CLOUD COMPUTING PROJECT
CUSTOMER DATA DATABASE MIGRATION FROM ON-PREMISE TO CLOUD

OBJECTIVES:

After performing the project, the user should be able to:

1. Design a platform for recording, organizing, and analytics on customers transactions data received through application(s).

2. The data stored in the DB must be organized and maintained in such a way that it caters to the needs of the future. Derive insights from the results to device better strategies and enhance customers experience.

THEORY:

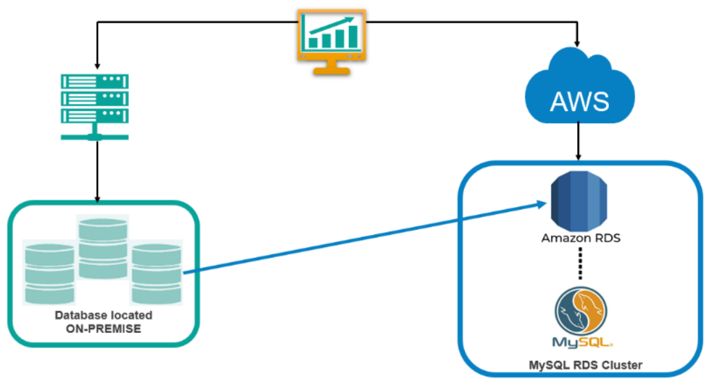
You can use AWS Database Migration Service (AWS DMS) to migrate your data to and from most widely used commercial and open-source databases such as Oracle, PostgreSQL, Microsoft SQL Server, Amazon Redshift, Amazon Aurora, MariaDB, and MySQL. The service supports homogeneous migrations such as Oracle to Oracle, and also heterogeneous migrations between different database platforms, such as Oracle to MySQL or MySQL to Amazon Aurora with MySQL compatibility. The source or target database must be on an AWS service.

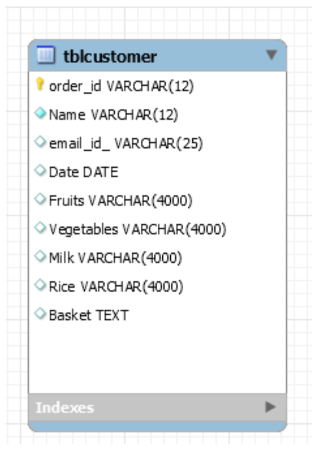
This pattern provides guidance for migrating an on-premises MySQL database to a MySQL database on an Amazon RDS. The pattern discusses the use of AWS Database Migration Service tools such as mysqldbcopy, mysqldump and mysql workbench migration methodology.

SOFTWARE NEEDED

MySQL Workbench
AWS RDS MySQL Environment
Data to be used

MIGRATION DESIGN AND SCHEMA DESIGN





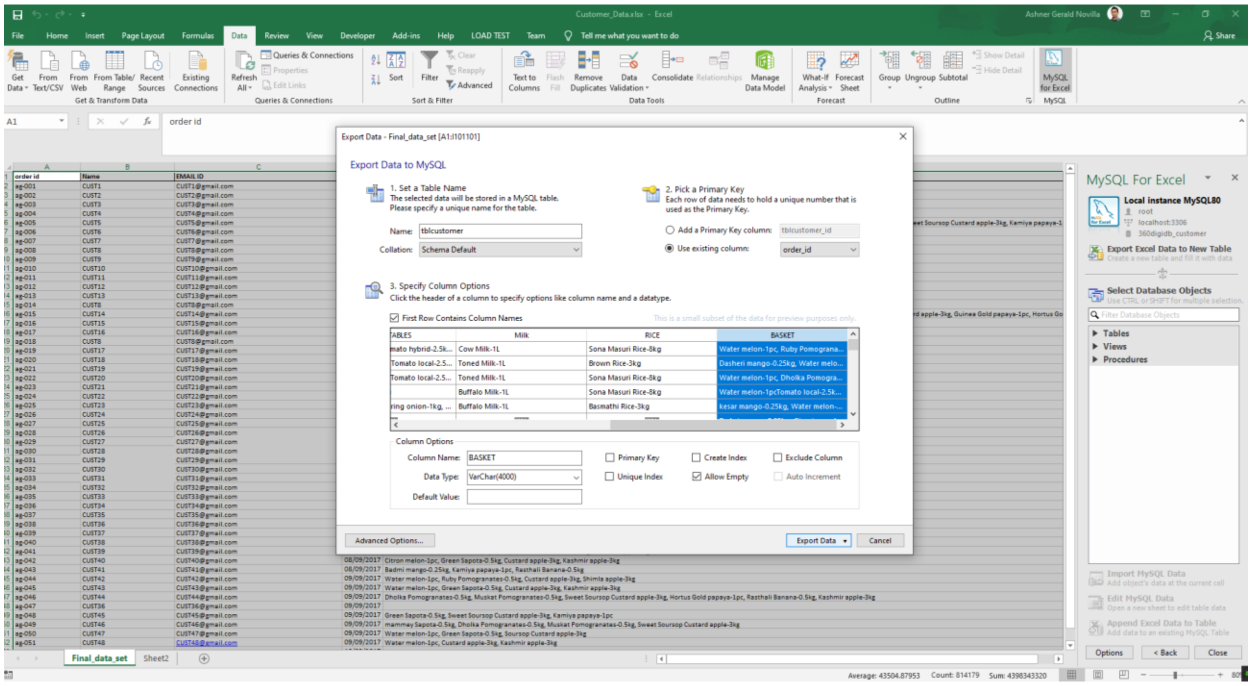
tblcustomer
order_id VARCHAR(12)
Name VARCHAR(12)
email_id_ VARCHAR(25)
Date DATE
Fruits VARCHAR(4000)
Vegetables VARCHAR(4000)
Milk VARCHAR(4000)
Rice VARCHAR(4000)
Basket TEXT
Indexes

1. Steps in Importing file from .csv file to MySQL On-Premise

1. Start Excel, select the **Data** menu tab, and then click **MySQL for Excel** to open the MySQL for Excel task pane.
2. From the **Open a MySQL Connection** area in the task pane, double-click an existing local or remote connection to display the available database schemas.
3. Select a schema from the list and click **Next** to display all database objects in the schema (tables, views, and procedures).
4. Select the table, view, or procedure with data to import and then click **Import MySQL Data**. A preview window displays the selected data and provides **Options** and Advanced Options to be used during the import operation.
5. Click **Import** to finish the operation.

The Import Data windows provides a preview of the columns to select during the import operation. You can specify both the columns and rows to import. As the following figure shows, the preview includes a small subset of the rows for the selected table or view.

Figure 1.1 Importing table data with MySQL for Excel



Export Data - Final_data_set [A1:I101101]

Export Data to MySQL

1. Set a Table Name
The selected data will be stored in a MySQL table. Please specify a unique name for the table.

Name: tblcustomer
Collation: Schema Default

2. Pick a Primary Key
Each row of data needs to hold a unique number that is used as the Primary Key.

( ) Add a Primary Key column: tblcustomer_id
(●) Use existing column: order_id

3. Specify Column Options
Click the header of a column to specify options like column name and a datatype.

☑ First Row Contains Column Names

This is a small subset of the data for preview purposes only.

ABLES	Milk	RICE	BASKET
mato hybrid-2.5k...	Cow Milk-1L	Sona Masuri Rice-8kg	Water melon-1pc, Ruby Pomograna...
Tomato local-2.5...	Toned Milk-1L	Brown Rice-3kg	Dasheri mango-0.25kg, Water melo...
Tomato local-2.5...	Toned Milk-1L	Sona Masuri Rice-8kg	Water melon-1pc, Dholka Pomogra...
	Buffalo Milk-1L	Sona Masuri Rice-8kg	Water melon-1pcTomato local-2.5k...
ring onion-1kg, ...	Buffalo Milk-1L	Basmathi Rice-3kg	kesar mango-0.25kg, Water melon-...

Column Options

Column Name: BASKET
Data Type: VarChar(4000)
Default Value:

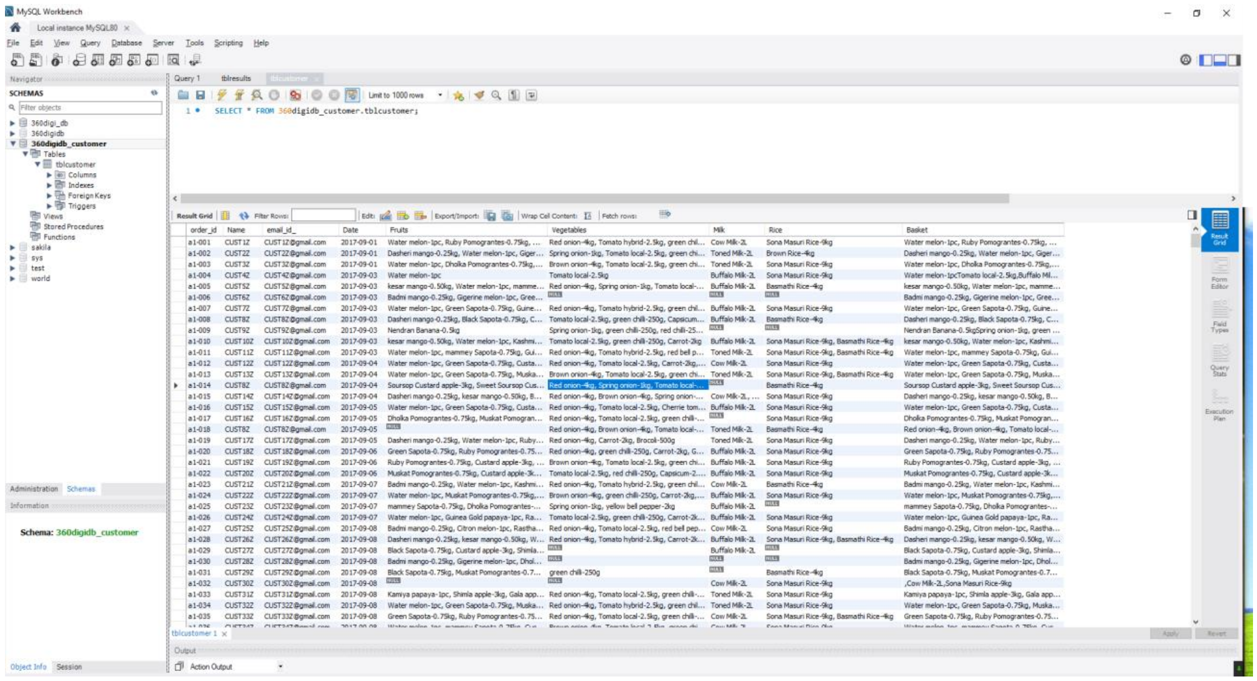
☐ Primary Key ☐ Create Index ☐ Exclude Column
☐ Unique Index ☑ Allow Empty ☐ Auto Increment

Advanced Options... Export Data Cancel

MySQL For Excel
Local instance MySQL80
root
localhost:3306
360digidb_customer
Export Excel Data to New Table
Select Database Objects
Tables
Views
Procedures
Import MySQL Data
Edit MySQL Data
Append Excel Data to Table
Options < Back Close

Average: 43504.87953 Count: 814179 Sum: 4398343320

Figure 1.2 Importing table data with MySQL for Excel Successful



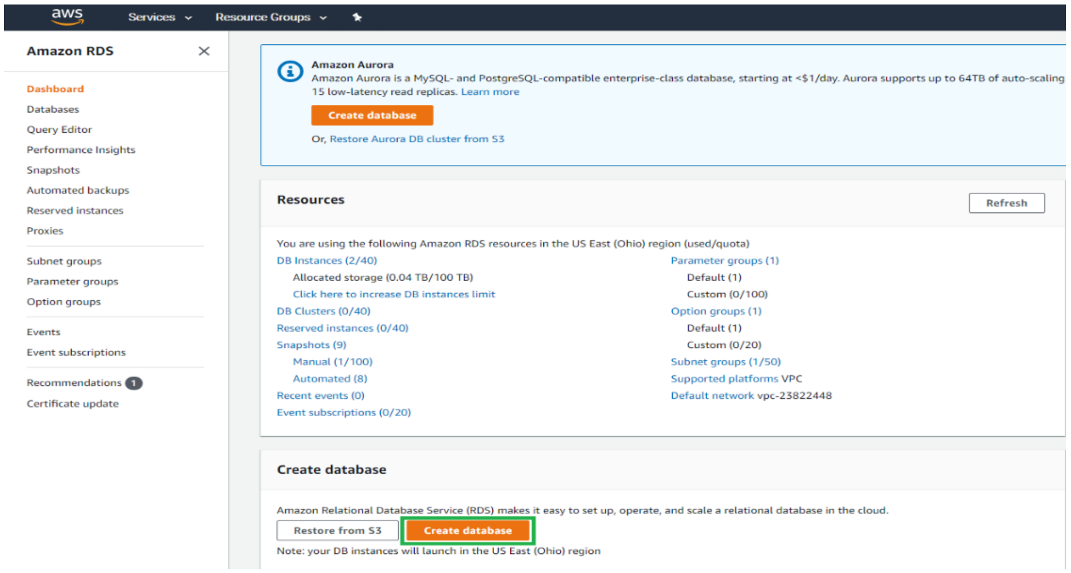
```
SELECT * FROM 360digidb_customer.tblcustomer;
```

order_id	Name	email_id_	Date	Fruits	Vegetables	Milk	Rice	Basket
a1-001	CUST1Z	CUST1Z@gmail.com	2017-09-01	Water melon-1pc, Ruby Pomograntes-0.75kg, ...	Red onion-4kg, Tomato hybrid-2.5kg, green chil...	Cow Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Ruby Pomograntes-0.75kg, ...
a1-002	CUST2Z	CUST2Z@gmail.com	2017-09-01	Dasheri mango-0.25kg, Water melon-1pc, Giger...	Spring onion-1kg, Tomato local-2.5kg, green chi...	Toned Milk-2L	Brown Rice-4kg	Dasheri mango-0.25kg, Water melon-1pc, Giger...
a1-003	CUST3Z	CUST3Z@gmail.com	2017-09-01	Water melon-1pc, Dholka Pomograntes-0.75kg,...	Brown onion-4kg, Tomato local-2.5kg, green chi...	Toned Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Dholka Pomograntes-0.75kg,...
a1-004	CUST4Z	CUST4Z@gmail.com	2017-09-03	Water melon-1pc	Tomato local-2.5kg	Buffalo Milk-2L	Sona Masuri Rice-9kg	Water melon-1pcTomato local-2.5kg,Buffalo Mil...
a1-005	CUST5Z	CUST5Z@gmail.com	2017-09-03	kesar mango-0.50kg, Water melon-1pc, mamme...	Red onion-4kg, Spring onion-1kg, Tomato local-...	Buffalo Milk-2L	Basmathi Rice-4kg	kesar mango-0.50kg, Water melon-1pc, mamme...
a1-006	CUST6Z	CUST6Z@gmail.com	2017-09-03	Badmi mango-0.25kg, Gigerine melon-1pc, Gree...	NULL	NULL	NULL	Badmi mango-0.25kg, Gigerine melon-1pc, Gree...
a1-007	CUST7Z	CUST7Z@gmail.com	2017-09-03	Water melon-1pc, Green Sapota-0.75kg, Guine...	Red onion-4kg, Tomato hybrid-2.5kg, green chil...	Buffalo Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Green Sapota-0.75kg, Guine...
a1-008	CUST8Z	CUST8Z@gmail.com	2017-09-03	Dasheri mango-0.25kg, Black Sapota-0.75kg, C...	Tomato local-2.5kg, green chili-250g, Capsicum...	Buffalo Milk-2L	Basmathi Rice-4kg	Dasheri mango-0.25kg, Black Sapota-0.75kg, C...
a1-009	CUST9Z	CUST9Z@gmail.com	2017-09-03	Nendran Banana-0.5kg	Spring onion-1kg, green chili-250g, red chili-25...	NULL	NULL	Nendran Banana-0.5kgSpring onion-1kg, green ...
a1-010	CUST10Z	CUST10Z@gmail.com	2017-09-03	kesar mango-0.50kg, Water melon-1pc, Kashmi...	Tomato local-2.5kg, green chili-250g, Carrot-2kg	Buffalo Milk-2L	Sona Masuri Rice-9kg, Basmathi Rice-4kg	kesar mango-0.50kg, Water melon-1pc, Kashmi...
a1-011	CUST11Z	CUST11Z@gmail.com	2017-09-03	Water melon-1pc, mammey Sapota-0.75kg, Gui...	Red onion-4kg, Tomato hybrid-2.5kg, red bell p...	Toned Milk-2L	Sona Masuri Rice-9kg, Basmathi Rice-4kg	Water melon-1pc, mammey Sapota-0.75kg, Gui...
a1-012	CUST12Z	CUST12Z@gmail.com	2017-09-04	Water melon-1pc, Green Sapota-0.75kg, Custa...	Red onion-4kg, Tomato local-2.5kg, Carrot-2kg,...	Cow Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Green Sapota-0.75kg, Custa...
a1-013	CUST13Z	CUST13Z@gmail.com	2017-09-04	Water melon-1pc, Green Sapota-0.75kg, Muska...	Brown onion-4kg, Tomato local-2.5kg, green chi...	Toned Milk-2L	Sona Masuri Rice-9kg, Basmathi Rice-4kg	Water melon-1pc, Green Sapota-0.75kg, Muska...
a1-014	CUST8Z	CUST8Z@gmail.com	2017-09-04	Soursop Custard apple-3kg, Sweet Soursop Cus...	Red onion-4kg, Spring onion-1kg, Tomato local-...	NULL	Basmathi Rice-4kg	Soursop Custard apple-3kg, Sweet Soursop Cus...
a1-015	CUST14Z	CUST14Z@gmail.com	2017-09-04	Dasheri mango-0.25kg, kesar mango-0.50kg, B...	Red onion-4kg, Brown onion-4kg, Spring onion-...	Cow Milk-2L, ...	Sona Masuri Rice-9kg	Dasheri mango-0.25kg, kesar mango-0.50kg, B...
a1-016	CUST15Z	CUST15Z@gmail.com	2017-09-05	Water melon-1pc, Green Sapota-0.75kg, Custa...	Red onion-4kg, Tomato local-2.5kg, Cherrie tom...	Buffalo Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Green Sapota-0.75kg, Custa...
a1-017	CUST16Z	CUST16Z@gmail.com	2017-09-05	Dholka Pomograntes-0.75kg, Muskat Pomogran...	Red onion-4kg, Tomato local-2.5kg, green chili-...	NULL	Sona Masuri Rice-9kg	Dholka Pomograntes-0.75kg, Muskat Pomogran...
a1-018	CUST8Z	CUST8Z@gmail.com	2017-09-05	NULL	Red onion-4kg, Brown onion-4kg, Tomato local-...	Toned Milk-2L	Basmathi Rice-4kg	Red onion-4kg, Brown onion-4kg, Tomato local-...
a1-019	CUST17Z	CUST17Z@gmail.com	2017-09-05	Dasheri mango-0.25kg, Water melon-1pc, Ruby...	Red onion-4kg, Carrot-2kg, Brocoli-500g	Toned Milk-2L	Sona Masuri Rice-9kg	Dasheri mango-0.25kg, Water melon-1pc, Ruby...
a1-020	CUST18Z	CUST18Z@gmail.com	2017-09-06	Green Sapota-0.75kg, Ruby Pomograntes-0.75...	Red onion-4kg, green chili-250g, Carrot-2kg, G...	Buffalo Milk-2L	Sona Masuri Rice-9kg	Green Sapota-0.75kg, Ruby Pomograntes-0.75...
a1-021	CUST19Z	CUST19Z@gmail.com	2017-09-06	Ruby Pomograntes-0.75kg, Custard apple-3kg, ...	Brown onion-4kg, Tomato local-2.5kg, green chi...	Buffalo Milk-2L	Sona Masuri Rice-9kg	Ruby Pomograntes-0.75kg, Custard apple-3kg, ...
a1-022	CUST20Z	CUST20Z@gmail.com	2017-09-06	Muskat Pomograntes-0.75kg, Custard apple-3k...	Tomato local-2.5kg, red chili-250g, Capsicum-2....	Buffalo Milk-2L	Sona Masuri Rice-9kg	Muskat Pomograntes-0.75kg, Custard apple-3k...
a1-023	CUST21Z	CUST21Z@gmail.com	2017-09-07	Badmi mango-0.25kg, Water melon-1pc, Kashmi...	Red onion-4kg, Tomato hybrid-2.5kg, green chil...	Cow Milk-2L	Basmathi Rice-4kg	Badmi mango-0.25kg, Water melon-1pc, Kashmi...
a1-024	CUST22Z	CUST22Z@gmail.com	2017-09-07	Water melon-1pc, Muskat Pomograntes-0.75kg,...	Brown onion-4kg, green chili-250g, Carrot-2kg,...	Buffalo Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Muskat Pomograntes-0.75kg,...
a1-025	CUST23Z	CUST23Z@gmail.com	2017-09-07	mammey Sapota-0.75kg, Dholka Pomograntes-...	Spring onion-1kg, yellow bell pepper-2kg	Buffalo Milk-2L	NULL	mammey Sapota-0.75kg, Dholka Pomograntes-...
a1-026	CUST24Z	CUST24Z@gmail.com	2017-09-07	Water melon-1pc, Guinea Gold papaya-1pc, Ra...	Tomato local-2.5kg, green chili-250g, Carrot-2k...	Buffalo Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Guinea Gold papaya-1pc, Ra...
a1-027	CUST25Z	CUST25Z@gmail.com	2017-09-08	Badmi mango-0.25kg, Citron melon-1pc, Rastha...	Red onion-4kg, Tomato local-2.5kg, red bell pep...	Cow Milk-2L	Sona Masuri Rice-9kg	Badmi mango-0.25kg, Citron melon-1pc, Rastha...
a1-028	CUST26Z	CUST26Z@gmail.com	2017-09-08	Dasheri mango-0.25kg, kesar mango-0.50kg, W...	Red onion-4kg, Tomato hybrid-2.5kg, Carrot-2k...	Buffalo Milk-2L	Sona Masuri Rice-9kg, Basmathi Rice-4kg	Dasheri mango-0.25kg, kesar mango-0.50kg, W...
a1-029	CUST27Z	CUST27Z@gmail.com	2017-09-08	Black Sapota-0.75kg, Custard apple-3kg, Shimla...	NULL	Buffalo Milk-2L	NULL	Black Sapota-0.75kg, Custard apple-3kg, Shimla...
a1-030	CUST28Z	CUST28Z@gmail.com	2017-09-08	Badmi mango-0.25kg, Gigerine melon-1pc, Dhol...	NULL	NULL	NULL	Badmi mango-0.25kg, Gigerine melon-1pc, Dhol...
a1-031	CUST29Z	CUST29Z@gmail.com	2017-09-08	Black Sapota-0.75kg, Muskat Pomograntes-0.7...	green chili-250g	NULL	Basmathi Rice-4kg	Black Sapota-0.75kg, Muskat Pomograntes-0.7...
a1-032	CUST30Z	CUST30Z@gmail.com	2017-09-08	NULL	NULL	Cow Milk-2L	Sona Masuri Rice-9kg	,Cow Milk-2L,Sona Masuri Rice-9kg
a1-033	CUST31Z	CUST31Z@gmail.com	2017-09-08	Kamiya papaya-1pc, Shimla apple-3kg, Gala app...	Red onion-4kg, Tomato local-2.5kg, green chili-...	Toned Milk-2L	Sona Masuri Rice-9kg	Kamiya papaya-1pc, Shimla apple-3kg, Gala app...
a1-034	CUST32Z	CUST32Z@gmail.com	2017-09-08	Water melon-1pc, Green Sapota-0.75kg, Muska...	Red onion-4kg, Tomato hybrid-2.5kg, green chil...	Toned Milk-2L	Sona Masuri Rice-9kg	Water melon-1pc, Green Sapota-0.75kg, Muska...
a1-035	CUST33Z	CUST33Z@gmail.com	2017-09-08	Green Sapota-0.75kg, Ruby Pomograntes-0.75...	Red onion-4kg, Tomato local-2.5kg, green chili-...	Cow Milk-2L	Sona Masuri Rice-9kg, Basmathi Rice-4kg	Green Sapota-0.75kg, Ruby Pomograntes-0.75...

2. Steps in Deploying RDS MySQL in Amazon Web Services

1. Sign in to the AWS Management Console and open the Amazon RDS console at https://console.aws.amazon.com/rds/.
2. In the upper-right corner of the Amazon RDS console, choose the AWS Region in which you want to create the DB instance.
3. In the navigation pane, choose **Databases**.
4. Choose **Create database** and make sure that **Standard Create** is chosen.

Figure 2.1 Initiating the deployment of Database in RDS



Amazon Aurora
Amazon Aurora is a MySQL- and PostgreSQL-compatible enterprise-class database, starting at <$1/day. Aurora supports up to 64TB of auto-scaling
15 low-latency read replicas. Learn more

Or, Restore Aurora DB cluster from S3

Resources

You are using the following Amazon RDS resources in the US East (Ohio) region (used/quota)

DB Instances (2/40)	Parameter groups (1)
Allocated storage (0.04 TB/100 TB)	Default (1)
Click here to increase DB instances limit	Custom (0/100)
DB Clusters (0/40)	Option groups (1)
Reserved instances (0/40)	Default (1)
Snapshots (9)	Custom (0/20)
Manual (1/100)	Subnet groups (1/50)
Automated (8)	Supported platforms VPC
Recent events (0)	Default network vpc-23822448
Event subscriptions (0/20)	

Create database

Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale a relational database in the cloud.

Note: your DB instances will launch in the US East (Ohio) region

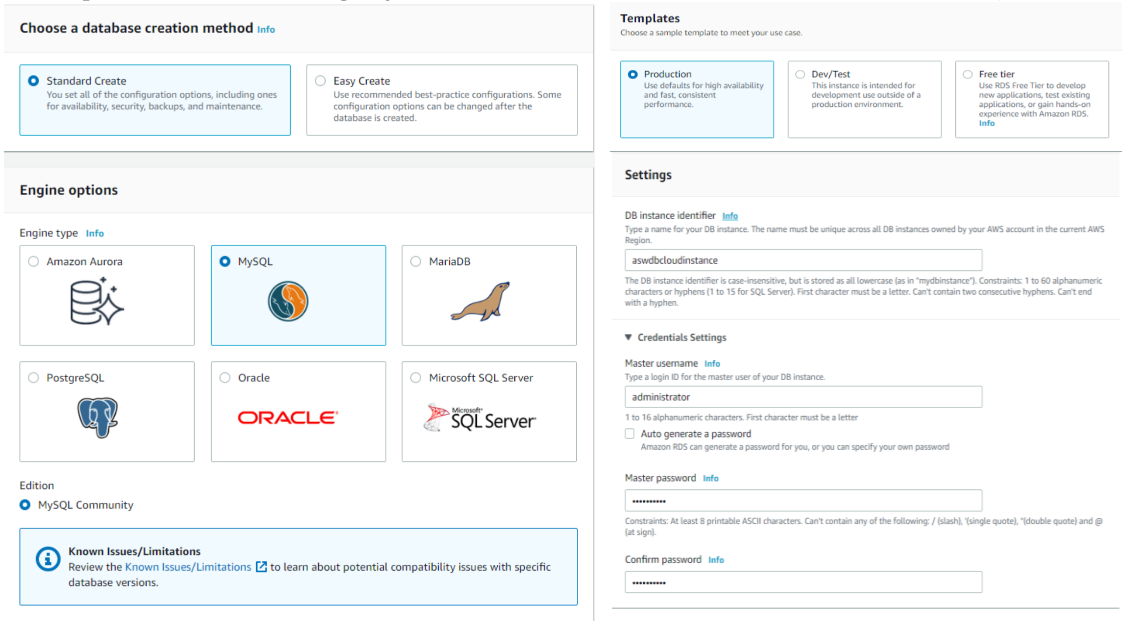
5. In **Configuration**, choose **MySQL**.
6. For **DB instance size**, choose **Free tier**.
7. For **DB instance identifier**, enter a name for the DB instance, or leave the default name.
8. For **Master username**, enter a name for the master user, or leave the default name.

   The **Create database** page should look similar to the following image.

9. To enter your master password, disable **Auto generate a password**, and then enter the same password in **Master password** and **Confirm password**.

10. Choose **Standard Create** to change one or more settings during database creation and set them. To change a setting with No in that column, use **Standard Create**. For settings with **Yes** in that column, you can either use **Standard Create** or modify the DB instance after it is created to change the setting.

Figure 2.2 Selecting the Database creation method and the engine option to be used. (In this project the developer will focus on using MySQL, User: administrator, Password: Amazon12#$)



Choose a database creation method Info

- [✓ Standard Create] You set all of the configuration options, including ones for availability, security, backups, and maintenance.
- Easy Create — Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type Info

Amazon Aurora · [✓ MySQL] · MariaDB · PostgreSQL · Oracle · Microsoft SQL Server

Edition
[✓ MySQL Community]

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

Templates
Choose a sample template to meet your use case.

- [✓ Production] Use defaults for high availability and fast, consistent performance.
- Dev/Test — This instance is intended for development use outside of a production environment.
- Free tier — Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. Info

Settings

DB instance identifier Info
Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.
aswdbcloudinstance
The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

▼ Credentials Settings

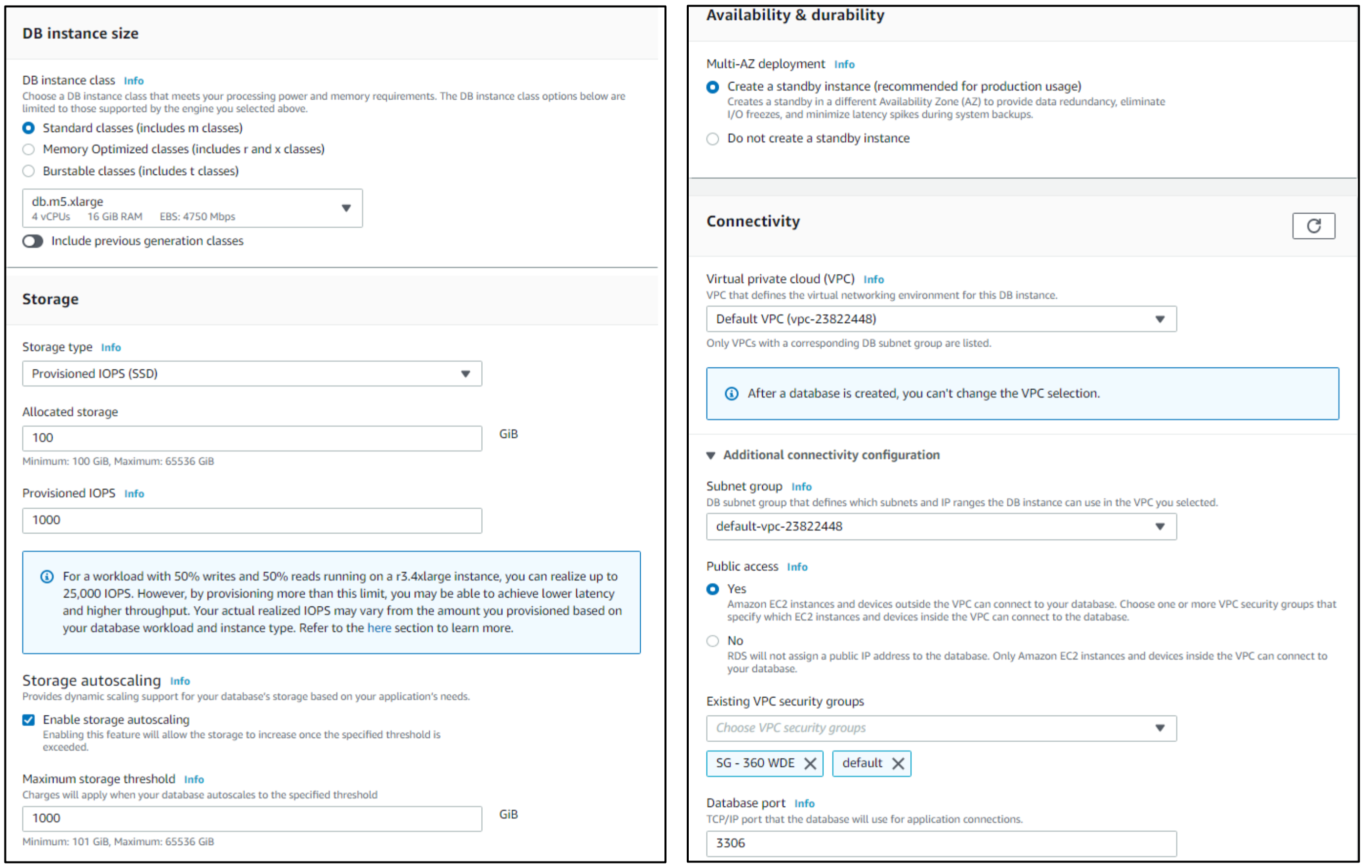
Master username Info
Type a login ID for the master user of your DB instance.
administrator
1 to 16 alphanumeric characters. First character must be a letter

☐ Auto generate a password
Amazon RDS can generate a password for you, or you can specify your own password

Master password Info
•••••••••••
Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote), "(double quote) and @ (at sign).

Confirm password Info
•••••••••••

Figure 2.3 Selecting the DB Instance size as the **Standard Class** and having an initial Storage of 100GB **SSD** with an autoscaling storage up to **1000 GB. Multi-AZ** Deployment for **Active and Standby Mode.**



DB instance size

DB instance class Info
Choose a DB instance class that meets your processing power and memory requirements. The DB instance class options below are limited to those supported by the engine you selected above.
- [✓ Standard classes (includes m classes)]
- Memory Optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.m5.xlarge
4 vCPUs 16 GiB RAM EBS: 4750 Mbps

Include previous generation classes

Storage

Storage type Info
Provisioned IOPS (SSD)

Allocated storage
100 GiB
Minimum: 100 GiB, Maximum: 65536 GiB

Provisioned IOPS Info
1000

For a workload with 50% writes and 50% reads running on a r3.4xlarge instance, you can realize up to 25,000 IOPS. However, by provisioning more than this limit, you may be able to achieve lower latency and higher throughput. Your actual realized IOPS may vary from the amount you provisioned based on your database workload and instance type. Refer to the here section to learn more.

Storage autoscaling Info
Provides dynamic scaling support for your database's storage based on your application's needs.
☑ Enable storage autoscaling
Enabling this feature will allow the storage to increase once the specified threshold is exceeded.

Maximum storage threshold Info
Charges will apply when your database autoscales to the specified threshold
1000 GiB
Minimum: 101 GiB, Maximum: 65536 GiB

Availability & durability

Multi-AZ deployment Info
- [✓ Create a standby instance (recommended for production usage)] Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.
- Do not create a standby instance

Connectivity

Virtual private cloud (VPC) Info
VPC that defines the virtual networking environment for this DB instance.
Default VPC (vpc-23822448)
Only VPCs with a corresponding DB subnet group are listed.

After a database is created, you can't change the VPC selection.

▼ Additional connectivity configuration

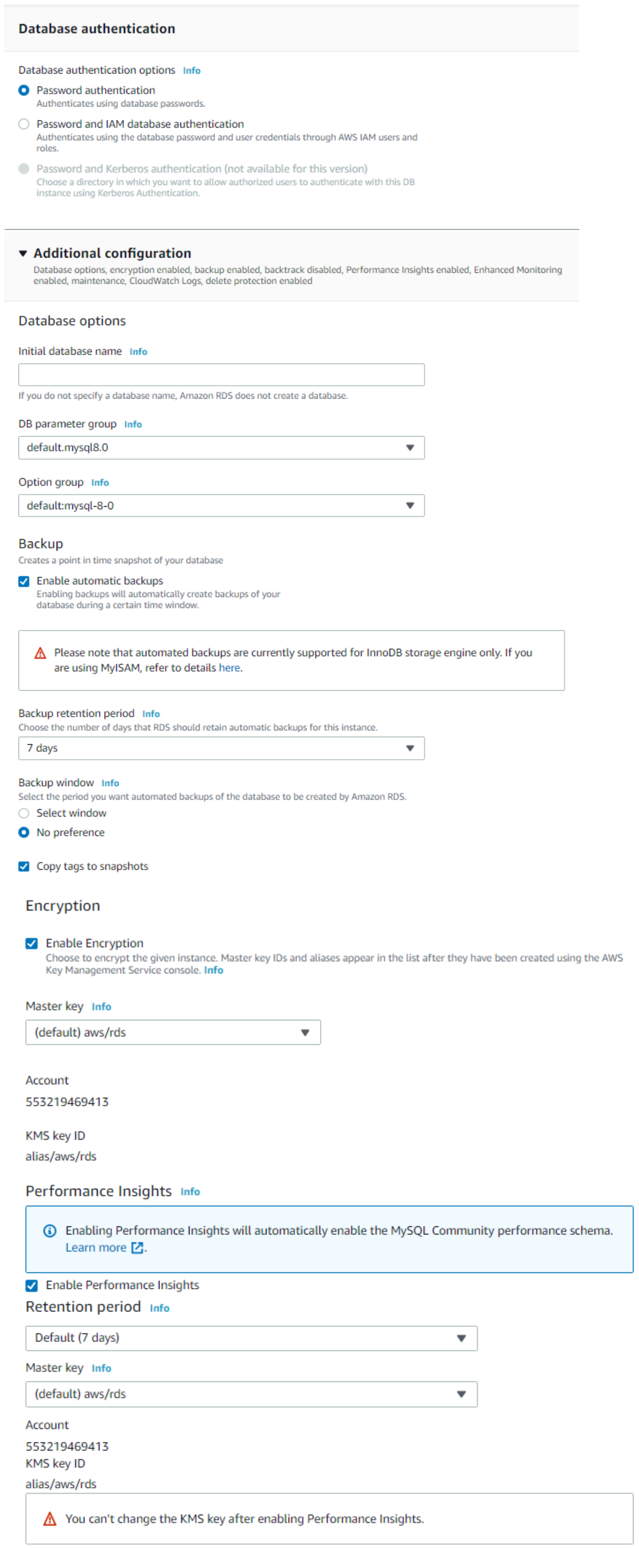
Subnet group Info
DB subnet group that defines which subnets and IP ranges the DB instance can use in the VPC you selected.
default-vpc-23822448

Public access Info
- [✓ Yes] Amazon EC2 instances and devices outside the VPC can connect to your database. Choose one or more VPC security groups that specify which EC2 instances and devices inside the VPC can connect to the database.
- No — RDS will not assign a public IP address to the database. Only Amazon EC2 instances and devices inside the VPC can connect to your database.

Existing VPC security groups
Choose VPC security groups
SG - 360 WDE ✕ default ✕

Database port Info
TCP/IP port that the database will use for application connections.
3306

Figure 2.4 Database authentication using **Password authentication**. The additional configuration set on the image below is configured to cater the ease of **maintenance**, **back-up**, **security**, **monitoring**, **scaling** and **update** on the client side.



Database authentication

Database authentication options Info

- [✓ Password authentication]
  Authenticates using database passwords.
- Password and IAM database authentication
  Authenticates using the database password and user credentials through AWS IAM users and roles.
- Password and Kerberos authentication (not available for this version)
  Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication.

▼ Additional configuration
Database options, encryption enabled, backup enabled, backtrack disabled, Performance Insights enabled, Enhanced Monitoring enabled, maintenance, CloudWatch Logs, delete protection enabled

Database options

Initial database name Info

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

DB parameter group Info
default.mysql8.0

Option group Info
default:mysql-8-0

Backup
Creates a point in time snapshot of your database

- [✓ Enable automatic backups]
  Enabling backups will automatically create backups of your database during a certain time window.

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

Backup retention period Info
Choose the number of days that RDS should retain automatic backups for this instance.
7 days

Backup window Info
Select the period you want automated backups of the database to be created by Amazon RDS.
- Select window
- [✓ No preference]

- [✓ Copy tags to snapshots]

Encryption

- [✓ Enable Encryption]
  Choose to encrypt the given instance. Master key IDs and aliases appear in the list after they have been created using the AWS Key Management Service console. Info

Master key Info
(default) aws/rds

Account
553219469413

KMS key ID
alias/aws/rds

Performance Insights Info

Enabling Performance Insights will automatically enable the MySQL Community performance schema.
Learn more.

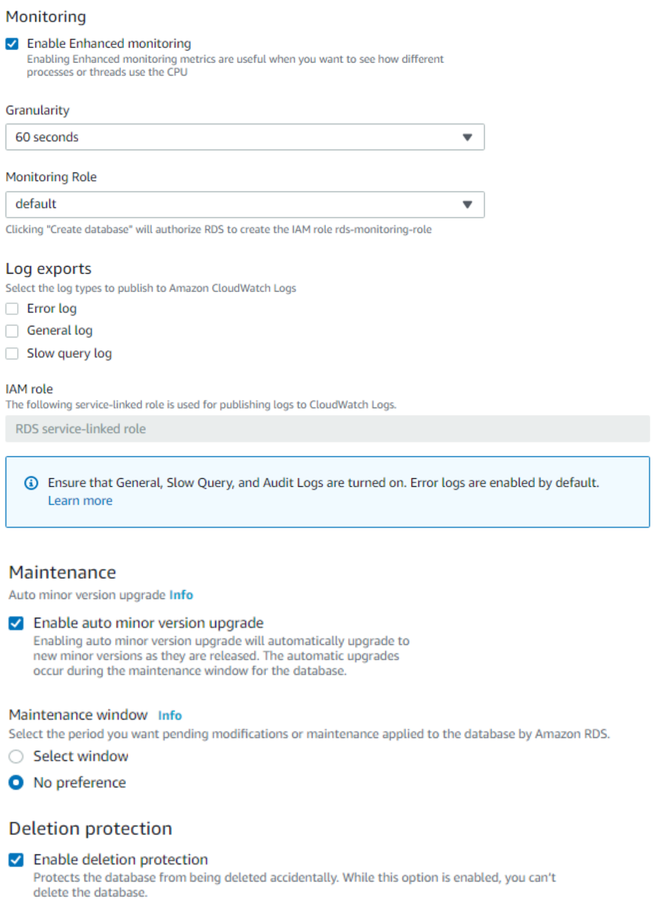
- [✓ Enable Performance Insights]

Retention period Info
Default (7 days)

Master key Info
(default) aws/rds

Account
553219469413
KMS key ID
alias/aws/rds

You can't change the KMS key after enabling Performance Insights.



Monitoring

- [✓ Enable Enhanced monitoring]
  Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU

Granularity
60 seconds

Monitoring Role
default
Clicking "Create database" will authorize RDS to create the IAM role rds-monitoring-role

Log exports
Select the log types to publish to Amazon CloudWatch Logs
- 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

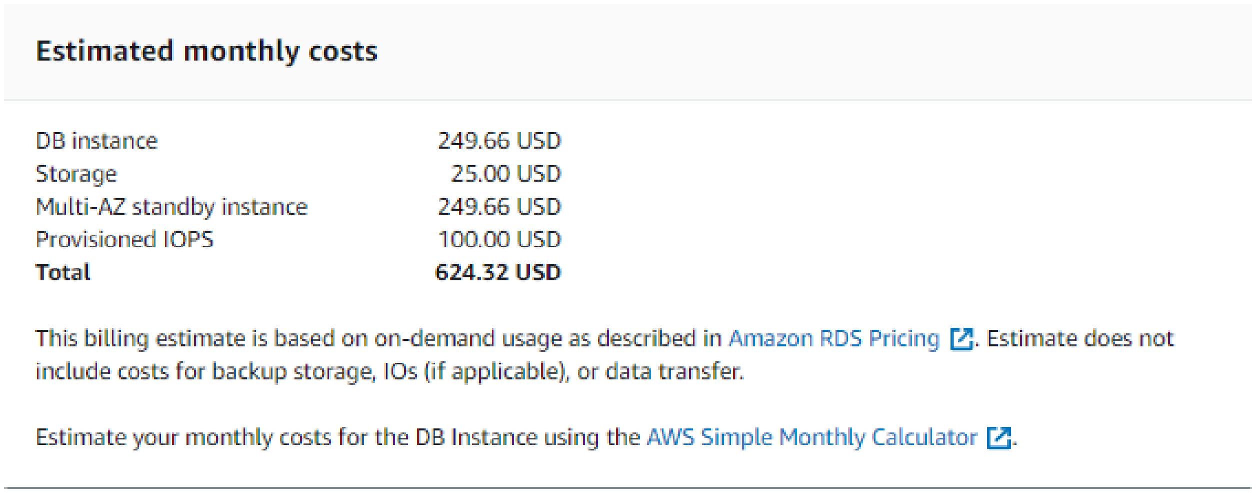
- [✓ Enable auto minor version upgrade]
  Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

Maintenance window Info
Select the period you want pending modifications or maintenance applied to the database 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.

Figure 2.5 Database estimated monthly costs that the client will need to keep in mind. (link: https://calculator.s3.amazonaws.com/index.html for future calculation or resizing of the environment)



Estimated monthly costs

DB instance	249.66 USD
Storage	25.00 USD
Multi-AZ standby instance	249.66 USD
Provisioned IOPS	100.00 USD
Total	**624.32 USD**

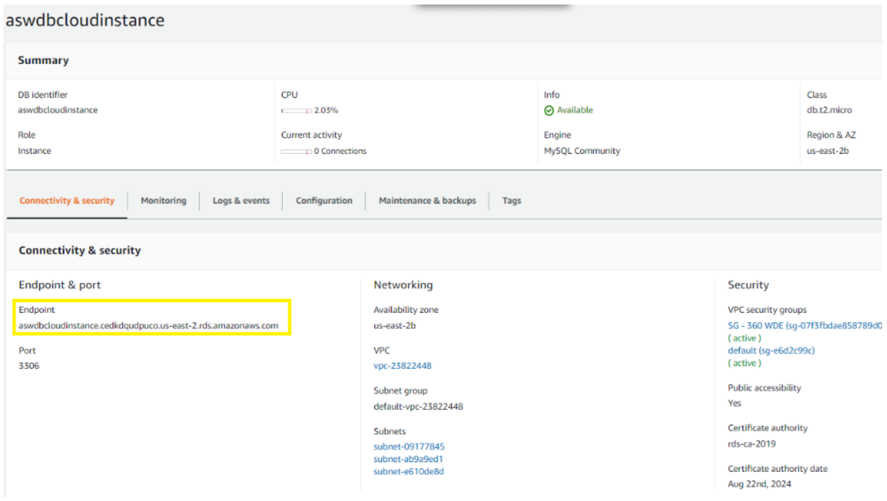
This billing estimate is based on on-demand usage as described in Amazon RDS Pricing. Estimate does not include costs for backup storage, IOs (if applicable), or data transfer.

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

3. Connecting to a Database on a DB Instance Running the MySQL Database Engine

1. After Amazon RDS provisions your DB instance, you can use any standard SQL client application to connect to a database on the DB instance. In this example, you connect to a database on a MySQL DB instance using MySQL monitor commands.
2. Find the endpoint (DNS name) and port number for your DB instance.
    a. Open the RDS console and then choose Databases to display a list of your DB instances.
    b. Choose the MySQL DB instance name to display its details.
    c. On the Connectivity & security tab, copy the endpoint. Also, note the port number. You need both the endpoint and the port number to connect to the DB instance.

Figure 3.1 Database Endpoint (*this endpoint is been done using free tier mode for the developer to avoid unneeded cost of deployment*)



aswdbcloudinstance

Summary

DB identifier
aswdbcloudinstance

Role
Instance

CPU
2.03%

Current activity
0 Connections

Info
Available

Engine
MySQL Community

Class
db.t2.micro

Region & AZ
us-east-2b

Connectivity & security

Endpoint & port

Endpoint
aswdbcloudinstance.cedkdqudpuco.us-east-2.rds.amazonaws.com

Port
3306

Networking

Availability zone
us-east-2b

VPC
vpc-23822448

Subnet group
default-vpc-23822448

Subnets
subnet-09177845
subnet-ab9a9ed1
subnet-e610de8d

Security

VPC security groups
SG - 360 WDE (sg-07f3fbdae858789d0
(active)
default (sg-e6d2c99c)
(active)

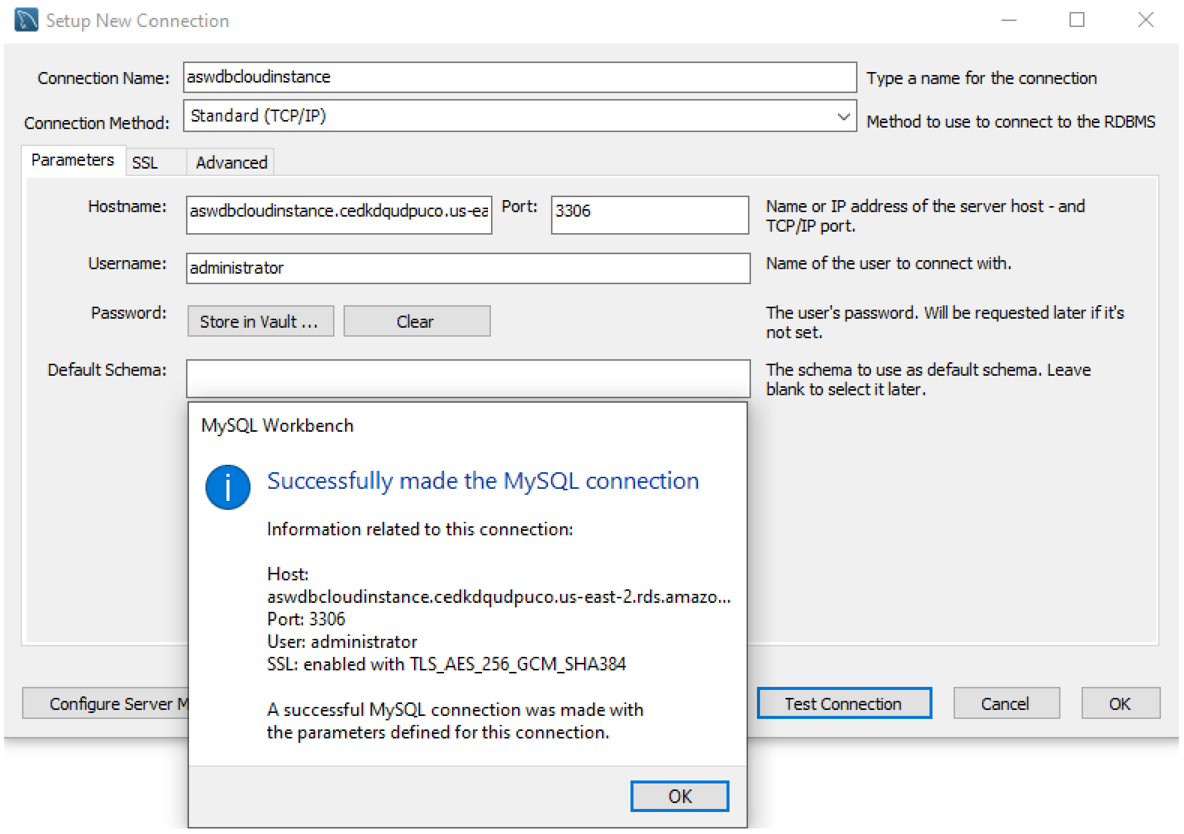
Public accessibility
Yes

Certificate authority
rds-ca-2019

Certificate authority date
Aug 22nd, 2024

3. Download a SQL client that you can use to connect to the DB instance. You can connect to an Amazon RDS MySQL DB instance by using tools like the MySQL Workbench.
4. Connect to a database on a MySQL DB instance. For example, enter the following command at a command prompt on a client computer to connect to a database on a MySQL DB instance using the MySQL client. Substitute the DNS name for your DB instance for <*endpoint*>, the master user name you used for <*mymasteruser*>, and provide the master password you used when prompted for a password.

Figure 3.2 Local MySQL Workbench successfully made a connect to MySQL of RDS in AWS



Connection Name: aswdbcloudinstance — Type a name for the connection
Connection Method: Standard (TCP/IP) — Method to use to connect to the RDBMS
Hostname: aswdbcloudinstance.cedkdqudpuco.us-ea Port: 3306 — Name or IP address of the server host - and TCP/IP port.
Username: administrator — Name of the user to connect with.
Password: — The user's password. Will be requested later if it's not set.
Default Schema: — The schema to use as default schema. Leave blank to select it later.

MySQL Workbench

Successfully made the MySQL connection

Information related to this connection:

Host:
aswdbcloudinstance.cedkdqudpuco.us-east-2.rds.amazo...
Port: 3306
User: administrator
SSL: enabled with TLS_AES_256_GCM_SHA384

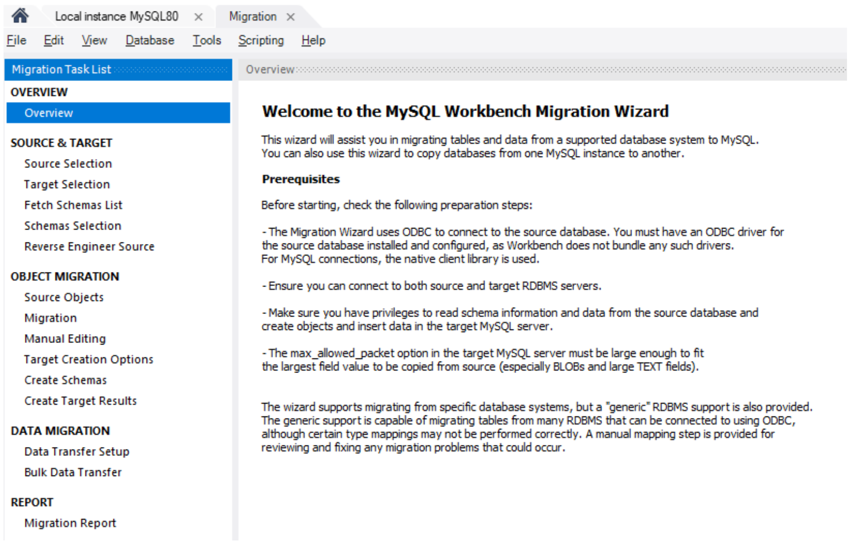
A successful MySQL connection was made with
the parameters defined for this connection.

4. Migrating an On-Premises Database to Amazon RDS MySQL

The MySQL Workbench Migration Wizard allows you to easily and quickly migrate databases from Microsoft SQL Server, PostgreSQL, Sybase ASE and SQL anywhere, SQLite, and most ODBC-capable RDBMSs to MySQL. In addition, you can use the module to create MySQL to MySQL database copies that can be used for tasks such as copying a database across servers or migrating data across different versions of MySQL.

1. Check if the user has an appropriate access to a running SQL Server instance of the database you want to migrate.
2. Check if the user has an appropriate access to a running MySQL Server instance.
3. Open MySQL Workbench and start the Migration Wizard. From the main MySQL Workbench screen, you can start the Migration Wizard by clicking on the Database Migration launcher in the Workbench Central panel or through **Database –> Migrate** in the main menu.

Figure 4.1 Migration Wizard



Welcome to the MySQL Workbench Migration Wizard

This wizard will assist you in migrating tables and data from a supported database system to MySQL.
You can also use this wizard to copy databases from one MySQL instance to another.

Prerequisites

Before starting, check the following preparation steps:

- The Migration Wizard uses ODBC to connect to the source database. You must have an ODBC driver for the source database installed and configured, as Workbench does not bundle any such drivers.
For MySQL connections, the native client library is used.

- Ensure you can connect to both source and target RDBMS servers.

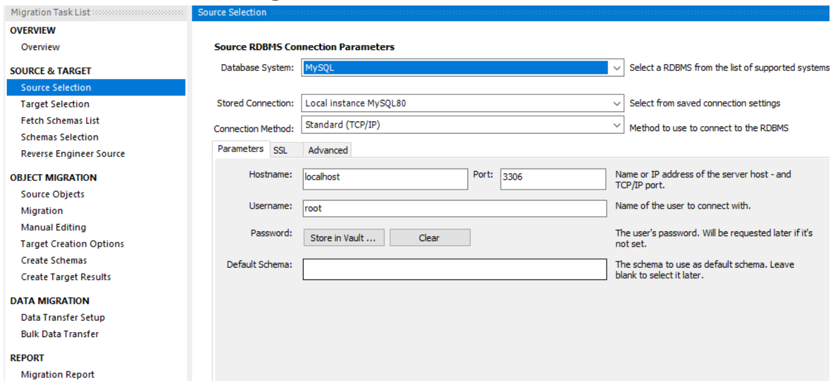
- Make sure you have privileges to read schema information and data from the source database and create objects and insert data in the target MySQL server.

- The max_allowed_packet option in the target MySQL server must be large enough to fit the largest field value to be copied from source (especially BLOBs and large TEXT fields).

The wizard supports migrating from specific database systems, but a "generic" RDBMS support is also provided.
The generic support is capable of migrating tables from many RDBMS that can be connected to using ODBC, although certain type mappings may not be performed correctly. A manual mapping step is provided for reviewing and fixing any migration problems that could occur.

4. Set up the parameters to connect to your source database by **clicking start.** In this page you need to provide the information about the RDBMS you are migrating.
5. If you open the **Database System** combo box, you'll find a list of the supported RDBMSs. Select MySQL Server from the list. Just below it there's another combo box named **Stored Connection**. It will list saved connection settings for that RDBMS. You can save connections by marking the checkbox at the bottom of the page and giving a name.

Figure 4.2 Source Connection Settings

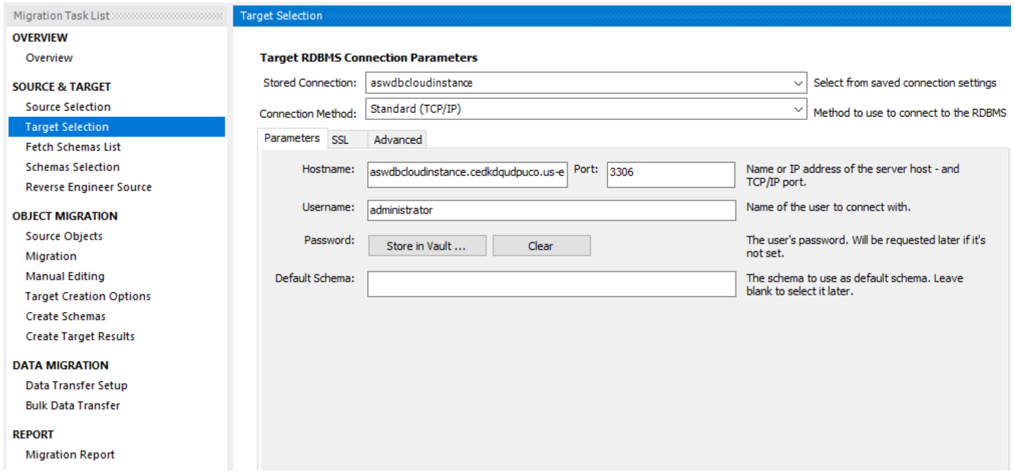


Source RDBMS Connection Parameters

Database System:	MySQL	Select a RDBMS from the list of supported systems
Stored Connection:	Local instance MySQL80	Select from saved connection settings
Connection Method:	Standard (TCP/IP)	Method to use to connect to the RDBMS
Hostname:	localhost Port: 3306	Name or IP address of the server host - and TCP/IP port.
Username:	root	Name of the user to connect with.
Password:		The user's password. Will be requested later if it's not set.
Default Schema:		The schema to use as default schema. Leave blank to select it later.

6. Set up the parameters to connect to your target Database. Click on the **Next** button to move to the **Target Selection** page. Once there, set the parameters to connect to your MySQL Server instance. When you are done click on the **Test Connection button** and verify that you can successfully connect to it.

Figure 4.3 Target Connection Settings



Target RDBMS Connection Parameters

Stored Connection: aswdbcloudinstance — Select from saved connection settings

Connection Method: Standard (TCP/IP) — Method to use to connect to the RDBMS

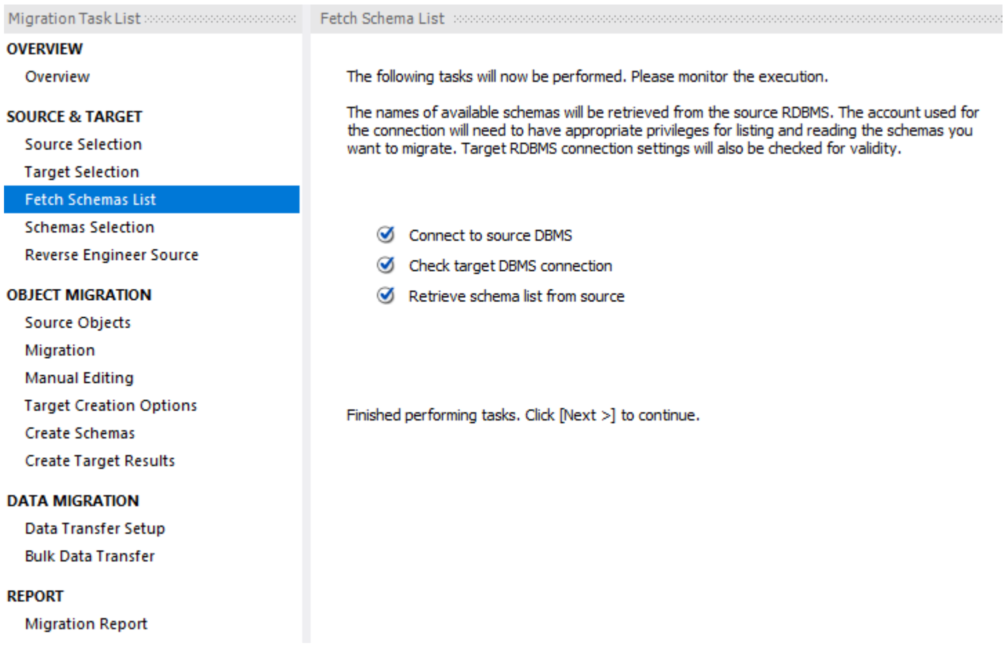
Hostname: aswdbcloudinstance.cedkdqudpuco.us-e Port: 3306 — Name or IP address of the server host - and TCP/IP port.

Username: administrator — Name of the user to connect with.

Password: — The user's password. Will be requested later if it's not set.

Default Schema: — The schema to use as default schema. Leave blank to select it later.

Figure 4.4 Fetch Schemas List



The following tasks will now be performed. Please monitor the execution.

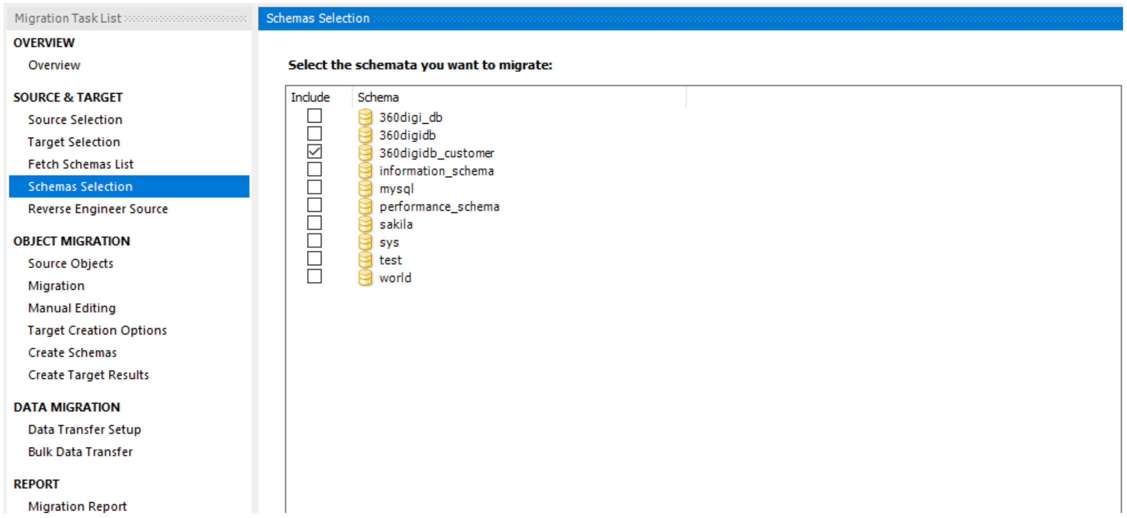
The names of available schemas will be retrieved from the source RDBMS. The account used for the connection will need to have appropriate privileges for listing and reading the schemas you want to migrate. Target RDBMS connection settings will also be checked for validity.

✓ Connect to source DBMS
✓ Check target DBMS connection
✓ Retrieve schema list from source

Finished performing tasks. Click [Next >] to continue.

7. Select the Schema to Migrate Click on the Next button to move to the next page. The Migration Wizard will connect to SQL Server to fetch a list of the catalogs and schemas.

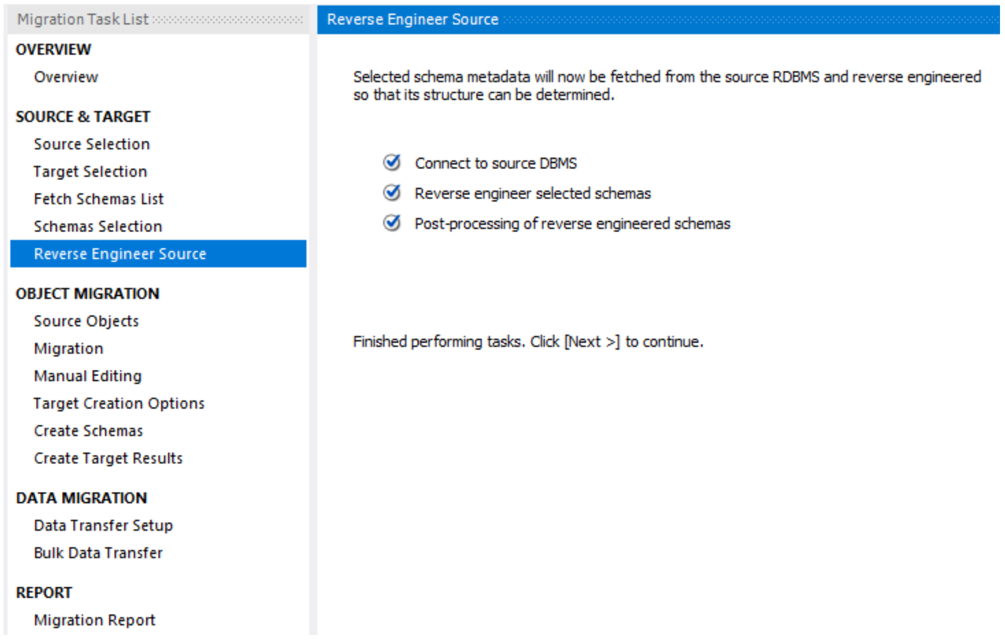
Figure 4.4 Schemas Selection (*In this project the user will be importing the data from 360digidb_customer schema that contains the data given by the PM*)



Select the schemata you want to migrate:

Include	Schema
☐	360digi_db
☐	360digidb
✓	360digidb_customer
☐	information_schema
☐	mysql
☐	performance_schema
☐	sakila
☐	sys
☐	test
☐	world

Figure 4.5 Reverse Engineer Source



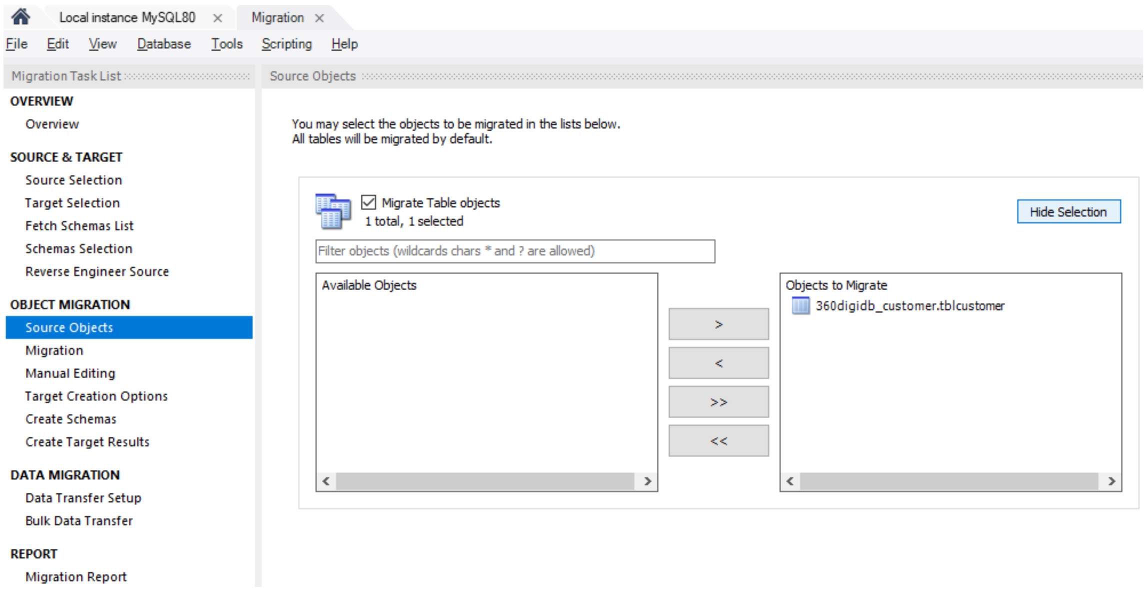
Selected schema metadata will now be fetched from the source RDBMS and reverse engineered so that its structure can be determined.

✓ Connect to source DBMS
✓ Reverse engineer selected schemas
✓ Post-processing of reverse engineered schemas

Finished performing tasks. Click [Next >] to continue.

8. Select the Objects to Migrate Move to the next page using the Next button. You should see the reverse engineering of the selected schema in progress. At this point the Migration Wizard is retrieving relevant information about the involved database objects (table names, table columns, primary and foreign keys, indices, triggers, views, etc.).

9. If you click on the **Show Selection** button you will be given the opportunity to select exactly what you want to migrate as shown here:



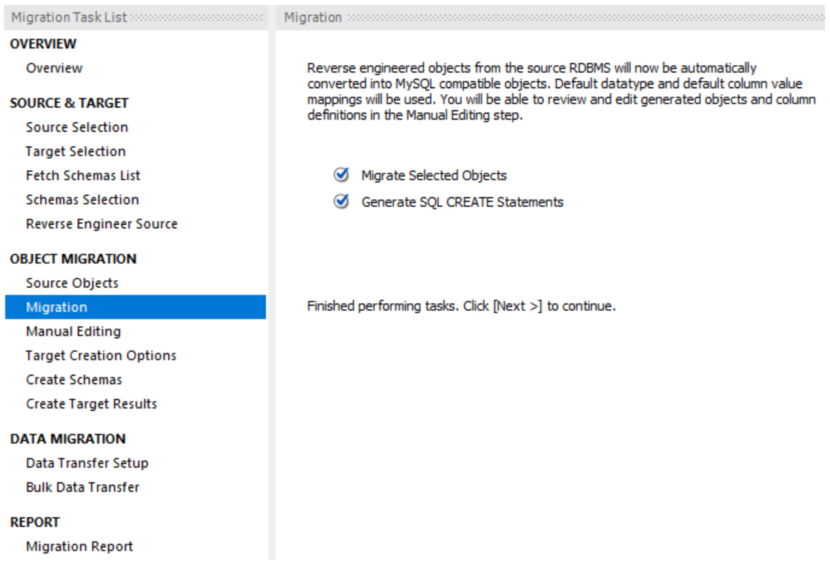
You may select the objects to be migrated in the lists below.
All tables will be migrated by default.

☑ Migrate Table objects
1 total, 1 selected

360digidb_customer.tblcustomer

10. Review the Proposed Migration. Move to the next page. You will see the progress of the migration there. At this point the Migration Wizard is converting the objects you selected into their equivalent objects in MySQL and creating the MySQL code needed to create them in the target server.

Figure 4.5 Migration

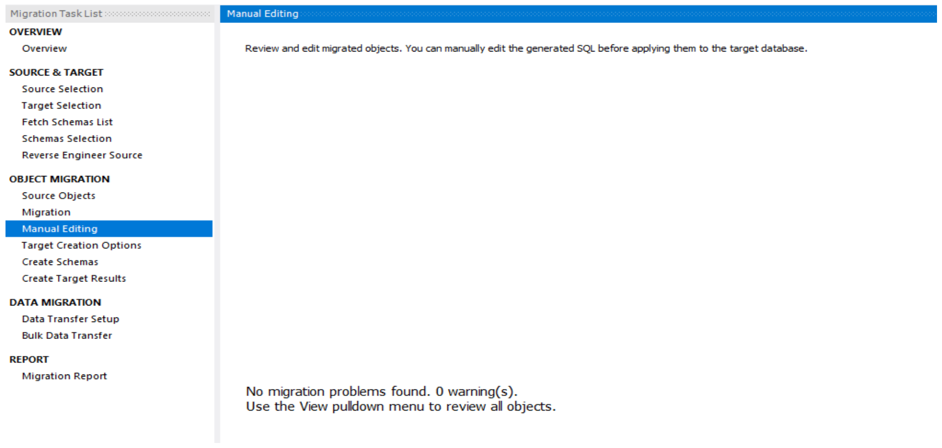


Reverse engineered objects from the source RDBMS will now be automatically converted into MySQL compatible objects. Default datatype and default column value mappings will be used. You will be able to review and edit generated objects and column definitions in the Manual Editing step.

✓ Migrate Selected Objects
✓ Generate SQL CREATE Statements

Finished performing tasks. Click [Next >] to continue.

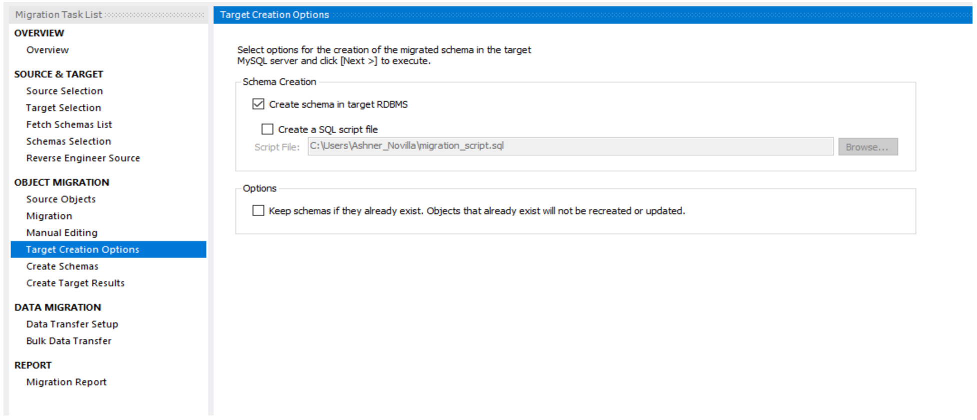
Figure 4.6 Manual Editing



Review and edit migrated objects. You can manually edit the generated SQL before applying them to the target database.

No migration problems found. 0 warning(s).
Use the View pulldown menu to review all objects.

Figure 4.7 Target Creation Options



Select options for the creation of the migrated schema in the target MySQL server and click [Next >] to execute.

Schema Creation

☑ Create schema in target RDBMS

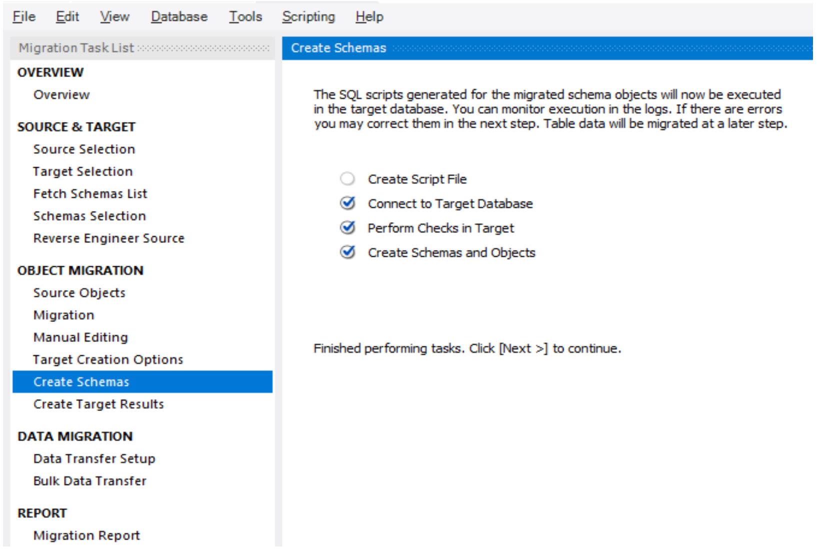
☐ Create a SQL script file

Script File: C:\Users\Ashner_Novilla\migration_script.sql

Options

☐ Keep schemas if they already exist. Objects that already exist will not be recreated or updated.

Figure 4.8 Create Schemas

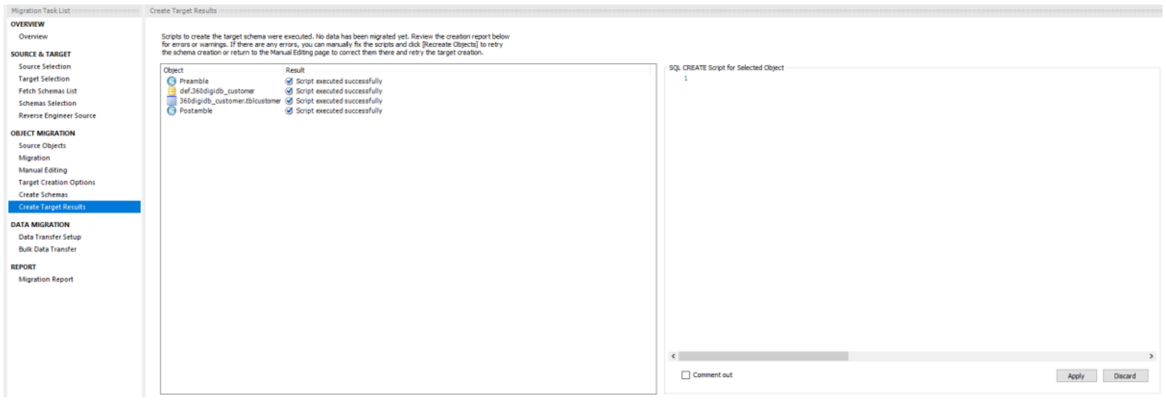


The SQL scripts generated for the migrated schema objects will now be executed in the target database. You can monitor execution in the logs. If there are errors you may correct them in the next step. Table data will be migrated at a later step.

○ Create Script File
✓ Connect to Target Database
✓ Perform Checks in Target
✓ Create Schemas and Objects

Finished performing tasks. Click [Next >] to continue.

Figure 4.96 Create Target Results

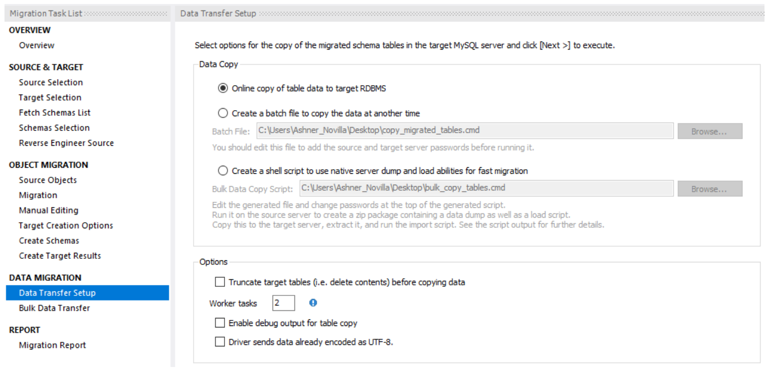


Scripts to create the target schema were executed. No data has been migrated yet. Review the creation report below for errors or warnings. If there are any errors, you can manually fix the scripts and click [Recreate Objects] to retry the schema creation or return to the Manual Editing page to correct them there and retry the target creation.

Object	Result
Preamble	✓ Script executed successfully
def.360digidb_customer	✓ Script executed successfully
360digidb_customer.tblcustomer	✓ Script executed successfully
Postamble	✓ Script executed successfully

11. This step in the Migration Wizard involve the transference of data from the source SQL Server database into your newly created MySQL database. The Data Transfer Setup page allows you to configure this process.

Figure 4.97 Data Transfer Setup



Select options for the copy of the migrated schema tables in the target MySQL server and click [Next >] to execute.

Data Copy

[✓ Online copy of table data to target RDBMS]

Create a batch file to copy the data at another time

Batch File: C:\Users\Ashner_Novilla\Desktop\copy_migrated_tables.cmd

You should edit this file to add the source and target server passwords before running it.

Create a shell script to use native server dump and load abilities for fast migration

Bulk Data Copy Script: C:\Users\Ashner_Novilla\Desktop\bulk_copy_tables.cmd

Edit the generated file and change passwords at the top of the generated script.
Run it on the source server to create a zip package containing a data dump as well as a load script.
Copy this to the target server, extract it, and run the import script. See the script output for further details.

Options

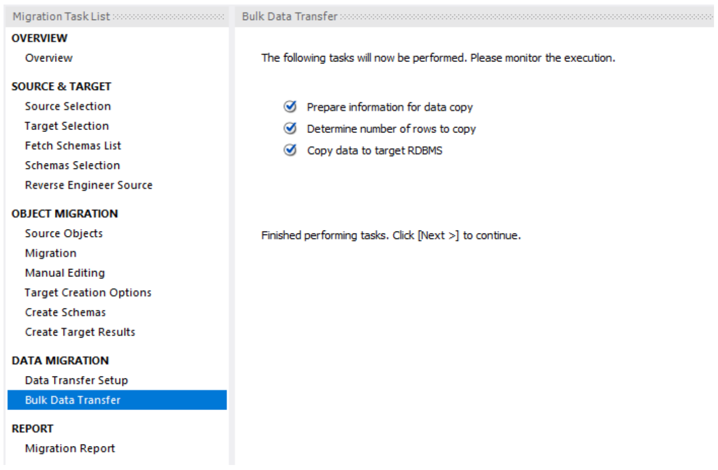
☐ Truncate target tables (i.e. delete contents) before copying data

Worker tasks: 2

☐ Enable debug output for table copy

☐ Driver sends data already encoded as UTF-8.

Figure 4.98 Bulk Data Transfer



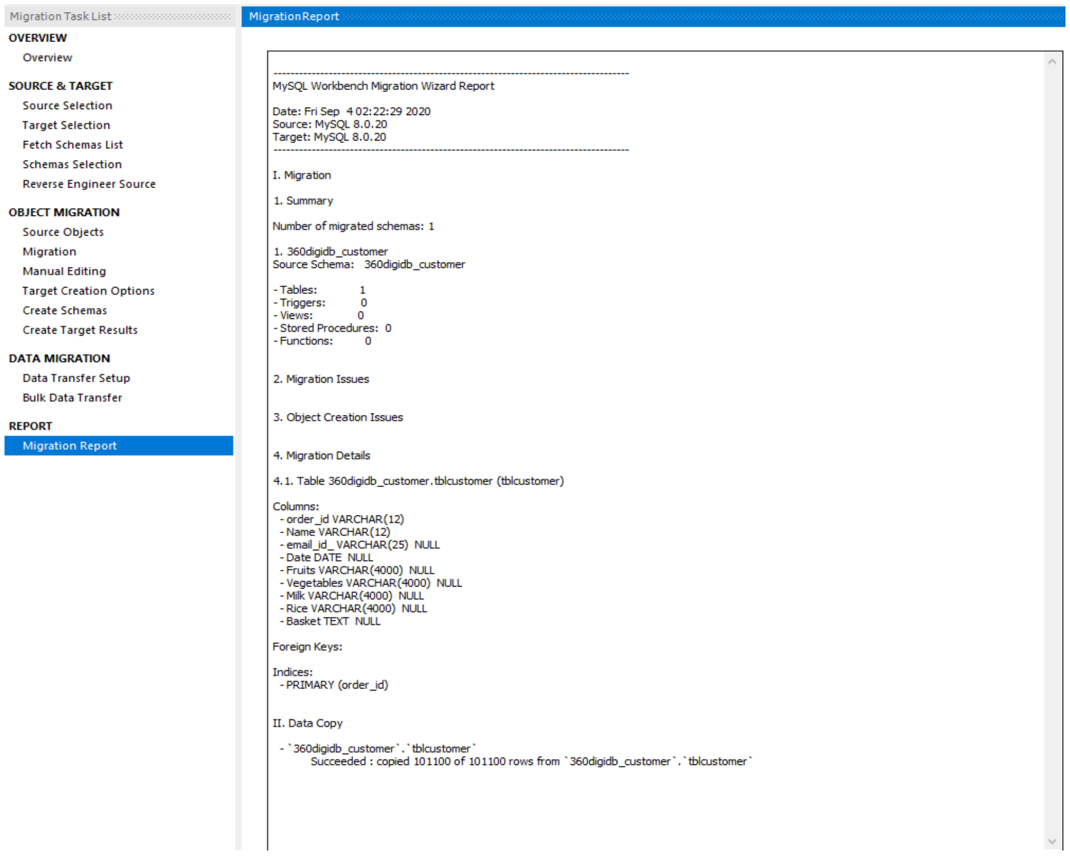
The following tasks will now be performed. Please monitor the execution.

✓ Prepare information for data copy
✓ Determine number of rows to copy
✓ Copy data to target RDBMS

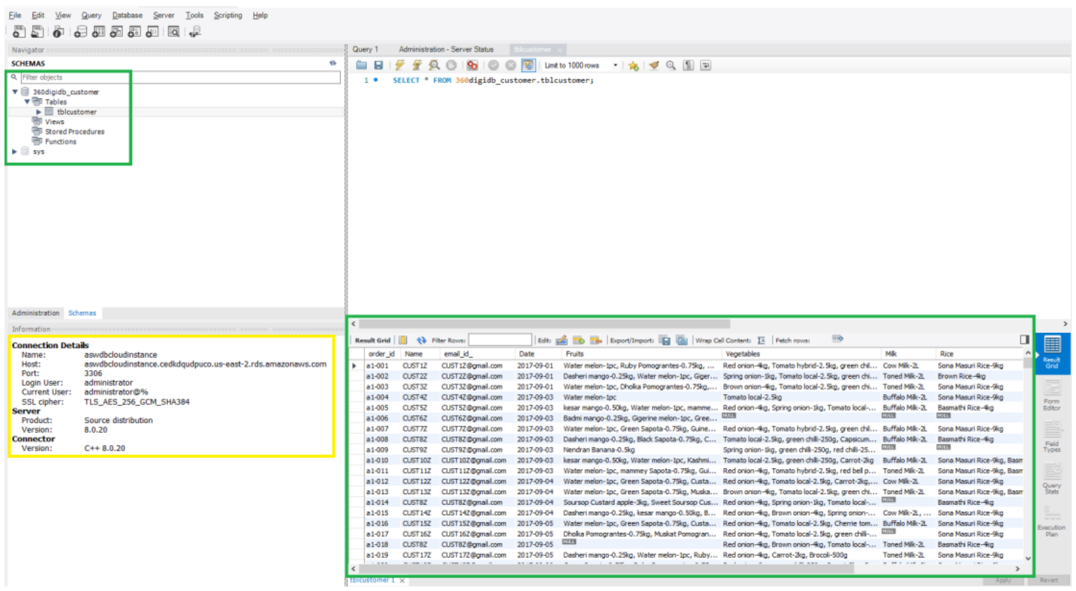
Finished performing tasks. Click [Next >] to continue.

12. Once it finishes, move to the next page. A report page will be displayed with a summary of the entire process:

Figure 4.98 Migration Report and Verification of Migration Result on the MySQL RDS in AWS



```
--------------------------------------------------------------------------------
MySQL Workbench Migration Wizard Report

Date: Fri Sep  4 02:22:29 2020
Source: MySQL 8.0.20
Target: MySQL 8.0.20
--------------------------------------------------------------------------------

I. Migration

1. Summary

Number of migrated schemas: 1

1. 360digidb_customer
Source Schema:   360digidb_customer

- Tables:            1
- Triggers:          0
- Views:             0
- Stored Procedures: 0
- Functions:         0


2. Migration Issues


3. Object Creation Issues


4. Migration Details

4.1. Table 360digidb_customer.tblcustomer (tblcustomer)

Columns:
  - order_id VARCHAR(12)
  - Name VARCHAR(12)
  - email_id_ VARCHAR(25)  NULL
  - Date DATE  NULL
  - Fruits VARCHAR(4000)  NULL
  - Vegetables VARCHAR(4000)  NULL
  - Milk VARCHAR(4000)  NULL
  - Rice VARCHAR(4000)  NULL
  - Basket TEXT  NULL

Foreign Keys:

Indices:
  - PRIMARY (order_id)


II. Data Copy

  - `360digidb_customer`.`tblcustomer`
        Succeeded : copied 101100 of 101100 rows from `360digidb_customer`.`tblcustomer`
```



```
SELECT * FROM 360digidb_customer.tblcustomer;
```

```
Connection Details
   Name:          aswdbcloudinstance
   Host:          aswdbcloudinstance.cedkdqudpuco.us-east-2.rds.amazonaws.com
   Port:          3306
   Login User:    administrator
   Current User:  administrator@%
   SSL cipher:    TLS_AES_256_GCM_SHA384
Server
   Product:       Source distribution
   Version:       8.0.20
Connector
   Version:       C++ 8.0.20
```

order_id	Name	email_id_	Date	Fruits	Vegetables	Milk	Rice
a1-001	CUST1Z	CUST1Z@gmail.com	2017-09-01	Water melon-1pc, Ruby Pomograntes-0.75kg, ...	Red onion-4kg, Tomato hybrid-2.5kg, green chil...	Cow Milk-2L	Sona Masuri Rice-9kg
a1-002	CUST2Z	CUST2Z@gmail.com	2017-09-01	Dasheri mango-0.25kg, Water melon-1pc, Giger...	Spring onion-1kg, Tomato local-2.5kg, green chi...	Toned Milk-2L	Brown Rice-4kg
a1-003	CUST3Z	CUST3Z@gmail.com	2017-09-01	Water melon-1pc, Dholka Pomograntes-0.75kg,...	Brown onion-4kg, Tomato local-2.5kg, green chi...	Toned Milk-2L	Sona Masuri Rice-9kg
a1-004	CUST4Z	CUST4Z@gmail.com	2017-09-03	Water melon-1pc	Tomato local-2.5kg	Buffalo Milk-2L	Sona Masuri Rice-9kg
a1-005	CUST5Z	CUST5Z@gmail.com	2017-09-03	kesar mango-0.50kg, Water melon-1pc, mamme...	Red onion-4kg, Spring onion-1kg, Tomato local-...	Buffalo Milk-2L	Basmathi Rice-4kg
a1-006	CUST6Z	CUST6Z@gmail.com	2017-09-03	Badmi mango-0.25kg, Gigerine melon-1pc, Gree...	NULL	NULL	NULL
a1-007	CUST7Z	CUST7Z@gmail.com	2017-09-03	Water melon-1pc, Green Sapota-0.75kg, Guine...	Red onion-4kg, Tomato hybrid-2.5kg, green chil...	Buffalo Milk-2L	Sona Masuri Rice-9kg
a1-008	CUST8Z	CUST8Z@gmail.com	2017-09-03	Dasheri mango-0.25kg, Black Sapota-0.75kg, C...	Tomato local-2.5kg, green chilli-250g, Capsicum...	Buffalo Milk-2L	Basmathi Rice-4kg
a1-009	CUST9Z	CUST9Z@gmail.com	2017-09-03	Nendran Banana-0.5kg	Spring onion-1kg, green chilli-250g, red chilli-25...	NULL	NULL
a1-010	CUST10Z	CUST10Z@gmail.com	2017-09-03	kesar mango-0.50kg, Water melon-1pc, Kashmi...	Tomato local-2.5kg, green chilli-250g, Carrot-2kg	Buffalo Milk-2L	Sona Masuri Rice-9kg, Basm
a1-011	CUST11Z	CUST11Z@gmail.com	2017-09-03	Water melon-1pc, mammey Sapota-0.75kg, Gui...	Red onion-4kg, Tomato hybrid-2.5kg, red bell p...	Toned Milk-2L	Sona Masuri Rice-9kg, Basm
a1-012	CUST12Z	CUST12Z@gmail.com	2017-09-04	Water melon-1pc, Green Sapota-0.75kg, Custa...	Red onion-4kg, Tomato local-2.5kg, Carrot-2kg,...	Cow Milk-2L	Sona Masuri Rice-9kg
a1-013	CUST13Z	CUST13Z@gmail.com	2017-09-04	Water melon-1pc, Green Sapota-0.75kg, Muska...	Brown onion-4kg, Tomato local-2.5kg, green chi...	Toned Milk-2L	Sona Masuri Rice-9kg, Basm
a1-014	CUST8Z	CUST8Z@gmail.com	2017-09-04	Soursop Custard apple-3kg, Sweet Soursop Cus...	Red onion-4kg, Spring onion-1kg, Tomato local-...	NULL	Basmathi Rice-4kg
a1-015	CUST14Z	CUST14Z@gmail.com	2017-09-04	Dasheri mango-0.25kg, kesar mango-0.50kg, B...	Red onion-4kg, Brown onion-4kg, Spring onion-...	Cow Milk-2L, ...	Sona Masuri Rice-9kg
a1-016	CUST15Z	CUST15Z@gmail.com	2017-09-05	Water melon-1pc, Green Sapota-0.75kg, Custa...	Red onion-4kg, Tomato local-2.5kg, Cherrie tom...	Buffalo Milk-2L	Sona Masuri Rice-9kg
a1-017	CUST16Z	CUST16Z@gmail.com	2017-09-05	Dholka Pomograntes-0.75kg, Muskat Pomogran...	Red onion-4kg, Tomato local-2.5kg, green chilli-...	NULL	Sona Masuri Rice-9kg
a1-018	CUST8Z	CUST8Z@gmail.com	2017-09-05	NULL	Red onion-4kg, Brown onion-4kg, Tomato local-...	Toned Milk-2L	Basmathi Rice-4kg
a1-019	CUST17Z	CUST17Z@gmail.com	2017-09-05	Dasheri mango-0.25kg, Water melon-1pc, Ruby...	Red onion-4kg, Carrot-2kg, Brocoli-500g	Toned Milk-2L	Sona Masuri Rice-9kg