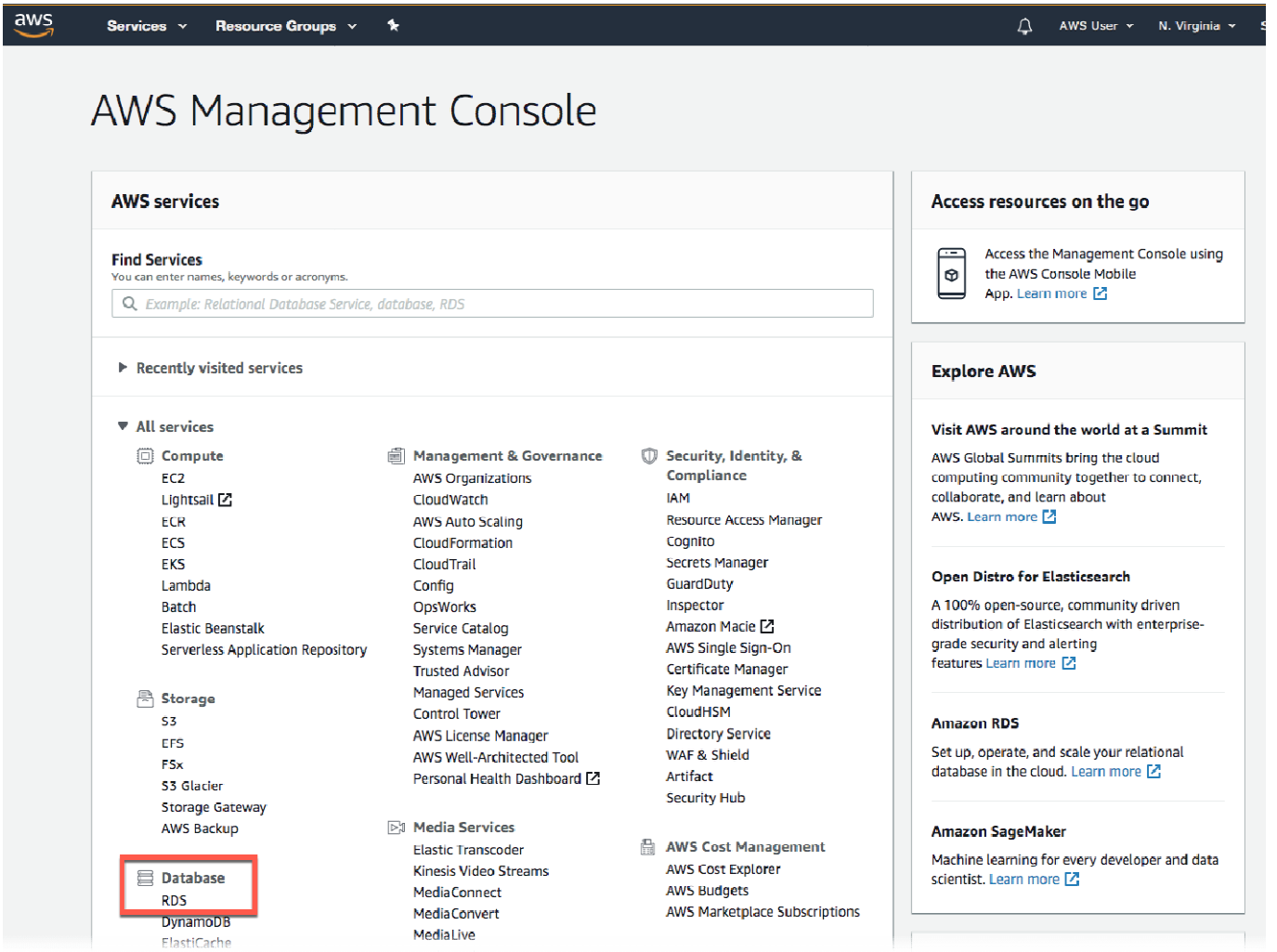
Experiment No. : 08

Title: Create and Connect to a MySQL Database: Create an environment to run your MySQL database, connect to the database, and delete the DB.

In this experiment, you will learn how to create an environment to run your MySQL database (we call this environment an *instance*), connect to the database, and delete the DB instance. We will do this using Amazon Relational Database Service (Amazon RDS) and everything done in this tutorial is free-tier eligible.

Open the AWS management console in a new browser window, so you can keep this step-by-step guide open. When this screen loads, find **RDS** under *Database* and click to open the Amazon RDS Console.



Step 1: Create a MySQL DB Instance

In this step, we will use Amazon RDS to create a MySQL DB Instance with db.t2.micro DB instance class, 20 GB of storage, and automated backups enabled with a retention period of one day. As a reminder, all of this is free tier eligible.

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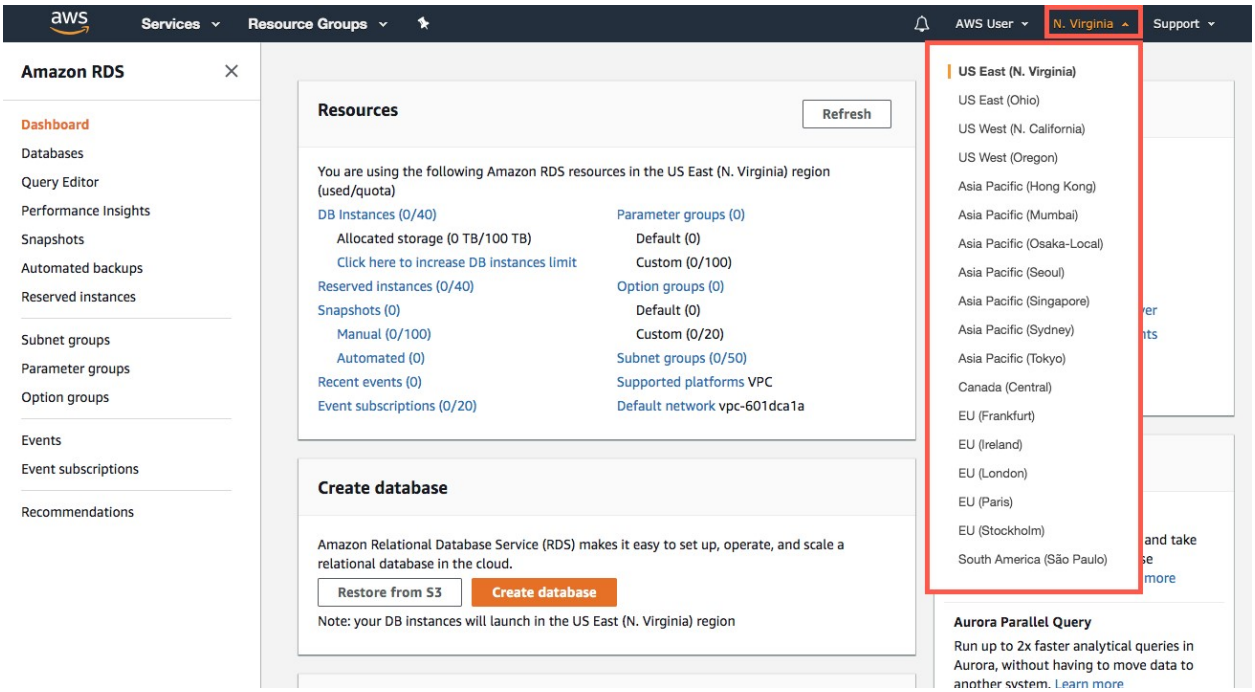
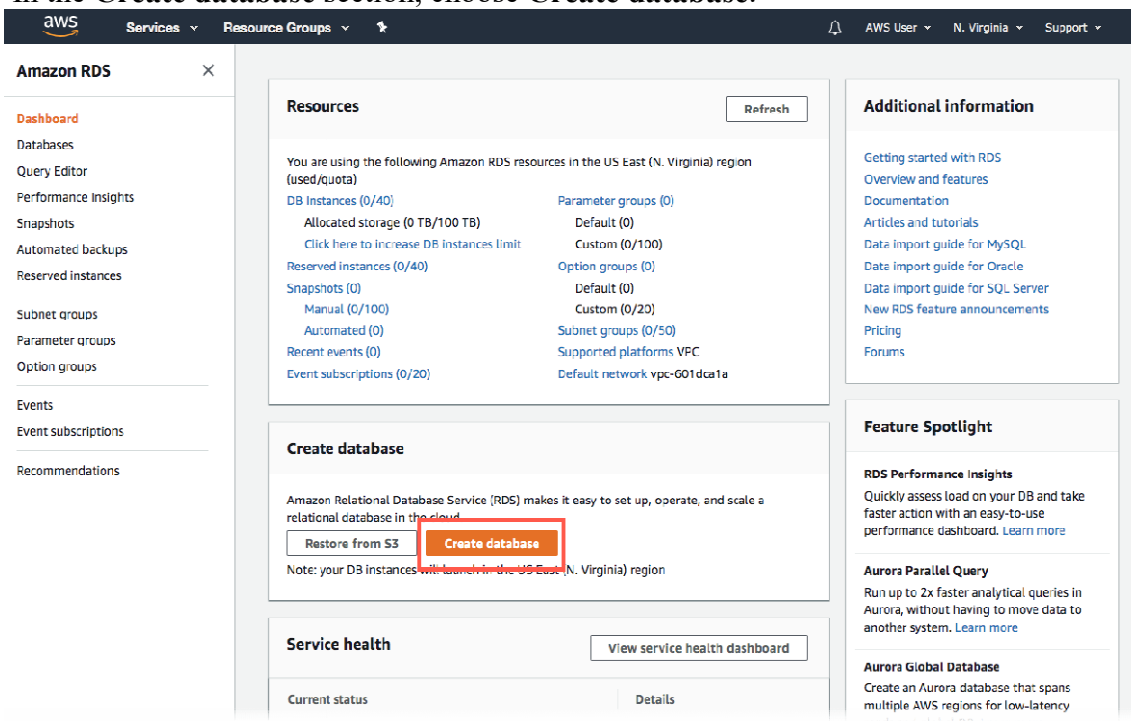
a. In the top right corner of the Amazon RDS console, select the *Region* in which you want to create the DB instance.

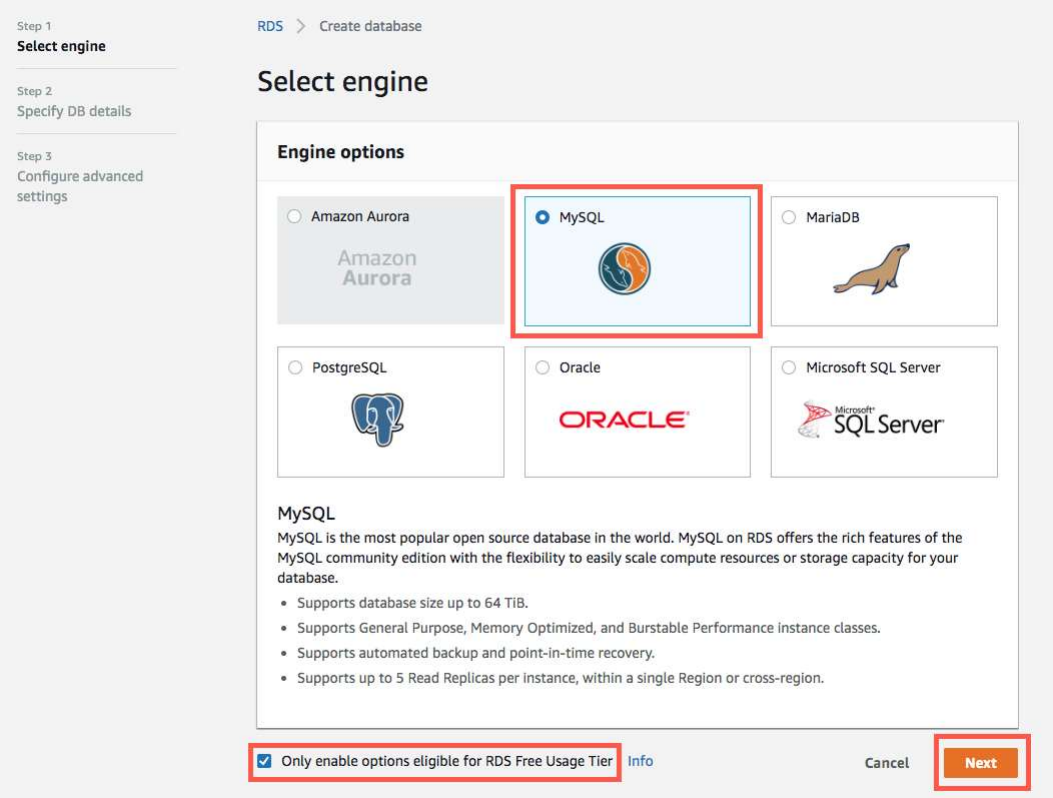
> Note: AWS Cloud resources are housed in highly available data center facilities in different areas of the world. Each Region contains multiple distinct locations called Availability Zones. You have the ability to choose which Region to host your Amazon RDS activity in.



b. In the **Create database** section, choose **Create database**.



c. You now have options to select your engine. For this tutorial, click the *MySQL icon,* choose **Only enable options eligible for RDS Free Usage Tier**, and then click **Next**.



d. You will now configure your DB instance. The list below shows the example settings you can use for this tutorial:

Instance specifications:

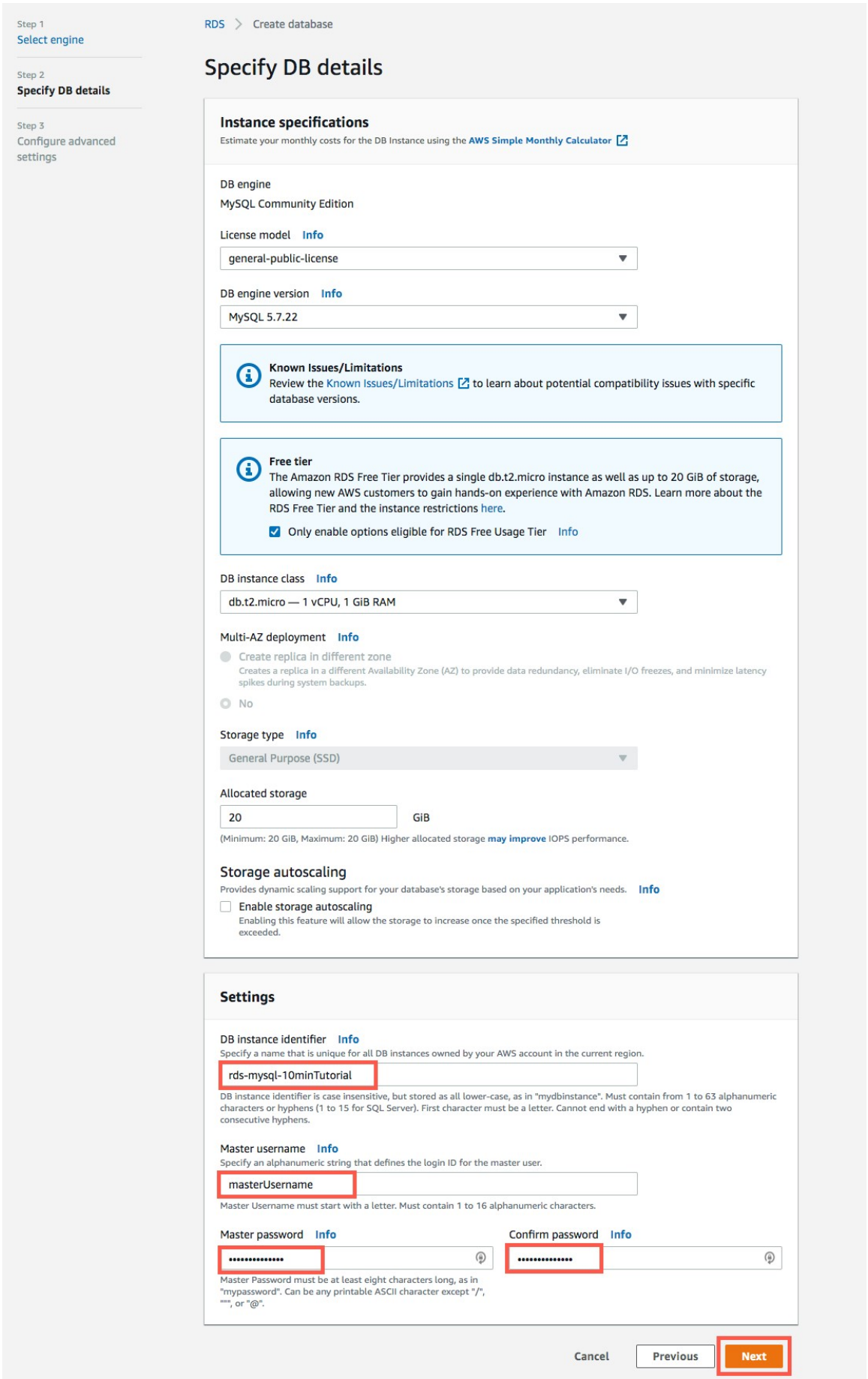
- **License model**: Select the default *general-public-license* to use the general license agreement for MySQL. MySQL has only one license model.
- **DB engine version**: Select the default version of MySQL. Note that Amazon RDS supports multiple versions of MySQL in some Regions.
- **DB instance class**: Select *db.t2.micro --- 1vCPU, 1 GIB RAM*. This equates to 1 GB memory and 1 vCPU. To see a list of supported instance classes, see Amazon RDS Product Details.
- **Multi-AZ deployment**: Note that you will have to pay for Multi-AZ deployment. Using a Multi-AZ deployment will automatically provision and maintain a synchronous standby replica in a different Availability Zone. For more information, see High Availability Deployment.
- **Storage type**: Select General Purpose (SSD). For more information about storage, see Storage for Amazon RDS.
- **Allocated storage**: Select the default of 20 to allocate 20 GB of storage for your database. You can scale up to a maximum of 16 TB with Amazon RDS for MySQL.
- **Enable storage autoscaling**: If your workload is cyclical or unpredictable, you would enable storage autoscaling to enable RDS to automatically scale up your storage when needed. This option does not apply to this tutorial.

Settings:

- **DB instance identifier**: Type a name for the DB instance that is unique for your account in the Region that you selected. For this tutorial, we will name it *rds-mysql-10minTutorial*.
- **Master username**: Type a username that you will use to log in to your DB instance. We will use *masterUsername* in this example.
- **Master password**: Type a password that contains from 8 to 41 printable ASCII characters (excluding /,", and @) for your master user password.
- **Confirm password**: Retype your password

- **Allocated Storage**: Type 5 to allocate 5 GB of storage for your database. For more information about storage allocation, see Amazon Relational Database Service Features. (switch ordering, its after storage type)

Click **Next**.


Step 1
Select engine
Step 2
Specify DB details
Step 3
Configure advanced settings
RDS > Create database
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 5.7.22
Known Issues/Limitations
Review the Known Issues/Limitations to learn about potential compatibility issues with specific database versions.
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
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
GiB
(Minimum: 20 GiB, Maximum: 20 GiB) Higher allocated storage may improve IOPS performance.
Storage autoscaling
Provides dynamic scaling support for your database's storage based on your application's needs. Info
Enable storage autoscaling
Enabling this feature will allow the storage to increase once the specified threshold is exceeded.
Settings
DB instance identifier Info
Specify a name that is unique for all DB instances owned by your AWS account in the current region.
rds-mysql-10minTutorial
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.
masterUsername
Master Username must start with a letter. Must contain 1 to 16 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 "@".
Cancel
Previous
Next

e. You are now on the **Configure advanced settings** page where you can provide additional information that RDS needs to launch your MySQL DB instance. The list below shows settings for our example DB instance.

Network & Security

- **Virtual Private Cloud (VPC**): Select *Default VPC*. For more information about VPC, see Amazon RDS and Amazon Virtual Private Cloud (VPC).
- **Subnet group**: Choose the *default* subnet group. For more information about subnet groups, see Working with DB Subnet Groups.

- **Public accessibliity:** Choose *Yes*. This will allocate an IP address for your database instance so that you can directly connect to the database from your own device.

- **Availability zone**: Choose *No preference.* See Regions and Availability Zones for more details.

- **VPC security groups**: Select *Create new VPC security group*. This will create a security group that will allow connection from the IP address of the device that you are currently using to the database created.

Database options

- **Database name:** Type a database name that is 1 to 64 alpha-numeric characters. If you do not provide a name, Amazon RDS will not automatically create a database on the DB instance you are creating.

- **Port**: Leave the default value of *3306.*

- **DB parameter group**: Leave the default value of *default.mysql5.6*. For more information, see Working with DB Parameter Groups.

- **Option group**: Select the default value of *default:mysql5.7.* Amazon RDS uses option groups to enable and configure additional features. For more information, see Working with Option Groups.

- **IAM DB authentication**: Select *Disable*. This option allows you to manage your database credentials using AWS IAM users and groups.

Encryption

This option is not available in the free tier. For more information, see Encrypting Amazon RDS Resources.

Backup

- **Backup retention period:** You can choose the number of days to retain the backup you take. For this tutorial, set this value to *1 day.*

- **Backup window:** Use the default of *No preference*.

Monitoring

- **Enhanced Monitoring:** Select *Disable enhanced monitoring* to stay within the free tier. Enabling enhanced monitoring will give you metrics in real time for the operating system (OS) that your DB instance runs on. For more information, see Viewing DB Instance Metrics.

Performance Insights

Select*Disable Performance Insights* for this tutorial.

Maintenance

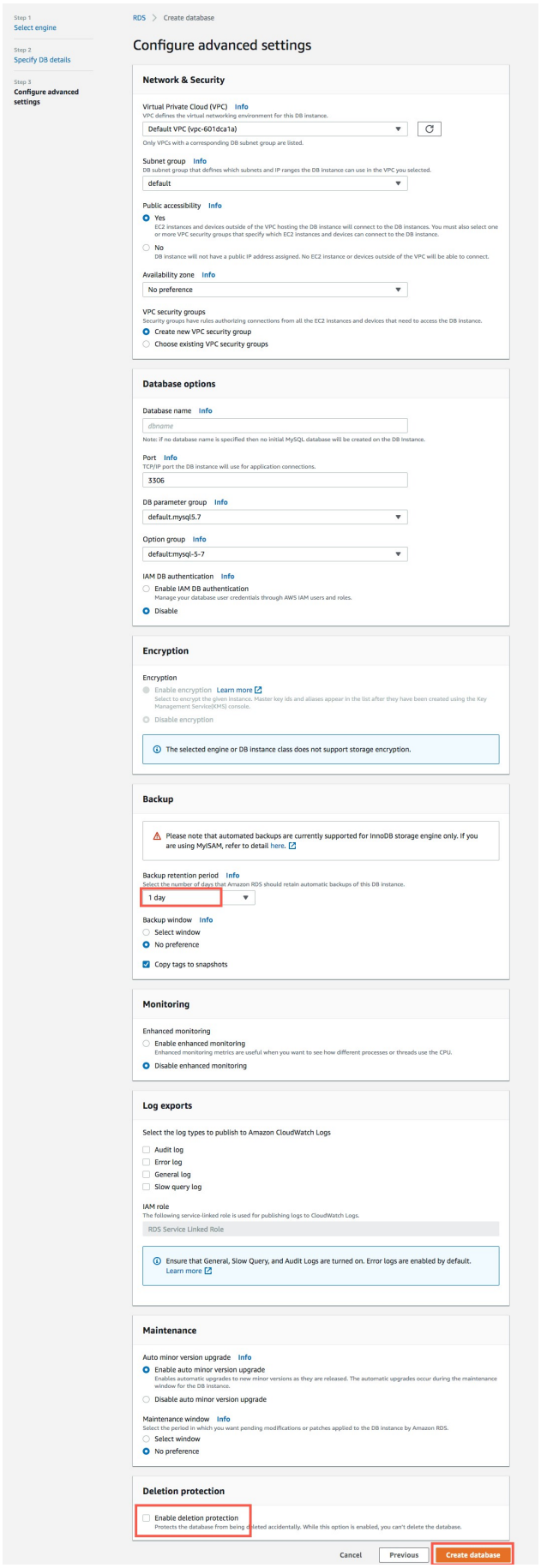
- **Auto minor version upgrade:** Select *Enable auto minor version upgrade* to receive automatic updates when they become available.

- **Maintenance Window:** Select *No preference.*

Deletion protection

Clear *Enable deletion protection* for this tutorial. When this option is enabled, you can't delete the database.

Click **Create database**.

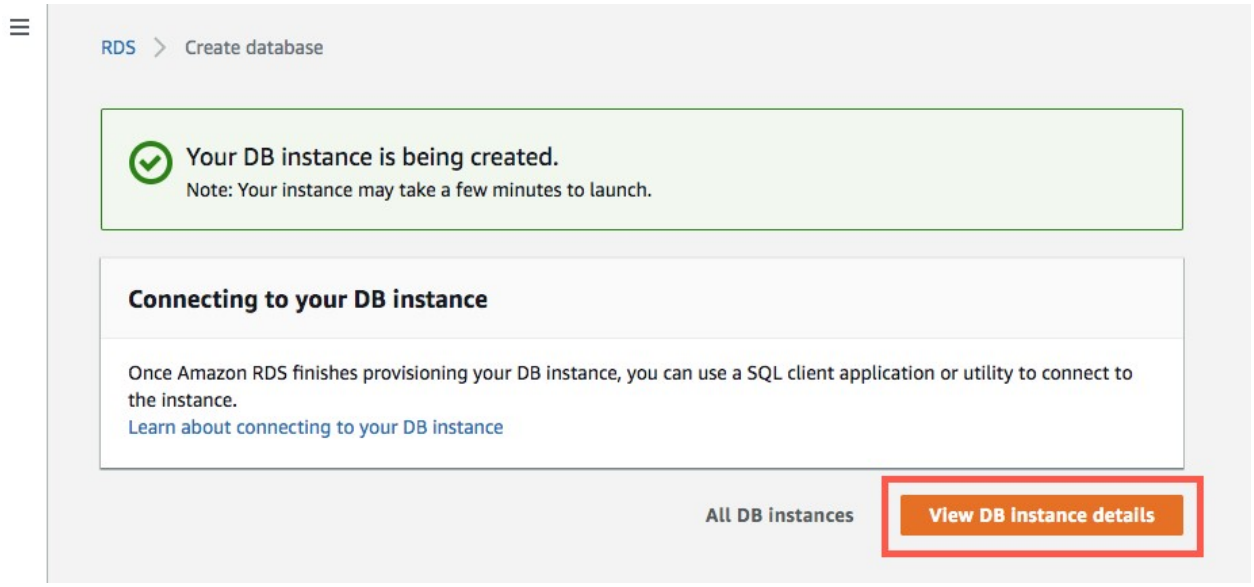

Step 1
Select engine
Step 2
Specify DB details
Step 3
Configure advanced settings
RDS > Create database
Configure advanced settings
Network & Security
Virtual Private Cloud (VPC) Info
VPC defines the virtual networking environment for this DB instance.
Default VPC (vpc-601dca1a)
Only VPCs with a corresponding 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
Choose existing VPC security groups
Database options
Database name Info
dbname
Note: if no database name is specified then no initial MySQL database will be created on the DB instance.
Port Info
TCP/IP port the DB instance will use for application connections.
3306
DB parameter group Info
default.mysql5.7
Option group Info
default:mysql-5-7
IAM DB authentication Info
Enable IAM DB authentication
Manage your database user credentials through AWS IAM users and roles.
Disable
Encryption
Encryption
Enable encryption Learn more
Select to encrypt the given instance. Master key ids and aliases appear in the list after they have been created using the Key Management Service(KMS) console.
Disable encryption
The selected engine or DB instance class does not support storage encryption.
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.
1 day
Backup window Info
Select window
No preference
Copy tags to snapshots
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
Log exports
Select the log types to publish to Amazon CloudWatch Logs
Audit log
Error log
General log
Slow query log
IAM role
The following service-linked role is used for publishing logs to CloudWatch Logs.
RDS Service Linked Role
Ensure that General, Slow Query, and Audit Logs are turned on. Error logs are enabled by default.
Learn more
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.
Cancel
Previous
Create database

f. Your DB Instance is now being created. Click **View Your DB Instances**.

Note: Depending on the DB instance class and storage allocated, it could take several minutes for the new DB instance to become available.

The new DB instance appears in the list of DB instances on the RDS console. The DB instance will have a status of *creating* until the DB instance is created and ready for use. When the state changes to *available*, you can connect to a database on the DB instance.

Feel free to move on to the next step as you wait for the DB instance to become available.

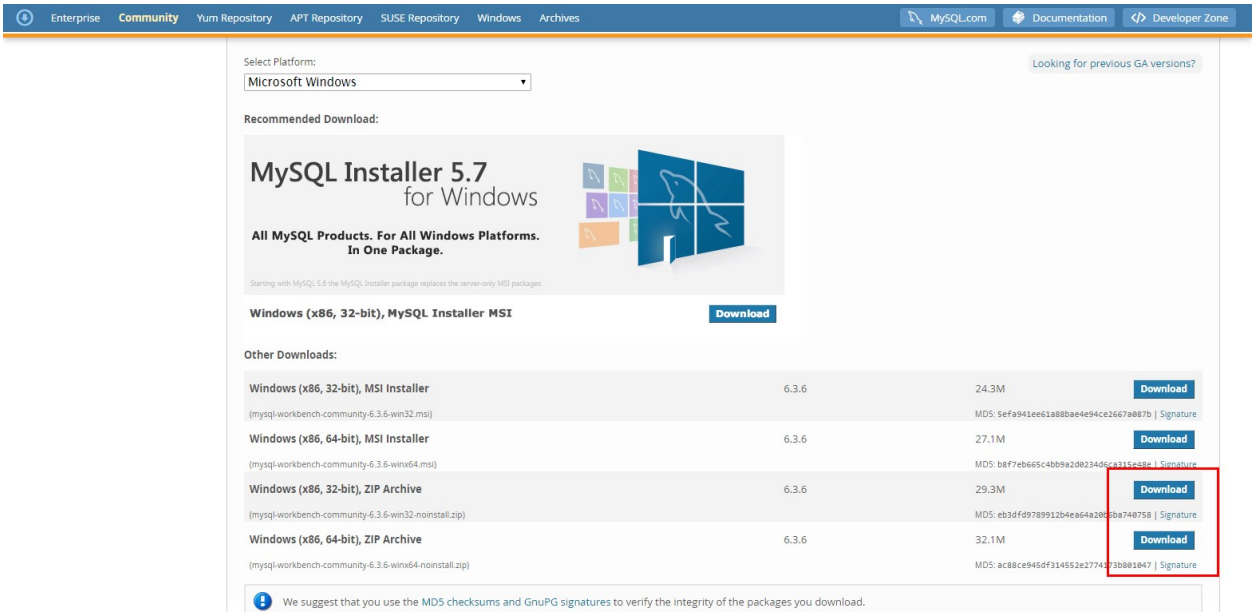


Step 2: Download a SQL Client

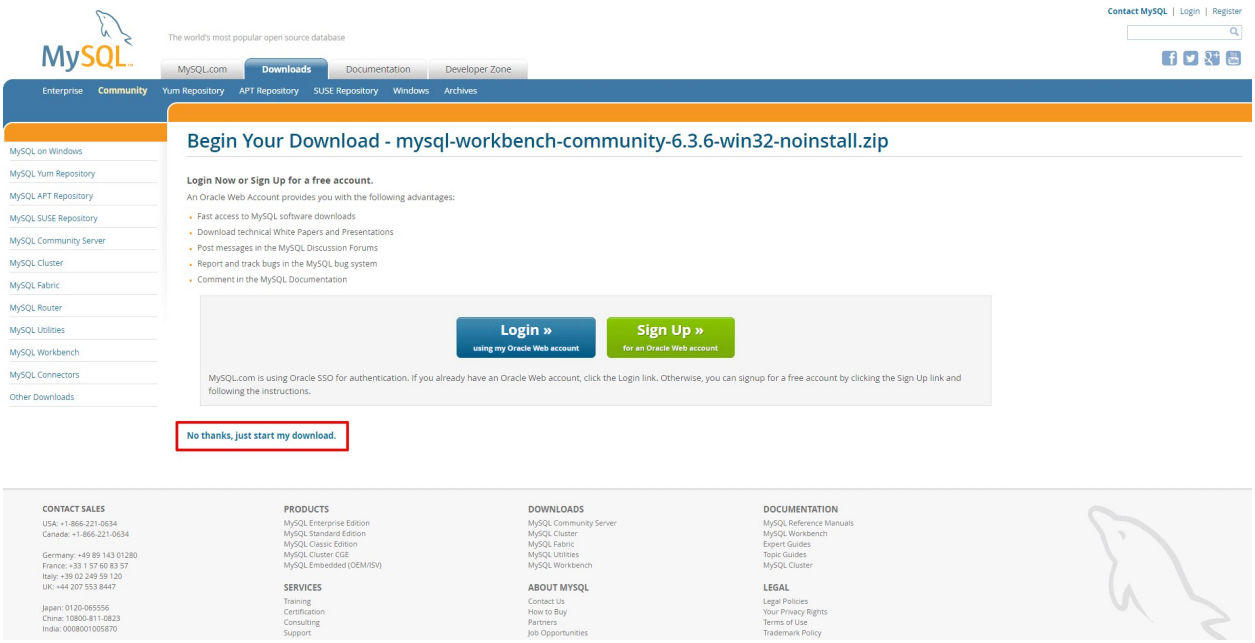
Once the database instance creation is complete and the status changes to available, you can connect to a database on the DB instance using any standard SQL client. In this step, we will download MySQL Workbench, which is a popular SQL client.

a. Go to the Download MySQL Workbench page to download and install MySQL Workbench. For more information on using MySQL, see the MySQL Documentation.

Note: Remember to run MySQL Workbench from the same device from which you created the DB Instance. The security group your database is placed in is configured to allow connection only from the device from which you created the DB instance.



b. You will be prompted to login, sign up, or begin your download. You can click **No thanks, just start my download** for a quick download.



Step 3: Connect to the MySQL Database

In this step, we will connect to the database you created using MySQL Workbench.

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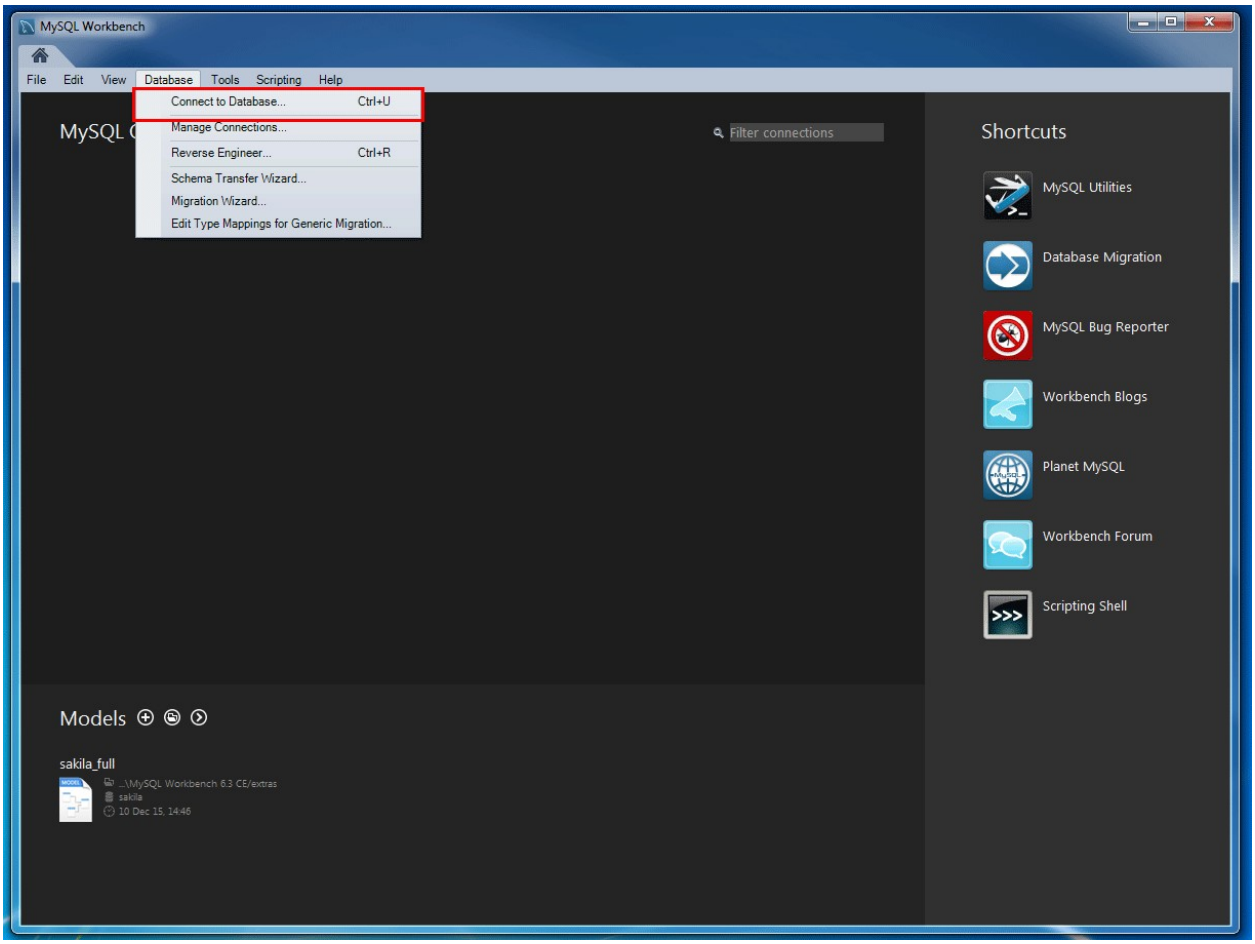
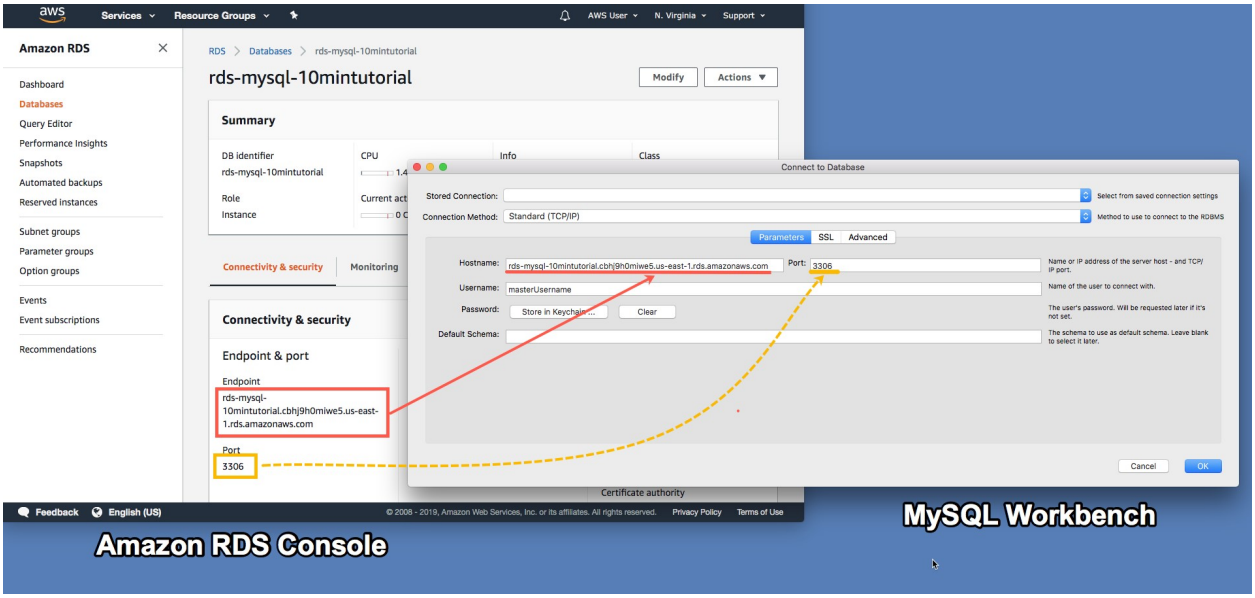
a. Launch the MySQL Workbench application and go to **Database > Connect to Database** (Ctrl+U) from the menu bar.



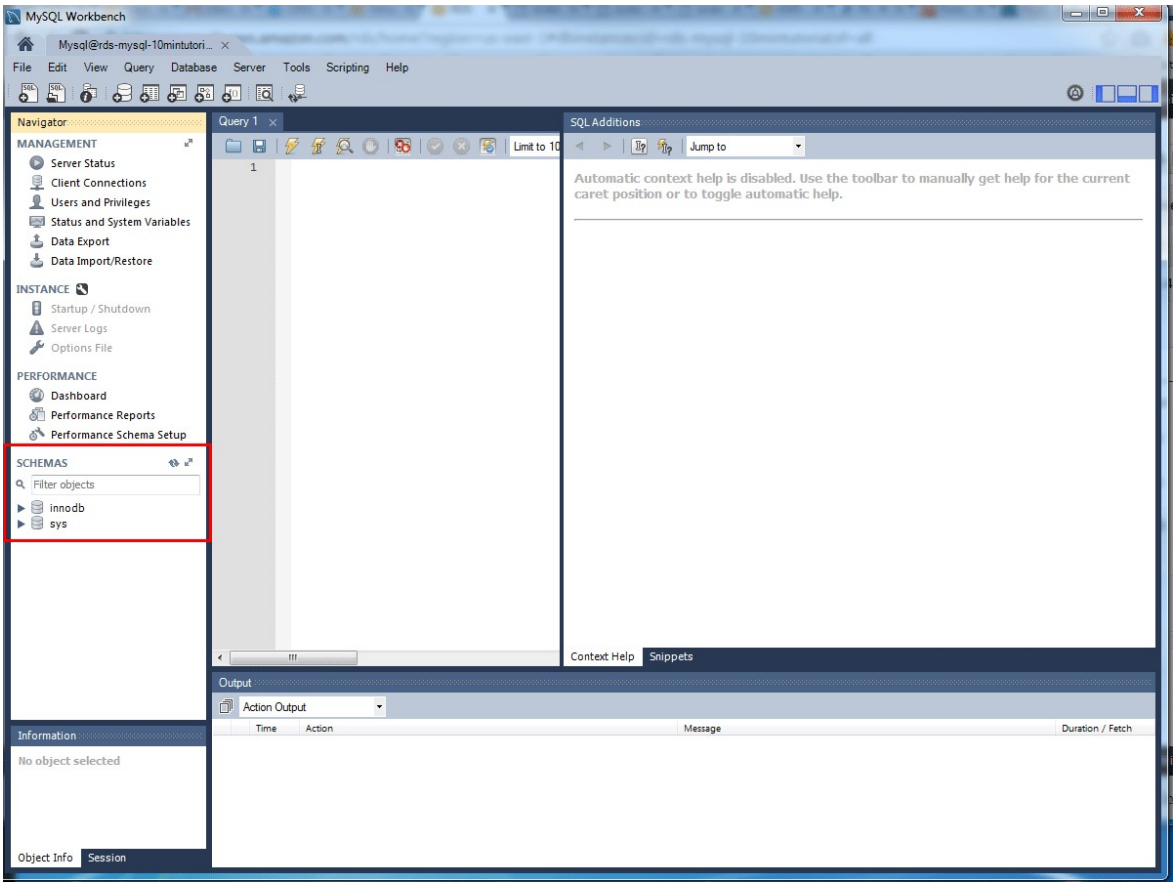
b. A dialog box appears. Enter the following:

- **Hostname:** You can find your hostname on the Amazon RDS console as shown in the screenshot to the right.
- **Port**: The default value should be 3306.
- **Username**: Type in the username you created for the Amazon RDS database. In this tutorial, it is '*masterUsername*.'
- **Password**: Click *Store in Vault* (or *Store in Keychain* on macOS) and enter the password that you used when creating the Amazon RDS database.

Click **OK**



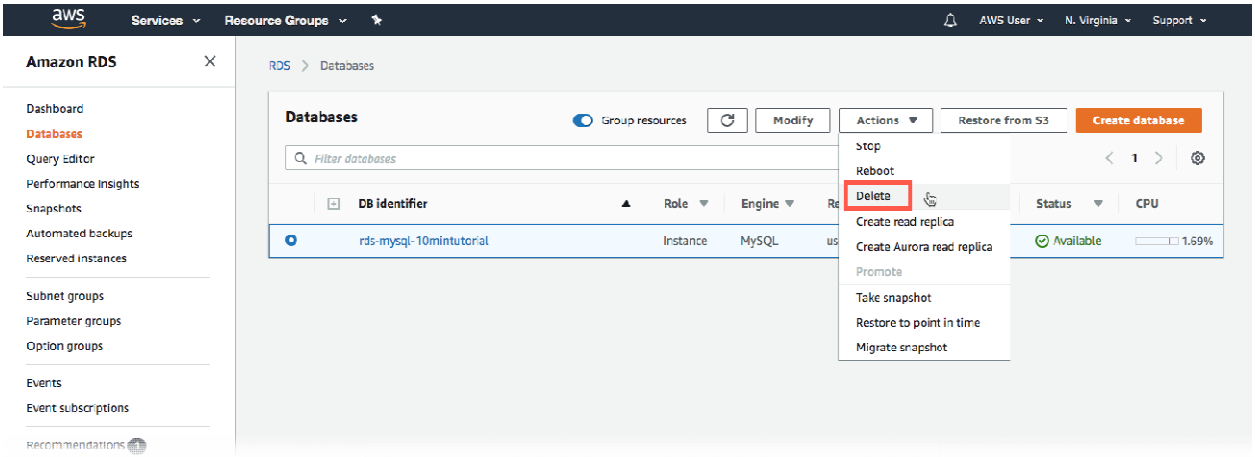
c. You are now connected to the database! On the MySQL Workbench, you will see various schema objects available in the database. Now you can start creating tables, insert data, and run queries.



Step 4: Delete the DB Instance

You can easily delete the MySQL DB Instance from the Amazon RDS console. It is a best practice to delete instances that you are no longer using so that you don't keep getting charged for them.

a. Go back to your Amazon RDS Console. Select **Databases**, choose the instance that you want to delete, and then select **Delete** from the **Actions** dropdown menu.



b. You are asked to create a final snapshot and to confirm the deletion. For our example, do not create a final snapshot, acknowledge that you want to delete the instance, and then click **Delete.**

Note: Deleting your DB Instance may take a few minutes