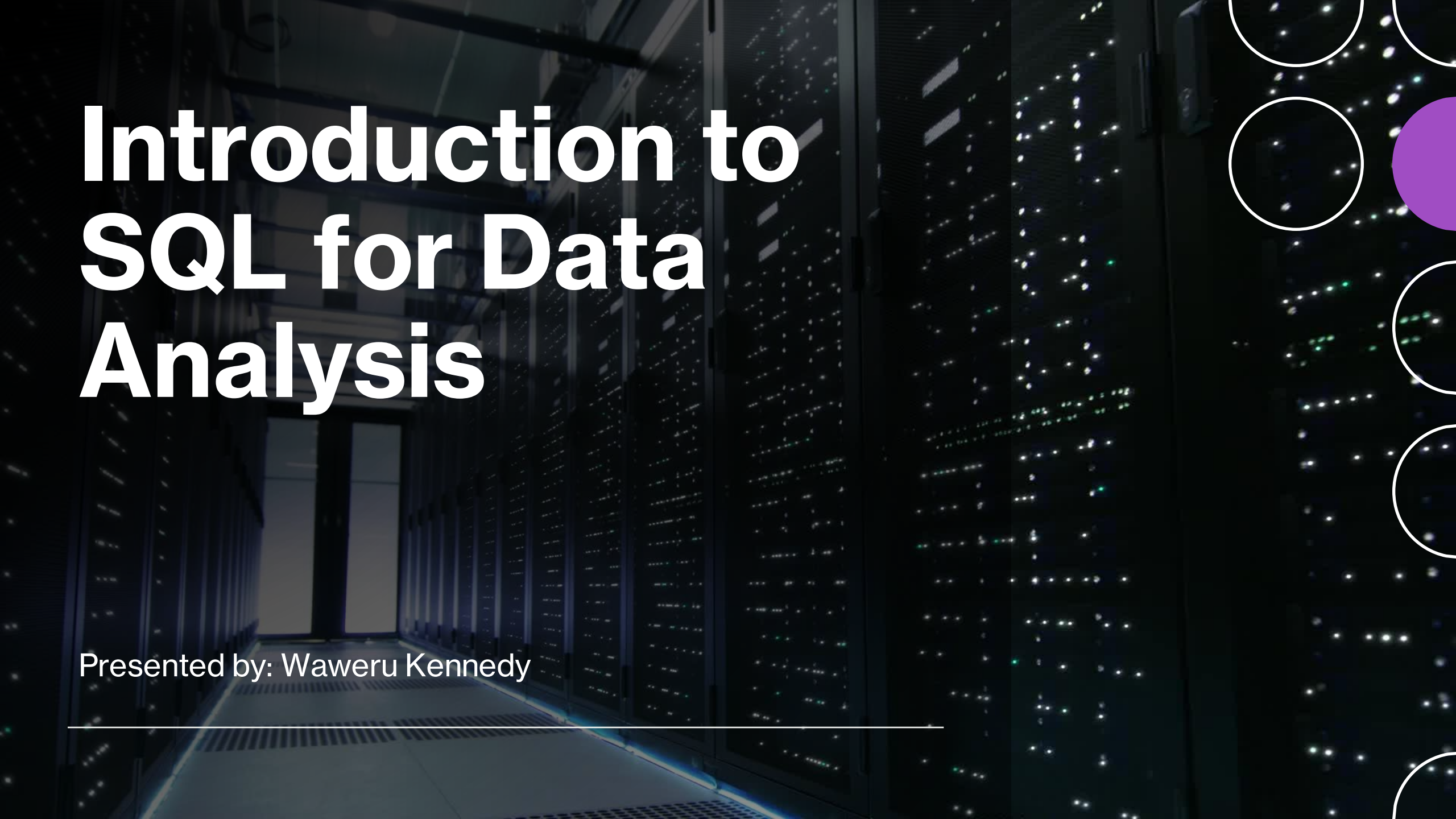

Introduction to SQL for Data Analysis

Presented by: Waweru Kennedy

What you will learn

- Install MySQL RDBMS
- Create a Database
- Selecting & Retrieving Data with SQL
- Use SQL commands to filter, sort, and summarize data.
- Modifying and Analyzing Data with SQL

Database

What is Data?

In simple words, data can be facts related to any object in consideration. For example, your name, age, height, weight, etc. are some data related to you. A picture, image, file, pdf, etc. can also be considered data.

What is Database?

A database is a systematic collection of data. They support electronic storage and manipulation of data. Databases make data management easy.

Database Management System

Database Management System (DBMS) is a collection of programs that enable its users to access databases, manipulate data, report, and represent data. It also helps to control access to the database.

Relational databases

This type of database defines database relationships in the form of tables. It is also called Relational DBMS, which is the most popular DBMS type in the market. Database example of the RDBMS system include MySQL, Oracle, and Microsoft SQL Server database.

What is SQL

SQL is the standard language for dealing with Relational Databases.

SQL is used to insert, search, update, and delete database records.

Out of all the relational databases, MySQL remains the most popular database for organizations.

Relational Database Concepts

Before we dive into SQL, there are a few relational database (RDBMS) concepts that will set the background for you.

Schema

The database schema refers to the organization of data. It is a blueprint of how the database is constructed. In RDBMS, the database model is implemented by the schema. It is the Entity-relationship model.

Table

One of the main units of the schema is the table. In RDBMS, tables are laid out and associated with each other in different types of relationships (one to one, one to many, many to many) relationships.

Columns

The vertical partitions of tables are called columns. In RDBMS, a column is often also called an attribute.

Rows

The horizontal partitions of tables are called rows. In RDBMS, a row is often also called a tuple.

Indexes

In RDBMS, the index is a data structure that improves the operation of the table by quickly locating the data.

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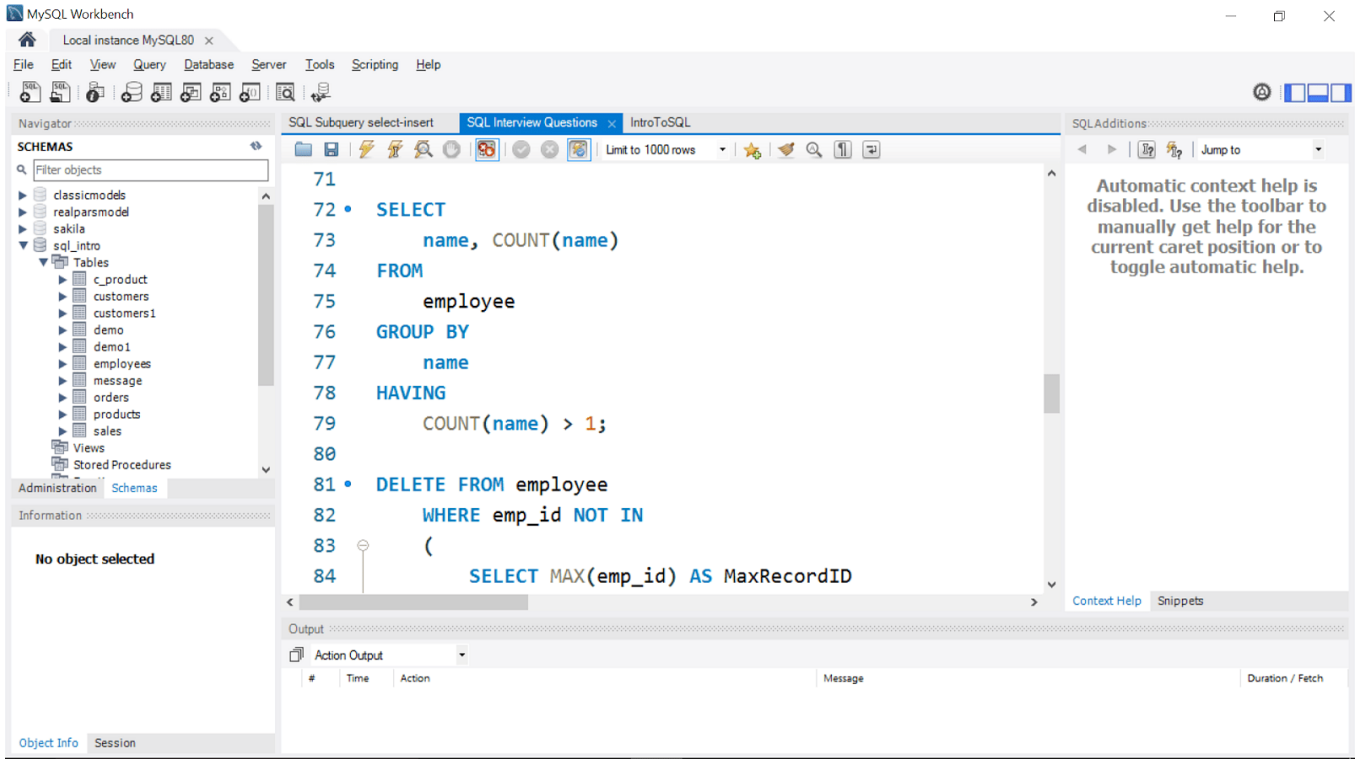
SQL Statements

SQL is the Structured Query Language for RDBMS databases. When you retrieve data, you typically use SQL statements to retrieve the data. You can join tables together to select out just the right types of data from different purposes using SQL statements.



MySQL

MySQL is an open source relational database.

MySQL is cross platform which means it runs on a number of different platforms such as Windows, Linux, and Mac OS etc.

Why MySQL

Who Uses MySQL

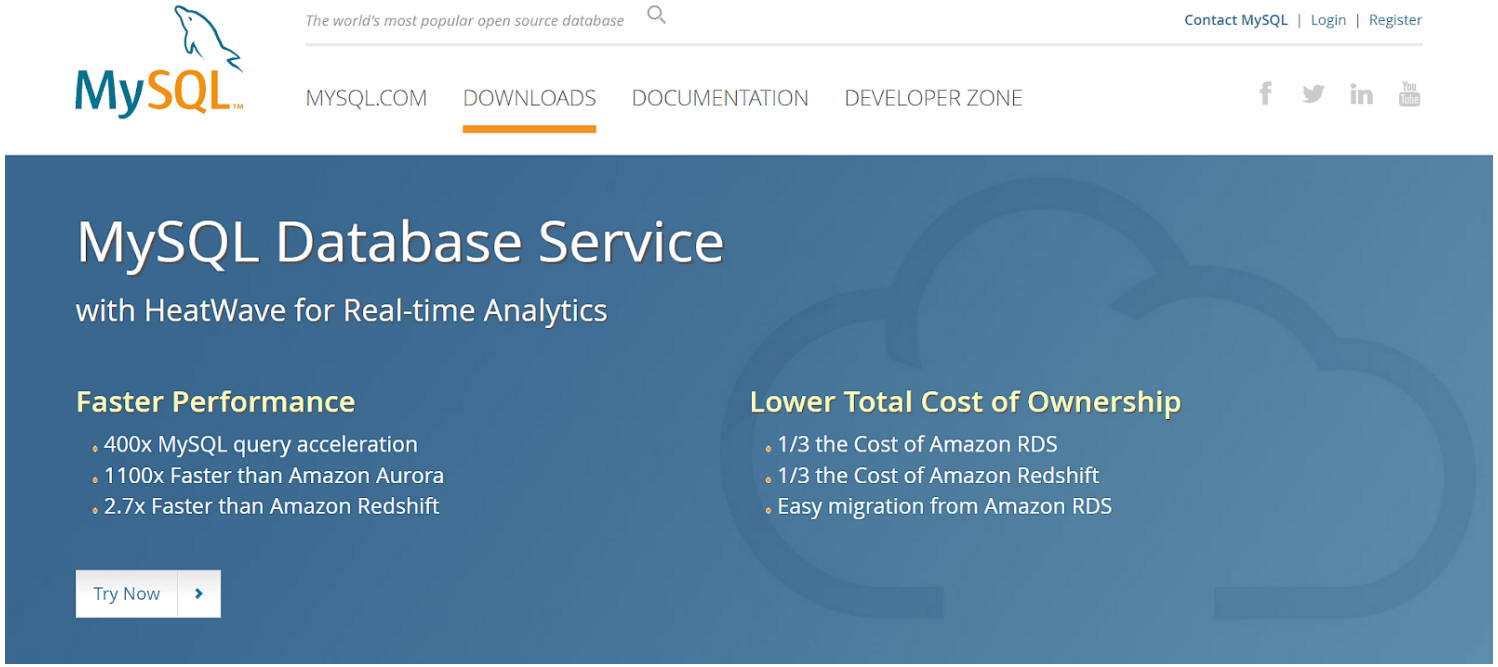
- Huge websites like Facebook, Twitter, Airbnb, Booking.com, Uber, GitHub, YouTube, etc.
- Content Management Systems like WordPress, Drupal, Joomla!, Contao, etc.

Why MySQL?

- Open Source - MySQL is open-source software. You don't have to spend a single penny to access its services.
- Cross-Platform - MySQL can run on Windows, Linux, Unix, and other operating systems.
- High Availability - MySQL possesses a high processing system that makes MySQL process bulk queries and transactions while ensuring unique memory caches.
- Reliability - SSH and SSL provide secure connections in MySQL. MySQL comes with features such as data encryption and data backup for recovery.

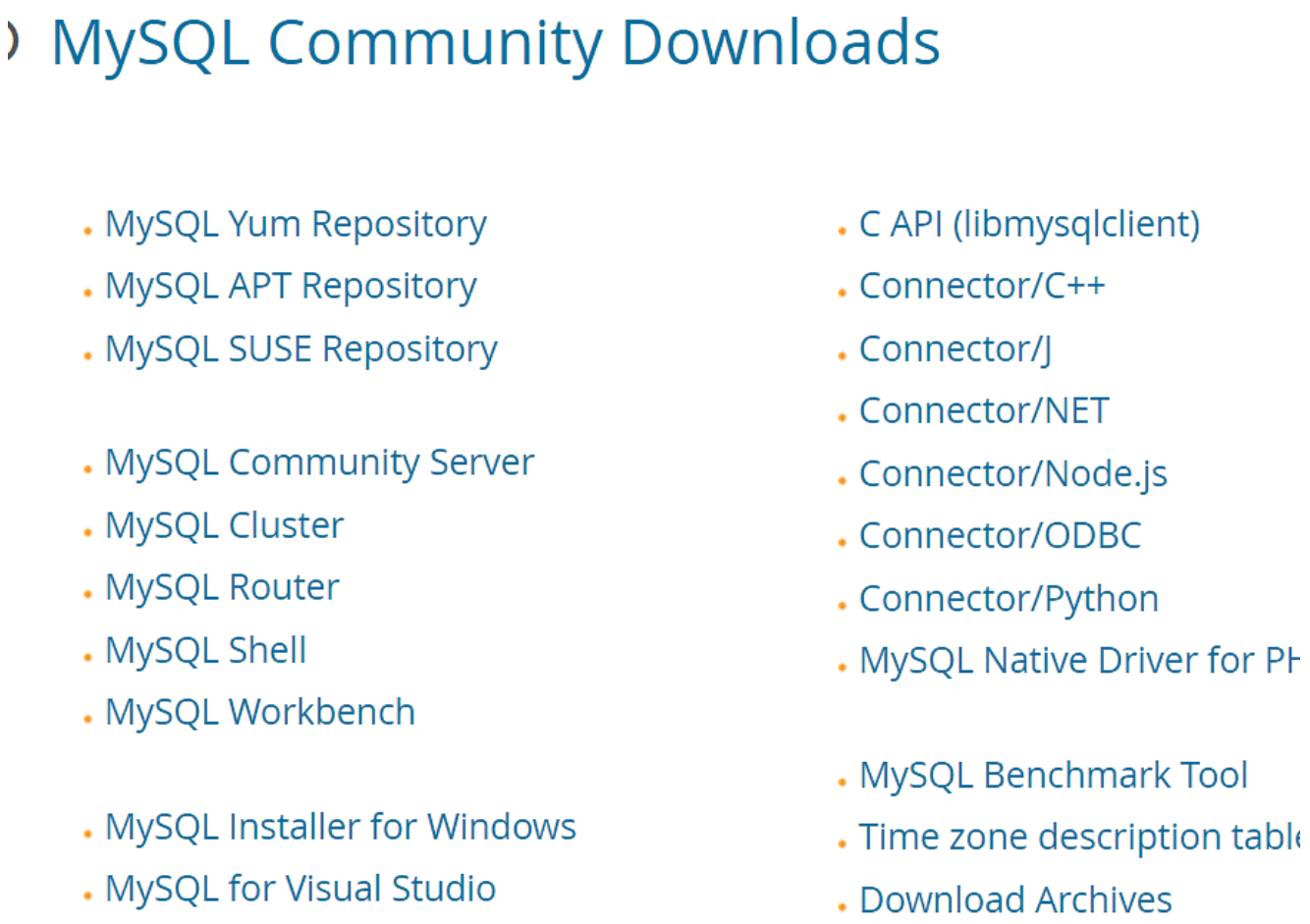
Installing MySQL

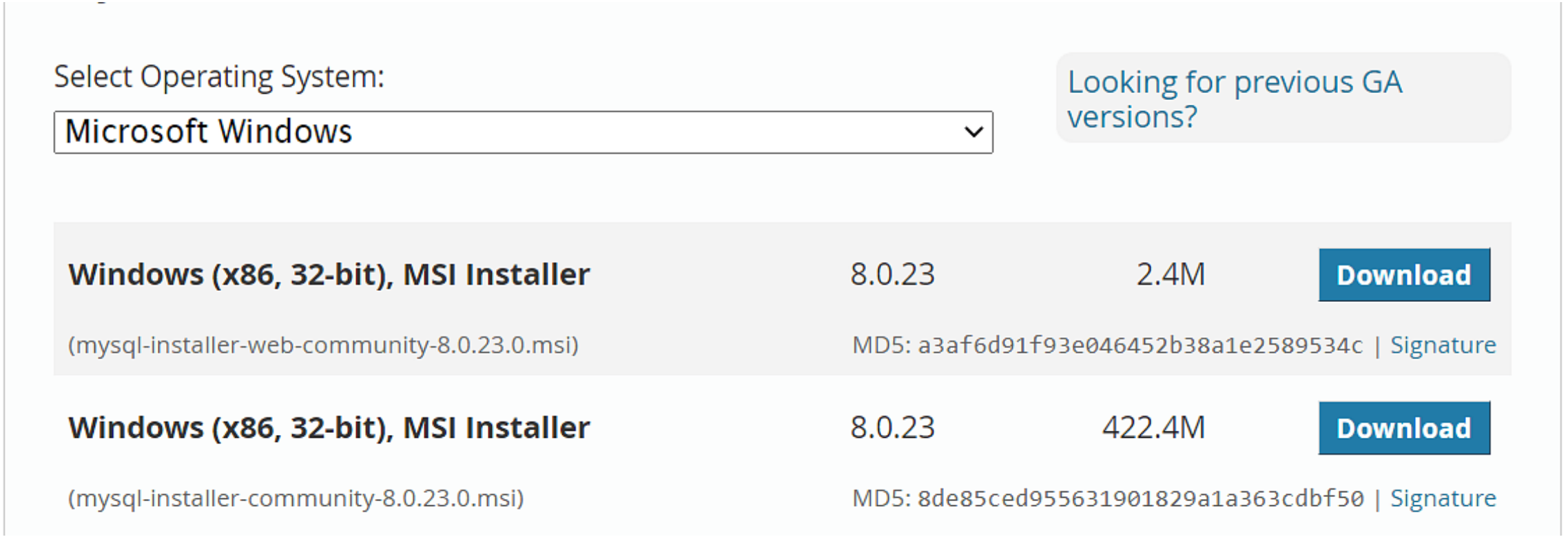
1. Open the MySQL website on a browser.
2. Select the **Downloads** option.



Use MySQL Installer

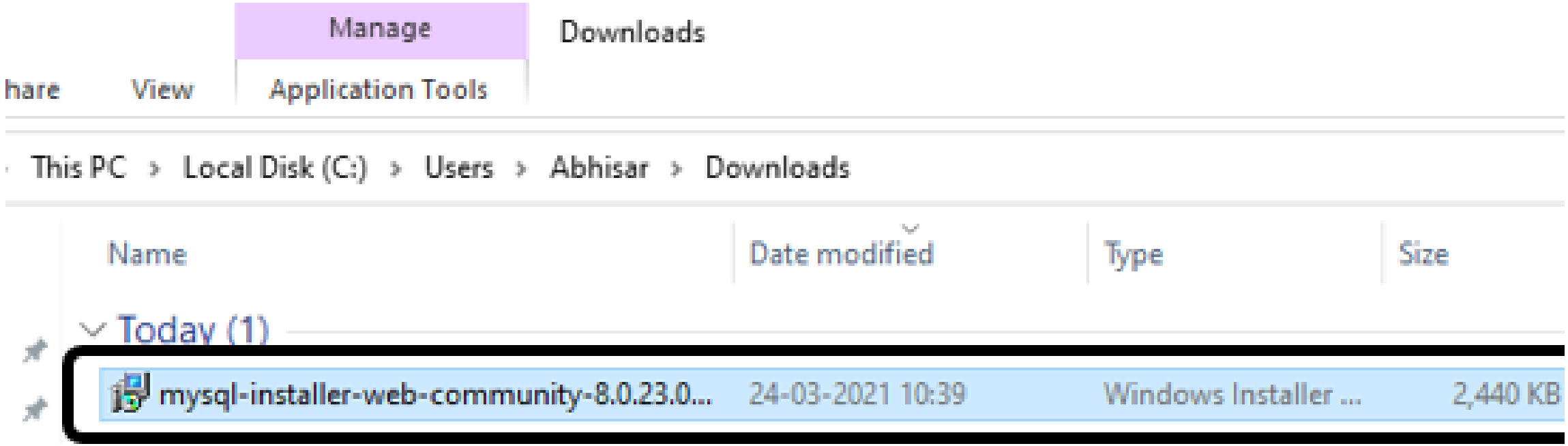
- 3. Select MySQL Installer for Windows.



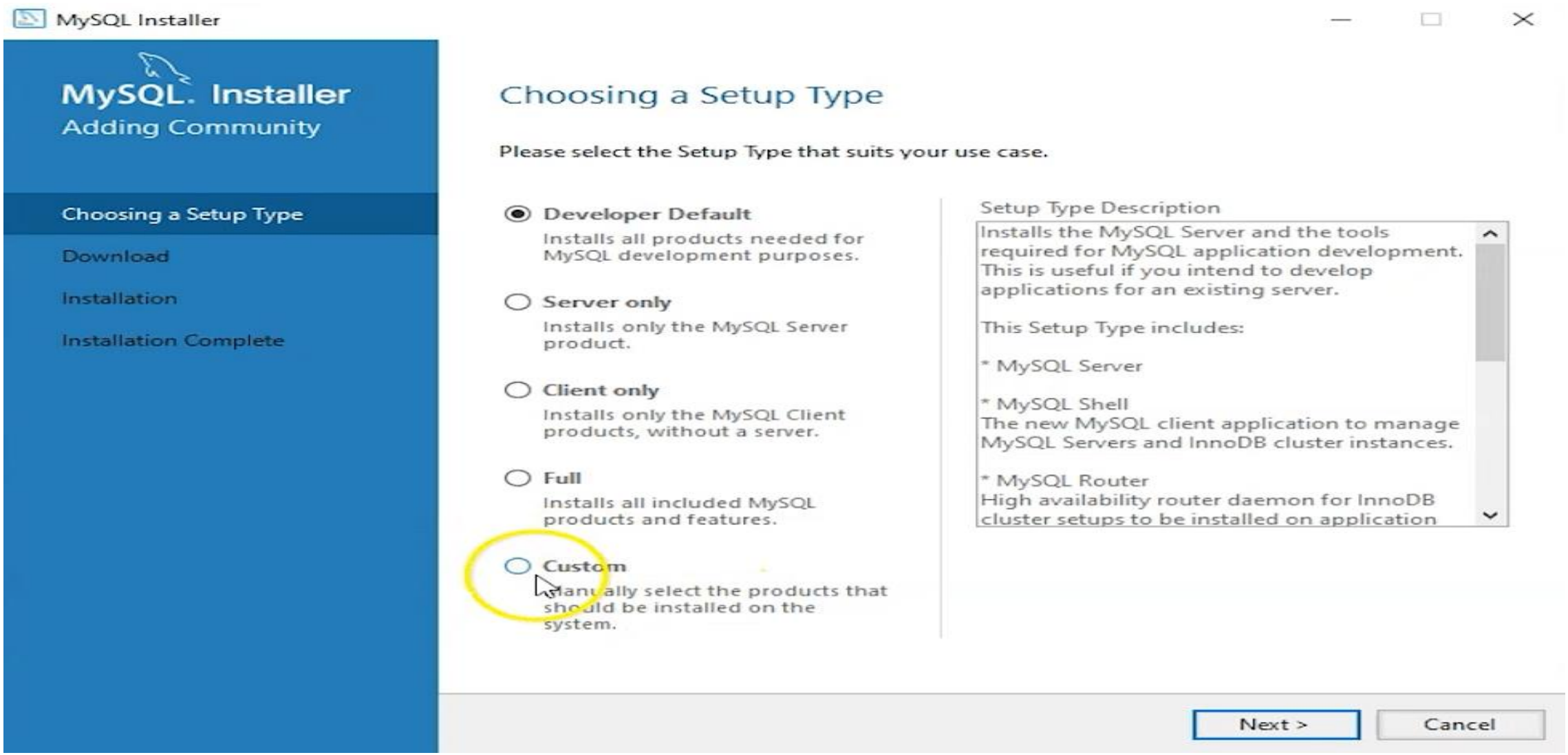


4. Choose the desired installer and click on download.

5. After the download, open the installer.

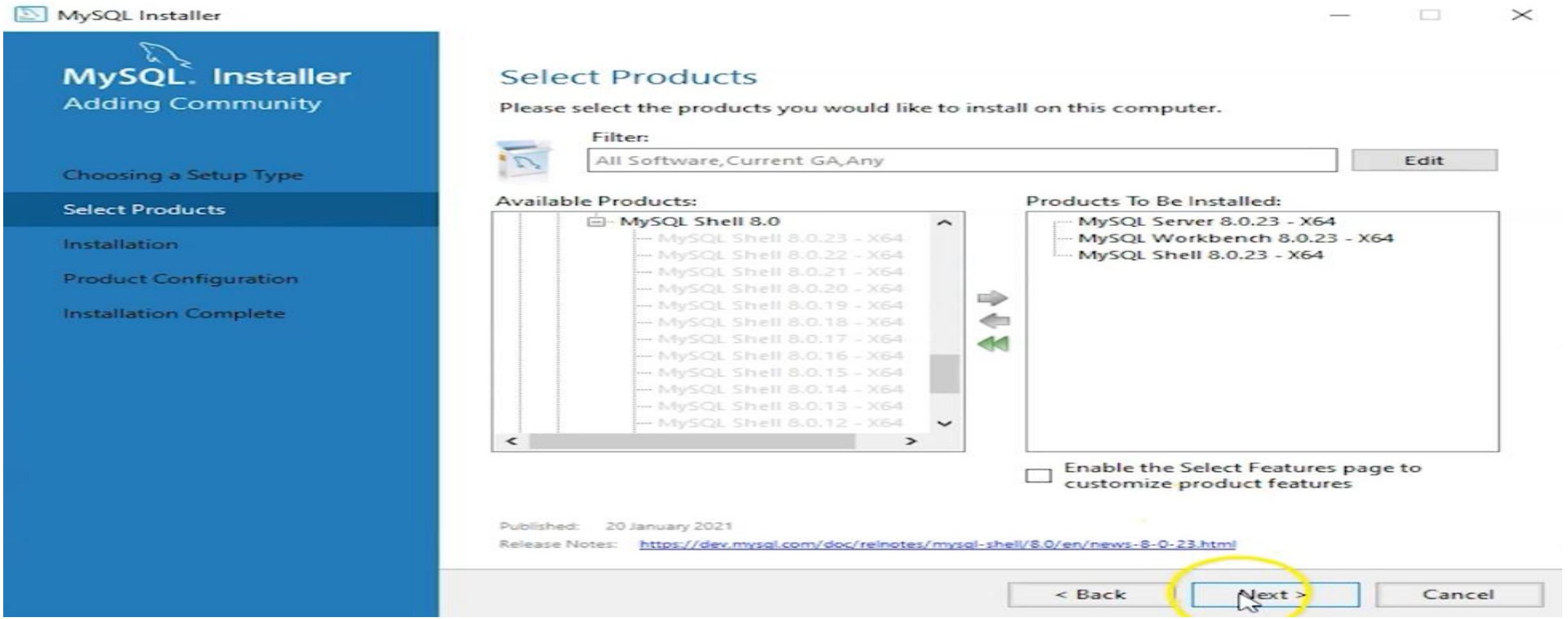


6. It will ask for permission; when it does, click Yes. The installer will then open. Now, it will ask to choose the setup type. Here, select Custom.

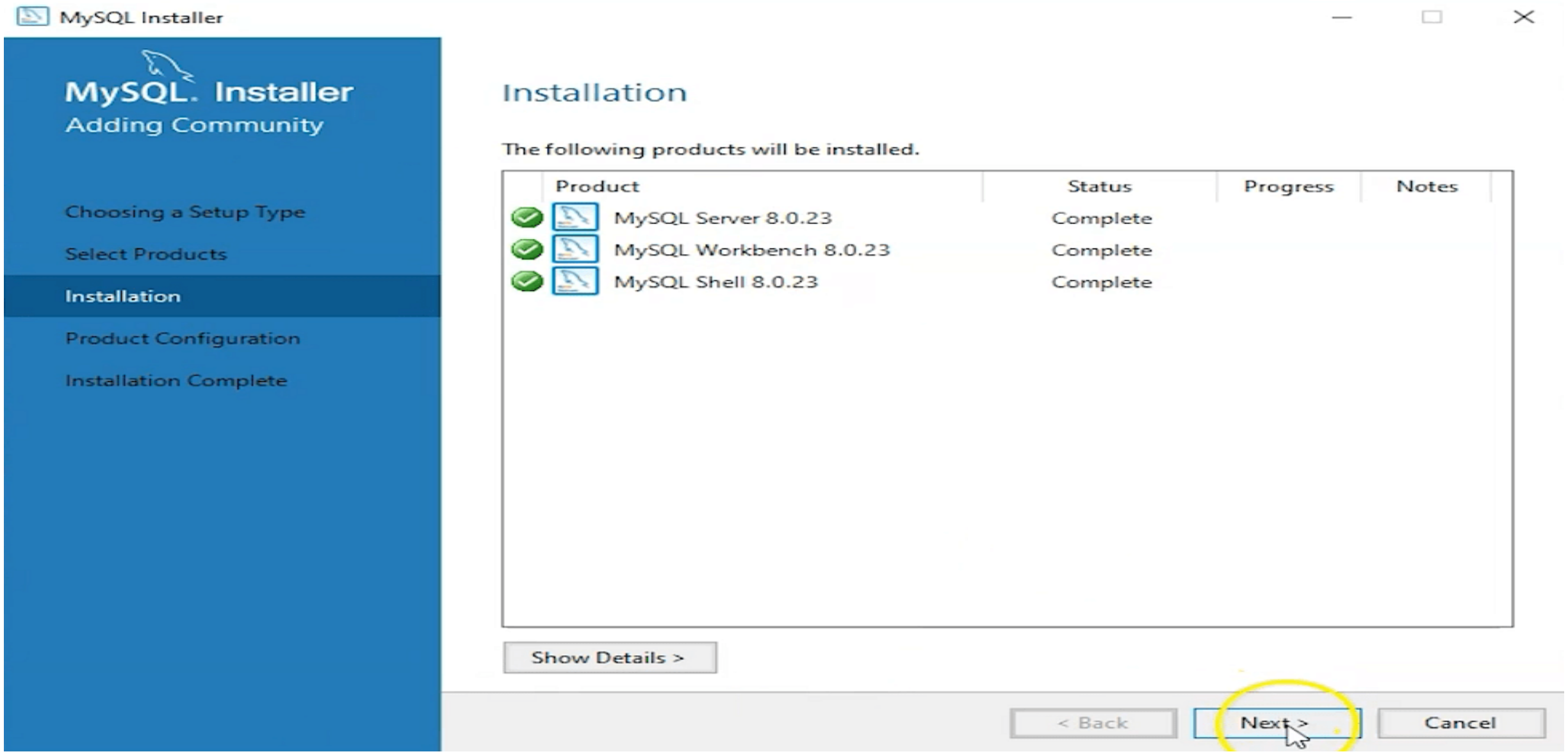


7. Click on Next. With this, you will install MySQL server, MySQL Workbench, and MySQL shell.

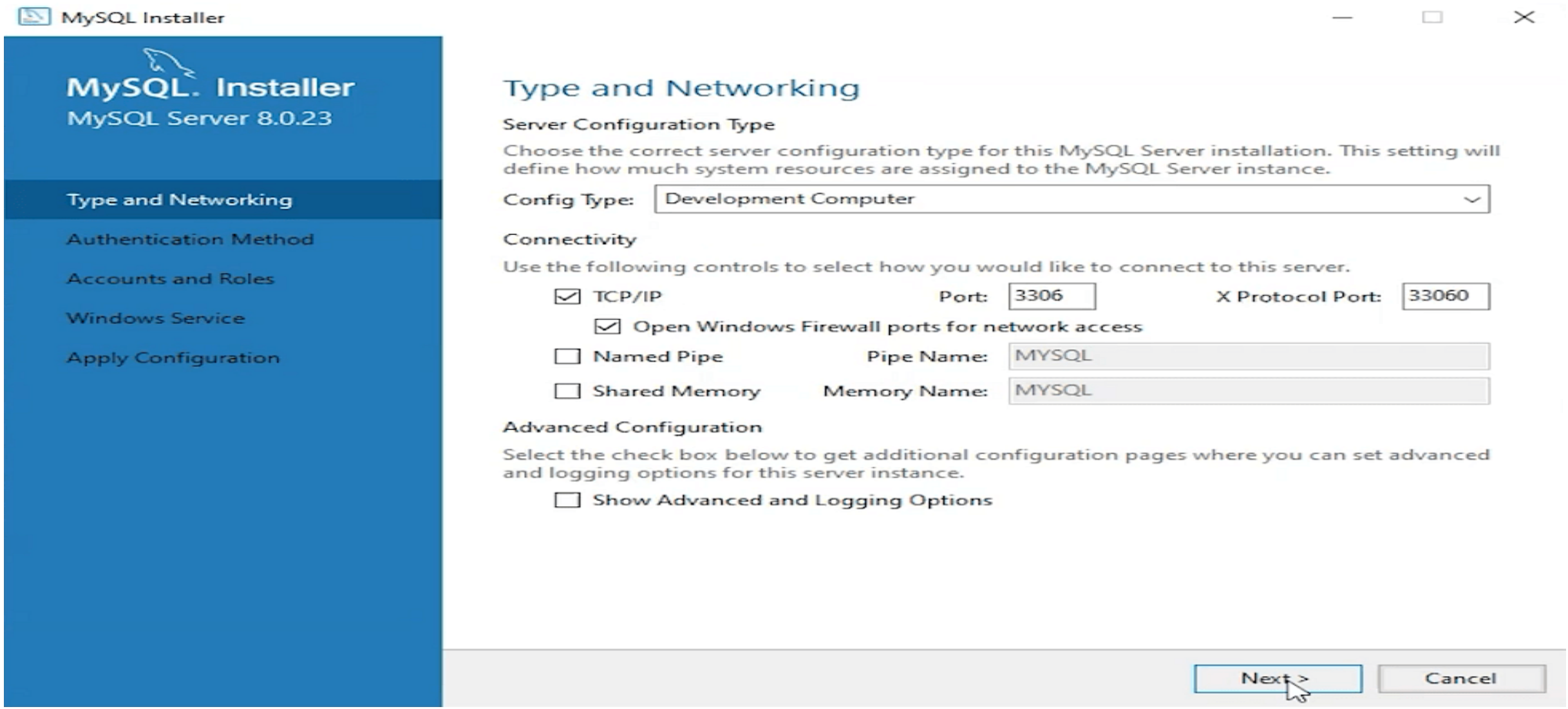
8. Open MySQL Servers, select the server you want to install, and move it to the Products/Features to be installed window section. Now, expand Applications, choose MySQL Workbench and MySQL shell. Move both of them to 'Products/Features to be installed'.



9. **Click on the Next button. Now, click on the Execute button to download and install the MySQL server, MySQL Workbench, and the MySQL shell.**

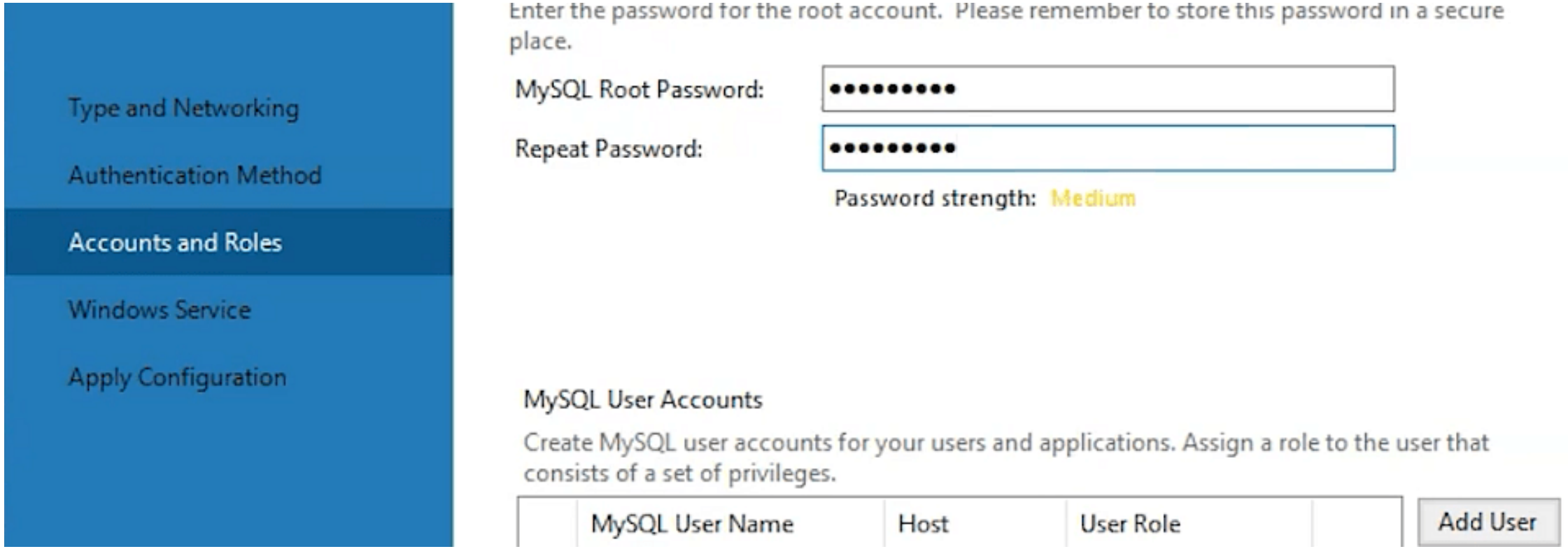


10. Once the product is ready to configure, click on Next. Under Type and Networking, go with the default settings and select Next.

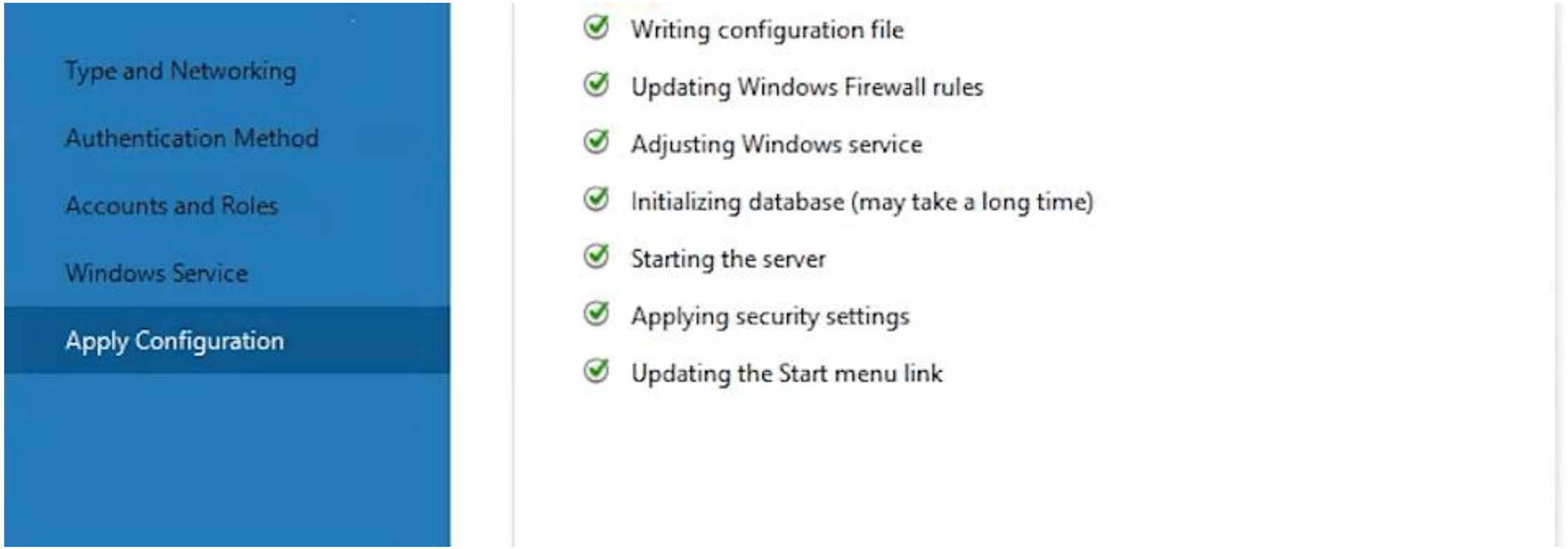


11. For authentication, use the recommended strong password encryption.

12. Set your MySQL Root password and click on next.



13. Go for the default windows service settings and under apply configuration, click on execute. Once the configuration is complete, click on finish.



14. Complete the installation. This will now launch the MySQL Workbench and the MySQL Shell.

MySQL Installer

Adding Community

Choosing a Setup Type

Select Products

Check Requirements

Installation

Product Configuration

Installation Complete

Installation Complete

The installation procedure has been completed.

Copy Log to Clipboard

☑ Start MySQL Workbench after setup

☑ Start MySQL Shell after setup

The MySQL Shell is an advanced MySQL client application that can be used to work with single MySQL Server instances. Further, it can be used to create and manage an InnoDB cluster, an integrated solution for high availability and scalability of MySQL databases, without requiring advanced MySQL expertise.

Refer to the following links for documentation, tutorials and examples on MySQL Shell:

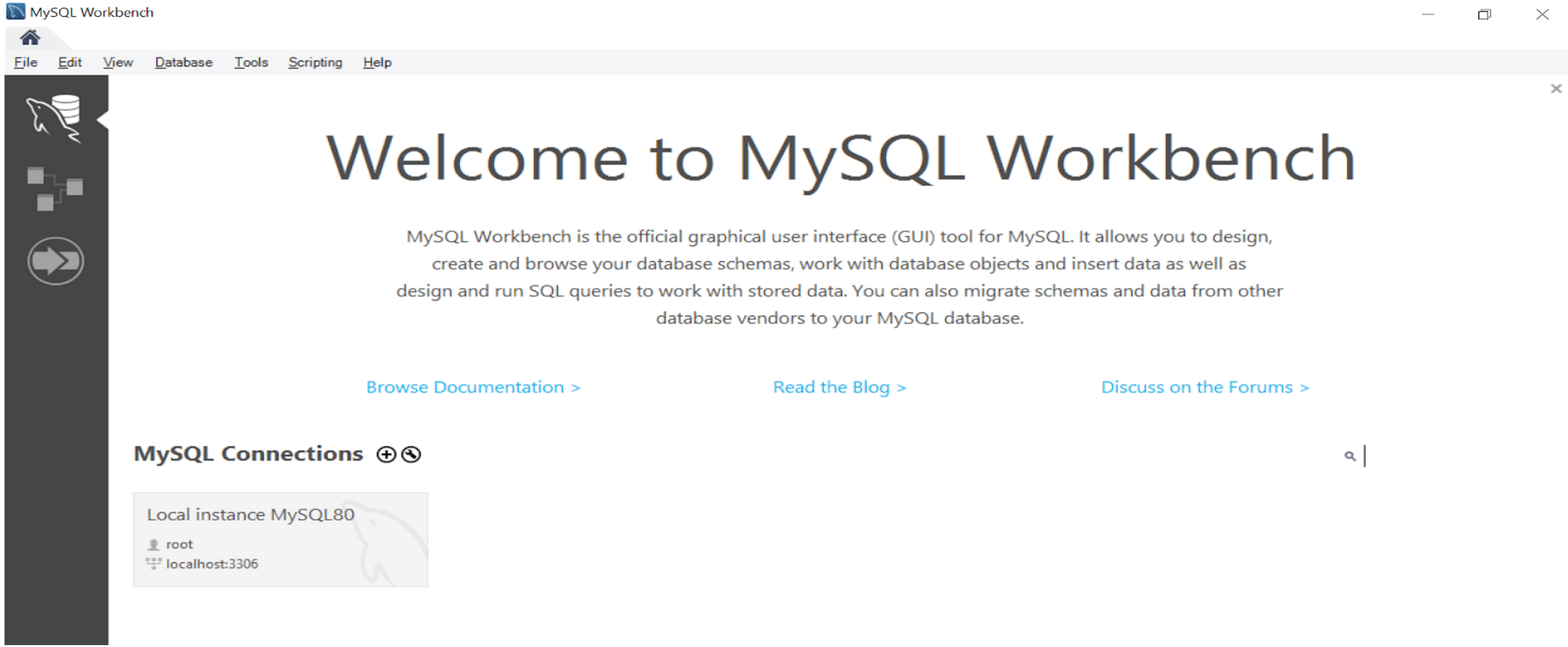
MySQL Shell Documentation

Setting up a Real World Cluster Blog

The All New MySQL InnoDB ReplicaSet Blog

Changing Cluster Options Live Blog

15. Once MySQL Workbench is installed, select the Local instance and enter the password.



Now, you can use the MySQL query tab to write your SQL queries.

MySQL Workbench

MySQL Workbench is a unified software used to add functionality and ease to SQL development work. MySQL Workbench provides data modeling, SQL development, and various administration tools for configuration. It also offers a graphical interface to work with the databases in a structured way.

With its comprehensive features, MySQL Workbench is a popularly used software by businesses to manage their structured databases.

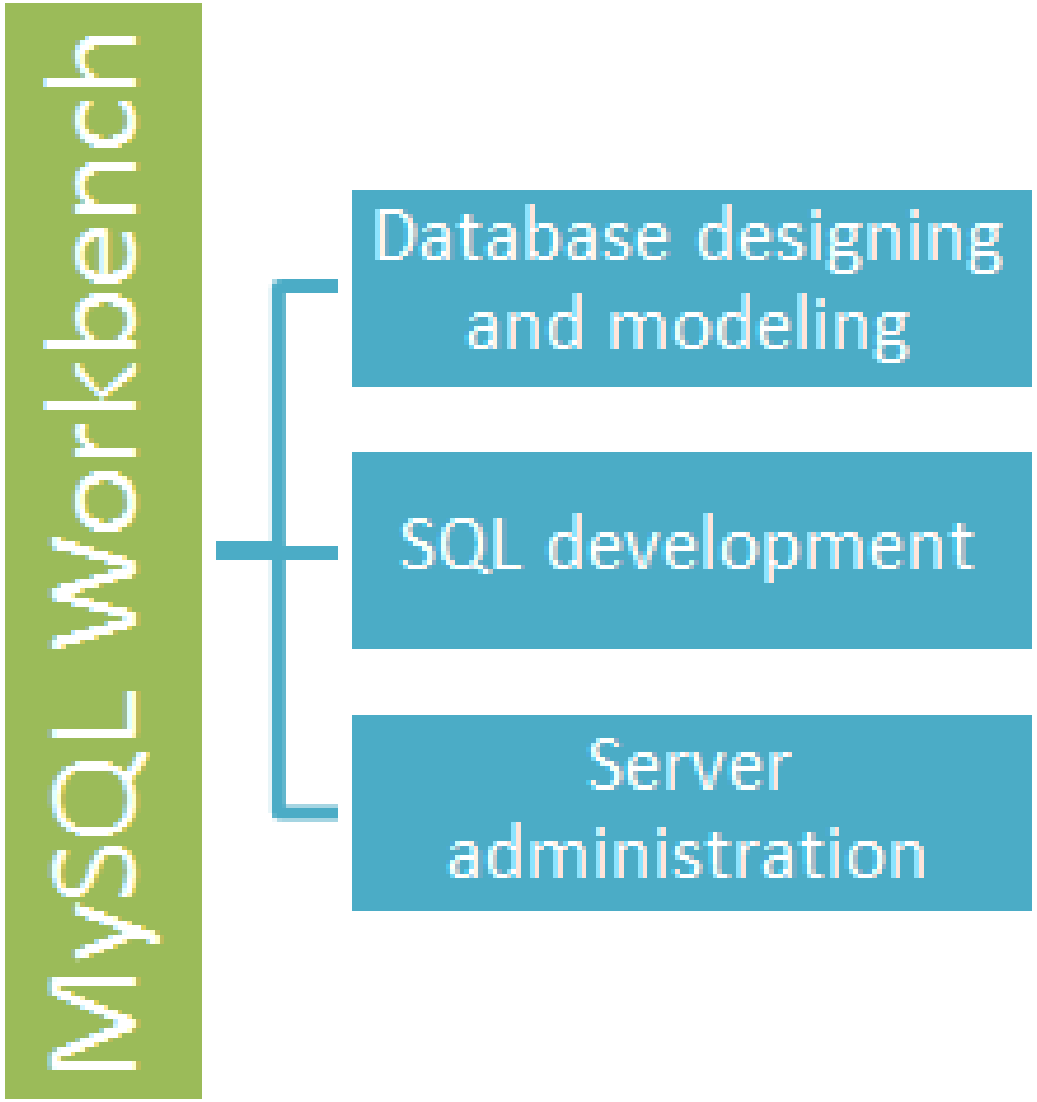
MySQL Workbench

MySQL Workbench provides data modeling, SQL development, and various administration tools for configuration. It also offers a graphical interface to work with the databases in a structured way.

- You can create a Graphical Model using MySQL Workbench
- MySQL Workbench provides reverse engineering for live databases to models
- MySQL Workbench offers a forward engineering model to a scipt/live database

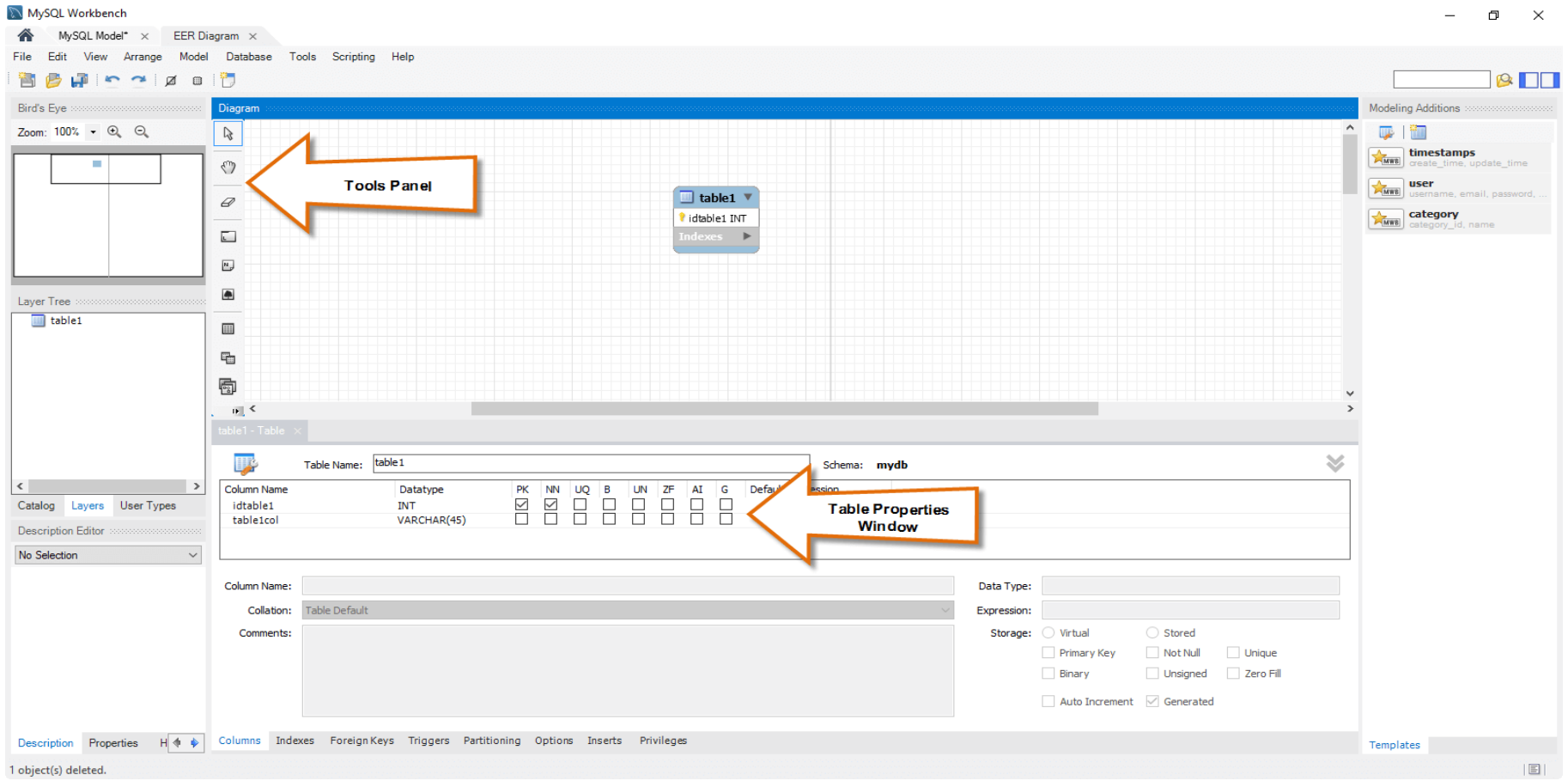
MySQL Workbench

The purpose of MySQL Workbench is to provide the interface to work with databases more easily and in a more structured way.



MySQL workbench- Modeling and Design Tool

- Models are at the core of most valid and high performance databases. MySQL Workbench has tools that allow developers and database administrators visually create physical database design models that can be easily translated into MySQL databases using forward engineering.
- MySQL workbench supports creation of multiple models in the same environment.
- It supports all objects such as tables, views, stored procedures, triggers, etc. that make up a database.
- MySQL workbench has a built in model validating utility that reports any issues that might be found to the data modeler.

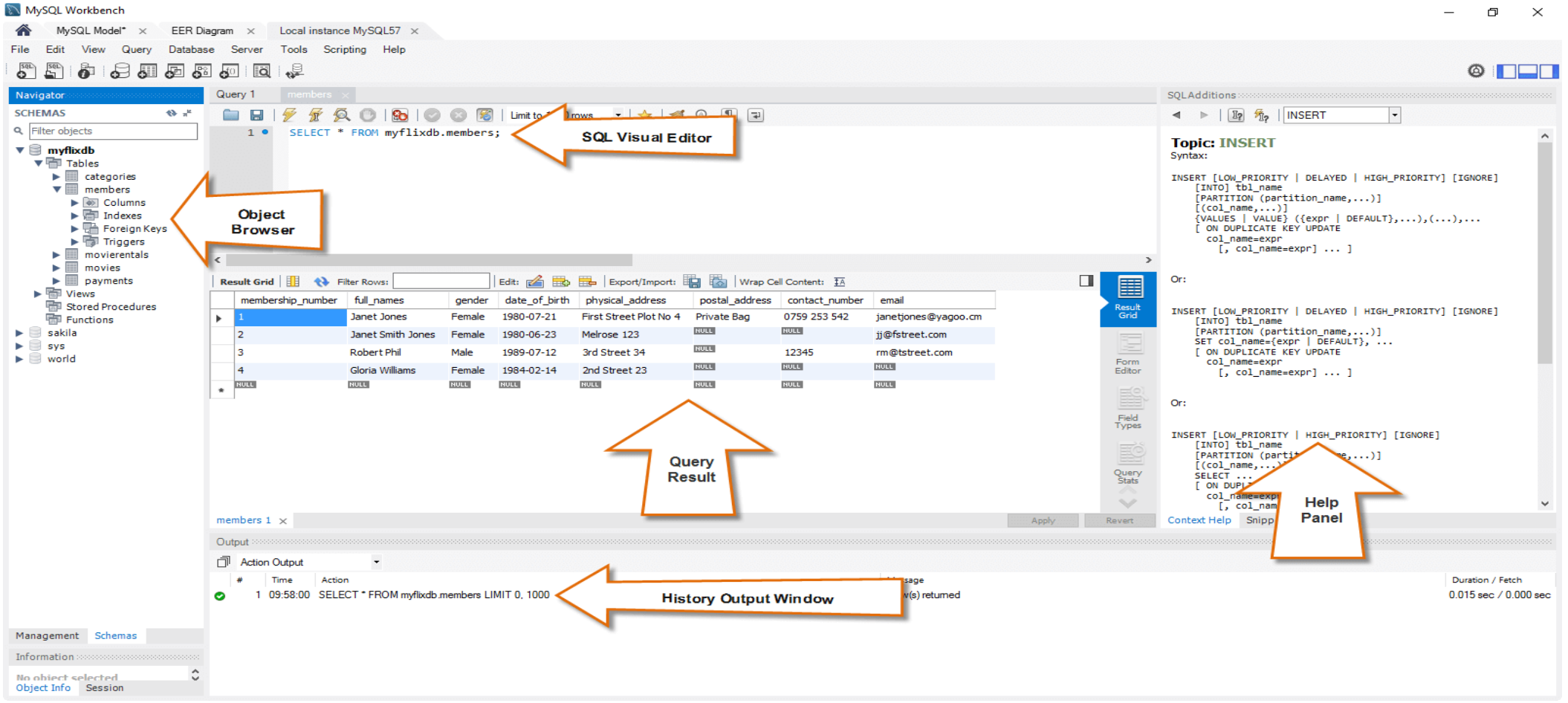


MySQL Workbench Modeling window

MySQL workbench – SQL Editor

Structured Query Language (SQL) allows us to manipulate our relational databases. SQL is at the heart of all relational databases

- MySQL workbench, has built in SQL visual editor.
- The Visual SQL editor allows developers to build, edit and run queries against MySQL server databases. It has utilities for viewing data and exporting it.
- Its syntax color highlighters help developers easily write and debug SQL statements.
- Multiple queries can be run and results automatically displayed in different tabs.
- The queries are also saved in the history panel for later retrieval and running.



MySQL Workbench SQL Development Window

MySQL Workbench – Administration tool

Server administration plays a critical role in securing the data of the company. The major issues concerning server administration are users' management, server configuration, server logs and many more.

MySQL Workbench – Administration tool

MySQL Workbench has the following features that simplify the process of MySQL server administration:

- **User administration** – visual utility for managing users that lets database administrators easily add new and remove existing users if need arises, grant and drop privileges and view user profiles.
- **Server configuration** – allows for advanced configuration of the server and fine tuning for optimal performance.
- **Database backup and restorations** – visual tool for exporting/importing MySQL dump files. MySQL dump files contain SQL scripts for creating databases, tables, views, stored procedures and insertion of data.
- **Server logs** – visual tool for viewing MySQL server logs. The logs include error logs, binary logs and InnodDB logs. These logs come in handy when performing diagnosis on the server.

MySQL Workbench – Admin Panel