Amazon Relational Database Service (Amazon RDS) is a web service that makes it easier to set up, operate and scale a relational database in the cloud. It provides cost-efficient, resizable capacity for an industry-standard relational database and manages common database administration tasks.

Amazon RDS major Components

- DB Instances
- Regions and Availability Zones
- Security Groups

DB Instances

The basic building block of Amazon RDS is the DB instance. A DB instance is an isolated database environment in the cloud. A DB instance can contain multiple user-created databases and we can access it by using the same tools and applications that we use with a stand-alone database instance. We can create and modify a DB instance by using the AWS Command Line Interface, the Amazon RDS API or the AWS Management Console.

Each DB instance runs a DB engine. Amazon RDS currently supports the MySQL, MariaDB, PostgreSQL, Oracle, and Microsoft SQL Server DB engines. Each DB engine has its own supported features and each version of a DB engine may include specific features. Additionally, each DB engine has a set of parameters in a DB parameter group that control the behavior of the databases that it manages.

The computation and memory capacity of a DB instance is determined by its DB instance class. We can select the DB instance that best meets our needs. If our needs change over time, we can change DB instances. For information about DB instance classes, see DB Instance Class. For pricing information on DB instance classes, go to the Pricing section of the Amazon Relational Database Service (Amazon RDS) product page.

For each DB instance, we can select from 5 GB to 6 TB of associated storage capacity. Each DB instance class has minimum and maximum storage requirements for the DB instances that are created from it. It is important to have sufficient storage so that our databases have room to grow and that features for the DB engine have room to write content or log entries.

DB instance disk storage comes in three types: Magnetic, General Purpose (SSD) and Provisioned IOPS (SSD). They differ in performance characteristics and price, allowing us to tailor our storage performance and cost to the needs of our database.

We can run a DB instance on a virtual private cloud using the Amazon Virtual Private Cloud (VPC) service. When we use a virtual private cloud, we have control over our virtual networking environment: we can select our own IP address range, create subnets and configure routing and access control lists. The basic functionality of Amazon RDS is the same whether it is running in a VPC or not; Amazon RDS manages backups, software patching, automatic failure detection, and recovery. There is no additional cost to run our DB instance in a VPC.

Regions and Availability Zones

Amazon cloud computing resources are housed in highly available data center facilities in different areas of the world (for example, North America, Europe, or Asia). Each data center location is called a region.

Each region contains multiple distinct locations called Availability Zones (AZ). Each Availability Zone is engineered to be isolated from failures in other Availability Zones and to provide inexpensive, low-latency network connectivity to other Availability Zones in the same region. By launching instances in separate Availability Zones, we can protect our applications from the failure of a single location.

We can run our DB instance in several Availability Zones (an option called Multi-AZ deployment). When we select this option, Amazon automatically provisions and maintains a synchronous standby replica of our DB instance in a different Availability Zone. The primary DB instance is synchronously replicated across Availability Zones to the standby replica to provide data redundancy, failover support, eliminate I/O freezes and minimize latency spikes during system backups.

Security Groups

A security group controls the access to a DB instance. It does so by allowing access to IP address ranges or Amazon EC2 instances that we specify.

Amazon RDS uses DB security groups, VPC security groups and EC2 security groups. In simple terms, a DB security group controls access to a DB instance that is not in a VPC, a VPC security group controls access to a DB instance inside a VPC and an Amazon EC2 security group controls access to an EC2 instance and can be used with a DB instance.

RDS AWS Advantages

Let us discuss about some interesting advantages that we get when we use AWS RDS. So usually when we talk about database services - the CPU, memory, storage, IOs are bundled together, i.e. we cannot control them individually, but with AWS RDS, each of these parameters can be tweaked individually. Like it manages your servers, updates them to the latest software configuration, takes backup, everything automatically. **We do not have to create a separate VM in order to use a DB.**

The backups can be taken in two ways

The automated backups wherein we set a time for our backup to be done.

DB Snapshots, where in we manually take a backup of our DB, we can take snapshots as frequently as we want.

It automatically creates a secondary instance for a failover, therefore provides high availability.

AWS RDS supports read replicas i.e. snapshots are created from a source DB and all the read traffic to the source database is distributed among the read replicas, this reduces the overall overhead on the source DB.

AWS RDS can be integrated with IAM, for giving customized access to your users who will be working on that database.

Pricing

AWS RDS is billed based on the following parameters:

- Instance Class i.e. the type of instance that you are choosing.
- Running Time i.e. the amount of time an instance is running, partial hours are billed as full hours.

Storage i.e. the amount of storage that we have provisioned to your DB Instance

I/O Requests per Month i.e. the I/O requests that are made to your DB Instance per month

Data Transfer: Data transfer in and out of our DB Instance.

Another way of getting billed for AWS RDS is by reserving some instances. Reserved Instance is also a way of using AWS RDS, in this we reserve an RDS Instance for a term, which can be for one or three years by making a onetime payment, it is a less expensive way compared to the monthly bill that one pays.

Free Tier

AWS has an amazing free tier usage for most of its services so that the customer can first use the service and then do the needful.

Similarly, it offers free tier usage for Amazon RDS, which includes the following benefits:

750 hours of Amazon RDS usage in single-AZ for db.t2.micro instance, every month for one year from signup.

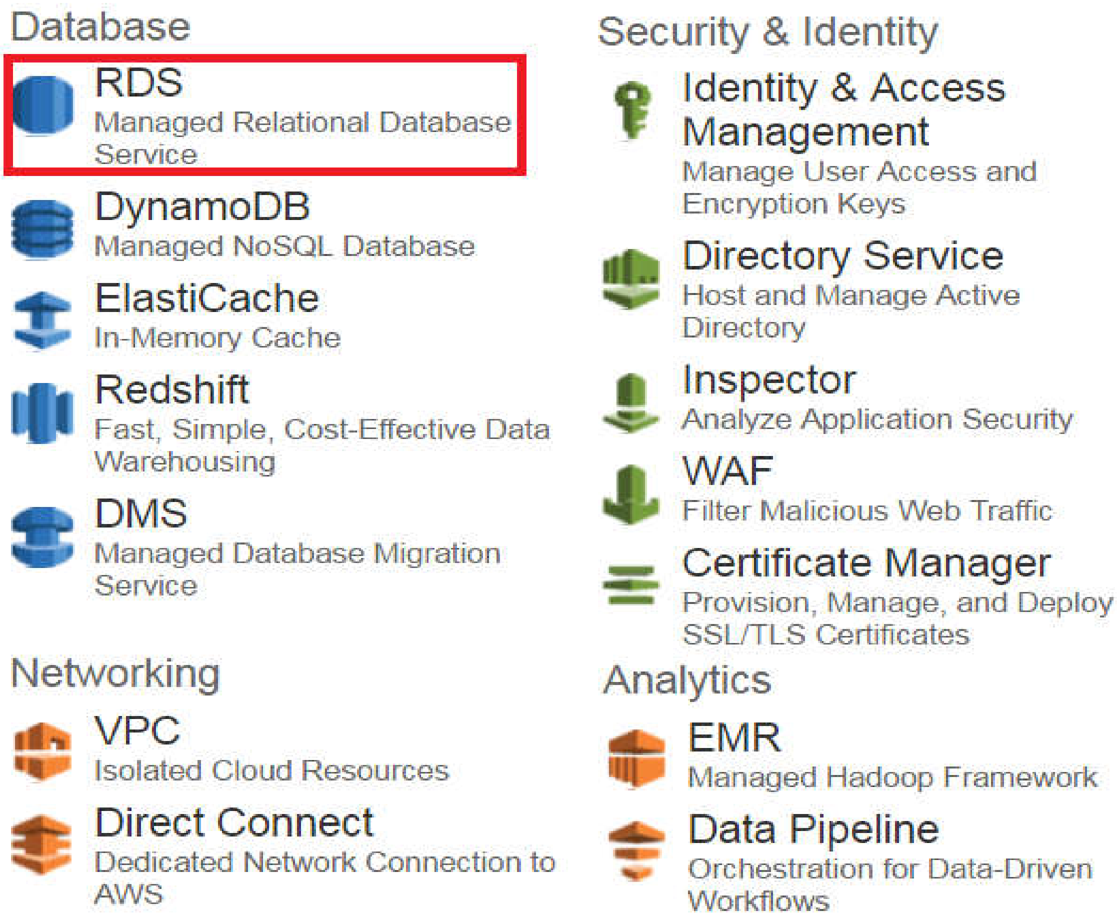
20 GB of Database Storage: any combination of General Purpose (SSD) or Magnetic storage.

10 million IOs

20GB of backup storage

Steps to launch a MySQL DB in RDS.

Step 1: First select the RDS service from the AWS Management Console.



Database

RDS
Managed Relational Database Service

DynamoDB
Managed NoSQL Database

ElastiCache
In-Memory Cache

Redshift
Fast, Simple, Cost-Effective Data Warehousing

DMS
Managed Database Migration Service

Networking

VPC
Isolated Cloud Resources

Direct Connect
Dedicated Network Connection to AWS

Security & Identity

Identity & Access Management
Manage User Access and Encryption Keys

Directory Service
Host and Manage Active Directory

Inspector
Analyze Application Security

WAF
Filter Malicious Web Traffic

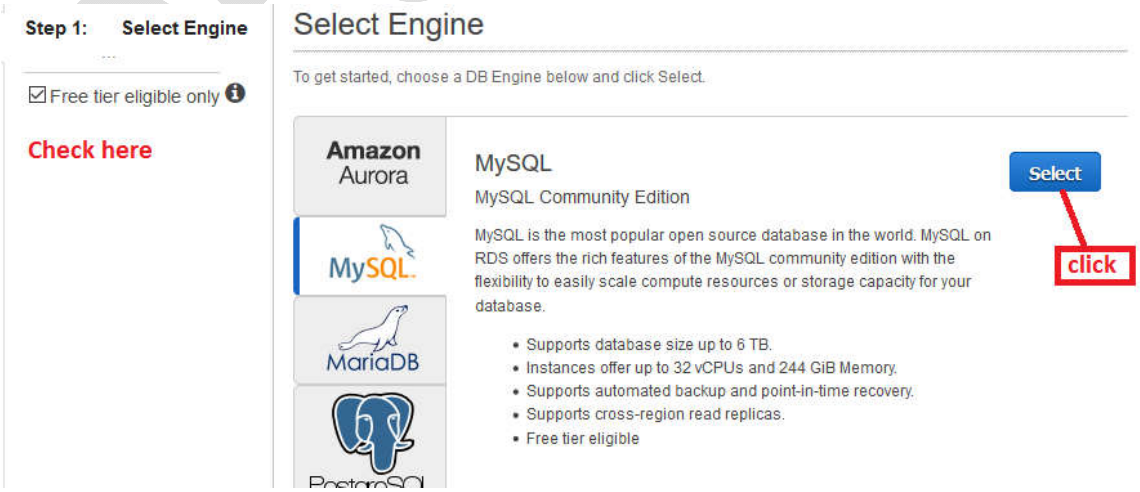
Certificate Manager
Provision, Manage, and Deploy SSL/TLS Certificates

Analytics

EMR
Managed Hadoop Framework

Data Pipeline
Orchestration for Data-Driven Workflows

Step 2: Select the MySQL instance from the list of Dbs.



Step 1: Select Engine

☑ Free tier eligible only

Check here

Select Engine

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

MySQL

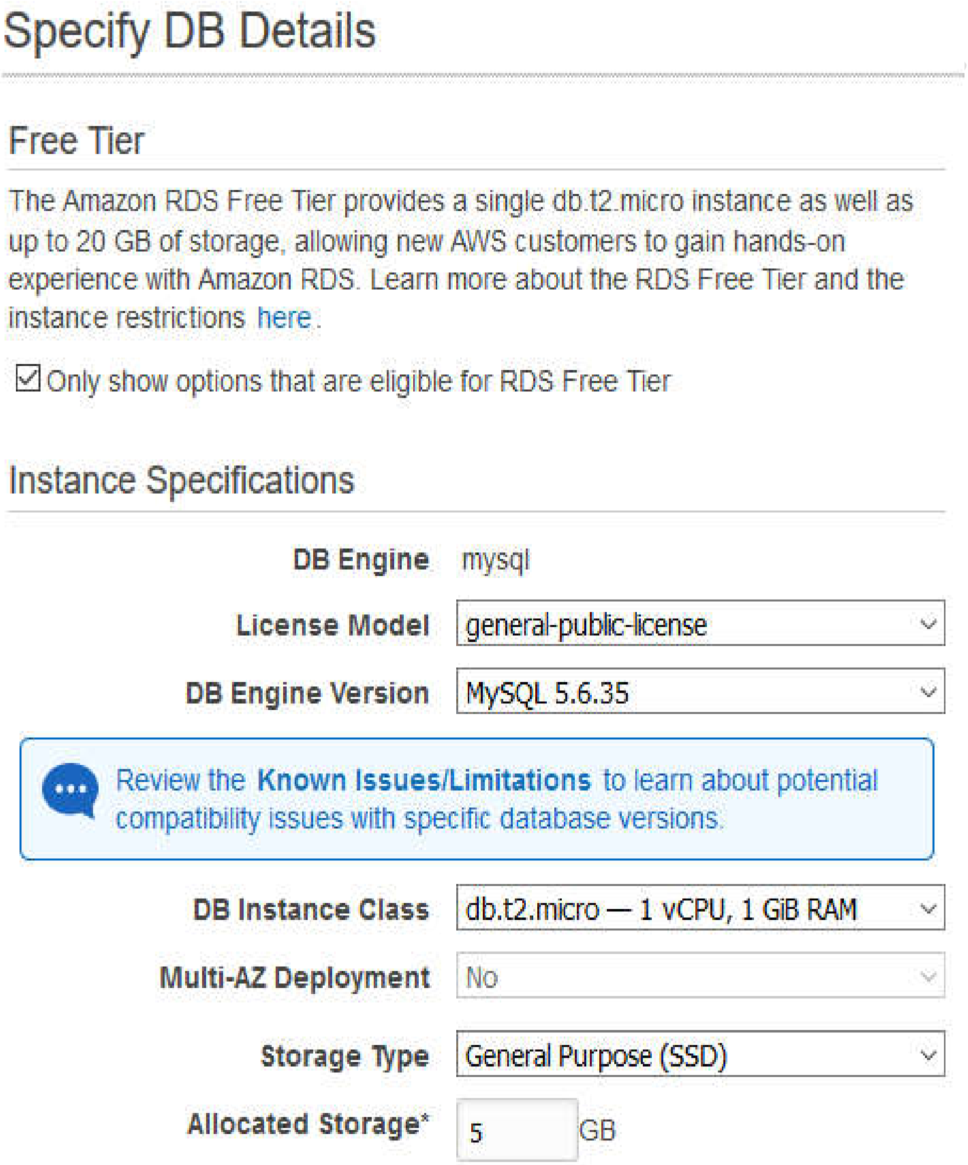
MySQL Community Edition

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 6 TB.
- Instances offer up to 32 vCPUs and 244 GiB Memory.
- Supports automated backup and point-in-time recovery.
- Supports cross-region read replicas.
- Free tier eligible

Step 3: Next page we need to fill the following details:

- We can select our desired Db instance here
- We can select whether we want Multi-AZ enabled in your MySQL Db.
- We can select how much space we want to allocate to our Db instance, it can vary from 5GB to 6TB.
- In the end we will be setting username and password for Db Instance



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.

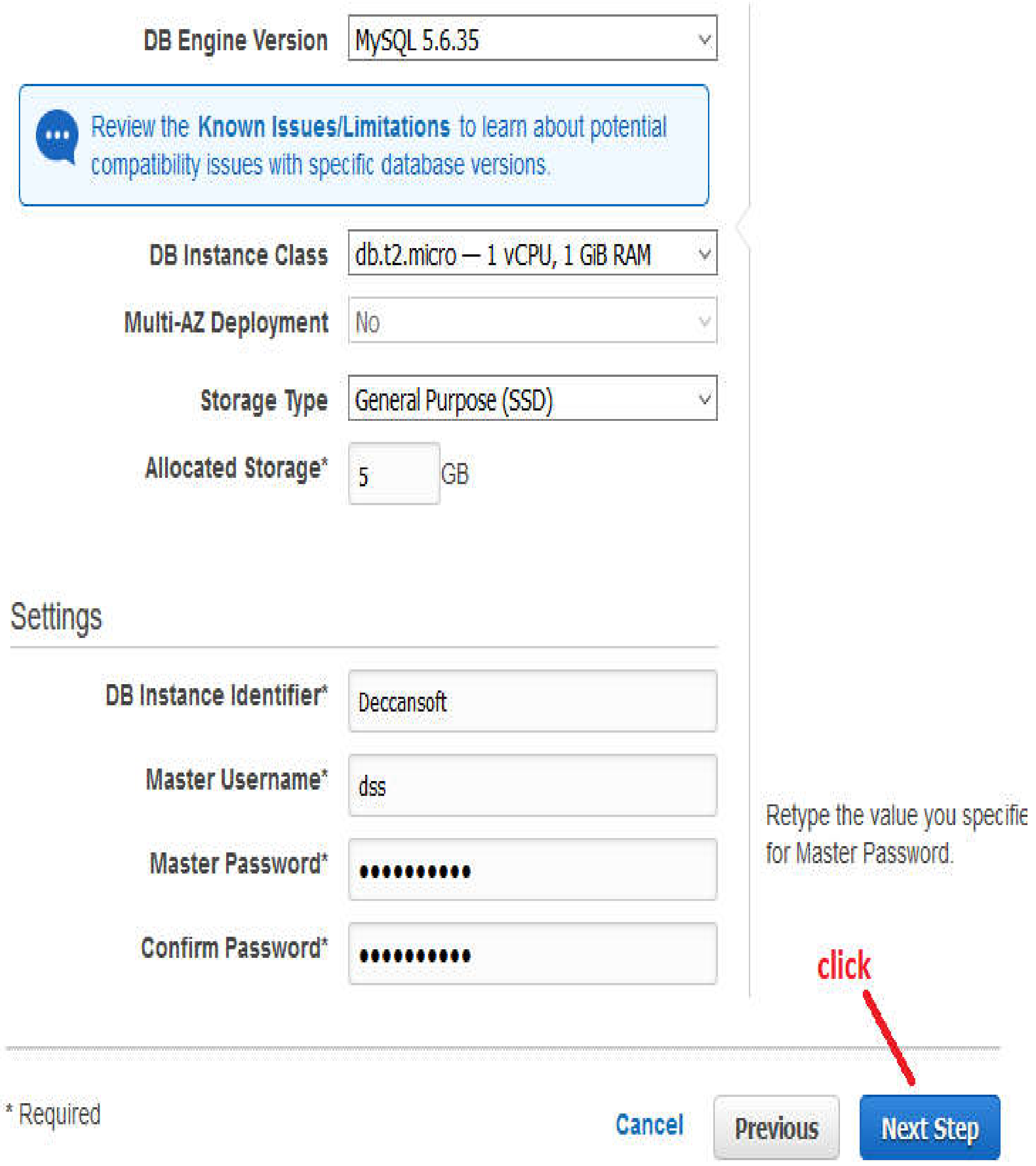
☑ Only show options that are eligible for RDS Free Tier

Instance Specifications

DB Engine	mysql
License Model	general-public-license
DB Engine Version	MySQL 5.6.35

Review the **Known Issues/Limitations** to learn about potential compatibility issues with specific database versions.

DB Instance Class	db.t2.micro — 1 vCPU, 1 GiB RAM
Multi-AZ Deployment	No
Storage Type	General Purpose (SSD)
Allocated Storage*	5 GB



DB Engine Version	MySQL 5.6.35

Review the **Known Issues/Limitations** to learn about potential compatibility issues with specific database versions.

DB Instance Class	db.t2.micro — 1 vCPU, 1 GiB RAM
Multi-AZ Deployment	No
Storage Type	General Purpose (SSD)
Allocated Storage*	5 GB

Settings

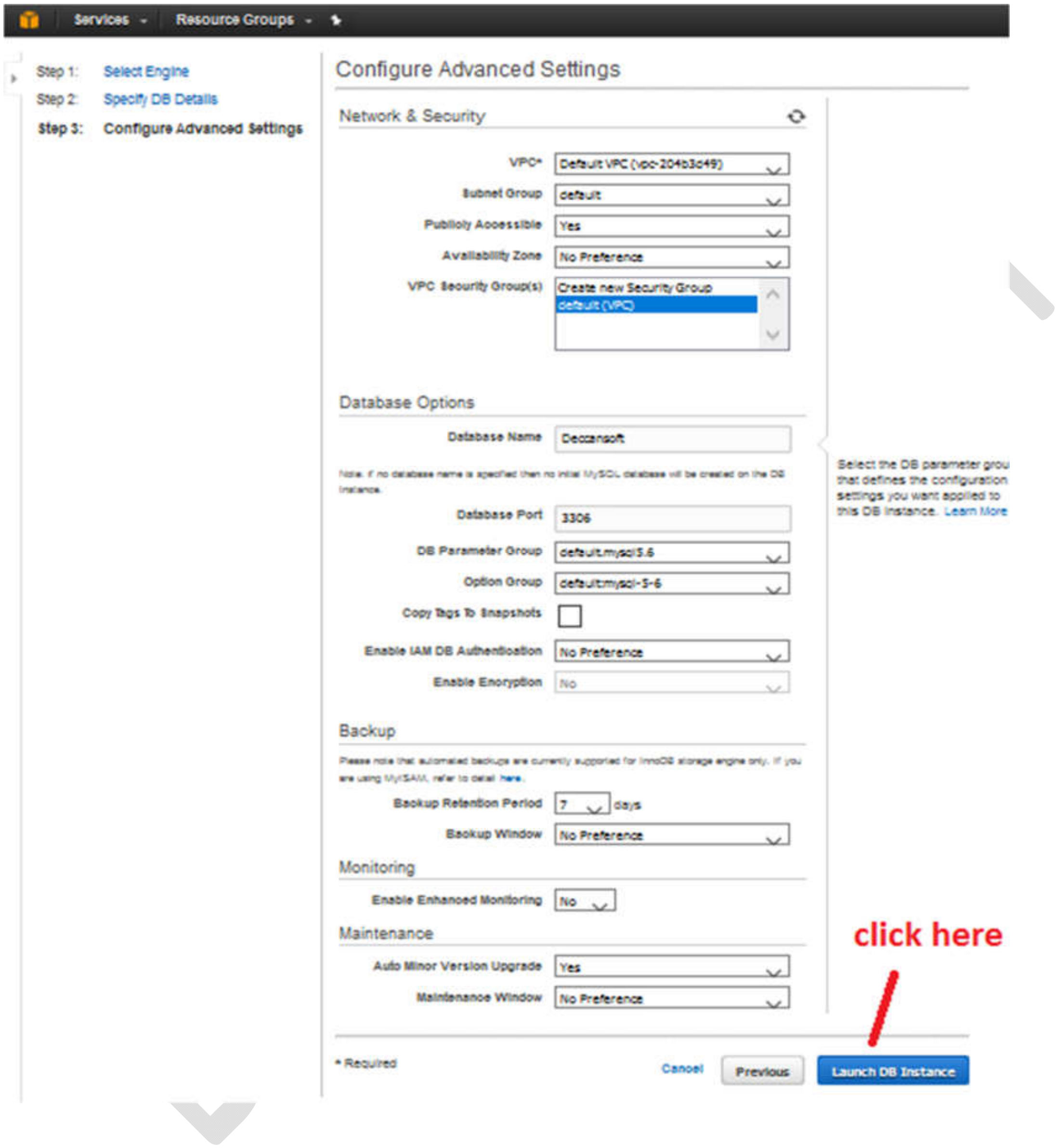
DB Instance Identifier*	Deccansoft
Master Username*	dss
Master Password*	••••••••••
Confirm Password*	••••••••••

Retype the value you specifie for Master Password.

click

* Required

Step 5: In this phase we can see the complete configuration of Database



Configure Advanced Settings

Network & Security

VPC* Default VPC (vpc-204b3d49)
Subnet Group default
Publicly Accessible Yes
Availability Zone No Preference
VPC Security Group(s) Create new Security Group / default (VPC)

Database Options

Database Name Deccansoft

Note. If no database name is specified then no initial MySQL database will be created on the DB instance.

Database Port 3306
DB Parameter Group default.mysql5.6
Option Group default:mysql-5-6
Copy Tags To Snapshots □
Enable IAM DB Authentication No Preference
Enable Encryption No

Select the DB parameter grou that defines the configuration settings you want applied to this DB instance. Learn More

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 7 days
Backup Window No Preference

Monitoring

Enable Enhanced Monitoring No

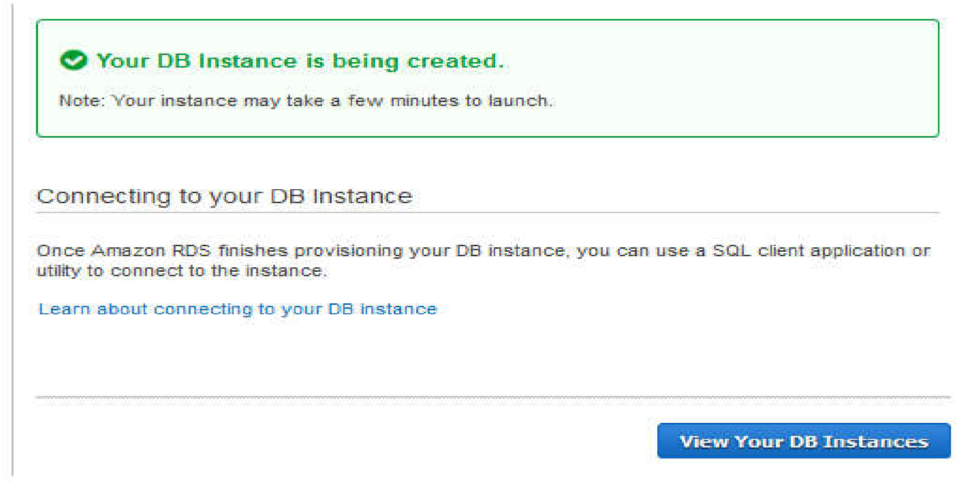
Maintenance

Auto Minor Version Upgrade Yes
Maintenance Window No Preference

* Required

click here

After launching the instance, we will find the message as below.



Your DB Instance is being created.

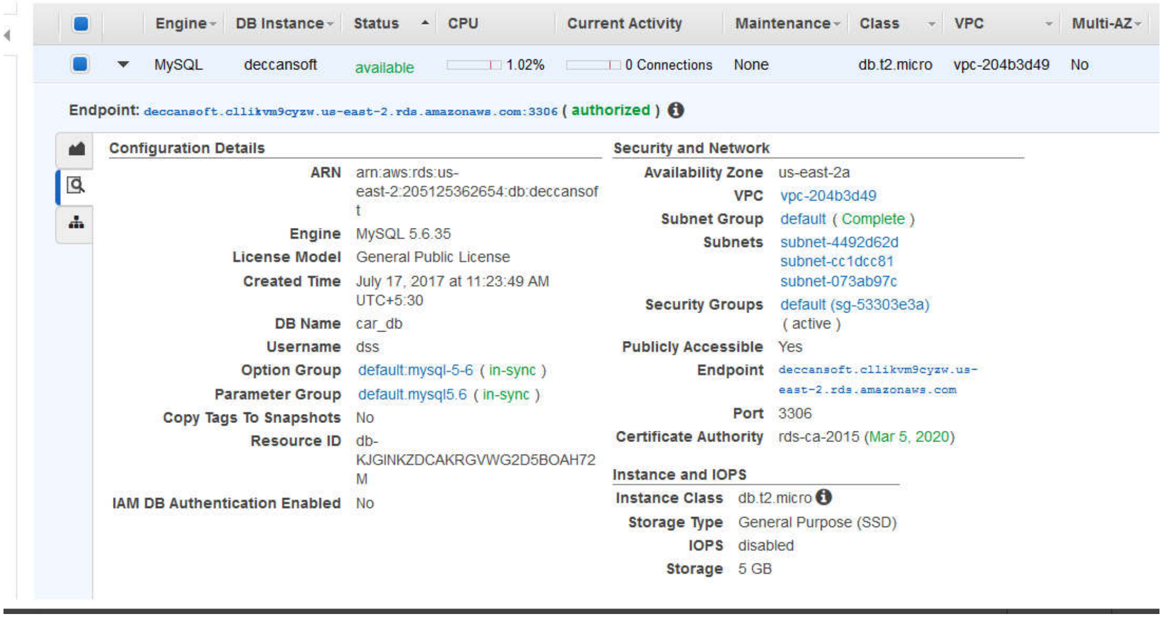
Note: Your instance may take a few minutes to launch.

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

To check out the configuration we need to click view DB instances as it is showing in below diagram.



		Engine	DB Instance	Status	CPU	Current Activity	Maintenance	Class	VPC	Multi-AZ
■	▼	MySQL	deccansoft	available	1.02%	0 Connections	None	db.t2.micro	vpc-204b3d49	No

Endpoint: deccansoft.cllikvm9cyzw.us-east-2.rds.amazonaws.com:3306 (authorized)

Configuration Details

ARN	arn:aws:rds:us-east-2:205125362654:db:deccansoft
Engine	MySQL 5.6.35
License Model	General Public License
Created Time	July 17, 2017 at 11:23:49 AM UTC+5:30
DB Name	car_db
Username	dss
Option Group	default:mysql-5-6 (in-sync)
Parameter Group	default.mysql5.6 (in-sync)
Copy Tags To Snapshots	No
Resource ID	db-KJGINKZDCAKRGVWG2D5BOAH72M
IAM DB Authentication Enabled	No

Security and Network

Availability Zone	us-east-2a
VPC	vpc-204b3d49
Subnet Group	default (Complete)
Subnets	subnet-4492d62d subnet-cc1dcc81 subnet-073ab97c
Security Groups	default (sg-53303e3a) (active)
Publicly Accessible	Yes
Endpoint	deccansoft.cllikvm9cyzw.us-east-2.rds.amazonaws.com
Port	3306
Certificate Authority	rds-ca-2015 (Mar 5, 2020)

Instance and IOPS

Instance Class	db.t2.micro
Storage Type	General Purpose (SSD)
IOPS	disabled
Storage	5 GB

So if we want to connect to database we need to pass the Endpoints the connectivity can be established.