Sriganesh Pera

Amazon Relational Database Service (Amazon RDS) is a fully-managed web service that makes it easier to set up, operate, and scale a relational database in the cloud.

It allows you to create and use MySQL,MariaDB, PostgreSQL,Oracle and MSSQL databases. This means the code, applications, and tools you already use today with your existing databases can be used with RDS.

**What do you mean by fully-managed?**

Things like infrastructure provisioning, software maintenance, and database admin tasks are taken care of AWS.

AWS RDS doesn't provide root access/shell access to the RDS instance. In short, RDS doesn't allow the user to access the underlying host operating system. That means, you cannot login to server OS.

Another limitation is that AWS doesn't provide option to stop RDS instance for a very long time unlike in EC2.An RDS instance for a single AZ can be stopped maximum 7 consecutive days. After 7 days that instance gets restarted.

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 MySQL, MariaDB, or PostgreSQL Read Replicas to increase read scaling.

**How to take backup:**

Just like in EBS you can take manual snapshots of RDS or You can have automated backups. If a manual snapshot is not taken before terminating RDS instance, it prompts you to take final snapshot. Once RDS DB instance is deleted, it cannot be recovered.

**Storage for RDS:**

Amazon RDS uses Amazon Elastic Block Store (Amazon EBS) volumes for database and log storage. The exception is Amazon Aurora, which uses AWS proprietary storage system. Depending on the amount of storage requested, Amazon RDS automatically stripes across multiple Amazon EBS volumes to enhance IOPS performance.

Amazon RDS provides three types of storage with a range of storage and performance options:

1. **General Purpose (SSD)**: General Purpose (SSD), also called gp2, volumes offer cost-effective storage that is ideal for a broad range of workloads. These volumes deliver single-digit millisecond latencies and the ability to burst to 3,000 IOPS for extended periods of time.

2. **Provisioned IOPS** : Provisioned IOPS storage is designed to meet the needs of I/O-intensive workloads, particularly database workloads, that are sensitive to storage performance and consistency in random access I/O throughput. You specify the amount of storage you want allocated, and then specify the amount of dedicated IOPS you want.

3. **Magnetic** – Amazon RDS also supports magnetic storage for backward compatibility.

**Charges for Amazon RDS:**

User is charged based on:

**1.Instance class :** Type of instance class(micro, Nano etc.)

**2.Running time :** billed by the instance-hour

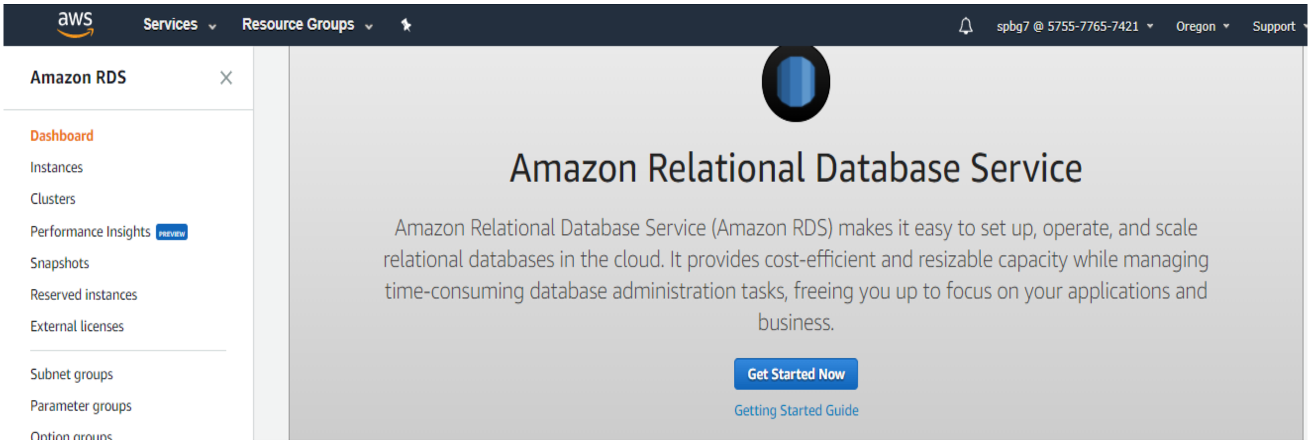
**3.Storage:** The storage capacity that you have provisioned to your DB instance is billed per GB per month.

**4.I/O requests for month**: Total number of storage I/O requests that you have made in a billing cycle.

**5.Backup storage:** Backup storage is the storage that is associated with automated database backups and any active database snapshots that you have taken

Lab 1: Creating an RDS instance and connecting to the instance

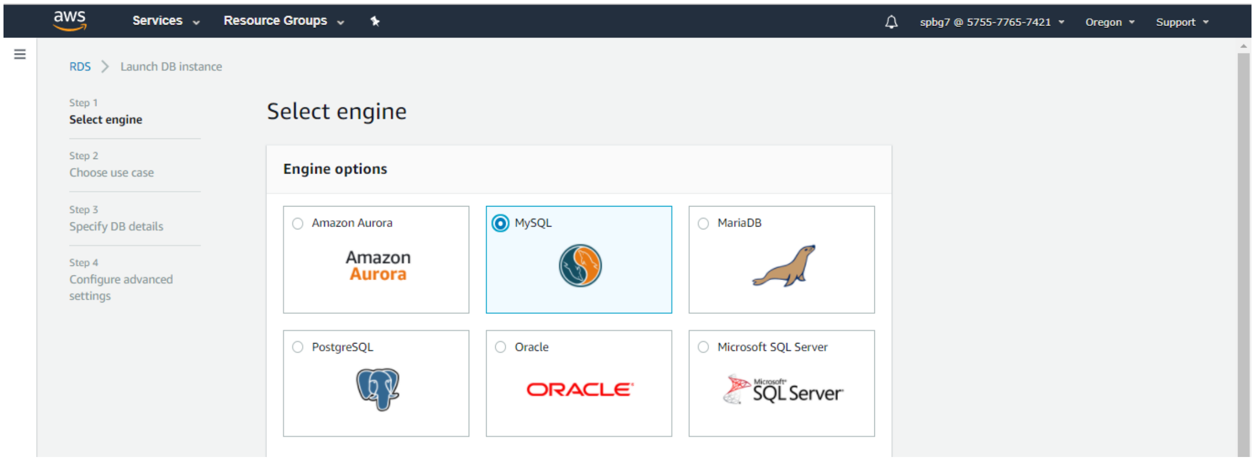
## Step 1: Click RDS on AWS management console and click on get started now



Amazon Relational Database Service

Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale relational databases 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.

## Step 2: Select the engine as MySQL

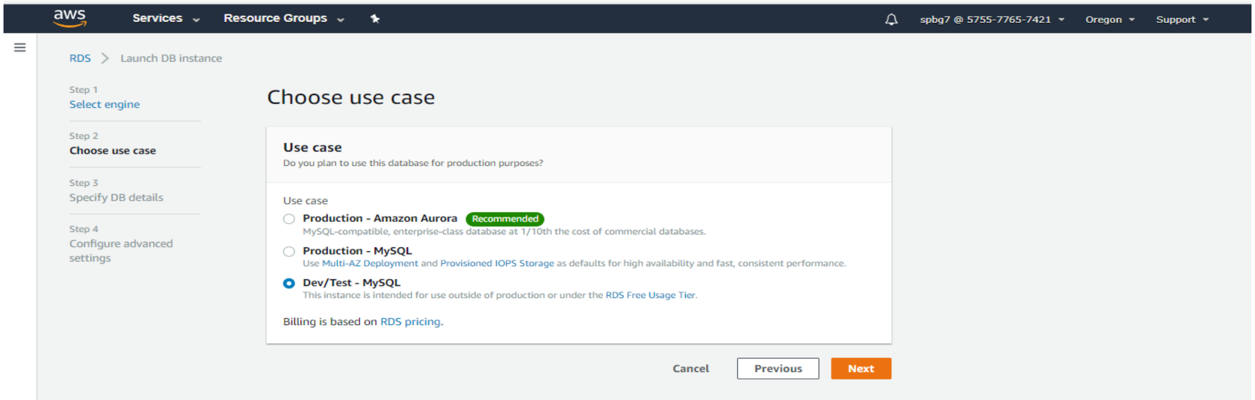


Select engine

Engine options

○ Amazon Aurora ● MySQL ○ MariaDB ○ PostgreSQL ○ Oracle ○ Microsoft SQL Server

## Step 3: Select dev/test and click next



Choose use case

**Use case**
Do you plan to use this database for production purposes?

Use case

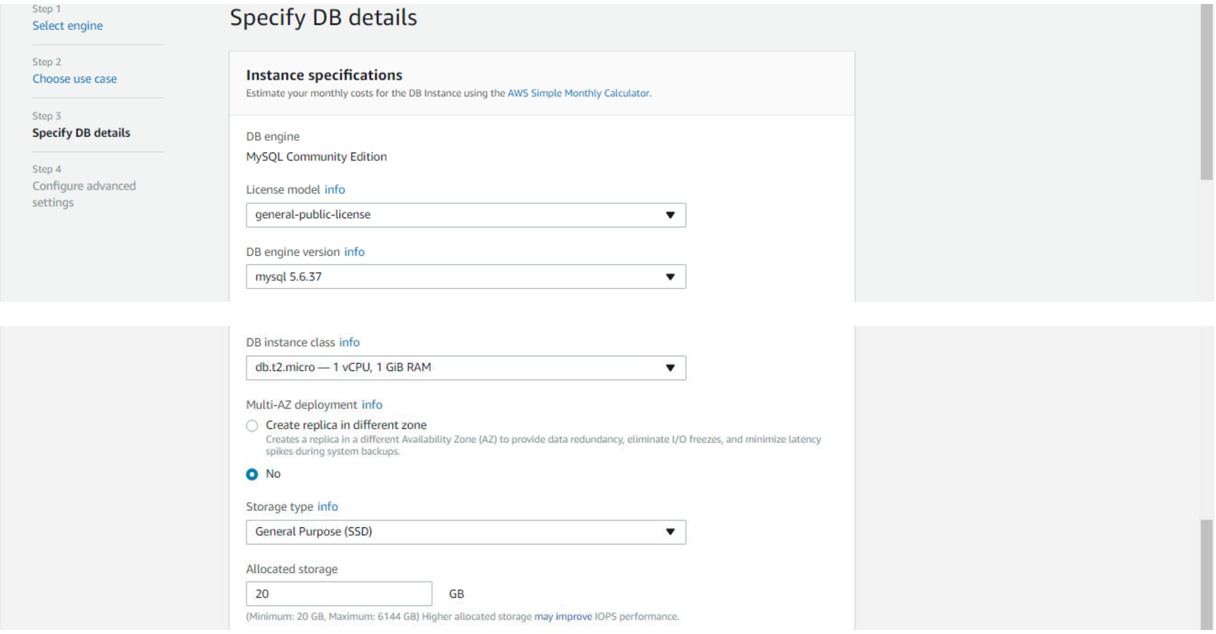
○ **Production - Amazon Aurora** Recommended
MySQL-compatible, enterprise-class database at 1/10th the cost of commercial databases.

○ **Production - MySQL**
Use Multi-AZ Deployment and Provisioned IOPS Storage as defaults for high availability and fast, consistent performance.

● **Dev/Test - MySQL**
This instance is intended for use outside of production or under the RDS Free Usage Tier.

Billing is based on RDS pricing.

## Step 4: Specify DB instance details as shown:



Specify DB details

**Instance specifications**
Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator.

DB engine
MySQL Community Edition

License model info
general-public-license

DB engine version info
mysql 5.6.37

DB instance class info
db.t2.micro — 1 vCPU, 1 GiB RAM

Multi-AZ deployment info

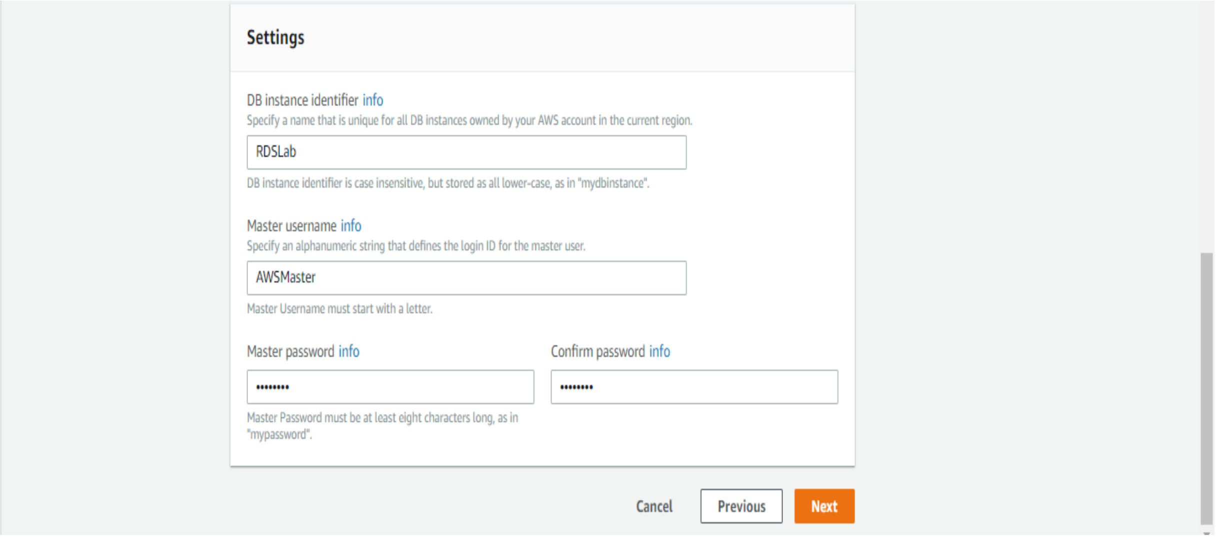
○ Create replica in different zone
Creates a replica in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.

● No

Storage type info
General Purpose (SSD)

Allocated storage
20 GB
(Minimum: 20 GB, Maximum: 6144 GB) Higher allocated storage may improve IOPS performance.

In the Master username and Password provide your own username and password



### Settings

DB instance identifier info

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

RDSLab

DB instance identifier is case insensitive, but stored as all lower-case, as in "mydbinstance".

Master username info

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

AWSMaster

Master Username must start with a letter.

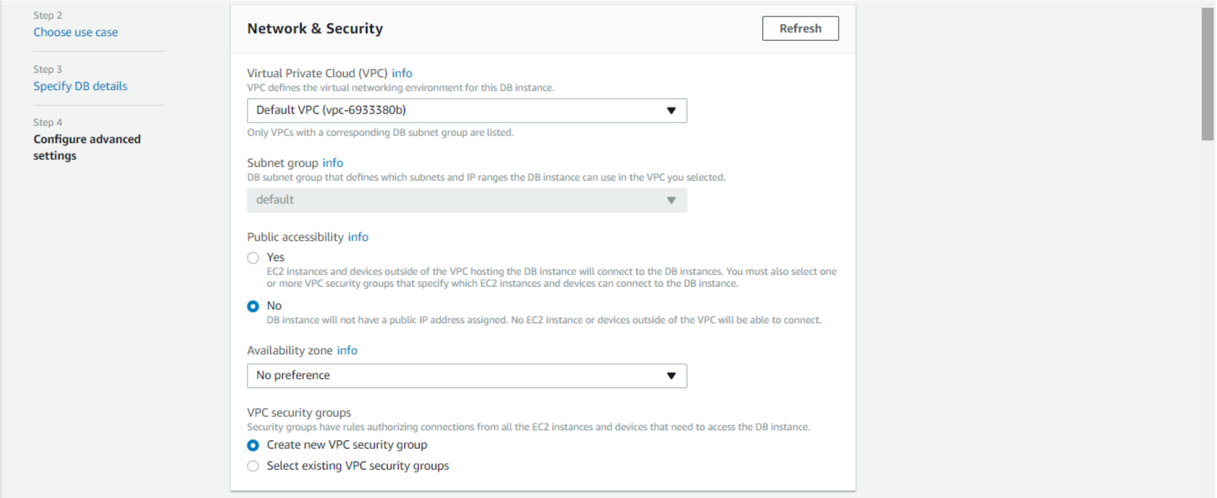
Master password info: ••••••••

Confirm password info: ••••••••

Master Password must be at least eight characters long, as in "mypassword".

Now click Next.

## Step 5: Configure advanced settings. Set the details as shown in the pics:



### Network & Security

Virtual Private Cloud (VPC) info

VPC defines the virtual networking environment for this DB instance.

Default VPC (vpc-6933380b) ▼

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

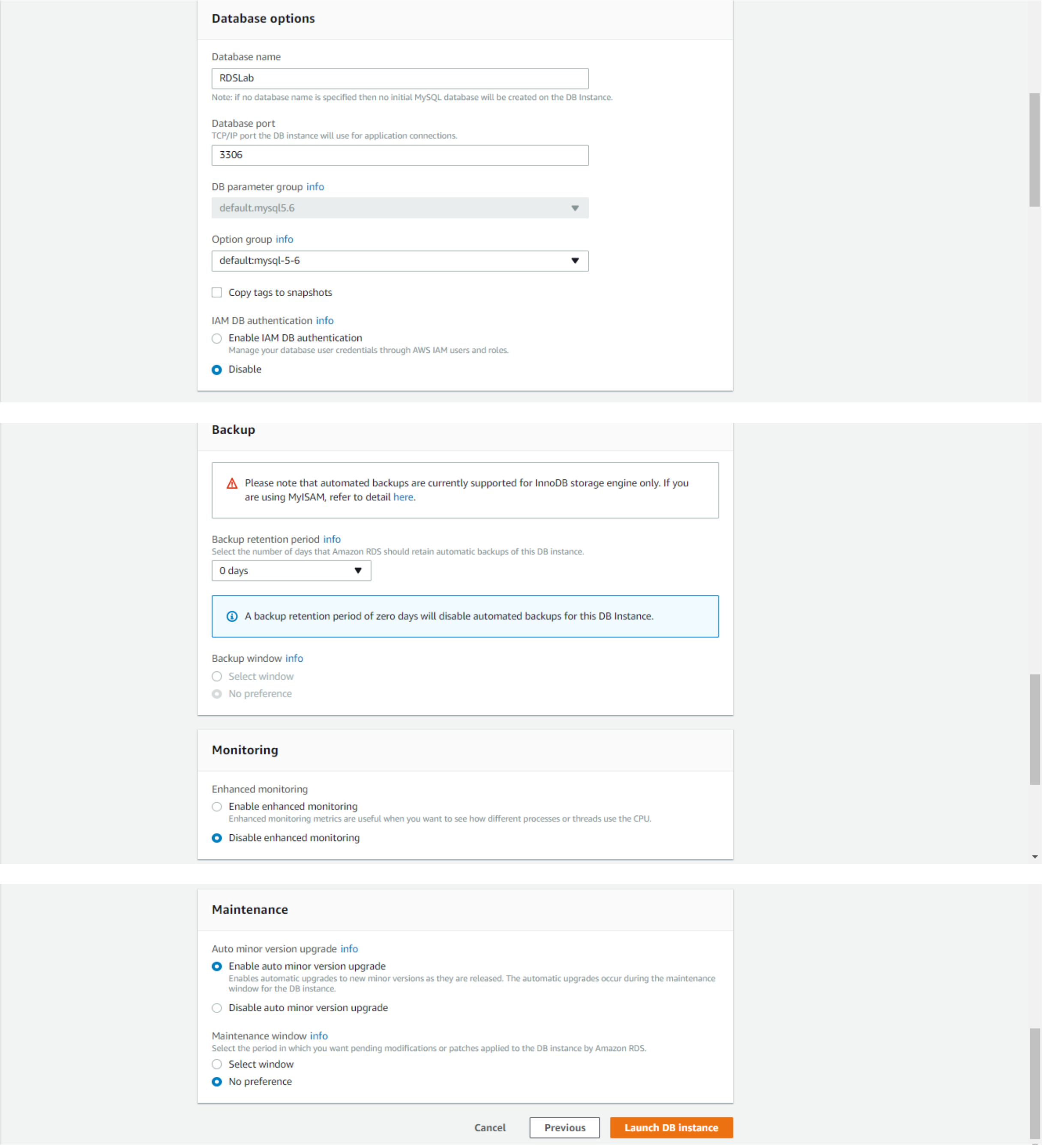
No preference ▼

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

RDSLab

Note: if no database name is specified then no initial MySQL database will be created on the DB Instance.

Database port

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

3306

DB parameter group info

default.mysql5.6

Option group info

default:mysql-5-6

□ Copy tags to snapshots

IAM DB authentication info

○ Enable IAM DB authentication

Manage your database user credentials through AWS IAM users and roles.

● Disable

**Backup**

⚠ Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to detail here.

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

**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.

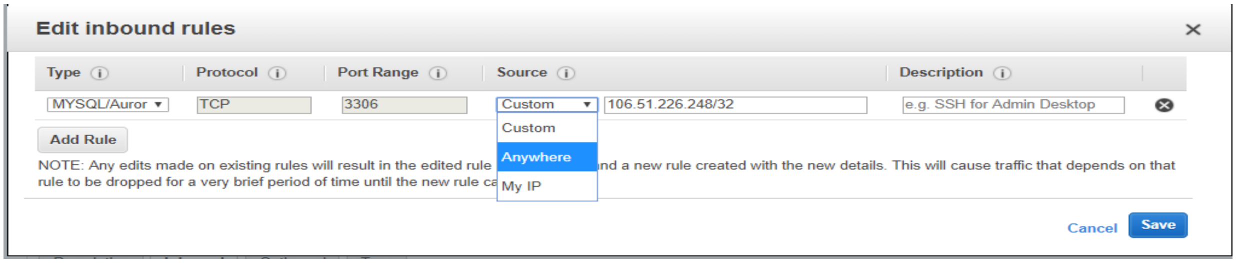
○ Select window

● No preference

Now click on Launch DB instance

## Step 6: Edit RDS security groups and launch an EC2 instance

Now go to EC2 dashboard and click on security groups, You'll notice RDS security group is created. Now edit the inbound rules and change the source to anywhere and click save.

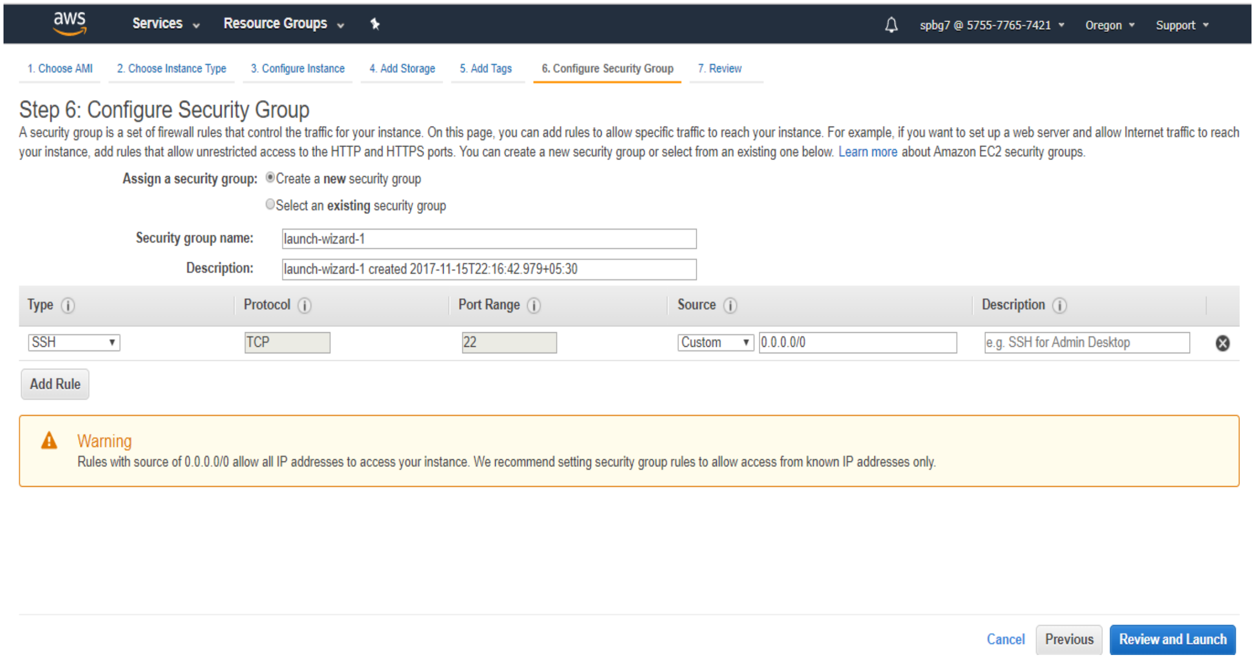


Edit inbound rules ×

| Type | Protocol | Port Range | Source | | Description |
|---|---|---|---|---|---|
| MYSQL/Auror ▾ | TCP | 3306 | Custom ▾ | 106.51.226.248/32 | e.g. SSH for Admin Desktop |

NOTE: Any edits made on existing rules will result in the edited rule nd a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule ca

Now create an EC2 t2.micro instance and in the security group just keep this setting only for SSH and then launch the instance.



Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. Learn more about Amazon EC2 security groups.

Assign a security group: ● Create a **new** security group

○ Select an **existing** security group

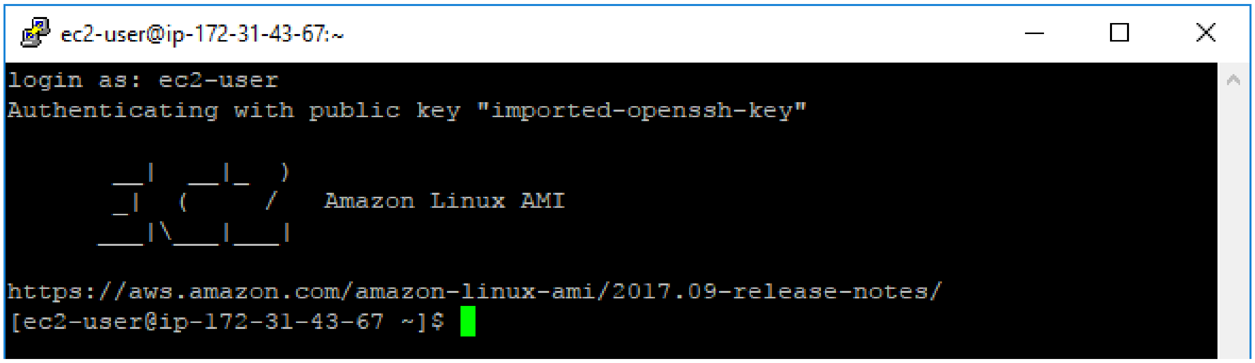
Security group name: launch-wizard-1

Description: launch-wizard-1 created 2017-11-15T22:16:42.979+05:30

| Type | Protocol | Port Range | Source | | Description |
|---|---|---|---|---|---|
| SSH ▾ | TCP | 22 | Custom ▾ | 0.0.0.0/0 | e.g. SSH for Admin Desktop |

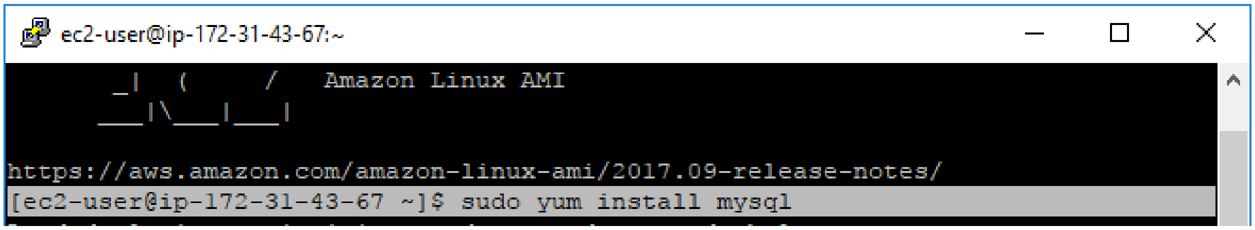
Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

## Step 7: Connect to your instance and then connect to RDS instance



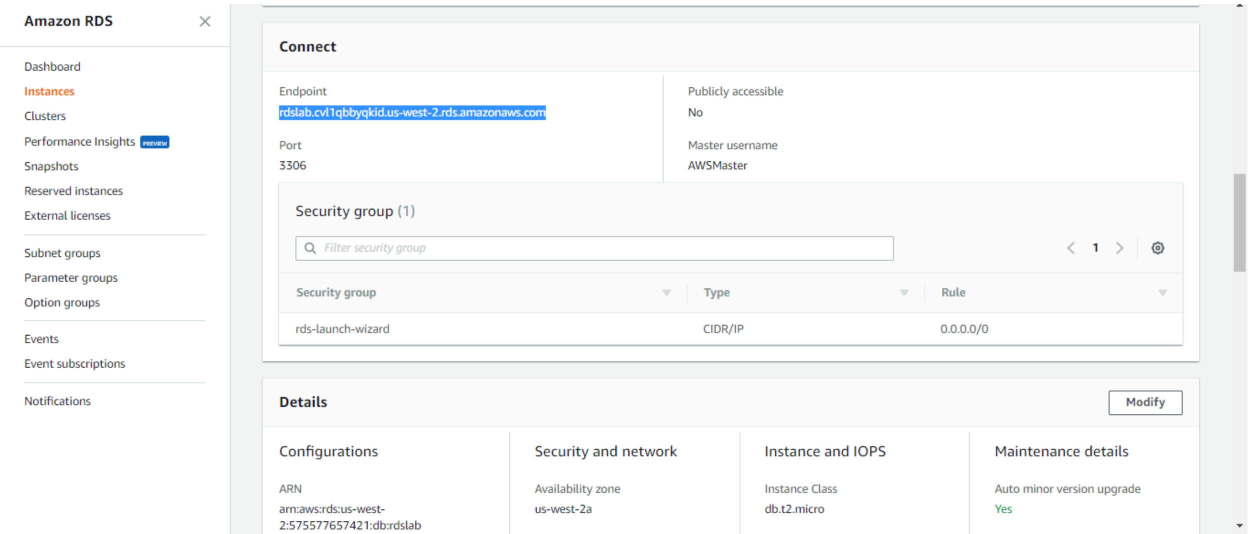
```
login as: ec2-user
Authenticating with public key "imported-openssh-key"

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2017.09-release-notes/
[ec2-user@ip-172-31-43-67 ~]$
```

Now Install mysql on your EC2 instance



```
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2017.09-release-notes/
[ec2-user@ip-172-31-43-67 ~]$ sudo yum install mysql
```

Now return to RDS dashboard and select the RDS instance and **copy its endpoint**



Connect

Endpoint
rdslab.cvl1qbbyqkid.us-west-2.rds.amazonaws.com

Port
3306

Publicly accessible
No

Master username
AWSMaster

Security group (1)

| Security group | Type | Rule |
|---|---|---|
| rds-launch-wizard | CIDR/IP | 0.0.0.0/0 |

Details

Configurations

ARN
arn:aws:rds:us-west-2:575577657421:db:rdslab

Security and network

Availability zone
us-west-2a

Instance and IOPS

Instance Class
db.t2.micro

Maintenance details

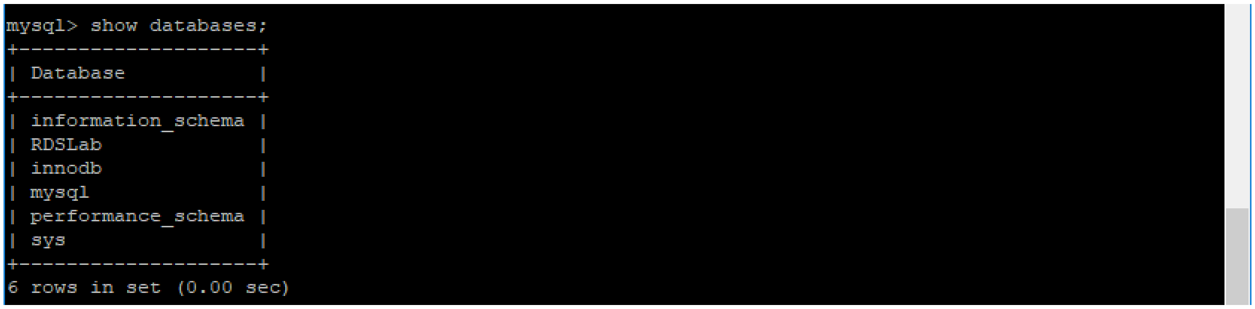
Auto minor version upgrade
Yes

Now switch back to your terminal console and enter the following command

```
    mysql --host endpoint-url --password –user
```

in the above command replace the endpoint-url with RDS endpoint and click enter. Then, you’re prompted for password and enter it based on what you’ve set.Remove the port number that comes after the endpoint

Now you’re logged into MYSQL console. Execute the following command to verify whether any records return:



```
mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| RDSLab             |
| innodb             |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
6 rows in set (0.00 sec)
```

**<u>You’ve successfully connected to your database.</u>**

## RDS Components:

### DB instances:

A DB instance is an isolated database environment running in the cloud. Each DB instance runs a DB engine. Amazon RDS currently supports the MySQL, MariaDB, PostgreSQL, Oracle, and Microsoft SQL Server DB engines.

The computation and memory capacity of a DB instance is determined by its DB instance class.(types of DB instances just like EC2 instances:t2,micro,t2.nano etc)

Each RDS engine can create an instance with at least one database in it. Each instance can have multiple user-created databases. Those databases are called DB instance identifier.

You can have up to 40 Amazon RDS DB instances. Of these 40, up to 10 can be Oracle or SQL ServerDB instances under the "License Included" model. All 40 DB instances can be used for MySQL, MariaDB,or PostgreSQL. You can also have 40 DB instances for SQL Server or Oracle under the "BYOL" licensing model

Each DB engine has its own version. The parameters of DB engine is configured using DB Parameter groups. One DB parameter group can be shared among the same instance types of the same DB engine and version.

Amazon RDS creates a master user account for your DB instance as part of the creation process. This master user has permissions to create databases and to perform create, delete, select, update, and insert operations on tables the master user creates. You must set the master user password when you create a DB instance, but you can change it at any time using the Amazon AWS command line tools, Amazon RDS API actions, or the AWS Management Console. You can also change the master user password and manage users using standard SQL commands.

Each DB instance can store data a minimum of 5GB and a maximum of 6TB.The only exception is Microsoft SQL server which supports up to 4 TB.

## Regions and Availability Zones:

An RDS DB instance can be provisioned in several AZs by selecting Multi-AZ deployment option. When this option is selected, Amazon automatically provisions and maintains a synchronous **standby replica** of the DB instance in a different Availability Zone.

It is advisable to create RDS in multiple AZs for avoiding single points of failures.

Amazon RDS uses several different technologies to provide failover support.

MultiAZdeployments for Oracle, PostgreSQL, MySQL, and MariaDB DB instances use Amazon's **failover technology.**

SQL Server DB instances use **SQL Server Mirroring**.

Amazon Aurora instances stores copies of the data in a DB cluster across multiple Availability Zones in a **single AWS Region**(regardless of whether the instances in the DB cluster span multiple Availability Zones).

RDS synchronized DBs between **primary and secondary instances**. In case a primary instance fails, the load is automatically shifted to a **secondary instance**. In the event of a planned or unplanned outage of your DB instance, Amazon RDS automatically switches to standby replica(secondary instance)**.**

The failover mechanism automatically changes the DNS record of the DB instance to point to the standby DB instance.

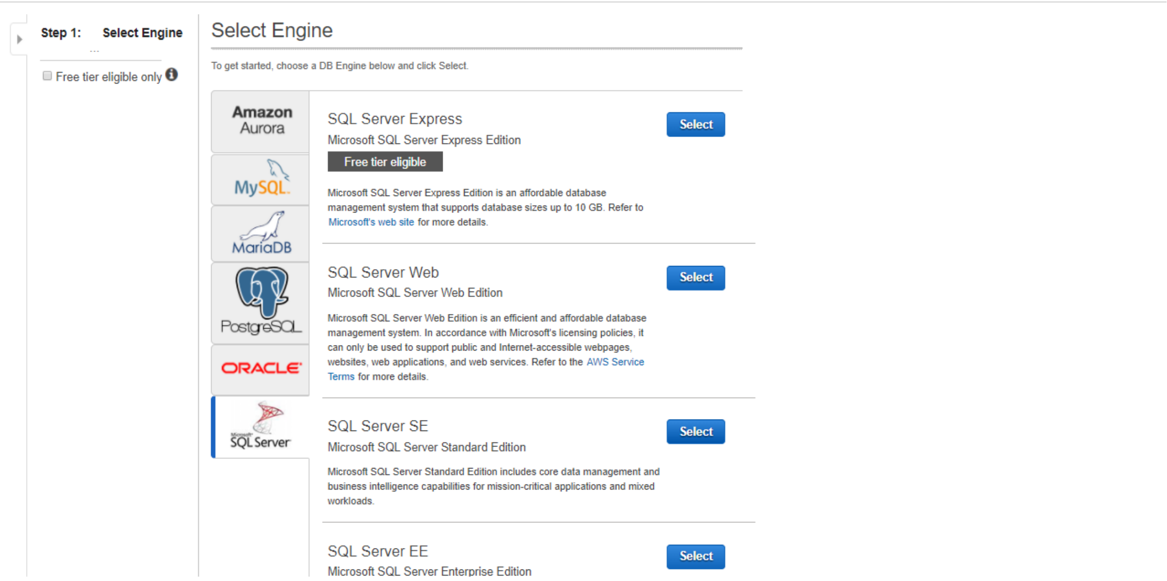
## Read Replica:

## Working with PostgreSQL, MySQL, and MariaDB Read Replicas

Amazon RDS uses the MySQL, MariaDB, and PostgreSQL (version 9.3.5 and later) DB engines' built-in replication functionality to create a special type of DB instance called a Read Replica from a source DB instance. Updates made to the source DB instance are asynchronously copied to the Read Replica. You can reduce the load on your source DB instance by routing read queries from your applications to the Read Replica.

# Lab 2: Migrate a stand-alone database to cloud

## Step 1: Go to RDS service in AWS console and Select SQL server SE



Select Engine

To get started, choose a DB Engine below and click Select.

SQL Server Express

Microsoft SQL Server Express Edition

Free tier eligible

Microsoft SQL Server Express Edition is an affordable database management system that supports database sizes up to 10 GB. Refer to Microsoft's web site for more details.

SQL Server Web

Microsoft SQL Server Web Edition

Microsoft SQL Server Web Edition is an efficient and affordable database management system. In accordance with Microsoft's licensing policies, it can only be used to support public and Internet-accessible webpages, websites, web applications, and web services. Refer to the AWS Service Terms for more details.

SQL Server SE

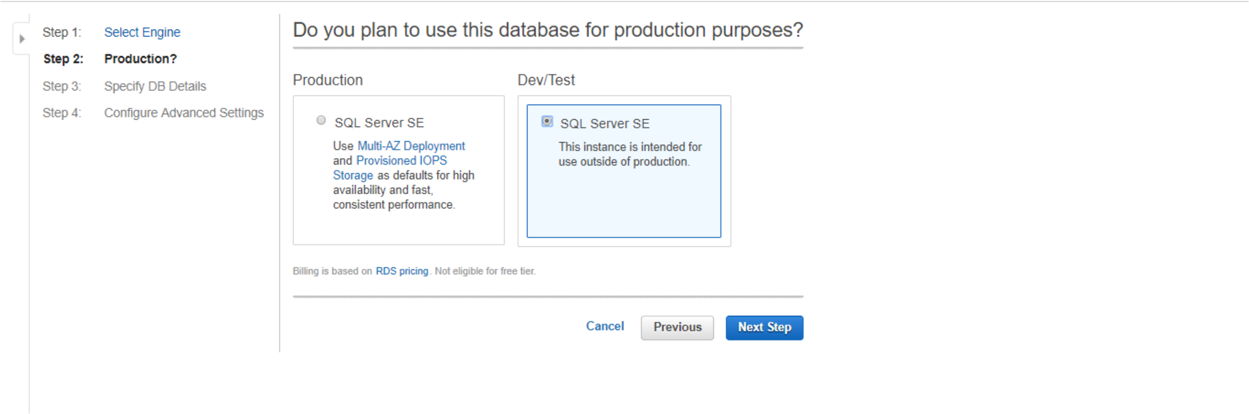
Microsoft SQL Server Standard Edition

Microsoft SQL Server Standard Edition includes core data management and business intelligence capabilities for mission-critical applications and mixed workloads.

SQL Server EE

Microsoft SQL Server Enterprise Edition

## Step 2: Select Dev/Test and click Next step



Do you plan to use this database for production purposes?

Production

○ SQL Server SE

Use Multi-AZ Deployment and Provisioned IOPS Storage as defaults for high availability and fast, consistent performance.

Dev/Test

● SQL Server SE

This instance is intended for use outside of production.

Billing is based on RDS pricing. Not eligible for free tier.

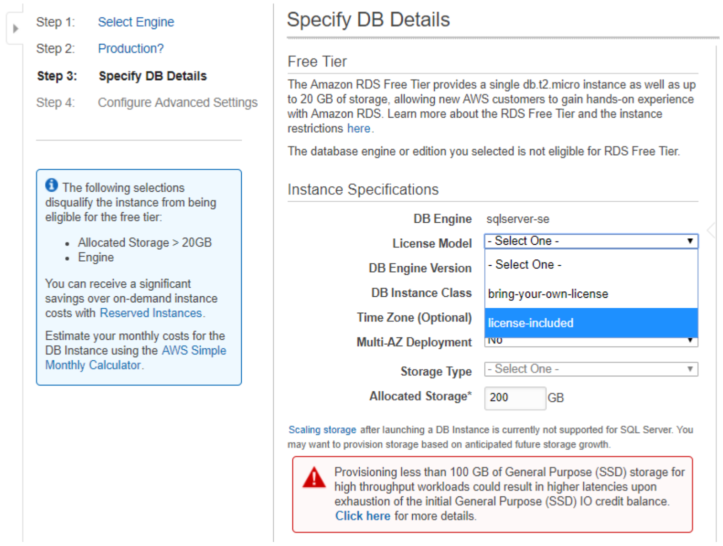
## Step 3: Select

License model :'License included'

DB engine version: SQL server 2014

DB instance class: m3.large

And for settings provide you own username and password


Step 1: Select Engine
Step 2: Production?
Step 3: Specify DB Details
Step 4: Configure Advanced Settings

The following selections disqualify the instance from being eligible for the free tier:

- Allocated Storage > 20GB
- Engine

You can receive a significant savings over on-demand instance costs with Reserved Instances.

Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator.

Specify DB Details

Free Tier

The Amazon RDS Free Tier provides a single db.t2.micro instance as well as up to 20 GB 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.

The database engine or edition you selected is not eligible for RDS Free Tier.

Instance Specifications

DB Engine: sqlserver-se

License Model: - Select One -

DB Engine Version

DB Instance Class

Time Zone (Optional)

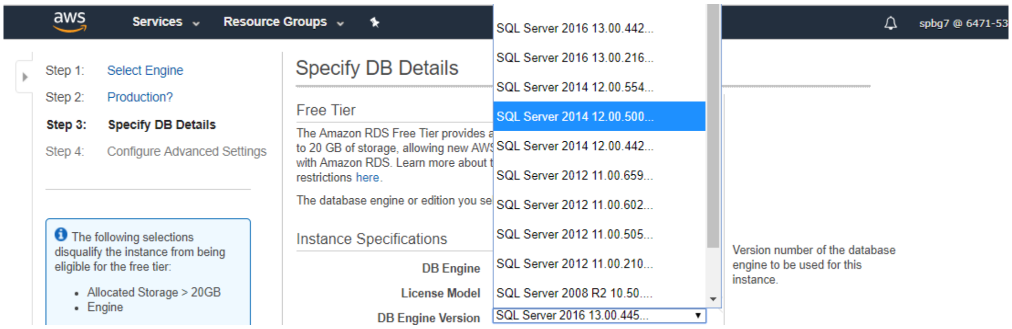
Multi-AZ Deployment: No

Storage Type: - Select One -

Allocated Storage*: 200 GB

Scaling storage after launching a DB Instance is currently not supported for SQL Server. You may want to provision storage based on anticipated future storage growth.

Provisioning less than 100 GB 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.



The following selections disqualify the instance from being eligible for the free tier:

- Allocated Storage > 20GB
- Engine

Specify DB Details

Free Tier

The Amazon RDS Free Tier provides a
to 20 GB of storage, allowing new AWS
with Amazon RDS. Learn more about t
restrictions here.

The database engine or edition you se

Instance Specifications

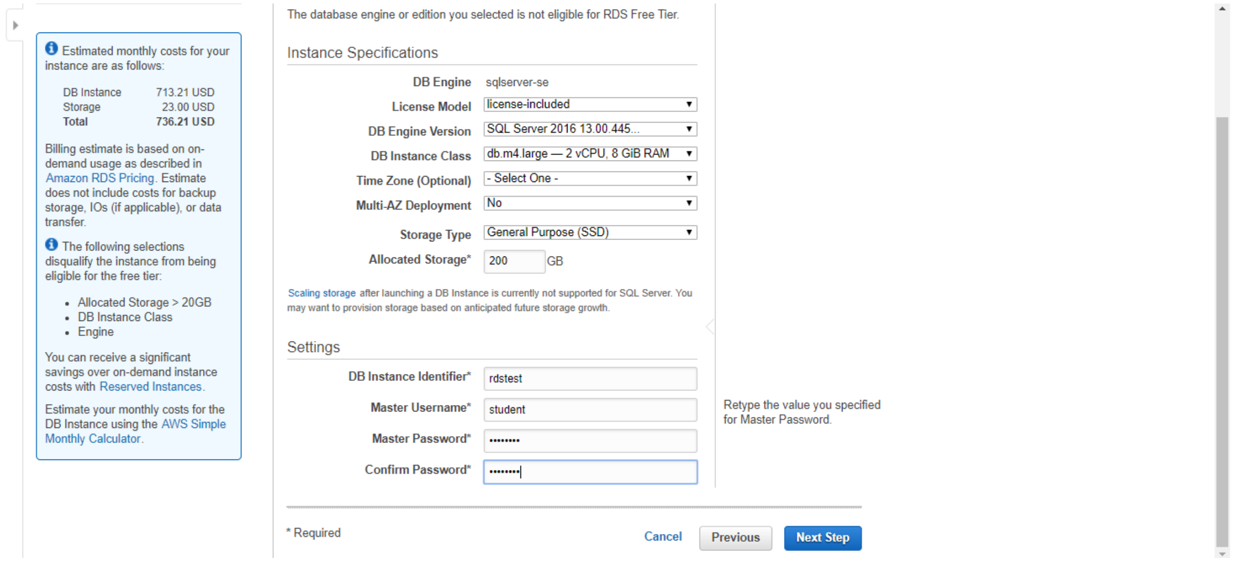
DB Engine

License Model

DB Engine Version: SQL Server 2016 13.00.445...

SQL Server 2016 13.00.442...
SQL Server 2016 13.00.216...
SQL Server 2014 12.00.554...
SQL Server 2014 12.00.500...
SQL Server 2014 12.00.442...
SQL Server 2012 11.00.659...
SQL Server 2012 11.00.602...
SQL Server 2012 11.00.505...
SQL Server 2012 11.00.210...
SQL Server 2008 R2 10.50....

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



Estimated monthly costs for your instance are as follows:

| | |
|---|---|
| DB Instance | 713.21 USD |
| Storage | 23.00 USD |
| **Total** | **736.21 USD** |

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.

The following selections disqualify the instance from being eligible for the free tier:

- Allocated Storage > 20GB
- DB Instance Class
- Engine

You can receive a significant savings over on-demand instance costs with Reserved Instances.

Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator.

The database engine or edition you selected is not eligible for RDS Free Tier.

Instance Specifications

| | |
|---|---|
| DB Engine | sqlserver-se |
| License Model | license-included |
| DB Engine Version | SQL Server 2016 13.00.445... |
| DB Instance Class | db.m4.large — 2 vCPU, 8 GiB RAM |
| Time Zone (Optional) | - Select One - |
| Multi-AZ Deployment | No |
| Storage Type | General Purpose (SSD) |
| Allocated Storage* | 200 GB |

Scaling storage after launching a DB Instance is currently not supported for SQL Server. You may want to provision storage based on anticipated future storage growth.

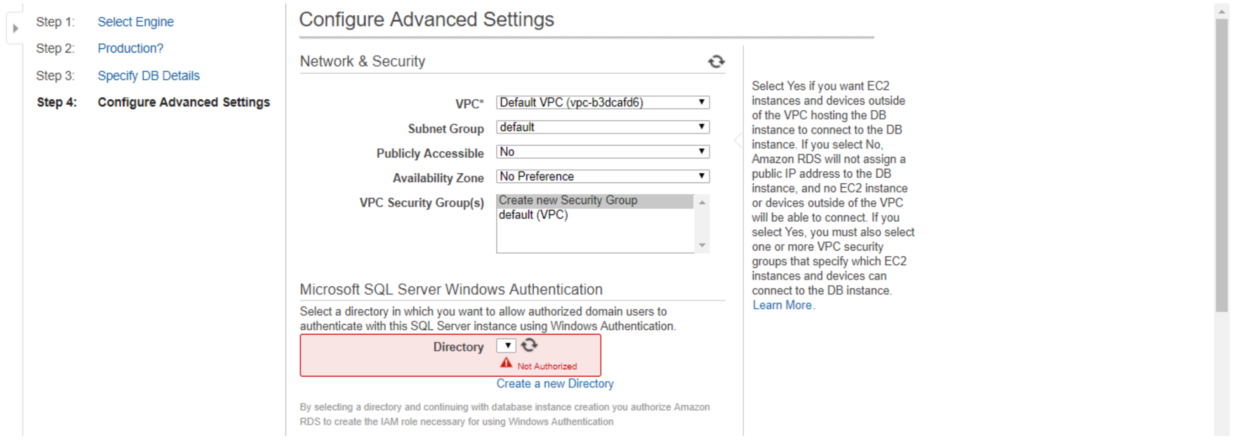
Settings

| | |
|---|---|
| DB Instance Identifier* | rdstest |
| Master Username* | student |
| Master Password* | •••••••• |
| Confirm Password* | •••••••• |

Retype the value you specified for Master Password.

* Required

## Step 4: In configure advance details Select default VPC and for security group select 'Create your own security group' and keep the remaining options default and click 'Launch DB instance'



Step 1: Select Engine
Step 2: Production?
Step 3: Specify DB Details
Step 4: Configure Advanced Settings

Configure Advanced Settings

Network & Security

| | |
|---|---|
| VPC* | Default VPC (vpc-b3dcafd6) |
| Subnet Group | default |
| Publicly Accessible | No |
| Availability Zone | No Preference |
| VPC Security Group(s) | Create new Security Group<br>default (VPC) |

Select Yes if you want EC2 instances and devices outside of the VPC hosting the DB instance to connect to the DB instance. If you select No, Amazon RDS will not assign a public IP address to the DB instance, and no EC2 instance or devices outside of the VPC will be able to connect. If you select Yes, you must also select one or more VPC security groups that specify which EC2 instances and devices can connect to the DB instance. Learn More.

Microsoft SQL Server Windows Authentication

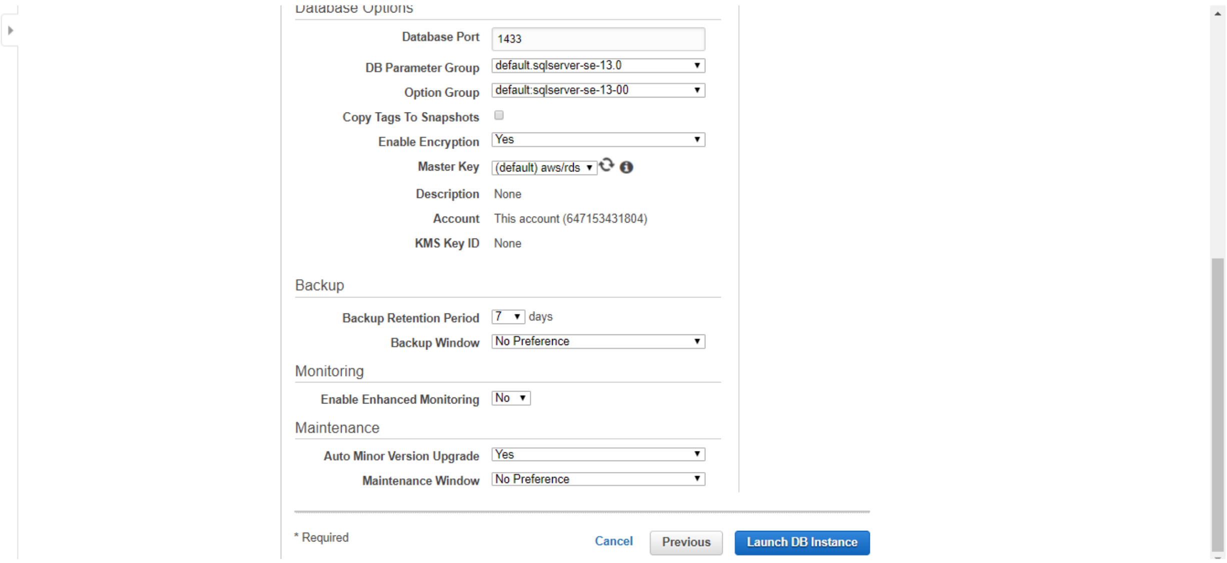
Select a directory in which you want to allow authorized domain users to authenticate with this SQL Server instance using Windows Authentication.

Directory

Not Authorized

Create a new Directory

By selecting a directory and continuing with database instance creation you authorize Amazon RDS to create the IAM role necessary for using Windows Authentication



Database Options

Database Port: 1433

DB Parameter Group: default.sqlserver-se-13.0

Option Group: default:sqlserver-se-13-00

Copy Tags To Snapshots: □

Enable Encryption: Yes

Master Key: (default) aws/rds

Description: None

Account: This account (647153431804)

KMS Key ID: None

Backup

Backup Retention Period: 7 days

Backup Window: No Preference

Monitoring

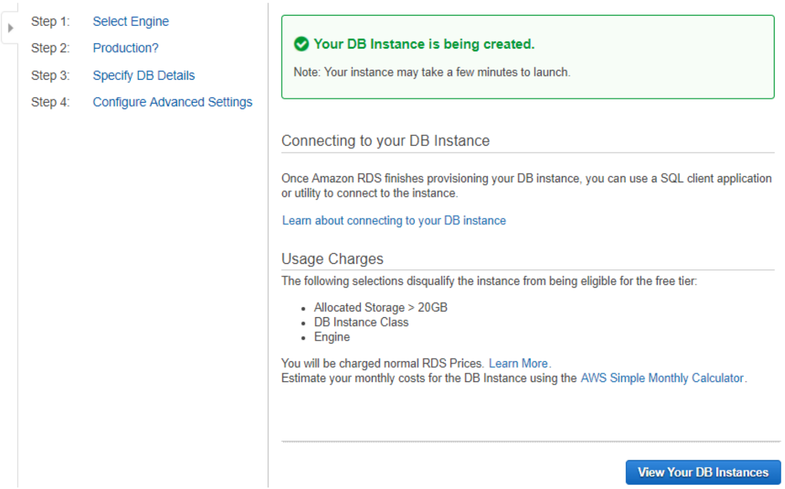
Enable Enhanced Monitoring: No

Maintenance

Auto Minor Version Upgrade: Yes

Maintenance Window: No Preference

**You can see your DB instance getting created. It will take a while before it is up**



Step 1: Select Engine
Step 2: Production?
Step 3: Specify DB Details
Step 4: Configure Advanced Settings

Your DB Instance is being created.

Note: Your instance may take a few minutes to launch.

Connecting to your DB Instance

Once Amazon RDS finishes provisioning your DB instance, you can use a SQL client application or utility to connect to the instance.

Learn about connecting to your DB instance

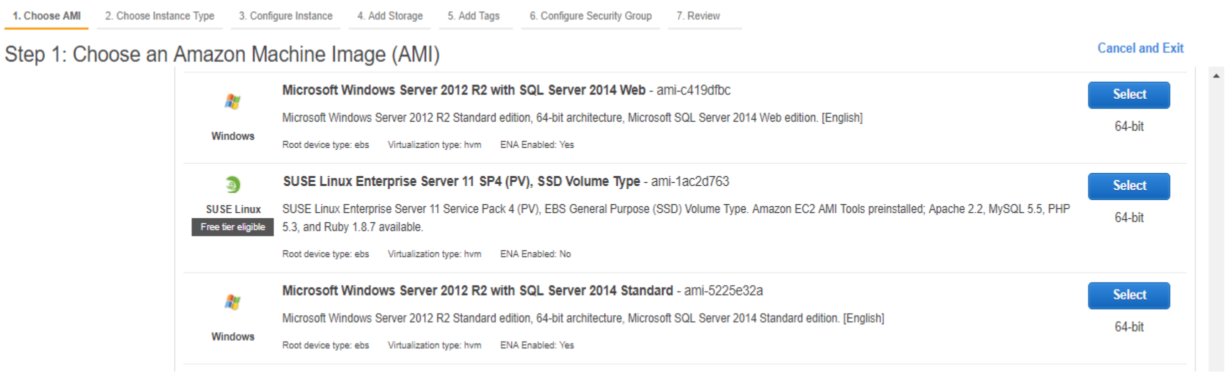
Usage Charges

The following selections disqualify the instance from being eligible for the free tier:

- Allocated Storage > 20GB
- DB Instance Class
- Engine

You will be charged normal RDS Prices. Learn More.
Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator.

## Step 5: Launch windows server: go to EC2 and click Launch instance and select Microsoft windows server 2012 R2 with SQL server 2014



Step 1: Choose an Amazon Machine Image (AMI)

Windows — **Microsoft Windows Server 2012 R2 with SQL Server 2014 Web** - ami-c419dfbc

Microsoft Windows Server 2012 R2 Standard edition, 64-bit architecture, Microsoft SQL Server 2014 Web edition. [English]

Root device type: ebs   Virtualization type: hvm   ENA Enabled: Yes

Select — 64-bit

SUSE Linux (Free tier eligible) — **SUSE Linux Enterprise Server 11 SP4 (PV), SSD Volume Type** - ami-1ac2d763

SUSE Linux Enterprise Server 11 Service Pack 4 (PV), EBS General Purpose (SSD) Volume Type. Amazon EC2 AMI Tools preinstalled; Apache 2.2, MySQL 5.5, PHP 5.3, and Ruby 1.8.7 available.

Root device type: ebs   Virtualization type: hvm   ENA Enabled: No

Select — 64-bit

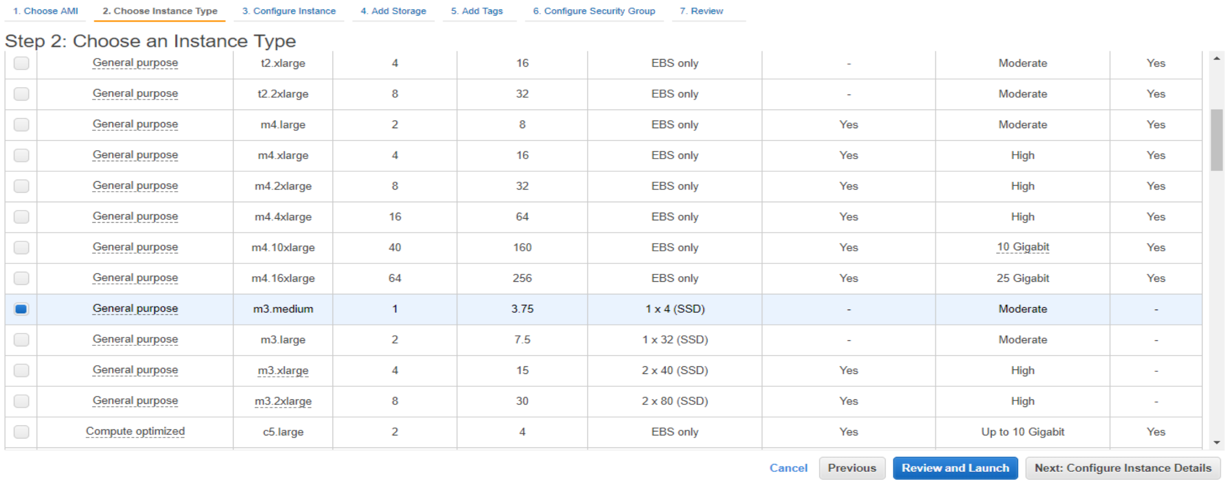
Windows — **Microsoft Windows Server 2012 R2 with SQL Server 2014 Standard** - ami-5225e32a

Microsoft Windows Server 2012 R2 Standard edition, 64-bit architecture, Microsoft SQL Server 2014 Standard edition. [English]

Root device type: ebs   Virtualization type: hvm   ENA Enabled: Yes

Select — 64-bit

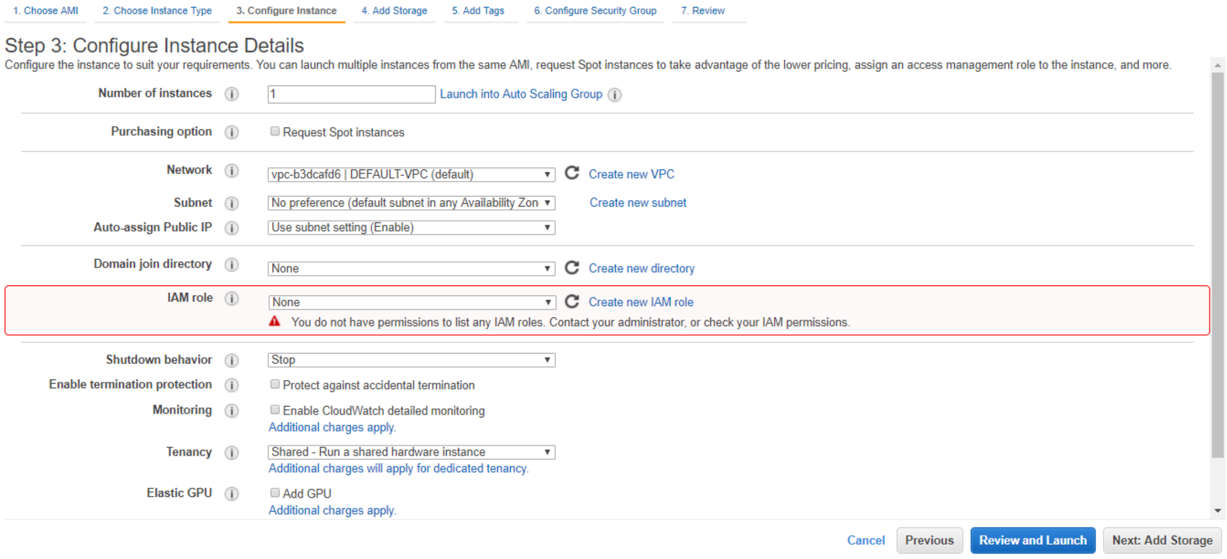
## Step 6: Chose the instance type as m3.medium and click Next



Step 2: Choose an Instance Type

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| □ | General purpose | t2.xlarge | 4 | 16 | EBS only | - | Moderate | Yes |
| □ | General purpose | t2.2xlarge | 8 | 32 | EBS only | - | Moderate | Yes |
| □ | General purpose | m4.large | 2 | 8 | EBS only | Yes | Moderate | Yes |
| □ | General purpose | m4.xlarge | 4 | 16 | EBS only | Yes | High | Yes |
| □ | General purpose | m4.2xlarge | 8 | 32 | EBS only | Yes | High | Yes |
| □ | General purpose | m4.4xlarge | 16 | 64 | EBS only | Yes | High | Yes |
| □ | General purpose | m4.10xlarge | 40 | 160 | EBS only | Yes | 10 Gigabit | Yes |
| □ | General purpose | m4.16xlarge | 64 | 256 | EBS only | Yes | 25 Gigabit | Yes |
| ■ | General purpose | m3.medium | 1 | 3.75 | 1 x 4 (SSD) | - | Moderate | - |
| □ | General purpose | m3.large | 2 | 7.5 | 1 x 32 (SSD) | - | Moderate | - |
| □ | General purpose | m3.xlarge | 4 | 15 | 2 x 40 (SSD) | Yes | High | - |
| □ | General purpose | m3.2xlarge | 8 | 30 | 2 x 80 (SSD) | Yes | High | - |
| □ | Compute optimized | c5.large | 2 | 4 | EBS only | Yes | Up to 10 Gigabit | Yes |

## Now  select Default VPC and keep the remaining settings as is and click 'Review and Launch'



Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances: 1 — Launch into Auto Scaling Group

Purchasing option: □ Request Spot instances

Network: vpc-b3dcafd6 | DEFAULT-VPC (default) — Create new VPC

Subnet: No preference (default subnet in any Availability Zon — Create new subnet

Auto-assign Public IP: Use subnet setting (Enable)

Domain join directory: None — Create new directory

IAM role: None — Create new IAM role

You do not have permissions to list any IAM roles. Contact your administrator, or check your IAM permissions.

Shutdown behavior: Stop

Enable termination protection: □ Protect against accidental termination

Monitoring: □ Enable CloudWatch detailed monitoring
Additional charges apply.

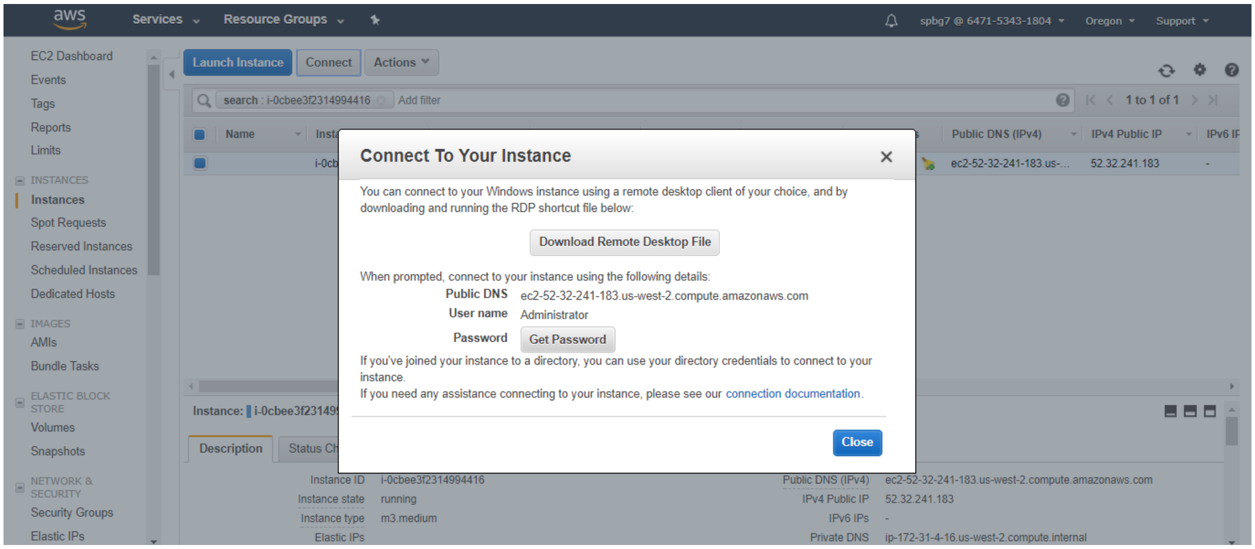
Tenancy: Shared - Run a shared hardware instance
Additional charges will apply for dedicated tenancy.

Elastic GPU: □ Add GPU
Additional charges apply.

Now it will take you to key pair. For this lab, you create new key pair,then click launch

Now we are going to Access RDS instance via Microsoft SQL management studio

## Step 7: Now click connect instance and click get password.



**Connect To Your Instance**

You can connect to your Windows instance using a remote desktop client of your choice, and by downloading and running the RDP shortcut file below:

Download Remote Desktop File

When prompted, connect to your instance using the following details:

| | |
|---|---|
| **Public DNS** | ec2-52-32-241-183.us-west-2.compute.amazonaws.com |
| **User name** | Administrator |
| **Password** | Get Password |

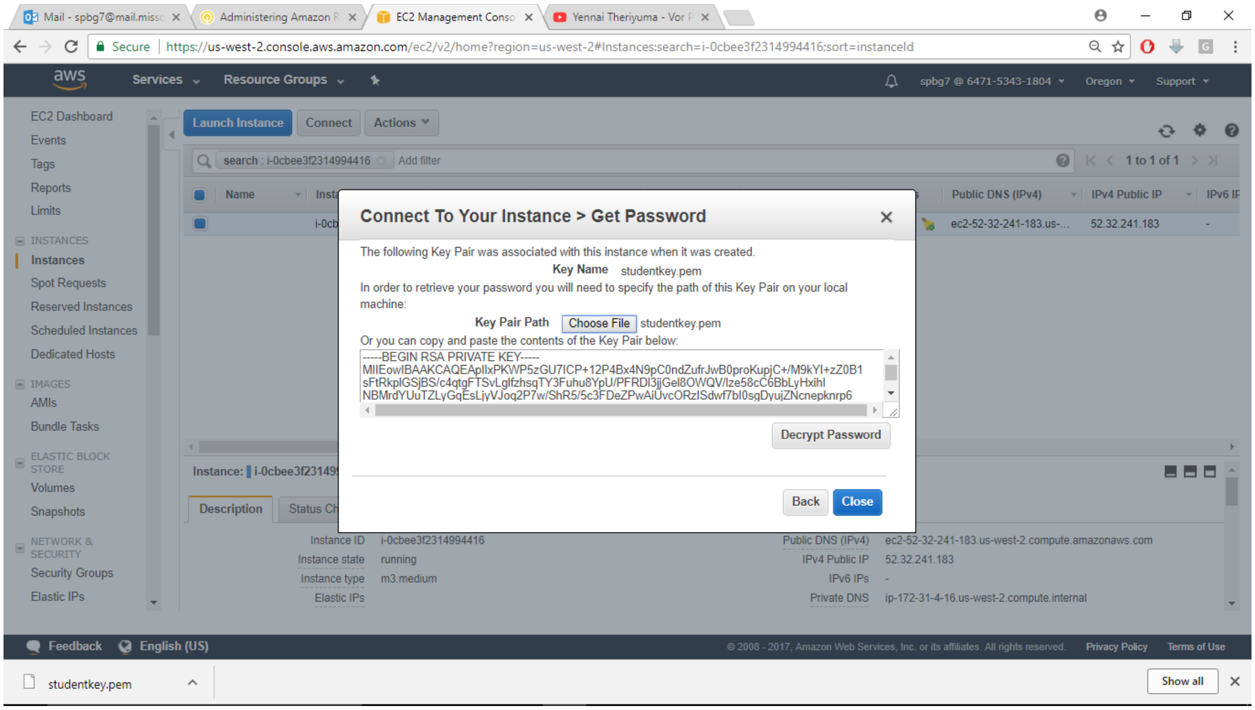
If you've joined your instance to a directory, you can use your directory credentials to connect to your instance.

If you need any assistance connecting to your instance, please see our connection documentation.

Close

| | | | |
|---|---|---|---|
| Instance ID | i-0cbee3f2314994416 | Public DNS (IPv4) | ec2-52-32-241-183.us-west-2.compute.amazonaws.com |
| Instance state | running | IPv4 Public IP | 52.32.241.183 |
| Instance type | m3.medium | IPv6 IPs | - |
| Elastic IPs | | Private DNS | ip-172-31-4-16.us-west-2.compute.internal |

**Now browse to your key file and provide the key path where you have downloaded your key and copy the RSA key and then click decrypt password**



https://us-west-2.console.aws.amazon.com/ec2/v2/home?region=us-west-2#Instances:search=i-0cbee3f2314994416;sort=instanceId

**Connect To Your Instance > Get Password**

The following Key Pair was associated with this instance when it was created.

**Key Name** studentkey.pem

In order to retrieve your password you will need to specify the path of this Key Pair on your local machine:

**Key Pair Path** Choose File studentkey.pem

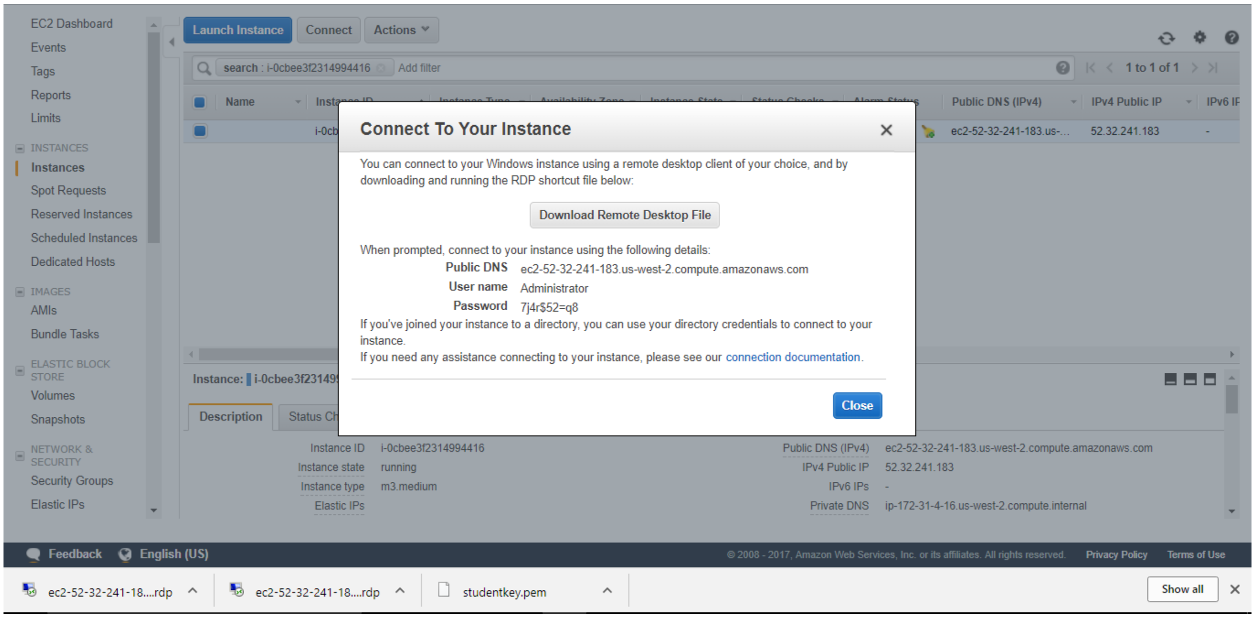
Or you can copy and paste the contents of the Key Pair below:

```
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEApIIxPKWP5zGU7ICP+12P4Bx4N9pC0ndZufrJwB0proKupjC+/M9kYI+zZ0B1
sFtRkplGSjBS/c4qtgFTSvLglfzhsqTY3Fuhu8YpU/PFRDI3jjGel8OWQV/Ize58cC6BbLyHxihl
NBMrdYUuTZLyGqEsLjyVJoq2P7w/ShR5/5c3FDeZPwAiUvcORzISdwf7bI0sgDyujZNcnepknrp6
```

Decrypt Password

Back Close

| | | | |
|---|---|---|---|
| Instance ID | i-0cbee3f2314994416 | Public DNS (IPv4) | ec2-52-32-241-183.us-west-2.compute.amazonaws.com |
| Instance state | running | IPv4 Public IP | 52.32.241.183 |
| Instance type | m3.medium | IPv6 IPs | - |
| Elastic IPs | | Private DNS | ip-172-31-4-16.us-west-2.compute.internal |



**Connect To Your Instance**

You can connect to your Windows instance using a remote desktop client of your choice, and by downloading and running the RDP shortcut file below:

Download Remote Desktop File

When prompted, connect to your instance using the following details:

| | |
|---|---|
| **Public DNS** | ec2-52-32-241-183.us-west-2.compute.amazonaws.com |
| **User name** | Administrator |
| **Password** | 7j4r$52=q8 |

If you've joined your instance to a directory, you can use your directory credentials to connect to your instance.

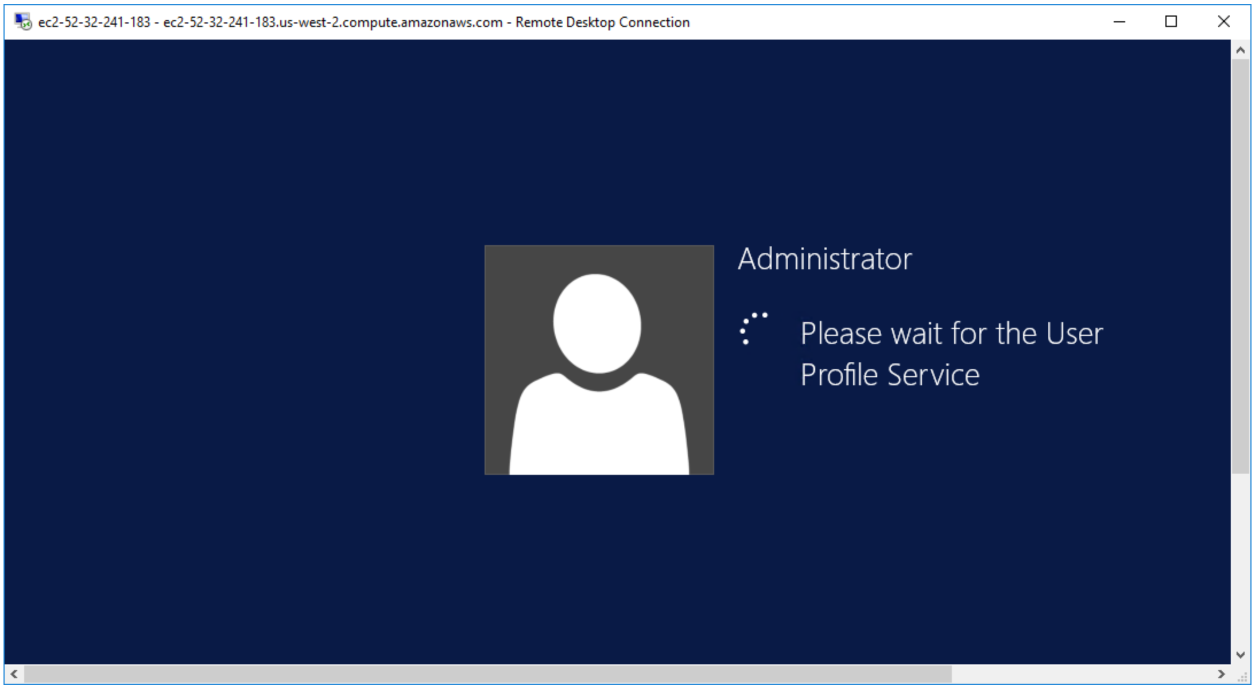
If you need any assistance connecting to your instance, please see our connection documentation.

Close

| | | | |
|---|---|---|---|
| Instance ID | i-0cbee3f2314994416 | Public DNS (IPv4) | ec2-52-32-241-183.us-west-2.compute.amazonaws.com |
| Instance state | running | IPv4 Public IP | 52.32.241.183 |
| Instance type | m3.medium | IPv6 IPs | - |
| Elastic IPs | | Private DNS | ip-172-31-4-16.us-west-2.compute.internal |

As you notice there's a Windows Remote Desktop File that is downloaded .You click on it and it asks for the password, just copy the password shown in the above screenshot and click yes for the certificate pop-up.

Now you will be logged into your instance in a moment

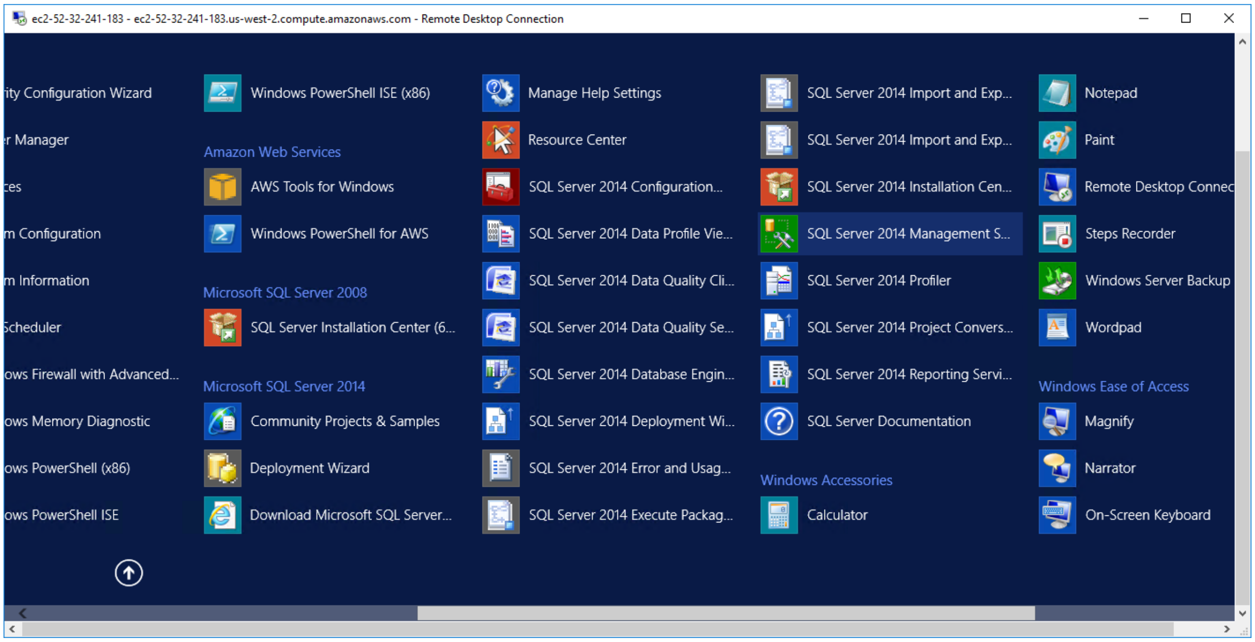


ec2-52-32-241-183 - ec2-52-32-241-183.us-west-2.compute.amazonaws.com - Remote Desktop Connection

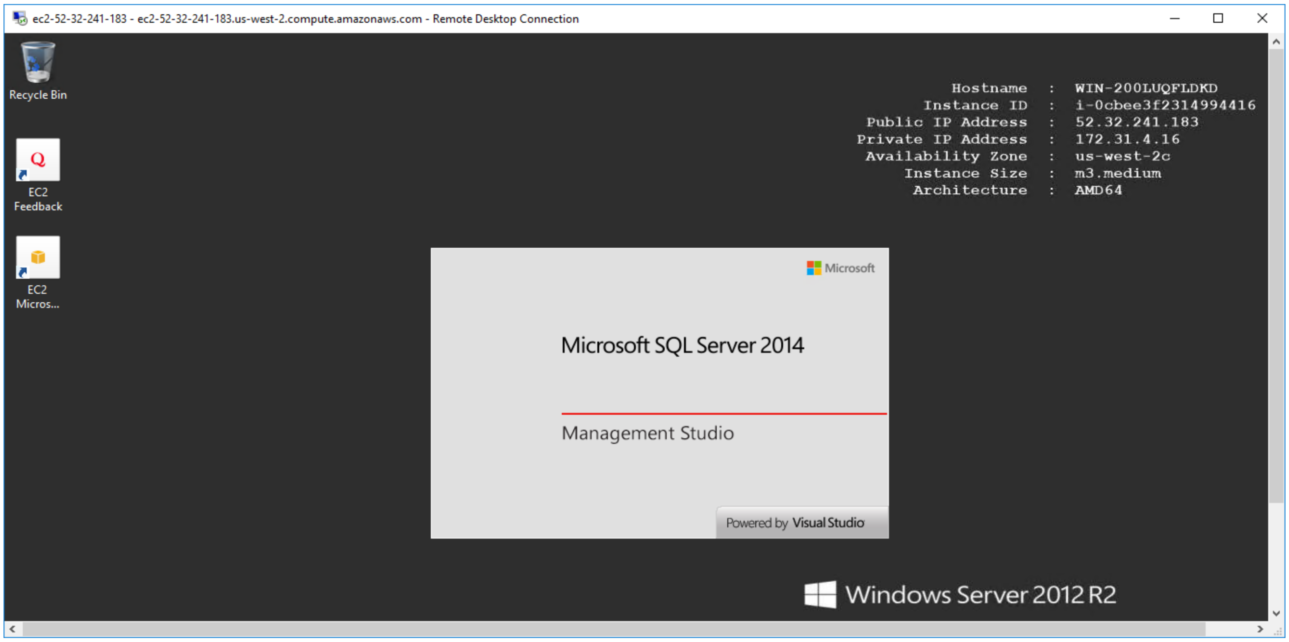
Administrator

Please wait for the User Profile Service

Now you will see the windows desktop. You just click on windows button and click the down arrow mark and find Windows server management studio.

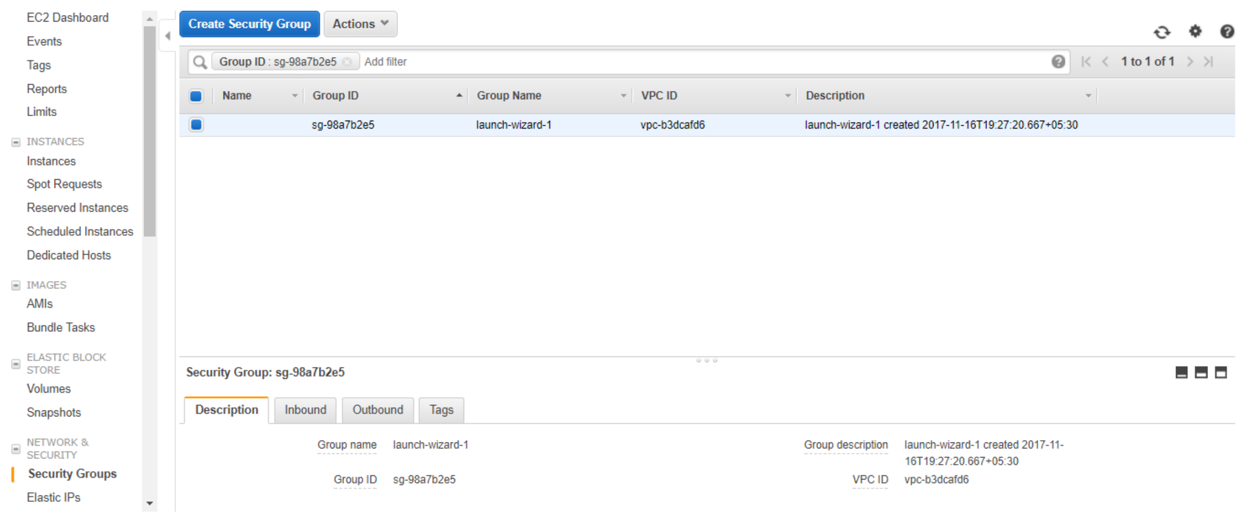

ec2-52-32-241-183 - ec2-52-32-241-183.us-west-2.compute.amazonaws.com - Remote Desktop Connection
ity Configuration Wizard
r Manager
ces
m Configuration
m Information
Scheduler
ows Firewall with Advanced...
ows Memory Diagnostic
ows PowerShell (x86)
ows PowerShell ISE
Windows PowerShell ISE (x86)
Amazon Web Services
AWS Tools for Windows
Windows PowerShell for AWS
Microsoft SQL Server 2008
SQL Server Installation Center (6...
Microsoft SQL Server 2014
Community Projects & Samples
Deployment Wizard
Download Microsoft SQL Server...
Manage Help Settings
Resource Center
SQL Server 2014 Configuration...
SQL Server 2014 Data Profile Vie...
SQL Server 2014 Data Quality Cli...
SQL Server 2014 Data Quality Se...
SQL Server 2014 Database Engin...
SQL Server 2014 Deployment Wi...
SQL Server 2014 Error and Usag...
SQL Server 2014 Execute Packag...
SQL Server 2014 Import and Exp...
SQL Server 2014 Import and Exp...
SQL Server 2014 Installation Cen...
SQL Server 2014 Management S...
SQL Server 2014 Profiler
SQL Server 2014 Project Convers...
SQL Server 2014 Reporting Servi...
SQL Server Documentation
Windows Accessories
Calculator
Notepad
Paint
Remote Desktop Connec
Steps Recorder
Windows Server Backup
Wordpad
Windows Ease of Access
Magnify
Narrator
On-Screen Keyboard

## Once you click on it you'll see this and it will take 3-5 minutes to start the studio


ec2-52-32-241-183 - ec2-52-32-241-183.us-west-2.compute.amazonaws.com - Remote Desktop Connection
Recycle Bin
EC2 Feedback
EC2 Micros...
Microsoft
Microsoft SQL Server 2014
Management Studio
Powered by Visual Studio
Windows Server 2012 R2

```
           Hostname  :  WIN-200LUQFLDKD
        Instance ID  :  i-0cbee3f2314994416
  Public IP Address  :  52.32.241.183
 Private IP Address  :  172.31.4.16
  Availability Zone  :  us-west-2c
      Instance Size  :  m3.medium
       Architecture  :  AMD64
```

## Step 8:Now go to EC2 Dashboard and close the ‘connect to instance’ window and go to security groups and click on RDS security groups which is identified by rds-launch-wizard



Group ID : sg-98a7b2e5

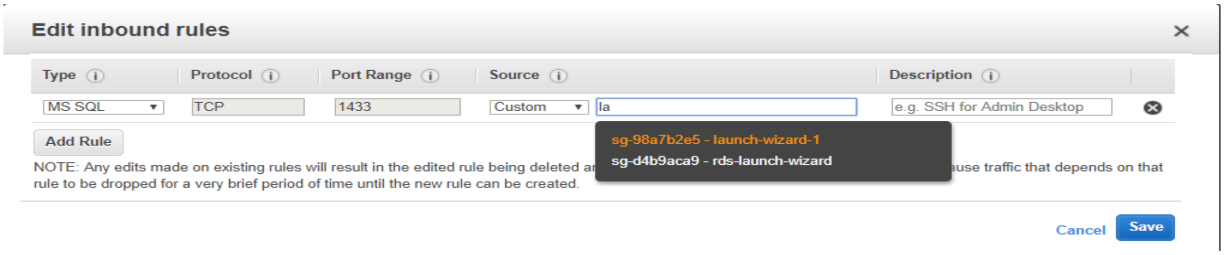
| Name | Group ID | Group Name | VPC ID | Description |
|---|---|---|---|---|
| | sg-98a7b2e5 | launch-wizard-1 | vpc-b3dcafd6 | launch-wizard-1 created 2017-11-16T19:27:20.667+05:30 |

Security Group: sg-98a7b2e5

Description | Inbound | Outbound | Tags

| | | | |
|---|---|---|---|
| Group name | launch-wizard-1 | Group description | launch-wizard-1 created 2017-11-16T19:27:20.667+05:30 |
| Group ID | sg-98a7b2e5 | VPC ID | vpc-b3dcafd6 |

## Now edit the inbound and delete the IP address in custom and replace it with the security group name of EC2 instance and click save.


Edit inbound rules

| Type | Protocol | Port Range | Source | | Description |
|---|---|---|---|---|---|
| MS SQL | TCP | 1433 | Custom | la | e.g. SSH for Admin Desktop |

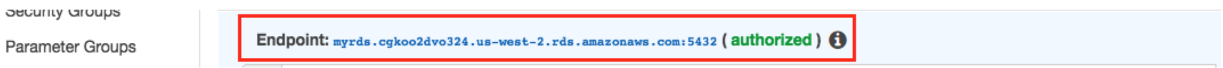
sg-98a7b2e5 - launch-wizard-1
sg-d4b9aca9 - rds-launch-wizard

NOTE: Any edits made on existing rules will result in the edited rule being deleted a[...]use traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

## This ensures that any EC2 instance will be able to connect to RDS instance.

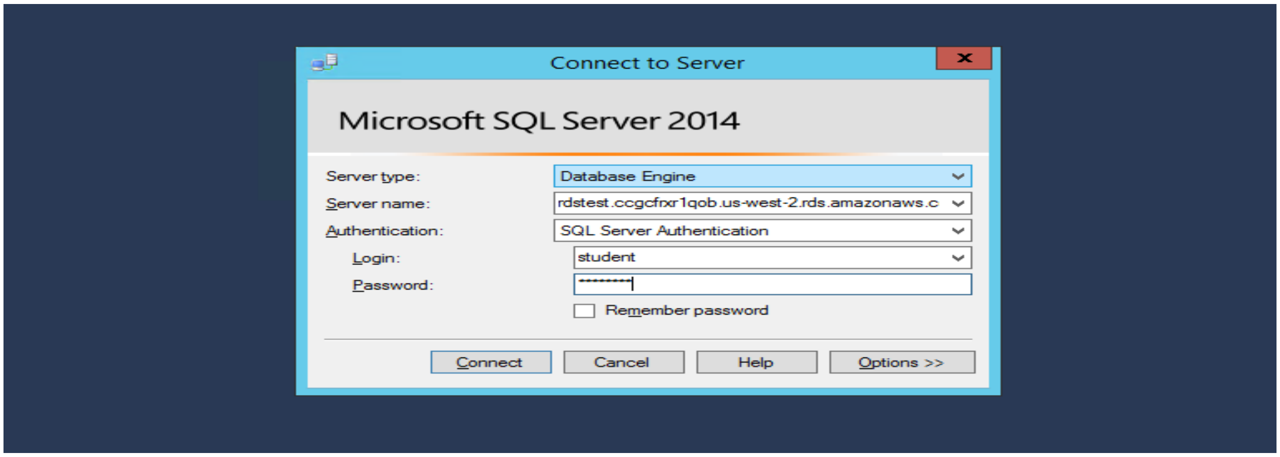
## Step 9: Connect to server

Now go to RDS and copy the endpoint(without port number) and clip to your clipboard and then go to your windows RDP client.



Endpoint: myrds.cgkoo2dvo324.us-west-2.rds.amazonaws.com:5432 ( authorized )

Now in your RDP client you’re seeing windows SQL 2014 connection window and in the server name copy the endpoint and in windows authentication:select SQL Server Authentication and in the login password enter the details you provide when you created RDS instance



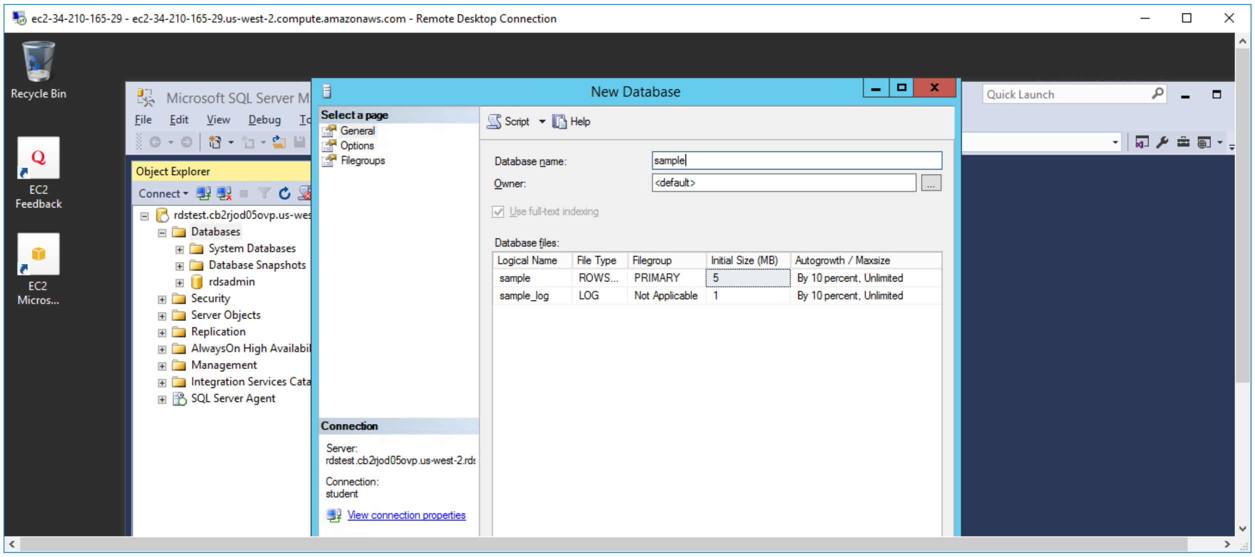
Server type: Database Engine
Server name: rdstest.ccgcfxr1qob.us-west-2.rds.amazonaws.c
Authentication: SQL Server Authentication
Login: student
Password: ********
□ Remember password

Now you will see Microsoft SQL server management studio opened.

## (a) Create a database:

In the object explorer pane click on create database and name it as sample.

So far, what we have done is we used SQL server management studio and created a database and connected to our RDS instance



Database name: sample
Owner: <default>
☑ Use full-text indexing

Database files:

| Logical Name | File Type | Filegroup | Initial Size (MB) | Autogrowth / Maxsize |
|---|---|---|---|---|
| sample | ROWS... | PRIMARY | 5 | By 10 percent, Unlimited |
| sample_log | LOG | Not Applicable | 1 | By 10 percent, Unlimited |

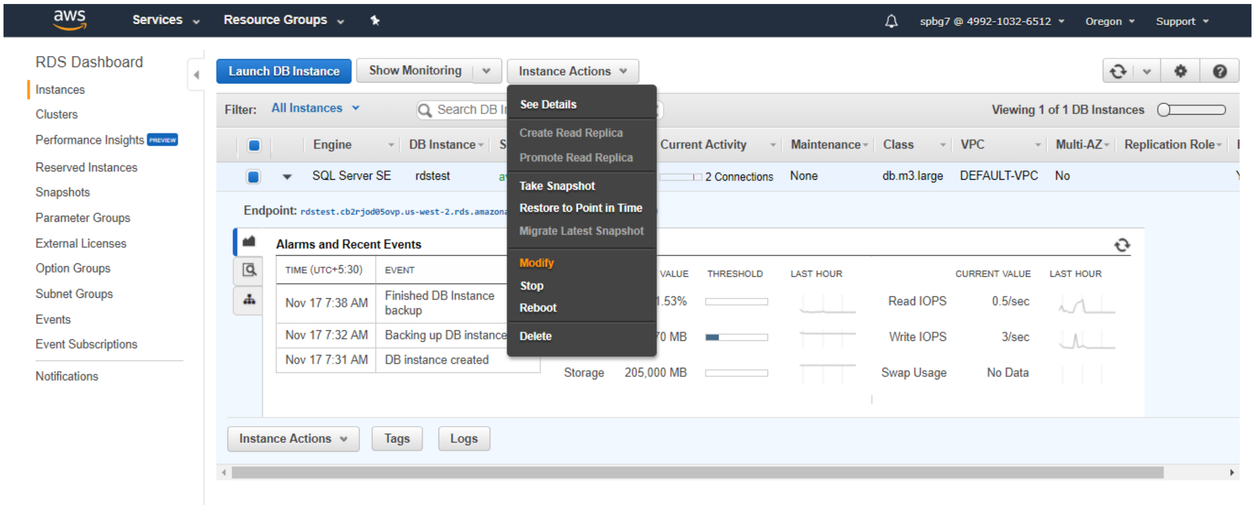
Connection

Server:
rdstest.cb2rjod05ovp.us-west-2.rds

Connection:
student

**(b) Database Scaling:** Databases that are running on RDS can be scaled up or down by changing the instance DB type. This adds or remove compute power from DB instance. The process of changing instance type is similar to ec2 instance but here in RDS we don't need to shut down

Now Return to RDS dashboard click instance instance actions and then modify



| Engine | DB Instance | S | Current Activity | Maintenance | Class | VPC | Multi-AZ | Replication Role |
|---|---|---|---|---|---|---|---|---|
| SQL Server SE | rdstest | a | 2 Connections | None | db.m3.large | DEFAULT-VPC | No | |

Endpoint: rdstest.cb2rjod05ovp.us-west-2.rds.amazona

Alarms and Recent Events

| TIME (UTC+5:30) | EVENT |
|---|---|
| Nov 17 7:38 AM | Finished DB Instance backup |
| Nov 17 7:32 AM | Backing up DB instance |
| Nov 17 7:31 AM | DB instance created |

| | VALUE | THRESHOLD | LAST HOUR | | CURRENT VALUE | LAST HOUR |
|---|---|---|---|---|---|---|
| | .53% | | | Read IOPS | 0.5/sec | |
| | 0 MB | | | Write IOPS | 3/sec | |
| Storage | 205,000 MB | | | Swap Usage | No Data | |

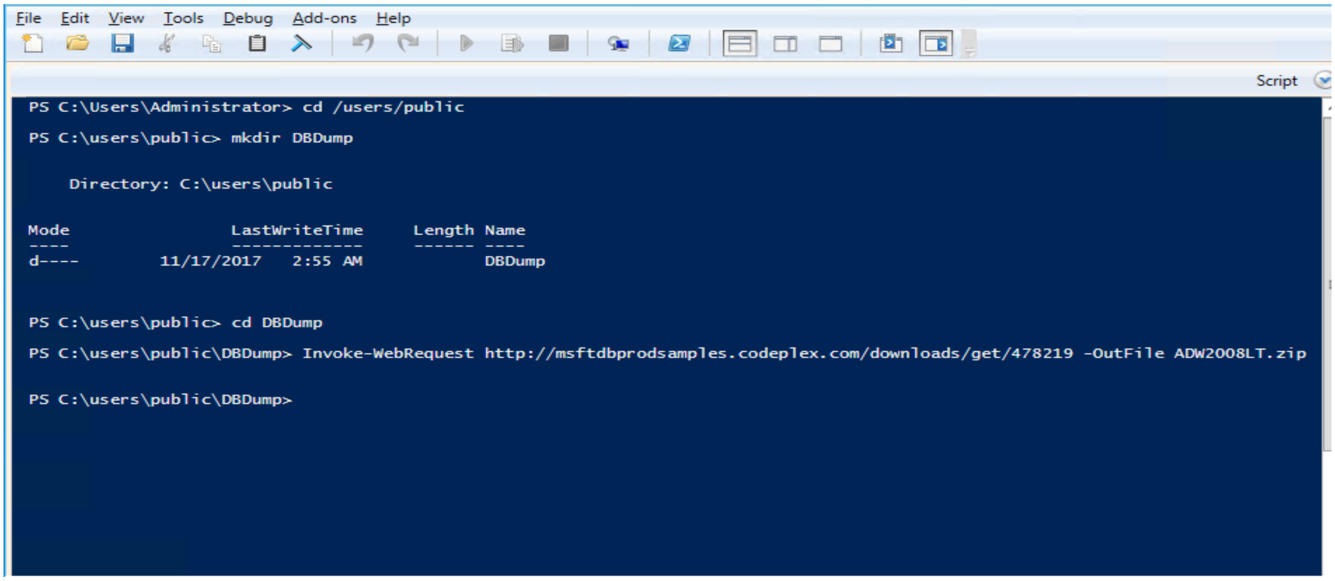
Now change the instance class change it to r3.large and **check apply immediately** and then Click continue and then click modify instance ,This will take several minutes but you proceed with further steps

## Step 10: Migrating a database to RDS:

Now we shall migrate a simple Database installed on EC2 to RDS .You will use some Windows Powershell commands here

Go to windows RDS and click windows button and click down arrow and find Windows powershell and launch it.

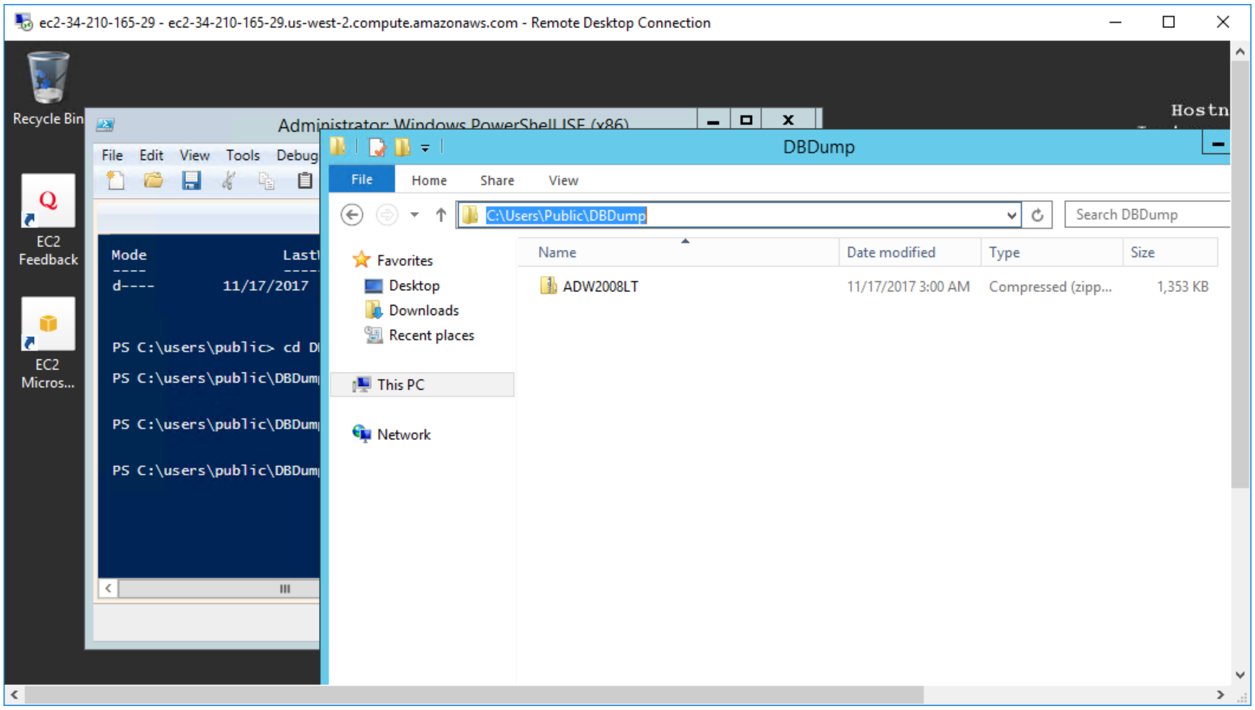
Now press ctrl R to get script pane,and pass on following commands as shown:



```
PS C:\Users\Administrator> cd /users/public

PS C:\users\public> mkdir DBDump


    Directory: C:\users\public


Mode                LastWriteTime     Length Name
----                -------------     ------ ----
d----        11/17/2017   2:55 AM            DBDump


PS C:\users\public> cd DBDump

PS C:\users\public\DBDump> Invoke-WebRequest http://msftdbprodsamples.codeplex.com/downloads/get/478219 -OutFile ADW2008LT.zip

PS C:\users\public\DBDump>
```

This set of commands downloads a sample database ADW2008LT .Now Press F5 to execute the script.After the script gets executed, go to the path where the file is downloaded and chose Extract ALL and Extract the folder

The path is  :C:\Users\Public\DBDump


ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

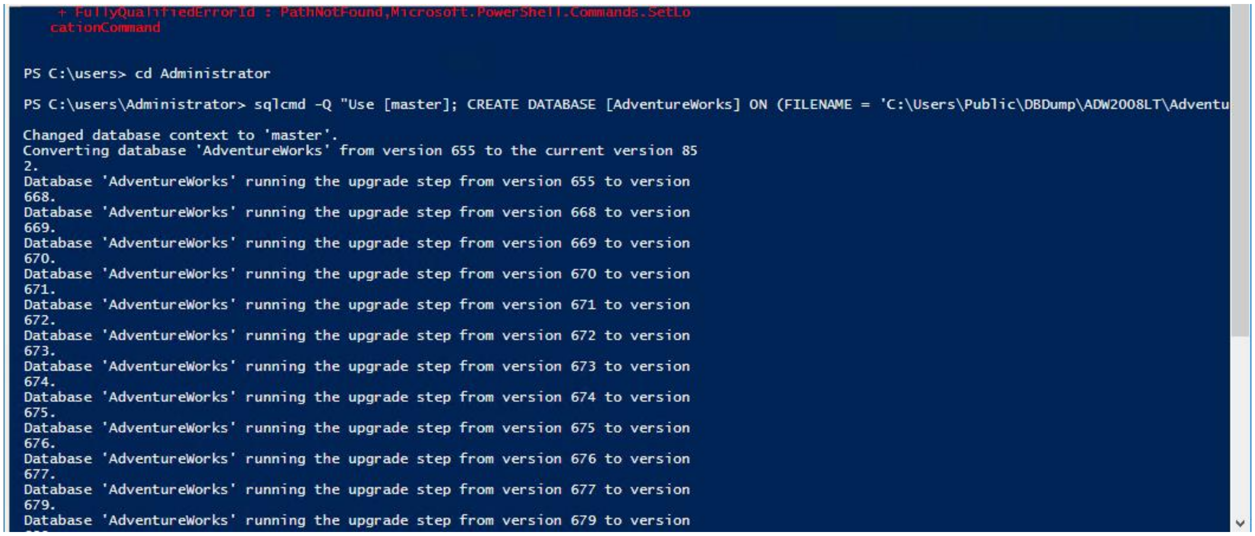
```
Mode                Last
----                ----
d----        11/17/2017


PS C:\users\public> cd D
PS C:\users\public\DBDum

PS C:\users\public\DBDum

PS C:\users\public\DBDum
```

| Name | Date modified | Type | Size |
|---|---|---|---|
| ADW2008LT | 11/17/2017 3:00 AM | Compressed (zipp... | 1,353 KB |

**<u>Now get back to you windows Powershell and use the following command which imports database from EC2 instance</u>**

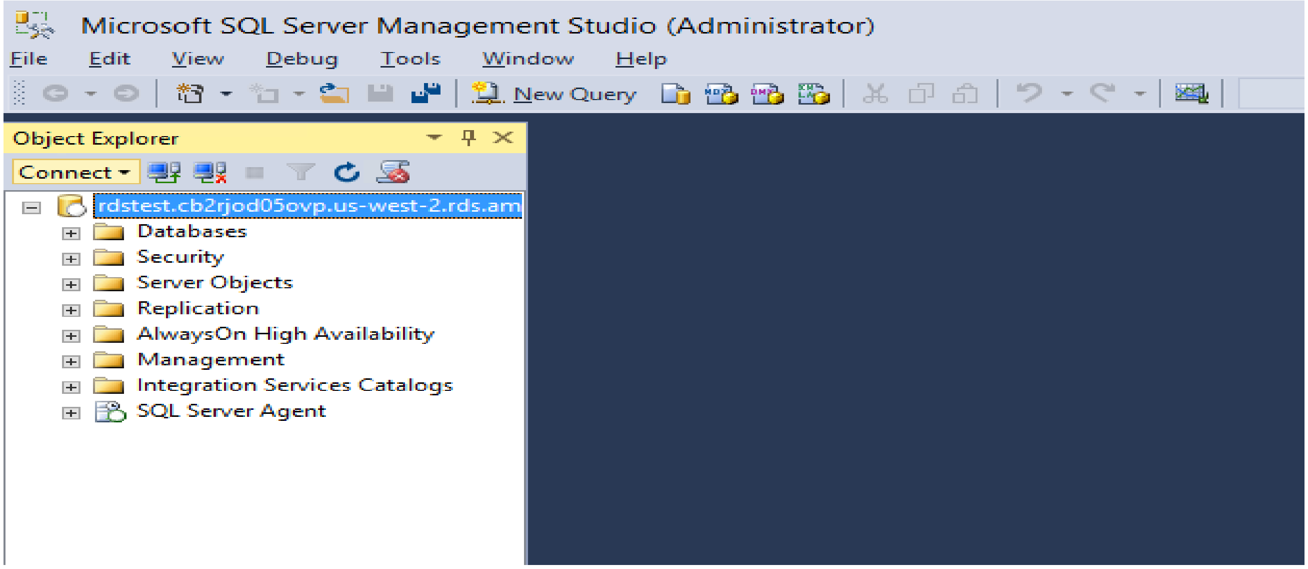
Change the directory to Administrator. Then you use the command

```
sqlcmd -Q "Use [master]; CREATE DATABASE [AdventureWorks] ON (FILENAME =
'C:\Users\Public\DBDump\ADW2008LT\AdventureWorksLT2008_Data.mdf'),(FILENAME =
'C:\Users\Public\DBDump\ADW2008LT\AdventureWorksLT2008_Log.ldf') for ATTACH"
```



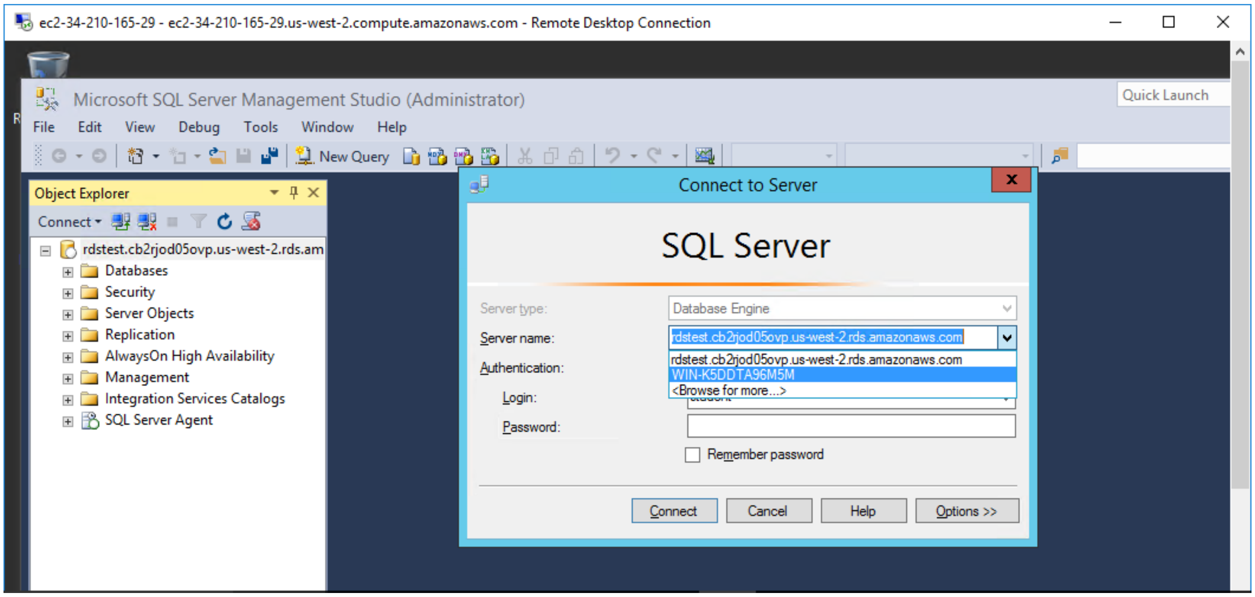
```
    + FullyQualifiedErrorId : PathNotFound,Microsoft.PowerShell.Commands.SetLo
   cationCommand


PS C:\users> cd Administrator

PS C:\users\Administrator> sqlcmd -Q "Use [master]; CREATE DATABASE [AdventureWorks] ON (FILENAME = 'C:\Users\Public\DBDump\ADW2008LT\Adventu

Changed database context to 'master'.
Converting database 'AdventureWorks' from version 655 to the current version 85
2.
Database 'AdventureWorks' running the upgrade step from version 655 to version
668.
Database 'AdventureWorks' running the upgrade step from version 668 to version
669.
Database 'AdventureWorks' running the upgrade step from version 669 to version
670.
Database 'AdventureWorks' running the upgrade step from version 670 to version
671.
Database 'AdventureWorks' running the upgrade step from version 671 to version
672.
Database 'AdventureWorks' running the upgrade step from version 672 to version
673.
Database 'AdventureWorks' running the upgrade step from version 673 to version
674.
Database 'AdventureWorks' running the upgrade step from version 674 to version
675.
Database 'AdventureWorks' running the upgrade step from version 675 to version
676.
Database 'AdventureWorks' running the upgrade step from version 676 to version
677.
Database 'AdventureWorks' running the upgrade step from version 677 to version
679.
Database 'AdventureWorks' running the upgrade step from version 679 to version
```

**<u>As you can see the command is getting executed, now minimize PowerShell and maximize SQL Server studio, and in the object explorer click connect</u>**



Microsoft SQL Server Management Studio (Administrator)
File
Edit
View
Debug
Tools
Window
Help
New Query
Object Explorer
Connect
rdstest.cb2rjod05ovp.us-west-2.rds.am
Databases
Security
Server Objects
Replication
AlwaysOn High Availability
Management
Integration Services Catalogs
SQL Server Agent

And in the server name select the RDS endpoint and in the Authentication select the server name that starts with WIN-XXX



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

Microsoft SQL Server Management Studio (Administrator)

Connect to Server

SQL Server

Server type: Database Engine

Server name: rdstest.cb2rjod05ovp.us-west-2.rds.amazonaws.com

rdstest.cb2rjod05ovp.us-west-2.rds.amazonaws.com<br>
WIN-K5DDTA96M5M<br>
<Browse for more...>

Authentication:

Login:

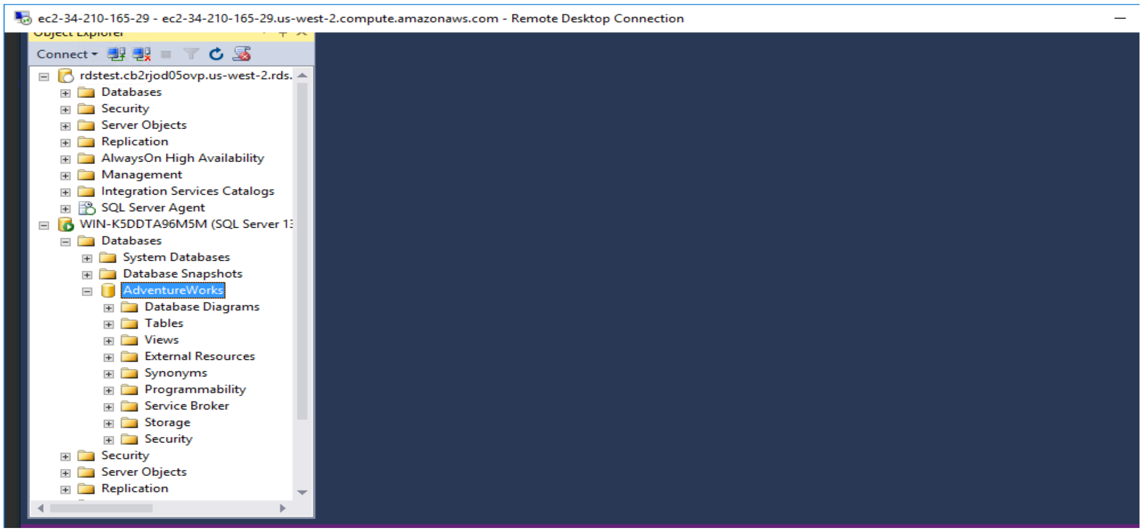
Password:

□ Remember password

Now your both Amazon RDS and local SQL server is connected.

## Migrate database to RDS instance:

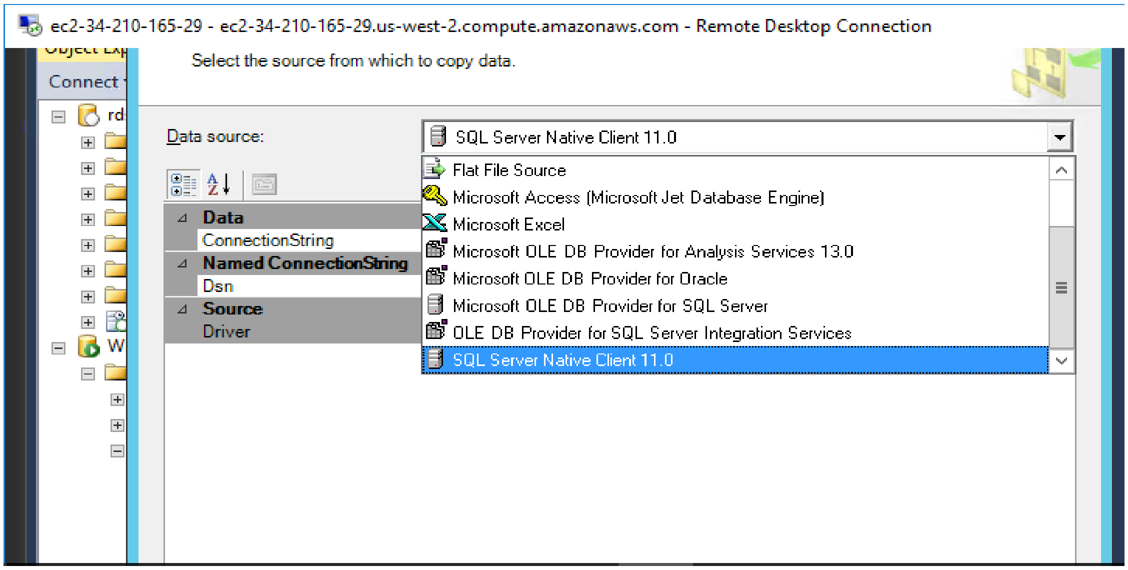
1. **Now click on the object explorer you will find AdventureWorks sample databse that you created using PowerShell commands.**



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

2. **<u>Now right click the database and click on tasks and then ExportData</u>**

You will see this screen:select SQL Server Native Client 11.0



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

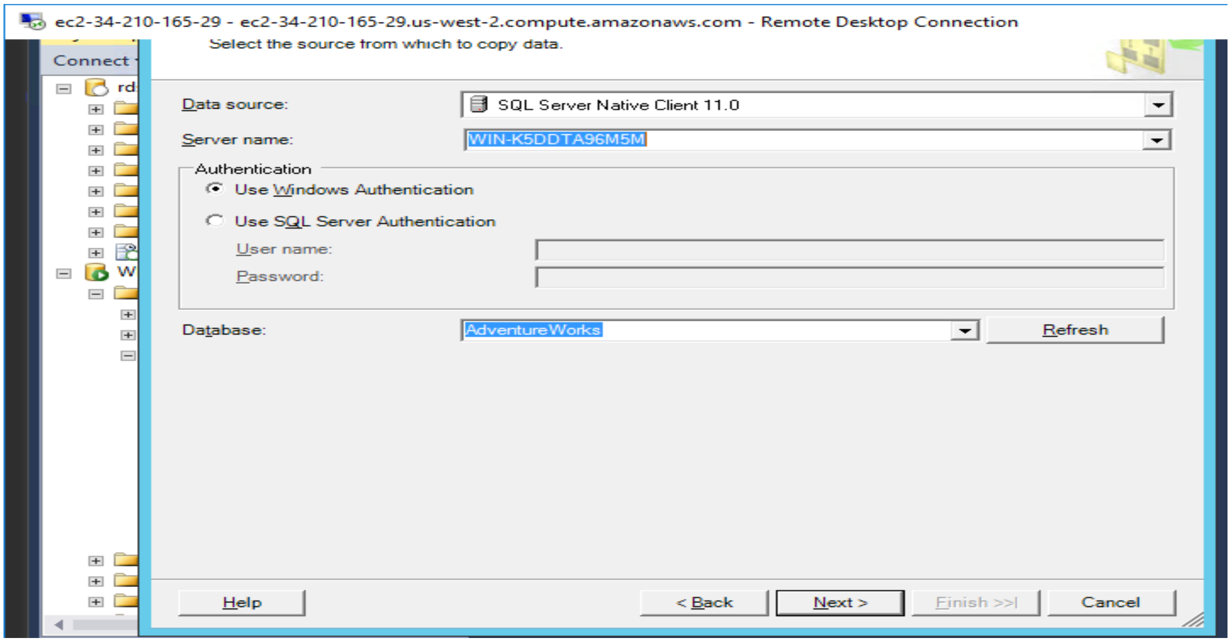
Select the source from which to copy data.

Data source: SQL Server Native Client 11.0

Flat File Source
Microsoft Access (Microsoft Jet Database Engine)
Microsoft Excel
Microsoft OLE DB Provider for Analysis Services 13.0
Microsoft OLE DB Provider for Oracle
Microsoft OLE DB Provider for SQL Server
OLE DB Provider for SQL Server Integration Services
SQL Server Native Client 11.0
Data
ConnectionString
Named ConnectionString
Dsn
Source
Driver
Connect
rd
W

And in the servername drop-down list a name is automatically populated which starts with WIN-

3. **<u>Now click on 'use Windows Authentication' and in the database drop-down verify Adventureworks is selected. Now click</u>** Next



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

Select the source from which to copy data.

Data source: SQL Server Native Client 11.0

Server name: WIN-K5DDTA96M5M

Authentication

● Use Windows Authentication

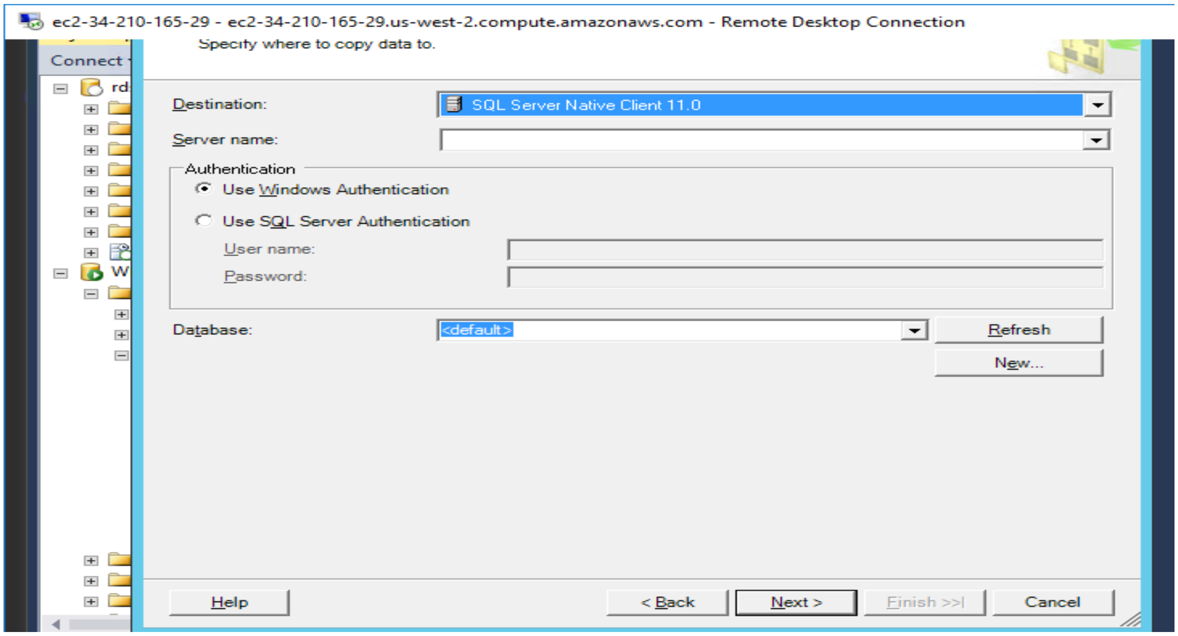
○ Use SQL Server Authentication

User name:

Password:

Database: AdventureWorks

4. **Now on the chose destination page select the SQL Server Native Client 11.0**



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

Specify where to copy data to.

Destination: SQL Server Native Client 11.0

Server name:

Authentication

● Use Windows Authentication

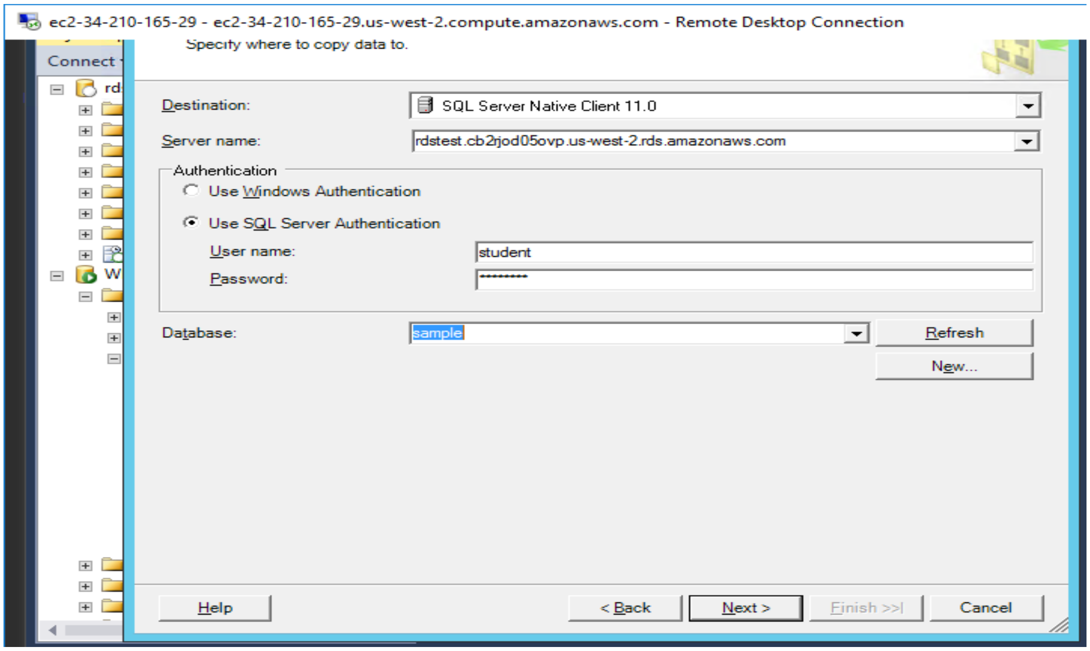
○ Use SQL Server Authentication

User name:

Password:

Database: <default>

And then chose server name copy and paste the RDS endpoint without port number.Then,select Authentication:Use SQL Server Authentication,and enter the username and password details that you set when you created RDS instance.Then,chose database as Sample and click Next.



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

Specify where to copy data to.

Destination: SQL Server Native Client 11.0

Server name: rdstest.cb2rjod05ovp.us-west-2.rds.amazonaws.com

Authentication

○ Use Windows Authentication

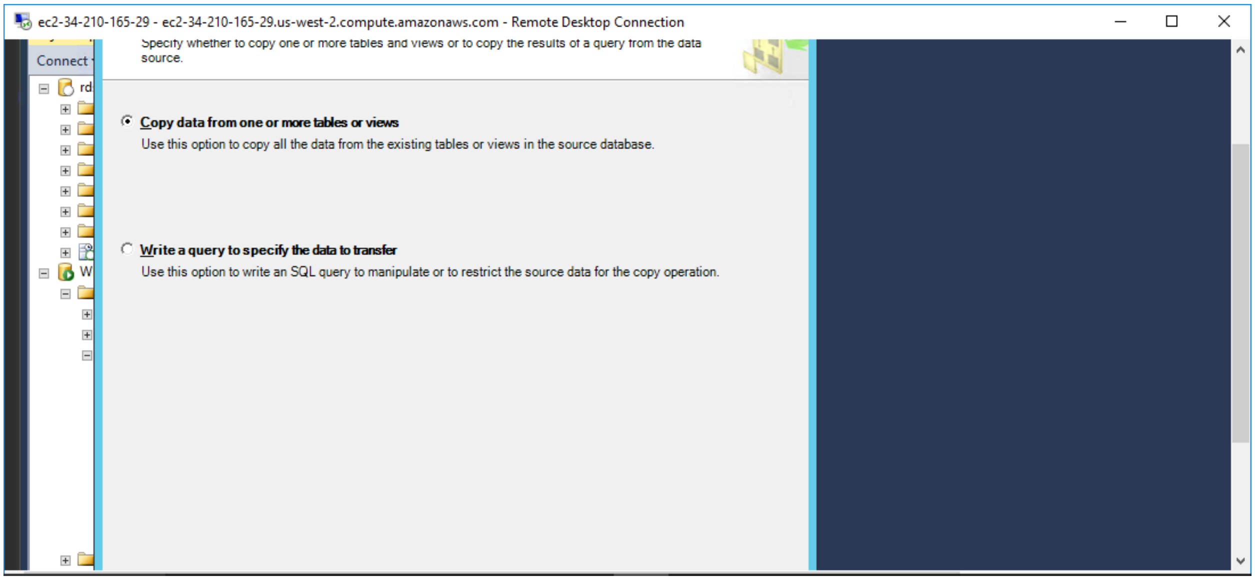
● Use SQL Server Authentication

User name: student

Password: ********

Database: sample

## 5. Select copy data from one or more tables or views and click next



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

Specify whether to copy one or more tables and views or to copy the results of a query from the data source.

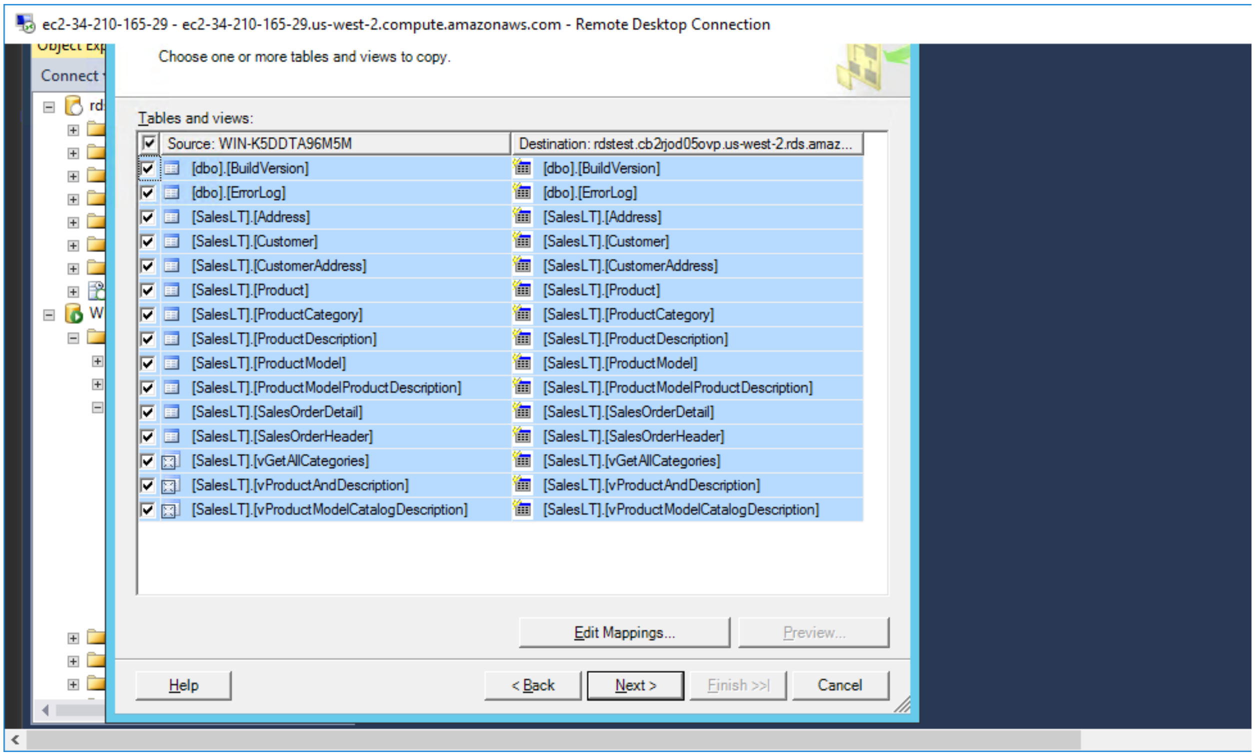
● **Copy data from one or more tables or views**

Use this option to copy all the data from the existing tables or views in the source database.

○ **Write a query to specify the data to transfer**

Use this option to write an SQL query to manipulate or to restrict the source data for the copy operation.

## 6. Now Check all sources and click next



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

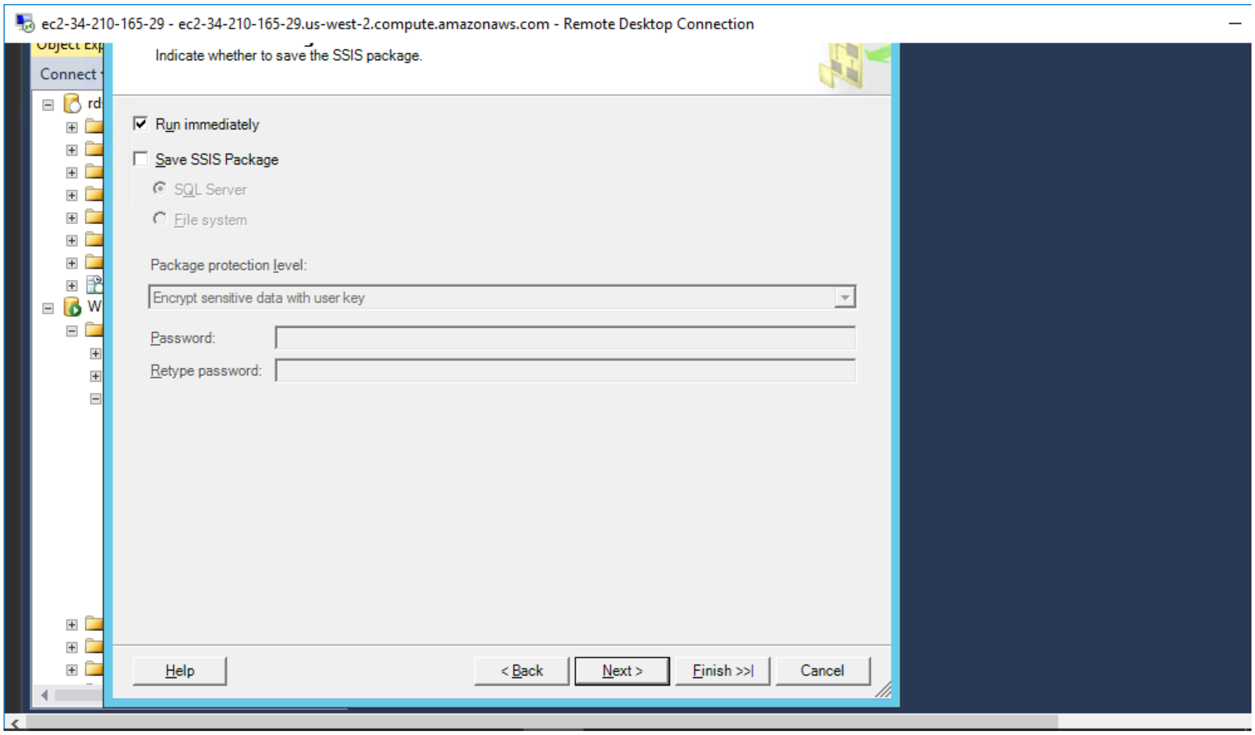
Choose one or more tables and views to copy.

Tables and views:

| ☑ Source: WIN-K5DDTA96M5M | Destination: rdstest.cb2rjod05ovp.us-west-2.rds.amaz... |
|---|---|
| ☑ [dbo].[BuildVersion] | [dbo].[BuildVersion] |
| ☑ [dbo].[ErrorLog] | [dbo].[ErrorLog] |
| ☑ [SalesLT].[Address] | [SalesLT].[Address] |
| ☑ [SalesLT].[Customer] | [SalesLT].[Customer] |
| ☑ [SalesLT].[CustomerAddress] | [SalesLT].[CustomerAddress] |
| ☑ [SalesLT].[Product] | [SalesLT].[Product] |
| ☑ [SalesLT].[ProductCategory] | [SalesLT].[ProductCategory] |
| ☑ [SalesLT].[ProductDescription] | [SalesLT].[ProductDescription] |
| ☑ [SalesLT].[ProductModel] | [SalesLT].[ProductModel] |
| ☑ [SalesLT].[ProductModelProductDescription] | [SalesLT].[ProductModelProductDescription] |
| ☑ [SalesLT].[SalesOrderDetail] | [SalesLT].[SalesOrderDetail] |
| ☑ [SalesLT].[SalesOrderHeader] | [SalesLT].[SalesOrderHeader] |
| ☑ [SalesLT].[vGetAllCategories] | [SalesLT].[vGetAllCategories] |
| ☑ [SalesLT].[vProductAndDescription] | [SalesLT].[vProductAndDescription] |
| ☑ [SalesLT].[vProductModelCatalogDescription] | [SalesLT].[vProductModelCatalogDescription] |

## 7.Now verify run immediately is selected and click finish twice

`



ec2-34-210-165-29 - ec2-34-210-165-29.us-west-2.compute.amazonaws.com - Remote Desktop Connection

Indicate whether to save the SSIS package.

☑ Run immediately

□ Save SSIS Package

● SQL Server

○ File system

Package protection level: Encrypt sensitive data with user key

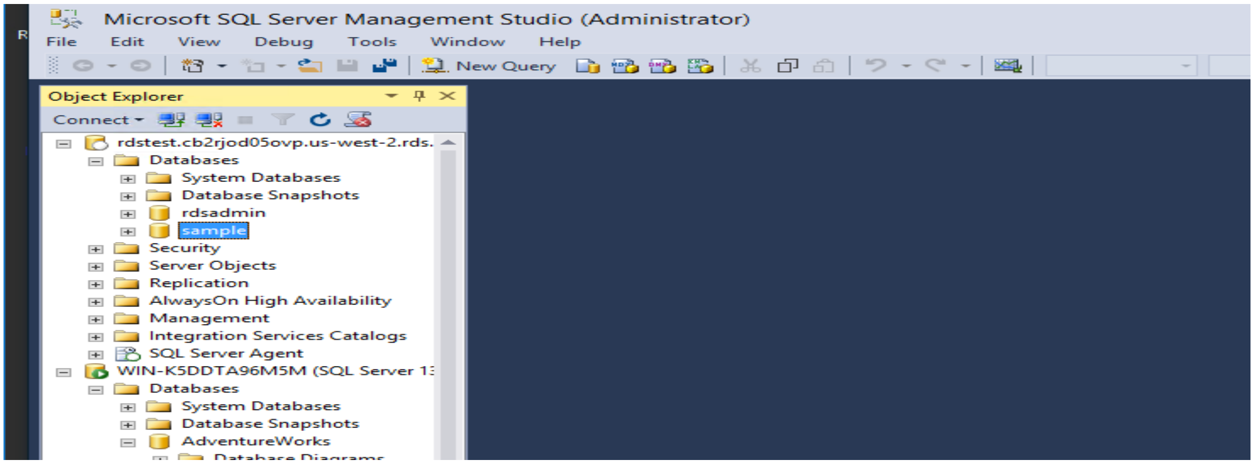
Password:

Retype password:

This would take couple of minutes as all the tables and data is being moved to RDS instance.A message will be displayed that operation of copying data to RDS instance is complete.

## 8.Now verify the data transfer by running a simple SQL query

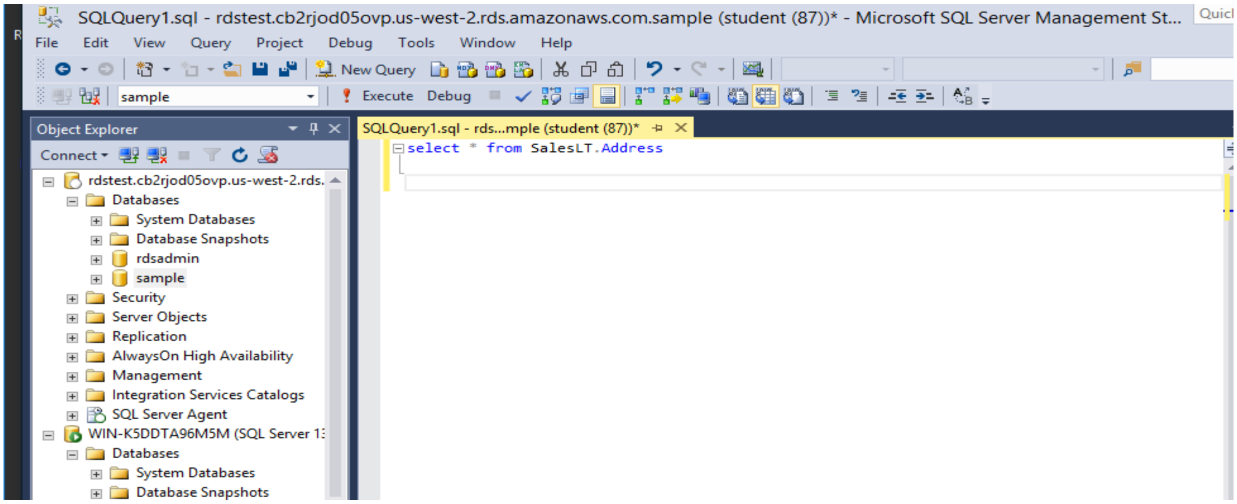
Go to object explorer and expand databases and right click on sample and select new query. An editor will be opened. Now write a simple command as shown



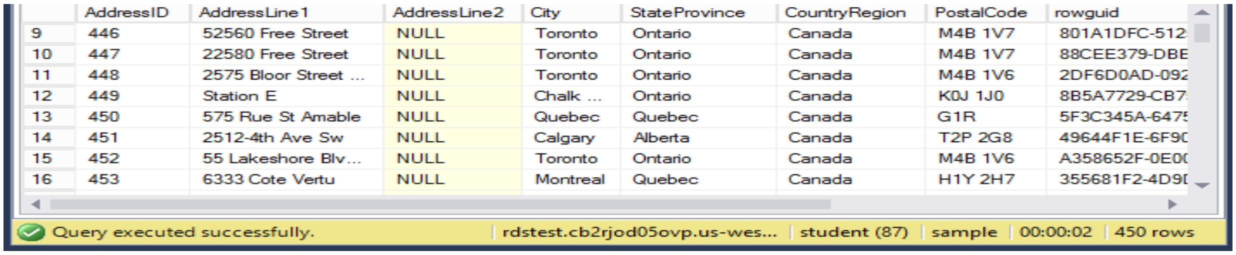
Microsoft SQL Server Management Studio (Administrator)

Object Explorer

- rdstest.cb2rjod05ovp.us-west-2.rds.
  - Databases
    - System Databases
    - Database Snapshots
    - rdsadmin
    - sample
  - Security
  - Server Objects
  - Replication
  - AlwaysOn High Availability
  - Management
  - Integration Services Catalogs
  - SQL Server Agent
- WIN-K5DDTA96M5M (SQL Server 1:
  - Databases
    - System Databases
    - Database Snapshots
    - AdventureWorks
      - Database Diagrams


SQLQuery1.sql - rdstest.cb2rjod05ovp.us-west-2.rds.amazonaws.com.sample (student (87))* - Microsoft SQL Server Management St...
File
Edit
View
Query
Project
Debug
Tools
Window
Help
New Query
sample
Execute
Debug
Object Explorer
Connect
SQLQuery1.sql - rds...mple (student (87))*
rdstest.cb2rjod05ovp.us-west-2.rds.
Databases
System Databases
Database Snapshots
rdsadmin
sample
Security
Server Objects
Replication
AlwaysOn High Availability
Management
Integration Services Catalogs
SQL Server Agent
WIN-K5DDTA96M5M (SQL Server 1
Databases
System Databases
Database Snapshots

```
select * from SalesLT.Address
```



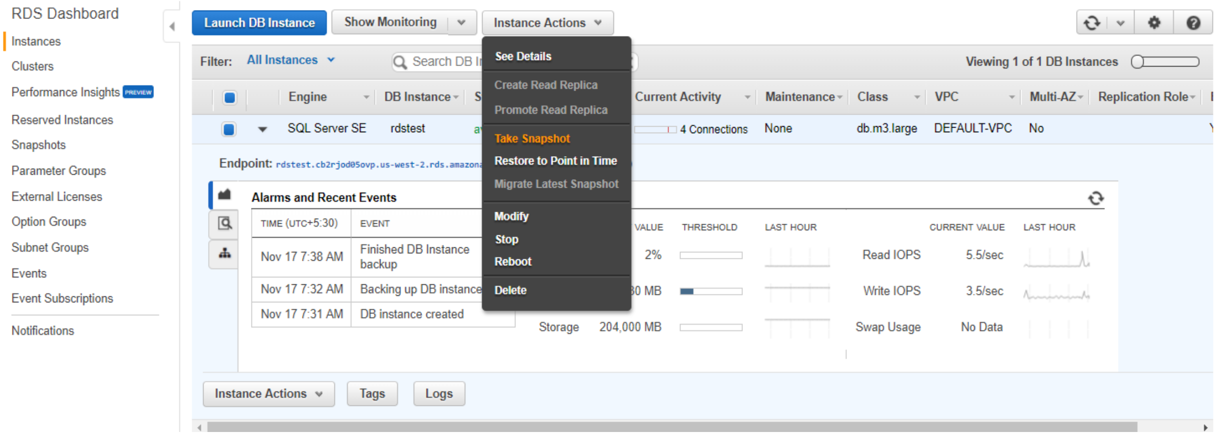
| | AddressID | AddressLine1 | AddressLine2 | City | StateProvince | CountryRegion | PostalCode | rowguid |
|---|---|---|---|---|---|---|---|---|
| 9 | 446 | 52560 Free Street | NULL | Toronto | Ontario | Canada | M4B 1V7 | 801A1DFC-512 |
| 10 | 447 | 22580 Free Street | NULL | Toronto | Ontario | Canada | M4B 1V7 | 88CEE379-DBE |
| 11 | 448 | 2575 Bloor Street ... | NULL | Toronto | Ontario | Canada | M4B 1V6 | 2DF6D0AD-092 |
| 12 | 449 | Station E | NULL | Chalk ... | Ontario | Canada | K0J 1J0 | 8B5A7729-CB7 |
| 13 | 450 | 575 Rue St Amable | NULL | Quebec | Quebec | Canada | G1R | 5F3C345A-6475 |
| 14 | 451 | 2512-4th Ave Sw | NULL | Calgary | Alberta | Canada | T2P 2G8 | 49644F1E-6F90 |
| 15 | 452 | 55 Lakeshore Blv... | NULL | Toronto | Ontario | Canada | M4B 1V6 | A358652F-0E00 |
| 16 | 453 | 6333 Cote Vertu | NULL | Montreal | Quebec | Canada | H1Y 2H7 | 355681F2-4D9D |

Query executed successfully. | rdstest.cb2rjod05ovp.us-wes... | student (87) | sample | 00:00:02 | 450 rows

As you can see query is executed successfully.

## Step 11: Perform database backup

## Now go back to RDS dashboard in AWS and select your DB engine. Then, click on Instance actions and click take snapshot



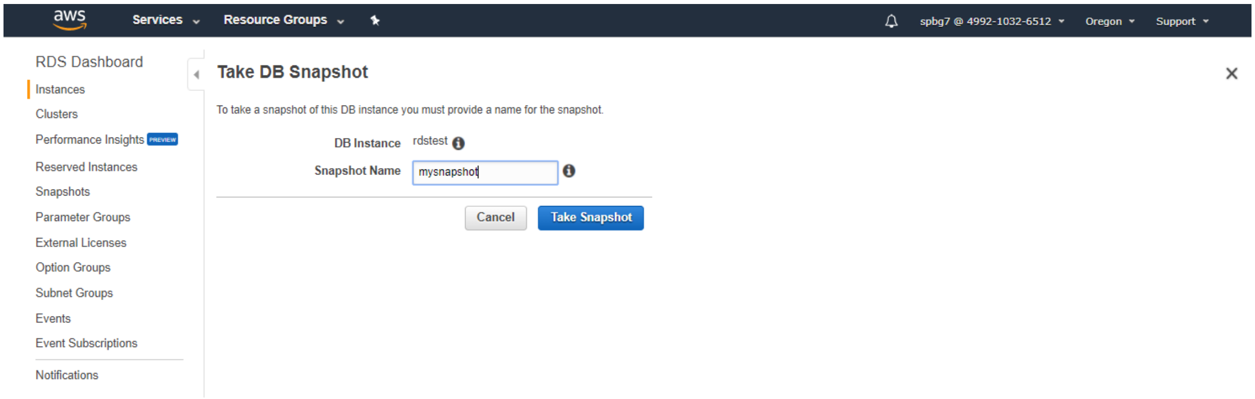
| Engine | DB Instance | S | Current Activity | Maintenance | Class | VPC | Multi-AZ | Replication Role |
|---|---|---|---|---|---|---|---|---|
| SQL Server SE | rdstest | a | 4 Connections | None | db.m3.large | DEFAULT-VPC | No | |

Endpoint: rdstest.cb2rjod05ovp.us-west-2.rds.amazona

| TIME (UTC+5:30) | EVENT |
|---|---|
| Nov 17 7:38 AM | Finished DB Instance backup |
| Nov 17 7:32 AM | Backing up DB instance |
| Nov 17 7:31 AM | DB instance created |

| | VALUE | THRESHOLD | LAST HOUR | | CURRENT VALUE | LAST HOUR |
|---|---|---|---|---|---|---|
| | 2% | | | Read IOPS | 5.5/sec | |
| | 0 MB | | | Write IOPS | 3.5/sec | |
| Storage | 204,000 MB | | | Swap Usage | No Data | |

Name the snapshot and click take snapshot



Take DB Snapshot

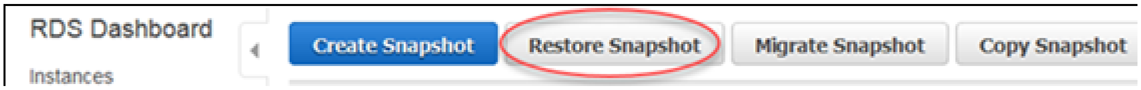
To take a snapshot of this DB instance you must provide a name for the snapshot.

DB Instance: rdstest

Snapshot Name: mysnapshot

## Step 12: Restore database from snapshot

After snapshot is created as you can see in Progress column, select your snapshot and click Restore Snapshot.



## Conclusion:

1.You created an RDS instance with user credentials

2.You launched an EC2 instance in windows

3.You connected Microsoft SQL server studio to rds and created a sample database

4.You downloaded a database using Powershell commands

5.You exported that database to RDS and executed SQL query

6.You took a snapshot and created a database from the snapshot.