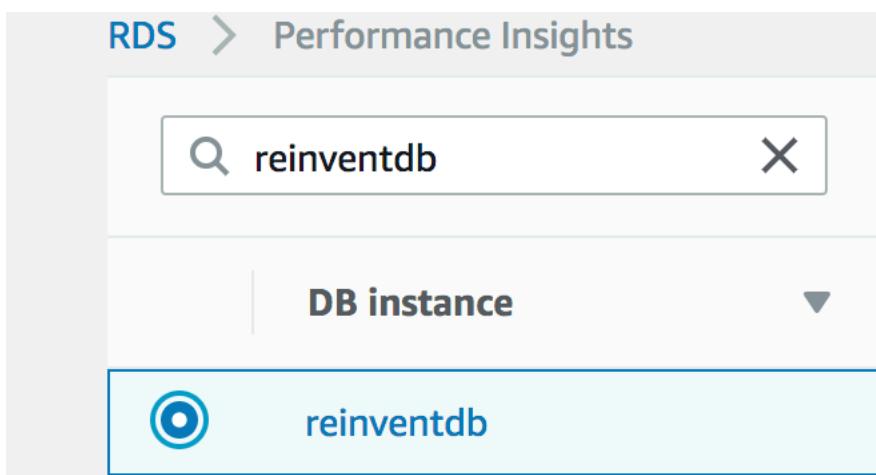
Dashboard

**Instances**

Clusters

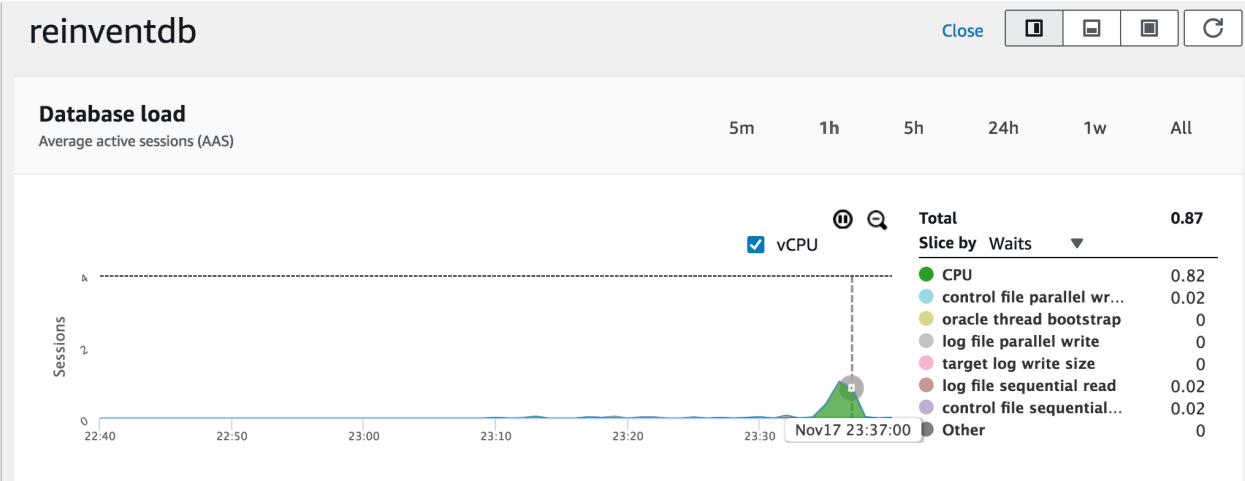
Performance Insights

On the next screen type the instance name you want to monitor (in this your RDS Oracle Database Instance) and click on the Instance name

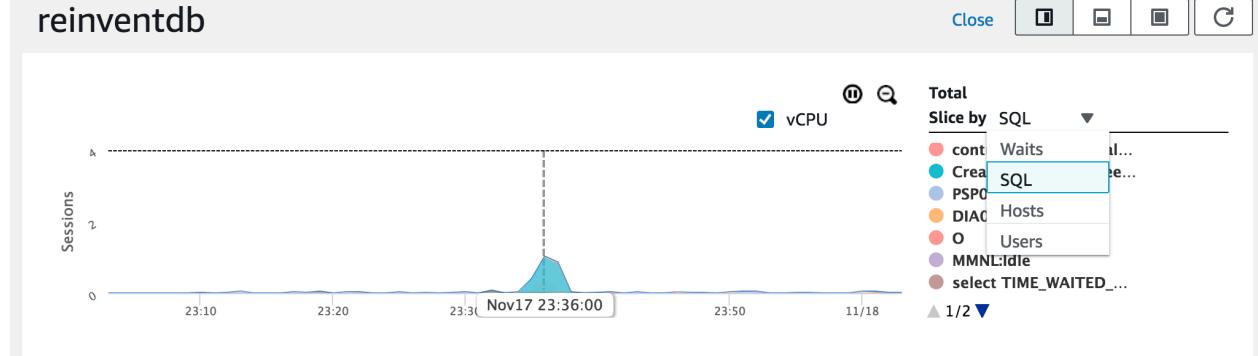


4. With the Performance Insights dashboard, you can visualize the database load and filter the load by waits, SQL statements, hosts, or users. The central metric for Performance Insights is DB Load, which represents the average number of active sessions for the DB engine. An active session is a connection that has submitted work to the DB engine and is waiting for a response from it. The Dashboard is divided into 2 sections on the top half it shows “DB Load” sliced by waits(SQLs/Hosts and users and the bottom half is displayed by either waits(SQLs/Hosts or users for that specific time period

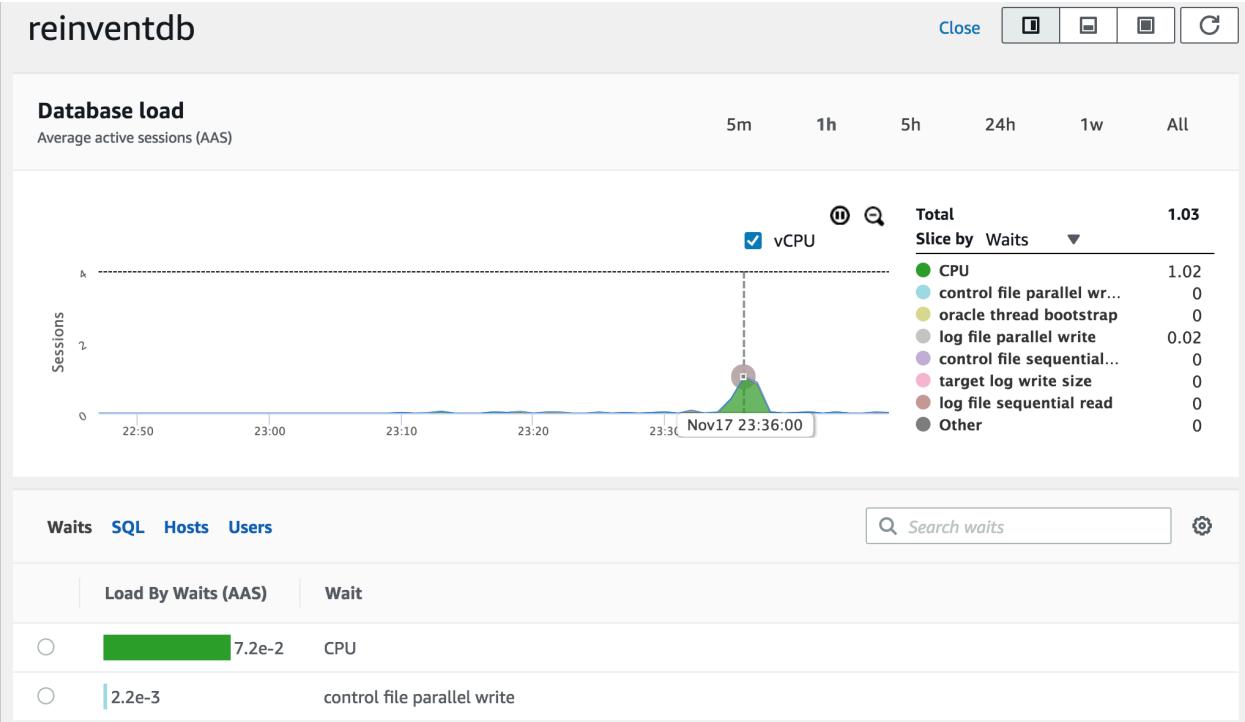
Database Load by Waits (default)



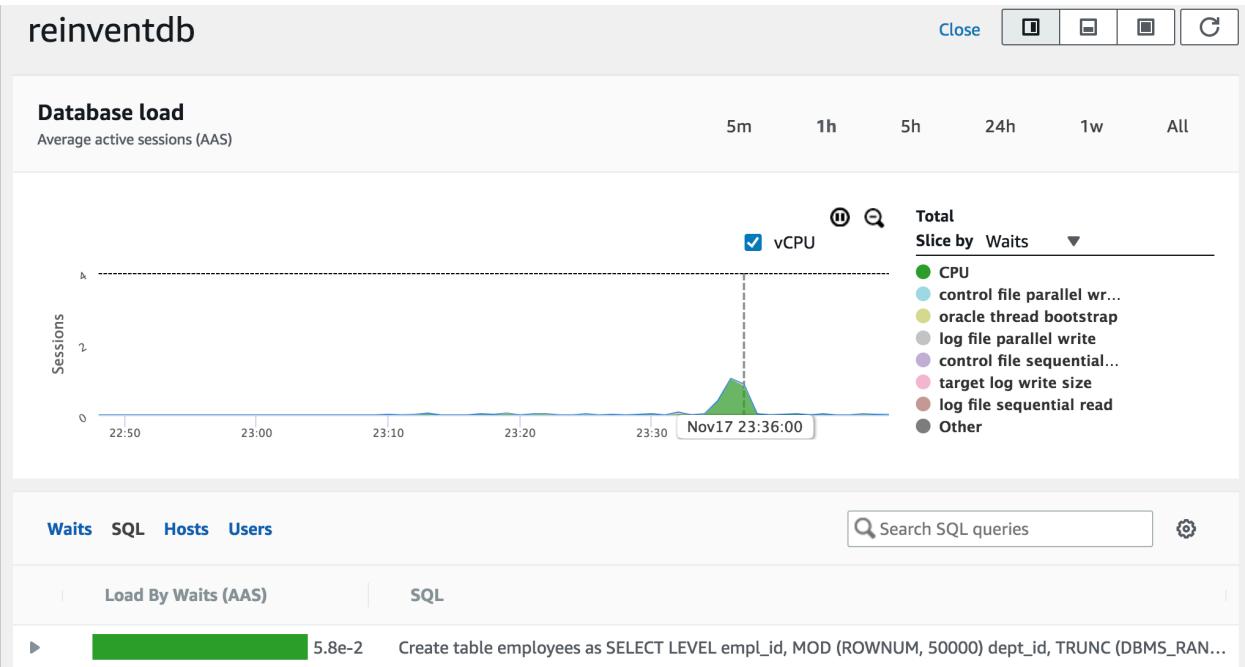
### Database load by SQL



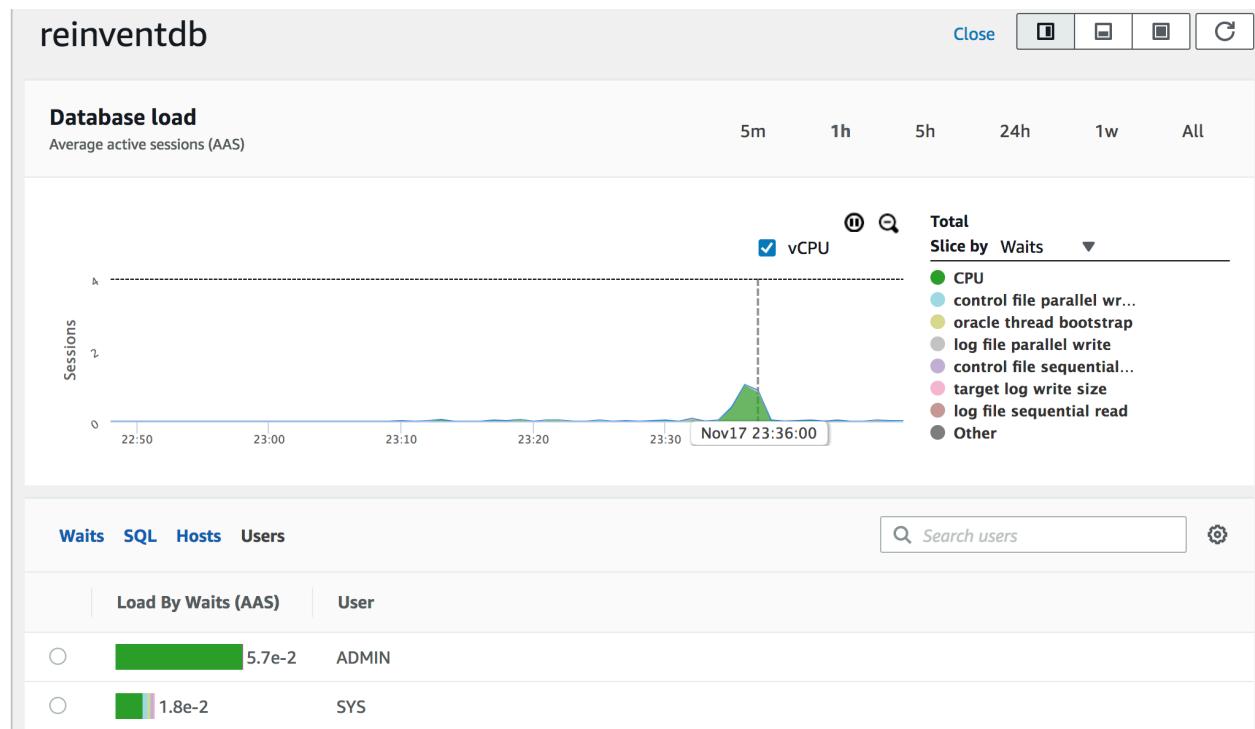
Database Load by waits displayed by top waits



Database Load by waits displayed by top SQLs



Database Load by waits displayed by top users



## Lab 6: Minor Version upgrade of RDS Oracle DB (ETC ~12 -18 minutes)

- Verify the current PSU of your Database Instance, connect to the RDS Oracle Database instance from SQL\*PLUS and run the following command

```
SQL> set serveroutput on
SQL> exec DBMS_QOPATCH.GET_SQLPATCH_STATUS;
```

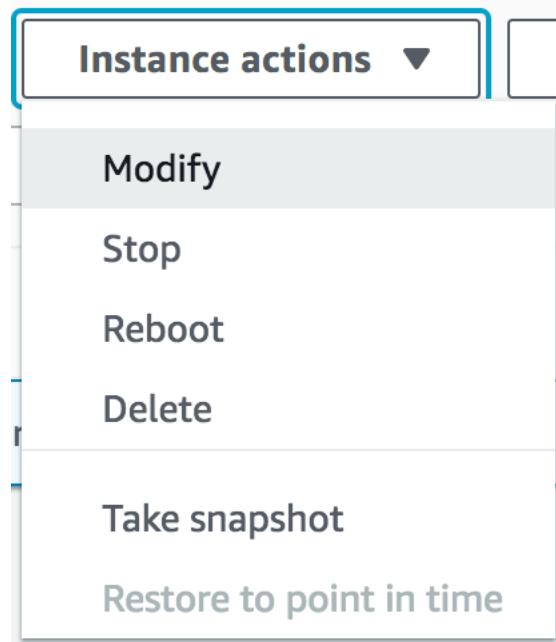
```
SQL> set serveroutput on
SQL> exec DBMS_QOPATCH.GET_SQLPATCH_STATUS;

Patch Id : 27923320
Action : APPLY
Action Time : 24-SEP-2018 07:04:33
Description : Database PSU 12.1.0.2.180717, Oracle JavaVM Component (JUL2018)
LogFile :
/rdsdbbin/oracle/cfgtoollogs/sqlpatch/27923320/22224206/27923320_apply_ORCL_2018
Sep24_07_04_24.log
Status : SUCCESS
```

- Find the newly created RDS Oracle instance under the “Instances” tab and click on the DB Instance name.

DB instance	▲	Engine	▼	Status	▼
 reinventdb		Oracle Enterprise Edition		 available	

2. Click on the “Instance Actions” drop down on the right side and choose “Modify”



3. On the Modify DB Instance screen change “DB engine version” to “Oracle 12.1.0.2.v14” and leave all other fields as is

Instance specifications	
License model	License type associated with the database engine
<input type="text" value="bring-your-own-license"/>	
DB engine version	Version number of the database engine to be used for this instance.
<input type="text" value="Oracle 12.1.0.2.v14 (default)"/>	

Click **Continue**

**Cancel** **Continue**

### Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
DB engine version	12.1.0.2.v13 (Oracle 12.1.0.2.v13)	12.1.0.2.v14 (Oracle 12.1.0.2.v14)

### Scheduling of modifications

When to apply modifications

- Apply during the next scheduled maintenance window  
Current maintenance window: wed:08:19-wed:08:49
- Apply immediately  
The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

- Click on “Modify DB Instance” to Upgrade the PSU on the Database Instance and the Instance status will change to “**upgrading**”

**Cancel** **Back** **Modify DB Instance**

DB instance	Engine	Status
reinventdb	Oracle Enterprise Edition	⌚ upgrading

- You can verify if the modification to the instance has been completed by looking under the “Recent Events” section on the Instance Details page.

**Recent events (14)**

Filter db events

Time	System notes
Sat Nov 17 19:59:54 GMT-800 2018	Database instance patched
Sat Nov 17 19:57:35 GMT-800 2018	DB instance restarted
Sat Nov 17 19:54:03 GMT-800 2018	DB instance shutdown

- Once the DB Instance is patched, query the Database to verify the PSU installation

```
SQL> set serveroutput on
SQL> exec DBMS_QOPATCH.GET_SQLPATCH_STATUS;
```

Output is truncated to show the latest PSU

```
SQL> set serveroutput on
SQL> exec DBMS_QOPATCH.GET_SQLPATCH_STATUS;

Patch Id : 28440711
      Action : APPLY
      Action Time : 18-NOV-2018 03:56:10
      Description : Database PSU 12.1.0.2.181016, Oracle JavaVM Component (OCT2018)
      Logfile :
/rdsdbbin/oracle/cfgtoollogs/sqlpatch/28440711/22440644/28440711_apply_MYDB_2018
Nov18_03_56_04.log
      Status : SUCCESS
```

## Lab 7: Backup and restore for RDS Oracle DB Instance (ETC ~10 -15 minutes)

### A) Automated Backups

- Verify the Automated backup status for your instance on your Instance details page. Click on the Instances tab and select your instance and click to go to the Instance detail page and under the section “Availability and Durability” check the status of Automated backups.

DB instance	▲	Engine	▼	Status	▼
 reinventdb		Oracle Enterprise Edition		 available	

## Availability and durability

DB instance status

available

Multi AZ

No

Automated backups

Disabled

Latest restore time

N/A

Also, from SQLPLUS

```
SQL> select log_mode from v$database;
```

```
SQL> select log_mode from v$database;
```

```
LOG_MODE
```

```
-----
```

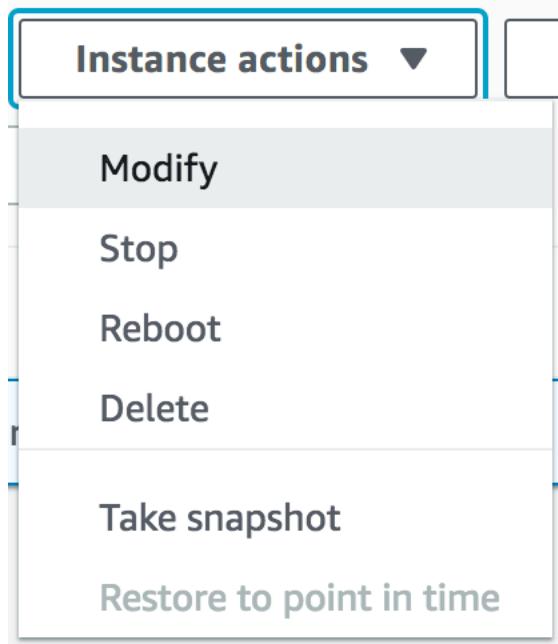
```
NOARCHIVELOG
```

```
SQL> 
```

2. Enable Automated backups for your Instance
3. Select your instance from the Instance tab

DB instance	Engine	Status
reinventdb	Oracle Enterprise Edition	available

4. Click on the “Instance Actions” drop down on the right side and choose “Modify”



5. On the Modify DB Instance screen under the section backup change “Backup retention period” to 2

Backup	
<b>Backup retention period</b> The number of days for which automated backups are retained. Setting this parameter to a positive number enables backups. Setting this parameter to 0 disables automated backups. 2 days	
<b>Backup window</b> The daily time range (in UTC) during which automated backups are created if automated backups are enabled. Start Time    Duration 09 : 30    0.5 hours	
<b>Copy tags to snapshots</b> <input type="radio"/> Yes <input checked="" type="radio"/> No	

**Summary of modifications**

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
Backup retention period	0 days	2 days

**Scheduling of modifications**

When to apply modifications

- Apply during the next scheduled maintenance window  
Current maintenance window: tue:07:14-tue:07:44
- Apply immediately  
The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

**Potential unexpected downtime**

If you choose to apply changes immediately, please note that any changes in the pending modifications queue are also applied. If any of the pending modifications require downtime, choosing this option can cause unexpected downtime.

**Cancel** **Back** **Modify DB Instance**

6. Click on “Modify DB Instance” to enable Automated backups for your DB instance.
7. Verify that the Automated backups are enabled by querying for the Archivelog status of the Database.

```
SQL> select log_mode from v$database;
```

```
SQL> select log_mode from v$database;
```

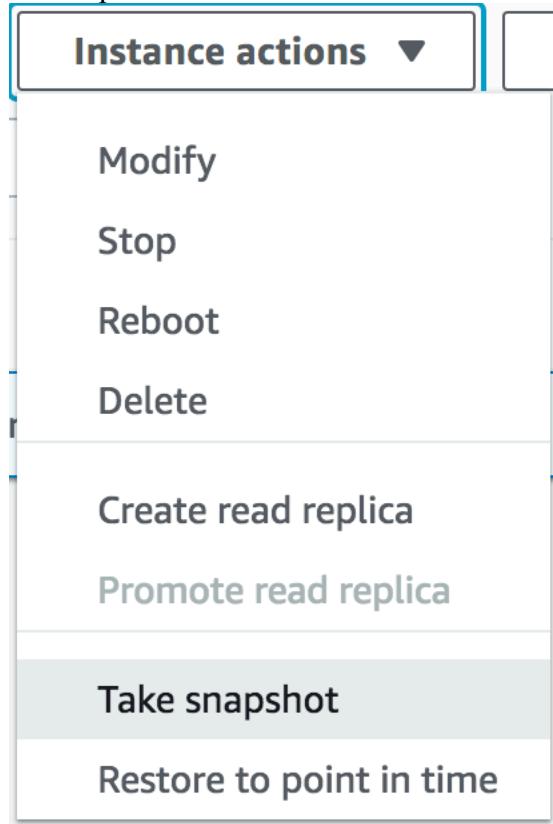
```
LOG_MODE
-----
ARCHIVELOG
SQL>
```

## B) Manual Backups

1. Select your instance from the Instance tab

A screenshot of a web-based interface for managing database instances. At the top, there are tabs for 'DB instance', 'Engine', and 'Status'. Below the tabs, a table lists one instance: 'reinventdb'. The instance details show it is an 'Oracle Enterprise Edition' and its status is 'available' (indicated by a green checkmark icon). The entire row for 'reinventdb' is highlighted with a light blue background.

2. Click on the “Instance Actions” drop down on the right side and choose “Take snapshot”



3. On the next screen provide input for the snapshot name <user defined name>
4. Click on “Take Snapshot” to create a manual snapshot

**Settings**

To take a snapshot of this DB instance you must provide a name for the snapshot.

**DB instance**  
The unique key that identifies a DB instance. This parameter isn't case-sensitive.  
**reinventdb**

**Snapshot name**  
The Identifier for the DB Snapshot.  
**manualsnapmydb**

Click Take snapshot

**Cancel**      **Take Snapshot**

Verify the snapshot is getting created on the “details” page under snapshot section

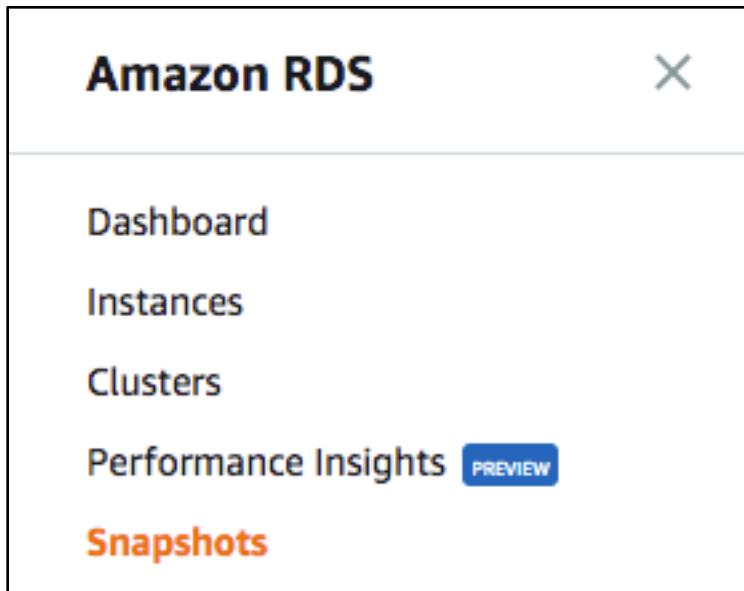
DB instance	Engine	Status
reinventdb	Oracle Enterprise Edition	⌚ backing-up
Snapshots (3)	Take snapshot	
Snapshot name	Snapshot creation time	Status
manualsnapmydb		⌚ creating

Once the snapshot is created and the instance status change to “available” verify the snapshot status change from “creating” to “available” under the snapshot section of the DB details screen

DB instance	Engine	Status
reinventdb	Oracle Enterprise Edition	✅ available
Snapshots (3)	Take snapshot	
Snapshot name	Snapshot creation time	Status
manualsnapmydb	Sat Nov 17 22:04:01 GMT-800 2018	✅ available

### C) Snapshot Restore on RDS Oracle.

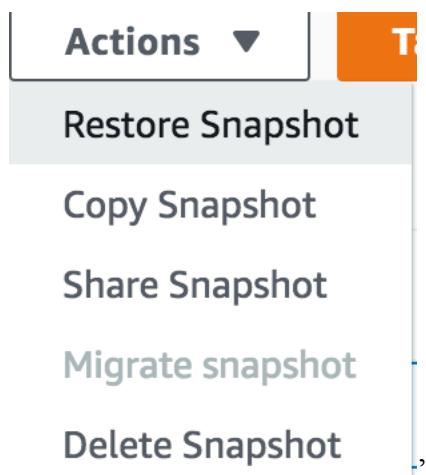
1. On the RDS home page click “Schemas”



2. Select the snapshot of your Database which you plan to use for the Restore

Snapshot	DB instance or cluster	Snapshot Creation Time	Status
<input checked="" type="checkbox"/> manualsnapmydb	reinventdb	Sat Nov 17 22:04:01 GMT-800 2018	<span>available</span>

3. Click on the dropdown for “Snapshot Actions” and choose “Restore snapshot”



- Provide the Input for the following fields to create a new RDS Oracle instance with the manual snapshot created above

DB Engine: - Oracle Database Enterprise Edition

License Model Info: - bring-your-own-license

DB Instance Class: - db.m4.xlarge

Multi-AZ deployment: - No

Storage Type: - General Purpose (SSD)

DB Instance Identifier: - <user defined name> e.g. restoreinst

DB Name – <user defined name> e.g. restdb

Leave all other fields as is and use defaults

### Instance specifications

**DB Engine**  
Name of the Database Engine

Oracle Database Enterprise Edition

**License Model**  
License type associated with the database engine

bring-your-own-license

**DB Instance Class**  
Contains the compute and memory capacity of the DB Instance.

db.m4.xlarge — 4 vCPU, 16 GiB RAM

**Multi-AZ Deployment**  
Specifies if the DB Instance should have a standby deployed in another Availability Zone.

Yes

No

Storage type [Info](#)

General Purpose (SSD)

**Settings**

**DB Snapshot ID**  
The identifier for the DB Snapshot.  
**manualsnapmydb**

**DB Instance Identifier** [Info](#)

---

**Database options**

**Database Name** [Info](#)  
Name of a database to create when the DB Instance is created.

**Database Port**  
Port number on which the database accepts connections.

**DB parameter group** [Info](#)  
 ▾

**Option Group** [Info](#)  
 ▾

5. Click on “Restore DB Instance” to create new RDS Oracle Instance using snapshot restore

**Cancel** **Restore DB Instance**

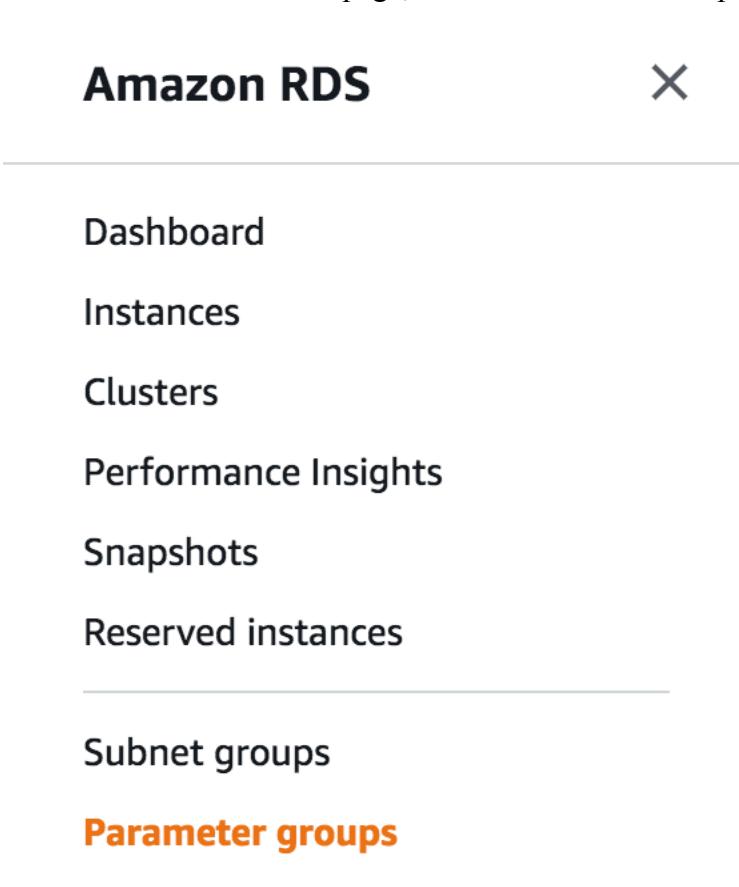
Verify the instance status of the restored Instance

DB instance	▲	Engine	▼	Status	▼
reinventdb		Oracle Enterprise Edition		<span>available</span>	
restoreinst		Oracle Enterprise Edition		<span>creating</span>	

## Lab 8: Parameter Groups and Option Groups on RDS Oracle (ETC ~10 -15 minutes)

### A) Creating the Parameter Group

1. On the RDS home page, select “Parameter Groups “on the left-hand side.



2. Click on “Create Parameter Group”

**Create parameter group**

3. On the Create Parameter group provide input as below

Parameter group family choose “oracle-ee-12.1”  
Groupname – custom-12-1-parameter-group  
Description - Custom parameter group for Oracle 12c R1

**Parameter group details**

To create a parameter group, choose a parameter group family, then name and describe your parameter group

Parameter group family  
DB family that this DB parameter group will apply to

Group name  
Identifier for the DB parameter group

Description  
Description for the DB parameter group

4. Click “create” to create new parameter group

**Create**

## B) Modifying the Parameter in the parameter Group

We will modify the parameter “Job\_queue\_process” from its default value of 50 to 100.  
Verify the current value of the parameter by login to the Database

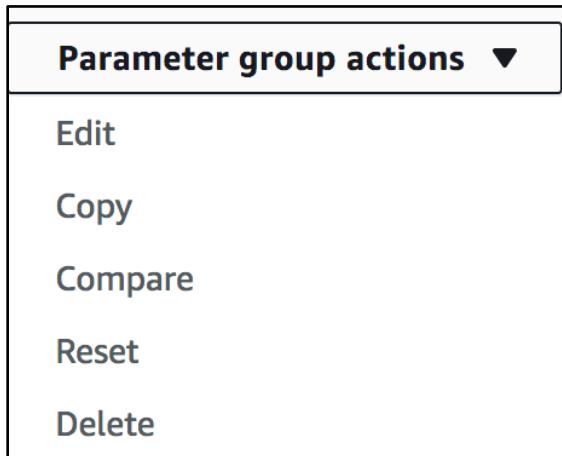
```
SQL> show parameter job_queue
```

NAME	TYPE	VALUE
job_queue_processes	integer	50

1. Click -> Parameter groups on RDS home page and Select the parameter group created by you

<input checked="" type="checkbox"/>	Name	Family	Type
<input checked="" type="checkbox"/>	custom-12-1-parameter-group	oracle-ee-12.1	Parameter groups

2. Click on the dropdown on the “Parameter group actions” click Edit



3. Under the “filter parameters” type “job\_queue\_process” and click on “Edit parameters”

Parameters				
<input type="text"/> job_ <span style="float: right;">X</span>				
<input type="checkbox"/>	Name	Values	Allowed values	Modifiable
<input type="checkbox"/>	job_queue_processes	50	0-1000	true

4. Change the value to 100 from the current value of 50 and click on save changes.

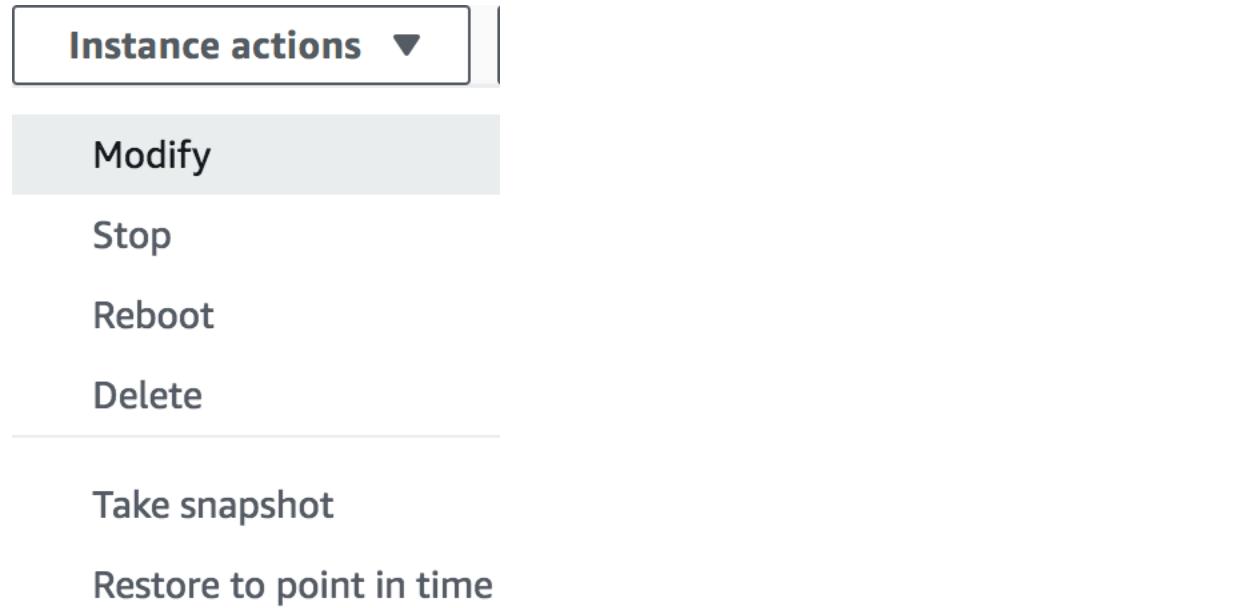
Parameters							<a href="#">Cancel editing</a>	<a href="#">Preview changes</a>	<a href="#">Reset</a>	<a href="#" style="background-color: orange; color: white;">Save changes</a>
							<a href="#">X</a>	< 1 >	<a href="#"></a>	
<input type="checkbox"/>	Name	▼	Values	Allowed values	Modifiable	Source	Apply type	Data type		
<input type="checkbox"/>	job_queue_processes		<input type="text" value="100"/>	0-1000	true	system	dynamic	integer		

### C) Associating new Parameter Group to your Instance

1. Select your instance from the Instance tab

DB instance	▲	Engine	▼	Status	▼
<input checked="" type="radio"/> reinventdb		Oracle Enterprise Edition		available	

2. Click on the “Instance Actions” drop down on the right side and click “Modify”



3. On the next page under the “Database Options” change the “DB Parameter Group” from the dropdown to the new Parameter Group “custom-12-1-parameter-group” created in the previous step.

## Database options

### Database port

Specify the TCP/IP port that the DB instance will use for application connections. The connection string of any application connecting to the DB instance must specify the port number of the DB instance. Both the security group applied to the DB instance and your company's firewalls must allow connections to the port. [Learn More](#)

1521

### DB parameter group

Database parameter group to associate with this DB instance

custom-12-1-parameter-group

custom-12-1-parameter-group

default.oracle-ee-12.1

test-pg-ee-121

testgrpccell

attached to this DB instance. If there  
a launch.

- Click Continue to go the next page, under the “Scheduling of notifications” choose “Apply Immediately”

### Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
DB parameter group	default.oracle-ee-12.1	custom-12-1-parameter-group

### Scheduling of modifications

#### When to apply modifications

Apply during the next scheduled maintenance window

Current maintenance window: tue:07:14-tue:07:44

Apply immediately

The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

- Click “Modify DB Instance” to apply the changes on the DB instance.

Cancel

Back

Modify DB Instance

6. Once the modify instance task is completed, this can be verified by looking at the status column for your Database instance on the Instances page. When the status column shows “available” it means the modification to the instance is completed.
7. We need to reboot the Instance manually to apply the new parameter group to the Instance. This can be verified on the Instance details page under the parameter Group section which will show “Pending-reboot”

## Parameter group

**custom-12-1-parameter-group  
(pending-reboot)**

8. Reboot the instance manually, choose your Instance from the RDS home page and under Instance actions choose “Reboot”. Since we are running the Instance in the multi-AZ mode we will have the option to do the “reboot with the failover”

## Reboot DB Instance

**DB Instances**  
Are you sure you want to reboot these DB Instance(s)?

- reinventdb
- Reboot With Failover?

Cancel Reboot

9. Verify the status of the instance on the RDS home page

DB instance	▲	Engine	▼	Status	▼
reinventdb		Oracle Enterprise Edition		<span style="color: blue;">i</span> rebooting	

10. Once the status of the instance become available, verify the value of the parameter “Job\_queue\_process” to make sure it is change to 100.

DB instance	▲ Engine	▼ Status
reinventdb	Oracle Enterprise Edition	available

```
SQL> show parameter job_queue
```

NAME	TYPE	VALUE
job_queue_processes	integer	100

#### D) Creating Option Groups

1. On the RDS home page, select “Option Groups “on the left-hand side.

Dashboard

Instances

Clusters

Performance Insights

Snapshots

Reserved instances

---

Subnet groups

Parameter groups

**Option groups**

---

2. Click on the “Create Group” to create new option group

**Create group**

3. On the Create option group page provide the following inputs

Name – User defined custom name (ora12ccustomgroup)

Description – Description for the option group (option group for SQLT option)

Engine – oracle - ee

Major engine version – 12.1

## Create option group

**Option group details**

Name	ora12ccustomgroup
Description	option group for SQLT option
Engine	oracle-ee
Major engine version	12.1

4. Click create to create new option group



### E) Adding options to the Option Groups

1. On the RDS home page, click “Option Groups “on the left-hand side.
2. Select the option group created in the previous step and click on the “Add option”

Option groups (13)		Add option	Modify option	Delete
<input type="text"/> ora12c				
<input checked="" type="checkbox"/>	Name	▼	Description	▼
<input checked="" type="checkbox"/>	ora12ccustomgroup		option group for SQLT option	

3. In this option Group, we are adding “SQLT” option, query the Database to verify it is not installed currently

```
SELECT sqlxplain.sqlt$a.get_param('tool_version') sqlt_version FROM DUAL;
```

```

SQL> SELECT sqlxplain.sqlt$a.get_param('tool_version') sqlt_version FROM DUAL;
SELECT sqlxplain.sqlt$a.get_param('tool_version') sqlt_version FROM DUAL
*
ERROR at line 1:
ORA-00904: "SQLTPLAIN"."SQLT$A"."GET_PARAM": invalid identifier

```

SQL> █

4. On the Option Details page, provide following inputs  
 For the option, choose the option “SQLT” from the dropdown  
 For the version field leave the default value  
 For the License\_pack field provide “T”  
 Apply Immediately field provide “Yes”

Option group name  
ora12ccustomgroup

Option  
Name of Option you want to add to this group

Version  
Choose the version of option software you want to install

**Option settings (1)**

Option setting	Value	Allowed values	Description
LICENSE_PACK	<input type="text" value="N"/>	T,D,N	Specifies the License Pack with which SQLT should be used.

\* Indicates multiple, comma-separated values are allowed, e.g. AES256,RC4\_128. (Note that spaces after commas are not accepted.) Otherwise, only a single value is allowed.

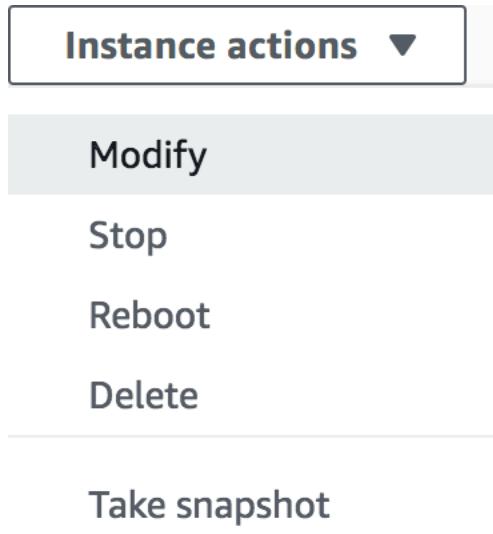
Apply Immediately [Info](#)  
 Yes  
 No

5. Click on the “Add option” to add SQLT to the option groups

**Add Option**

## F) Associating Option Group to your Instance

1. Select your instance from the Instance tab
2. Click on the “Instance Actions” drop down on the right side and click “Modify”



3. On the modify Instance page under the section “Database options” change the Option group from the dropdown and choose the newly created option Group with the SQLT option.

## Database options

### Database port

Specify the TCP/IP port that the DB instance will use for application connections. The connection string of the DB instance must specify the port number of the DB instance. Both the security group applied to the DB instance and the firewalls must allow connections to the port. [Learn More](#).

1521

### DB parameter group

Database parameter group to associate with this DB instance

custom-12-1-parameter-group



### Option group

Name of an option group that contains options (e.g. Memcached, Oracle Enterprise Manager) you want at the instance level. If there aren't any option groups compatible with the selected engine, a default option group will be created at the instance level.

ora12ccustomgroup



4. Click Continue to go to the next page
5. Under Scheduling of Modifications choose “Apply Immediately” and click “Modify DB Instance”

## Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
Option group	default:oracle-ee-12-1	ora12ccustomgroup

## Scheduling of modifications

When to apply modifications

Apply during the next scheduled maintenance window

Current maintenance window: tue:07:14-tue:07:44

Apply immediately

The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.



### Potential unexpected downtime

If you choose to apply changes immediately, please note that any changes in the pending modifications queue are also applied. If any of the pending modifications require downtime, choosing this option can cause unexpected downtime.

**Modify DB Instance**

6. Check the status of Instance and wait till it become “available”

DB instance	▲	Engine	▼	Status	▼
reinventdb		Oracle Enterprise Edition		modifying	

7. Once the status of the Instance becomes available, connect to the Database Instance and verify if the SQLT is installed on the Database.

DB instance	▲	Engine	▼	Status	▼
reinventdb		Oracle Enterprise Edition		available	

```

SELECT sqltxplain.sqlt$a.get_param('tool_version') sqlt_version FROM DUAL;

SQL> SELECT sqltxplain.sqlt$a.get_param('tool_version') sqlt_version FROM DUAL;
SQLT_VERSION
-----
12.2.180331
SQL>

```

## Lab 9: Common DBA tasks on RDS Oracle (ETC ~10 -15 minutes)

<https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Appendix.Oracle.CommonDBATasks.Log.html>

### A) View/ Download Logs from AWS console

Name	Last written	Size
trace/alert_MYDB.log	Thu Nov 08 11:14:26 GMT-800 2018	66.6 kB

### Viewing Log: trace/alert\_MYDB.log (66.6 kB)

text:  background:

```

Thu Nov 08 00:00:02 2018
Thread 1 advanced to log sequence 2239 (LGWR switch)
Current log# 3 seq# 2239 mem# 0: /rdsdbdata/db/MYDB_A/onlinelog/o1_mf_3_fxss0nht_.log
Thu Nov 08 00:00:02 2018
Archived Log entry 643 added for thread 1 sequence 2238 ID 0xad389b8d dest 1:
Thu Nov 08 00:04:34 2018

```

### B) View logs using RDS PL/SQL packages

```
SQL>select message_text from ALERTLOG where rownum<=10 order by indx;
```

```
SQL> SELECT text FROM table(rdsadmin.rds_file_util.read_text_file('BDUMP','alert_MYDB.log'))  
where rownum<=10;
```

### C) Common DBA tasks for redo log, archive log and other logging.

1. Retaining Archived Log files, You can use the Amazon RDS procedure `rdsadmin.rdsadmin_util.show_configuration` to view how long archived redo logs are retained for your DB instance.

```
SQL> set serveroutput on  
SQL> exec rdsadmin.rdsadmin_util.show_configuration ;  
SQL> exec rdsadmin.rdsadmin_util.show_configuration;  
NAME:archivelog retention hours  
VALUE:24  
DESCRIPTION:ArchiveLog expiration specifies the duration in hours before  
archive/redo log files are automatically deleted.  
NAME:tracefile retention  
VALUE:10080  
DESCRIPTION:tracefile expiration specifies the duration in minutes before  
tracefiles in bdump are automatically deleted.  
PL/SQL procedure successfully completed.  
SQL> █
```

2. Setting the retention of Archive log retention, you can use the Amazon RDS procedure

`rdsadmin.rdsadmin_util.set_configuration` to retain archived redo logs. The below example set the archive retention to 48 hours.

```
SQL> begin  
rdsadmin.rdsadmin_util.set_configuration(  
name=> 'archivelog retention hours',  
value=> '48');  
end;  
/
```

```

SQL> begin
      rdsadmin.rdsadmin_util.set_configuration(
          name  => 'archivelog retention hours',
          value => '48');
    end;
/
2   3   4   5   6
1 rows updated

PL/SQL procedure successfully completed.

SQL> exec rdsadmin.rdsadmin_util.show_configuration;
NAME:archivelog retention hours
VALUE:48
DESCRIPTION:ArchiveLog expiration specifies the duration in hours before
archive/redo log files are automatically deleted.
NAME:tracefile retention
VALUE:10080
DESCRIPTION:tracefile expiration specifies the duration in minutes before
tracefiles in bdump are automatically deleted.

PL/SQL procedure successfully completed.

SQL>

```

3. Switching Online redo log file – you can use the Amazon RDS procedure `rdsadmin.rdsadmin_util.switch_logfile` to switch files.

Verify the current log sequence number in the database as shown below and then run the command to switch the log file and query the current log sequence number again

```

SQL> select sequence# from v$log where status='CURRENT';
SQL> exec rdsadmin.rdsadmin_util.switch_logfile;
SQL> select sequence# from v$log where status='CURRENT';

SQL> select sequence# from v$log where status='CURRENT';

SEQUENCE#
-----
2476

```

```
SQL> exec rdsadmin.rdsadmin_util.switch_logfile;
PL/SQL procedure successfully completed.

SQL> select sequence# from v$log where status='CURRENT';

SEQUENCE#
-----
2477

SQL>
```

#### 4. Working with Directory object and the files

You can use the Amazon RDS procedure rdsadmin.rdsadmin\_util.create\_directory to create directories. You can create up to 10,000 directories, all located in your main data storage space.

The following example creates a new directory named product\_descriptions:

```
SQL> exec rdsadmin.rdsadmin_util.create_directory(p_directory_name=>
'product_descriptions');
SQL> select directory_path from dbaDirectories where
directory_name='PRODUCT_DESCRIPTIONS';
```

```
SQL> exec rdsadmin.rdsadmin_util.create_directory(p_directory_name => 'product_descriptions');

PL/SQL procedure successfully completed.
```

```
SQL> select DIRECTORY_PATH
  from DBA_DIRECTORIES
 where DIRECTORY_NAME='PRODUCT_DESCRIPTIONS'; 2      3

DIRECTORY_PATH
-----
/rdsdbdata/userdirs/01

SQL>
```

Create a sample file in the newly created directory as shown below

```

SQL> DECLARE
  out_file UTL_FILE.FILE_TYPE;
BEGIN
  out_file := UTL_FILE.FOPEN('PRODUCT_DESCRIPTIONS','test.txt','W');
  UTL_FILE.PUT_LINE(out_file,'this is a text file');
  UTL_FILE.FCLOSE(out_file);
end;
/
SQL> select * from table
(rdsadmin.rds_file_util.listdir(p_directory => 'PRODUCT_DESCRIPTIONS'));

```

```

SQL> DECLARE
  out_File  UTL_FILE.FILE_TYPE;
BEGIN
  out_File := UTL_FILE.FOPEN('PRODUCT_DESCRIPTIONS', 'test.txt' , 'W');
  UTL_FILE.PUT_LINE(out_File , ' this is text file!');
  UTL_FILE.FCLOSE(out_File);
END; 2   3   4   5   6   7
8 /
PL/SQL procedure successfully completed.

```

### List the file created on the directory as show below

```

SQL> select * from table
(rdsadmin.rds_file_util.listdir(p_directory => 'PRODUCT_DESCRIPTIONS'));

```

```

SQL> select * from table
  (rdsadmin.rds_file_util.listdir(p_directory => 'PRODUCT_DESCRIPTIONS'));

FILENAME
-----
TYPE      FILESIZE MTIME
-----
01/
directory      4096 18-FEB-18
test.txt
file          20 18-FEB-18

```

### List the content of the file test.txt as shown below

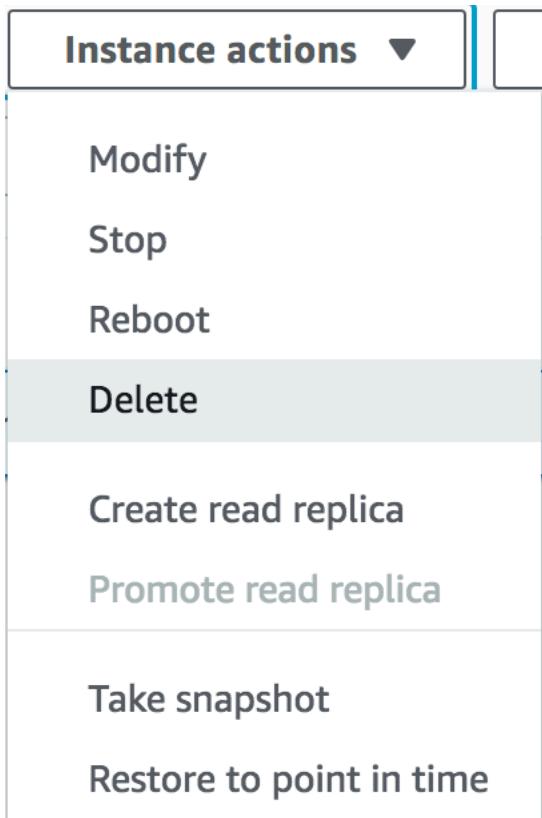
```
SQL> select * from table
  (rdsadmin.rds_file_util.read_text_file(
    p_directory => 'PRODUCT_DESCRIPTIONS',
    p_filename  => 'test.txt'));
```

```
SQL>  select * from table
  (rdsadmin.rds_file_util.read_text_file(
    p_directory => 'PRODUCT_DESCRIPTIONS',
    p_filename  => 'test.txt'));
 2      3      4
TEXT
-----
 this is text file!
```

## Lab 10: Cleaning up the RDS Oracle resources created for the labs (ETC ~5 minutes)

Make sure to delete all the instance and the manual snapshots created during the lab including the one created for Restore and Point-in-time recovery Instances. Please note that we are providing credits to all the attendees to cover the cost associated with creating all the AWS resources for the duration of this workshop only. Therefore, it is very important that all the resources created as a part of this workshop needs to be deleted at the end of the lab to avoid any additional cost associated with creating those resources.

1. Select your instance from the Instance tab
2. Click on the “Instance Actions” drop down on the right side and click “Delete”



1. Under the delete instance page

- Uncheck Create final snapshot
- Uncheck Retain automated backups
- Check the I acknowledge and enter phrase “delete me”
- Click “Delete”

## Delete reinventdb instance?

X

Are you sure you want to Delete the **reinventdb** DB Instance?

**Create final snapshot?**

Determines whether a final DB Snapshot is created before the DB instance is deleted.

**Retain automated backups**

Determines whether retaining automated backups for 2 days after deletion

**I acknowledge that upon instance deletion, automated backups, including system snapshots and point-in-time recovery, will no longer be available.**

To confirm deletion, type *delete me* into the field

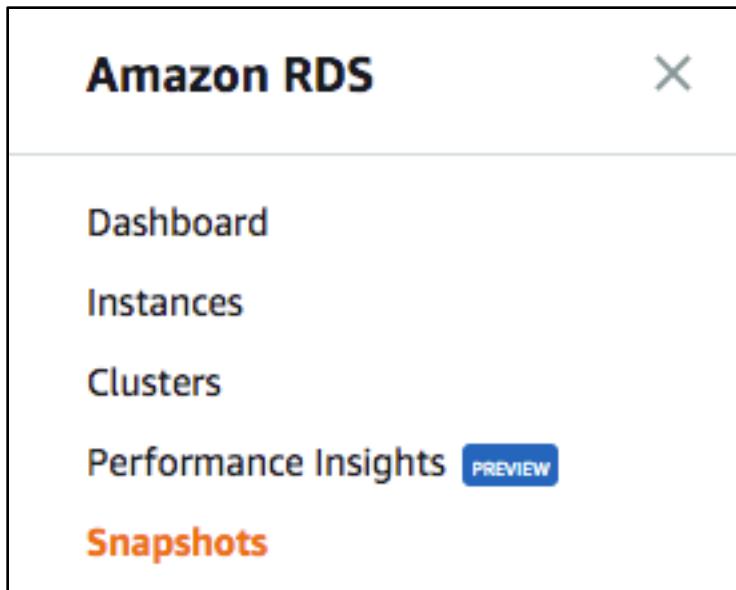
delete me



We strongly recommend taking a final snapshot before instance deletion since after your instance is deleted, automated backups will no longer be available.

**Delete**

2. Delete all the manual snapshot you have created for the Database  
On the RDS home page select “Snapshots” from the left-hand side

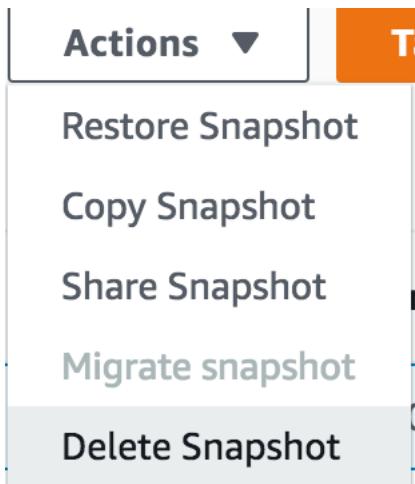


Select the manual snapshot you have created for the Database during this workshop

A screenshot of the AWS RDS "Snapshots" list. It shows a table with two columns: "Snapshot" and "DB instance or cluster". There is one row selected, indicated by a blue background. The snapshot name is "manualsnapmydb" and the DB instance is "reinventdb".

Snapshot	DB instance or cluster
manualsnapmydb	reinventdb

On the Actions tab select “Delete Snapshot” to delete the manual snapshot selected



## Upgrade Now?

X

Are you sure you want to delete these DB snapshots

- manualsnapmydb

Cancel

Delete

Click Delete

3. AWS Billing – check this to make sure you’re not surprised by your bill  
AWS Simple Monthly Calculator  
<https://calculator.s3.amazonaws.com/index.html>