

# Experiment 1

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# Installation: Download MySQL Installer

- If you want to install MySQL on the Windows environment, using MySQL installer is the easiest way.
- To download MySQL installer, go to the following link <http://dev.mysql.com/downloads/installer/>. There are two installer files:
  - If you are connecting to the internet while installing MySQL, you can choose the online installation version `mysql-installer-web-community-<version>.exe`.
  - In case you want to install MySQL offline, you can download the `mysql-installer-community-<version>.exe` file.

# Installation

## MySQL Community Downloads

MySQL Installer

General Availability (GA) Releases

Archives



### MySQL Installer 8.0.26

Select Operating System:

Microsoft Windows



Looking for previous GA versions?

**Windows (x86, 32-bit), MSI Installer**

(mysql-installer-web-community-8.0.26.0.msi)

8.0.26

2.4M

**Download**

MD5: eaddc383a742775a5b33a3783a4890fb | [Signature](#)

**Windows (x86, 32-bit), MSI Installer**

(mysql-installer-community-8.0.26.0.msi)

8.0.26

450.7M

**Download**

MD5: b5b8e6bc39f2b163b817264ae206b815 | [Signature](#)

# Installation

## MySQL Community Downloads

Login Now or Sign Up for a free account.

An Oracle Web Account provides you with the following advantages:

- Fast access to MySQL software downloads
- Download technical White Papers and Presentations
- Post messages in the MySQL Discussion Forums
- Report and track bugs in the MySQL bug system

**Login »**

using my Oracle Web account

**Sign Up »**

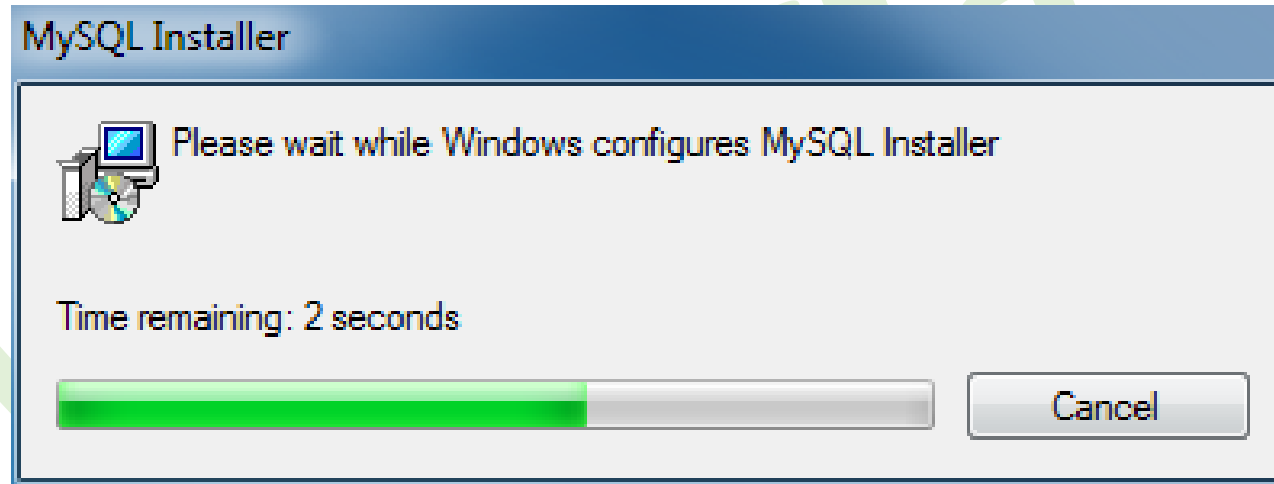
for an Oracle Web account

MySQL.com is using Oracle SSO for authentication. If you already have an Oracle Web account, click the Login link. Otherwise, you can signup for a free account by clicking the Sign Up link and following the instructions.

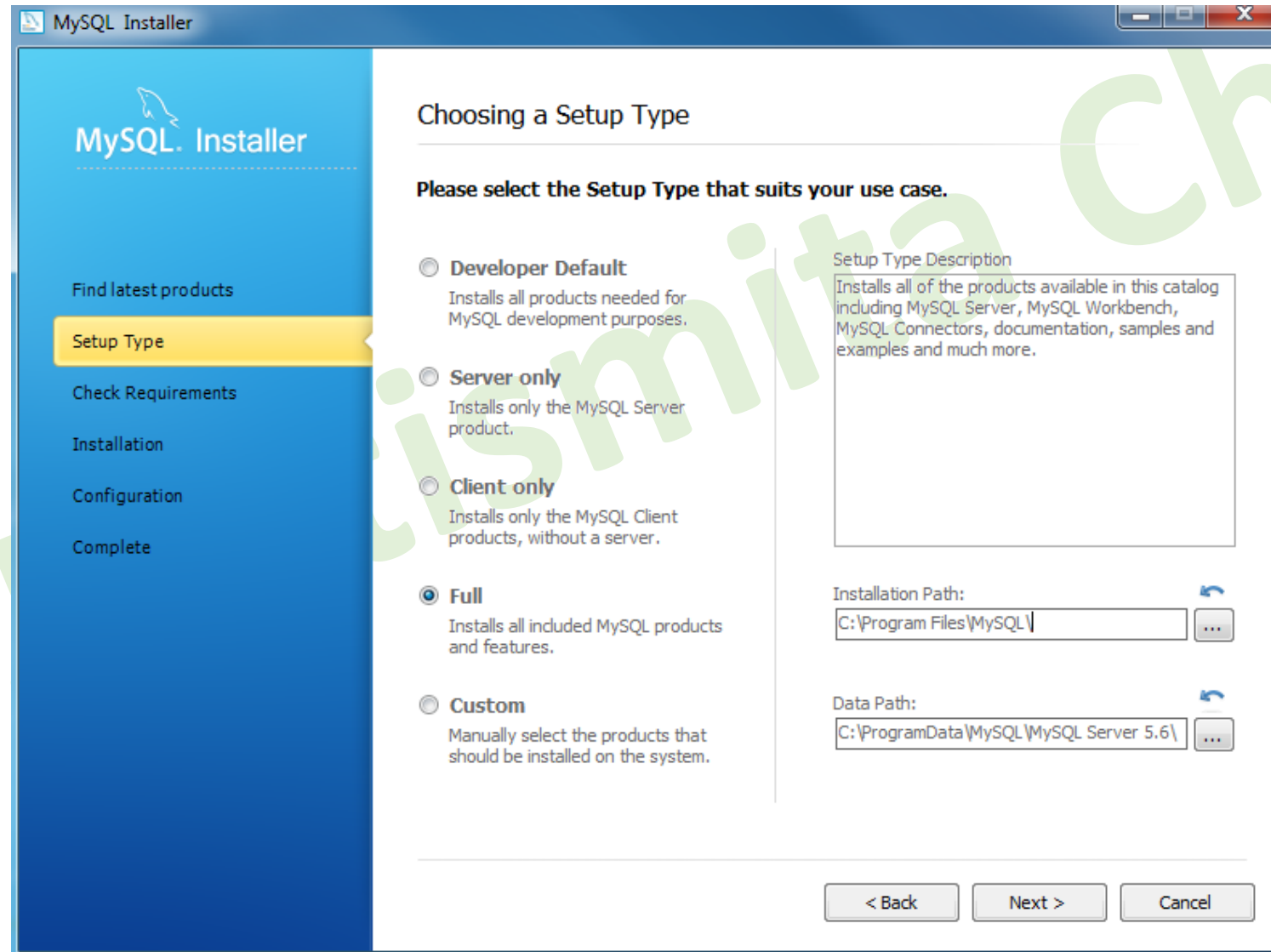
**No thanks, just start my download.**

# Installation: Install MySQL via MySQL Installer

- To install MySQL using the MySQL installer, double-click on the MySQL installer file and follow the steps below:

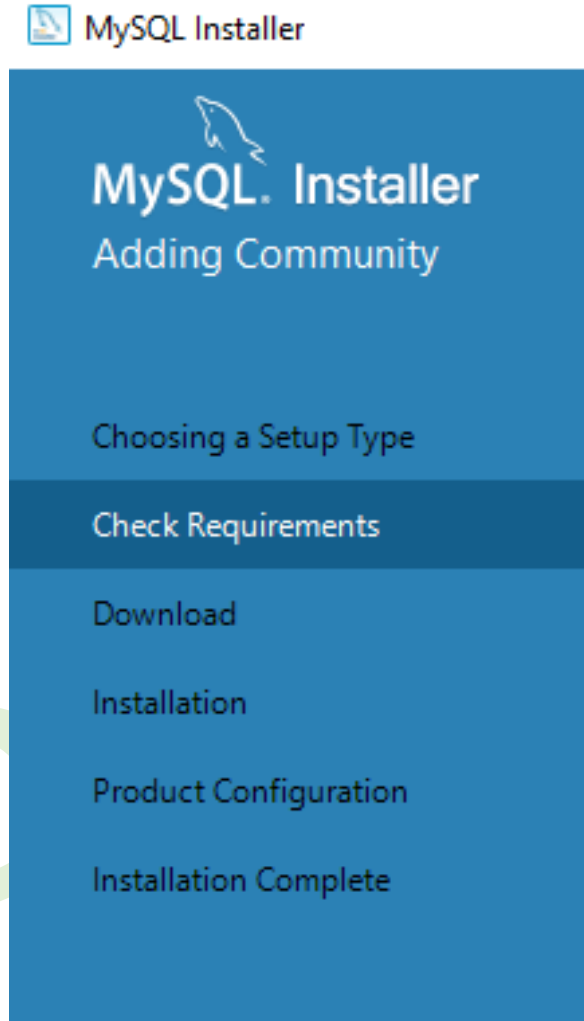


# Installation: Setup Type



# Installation

Select Execute



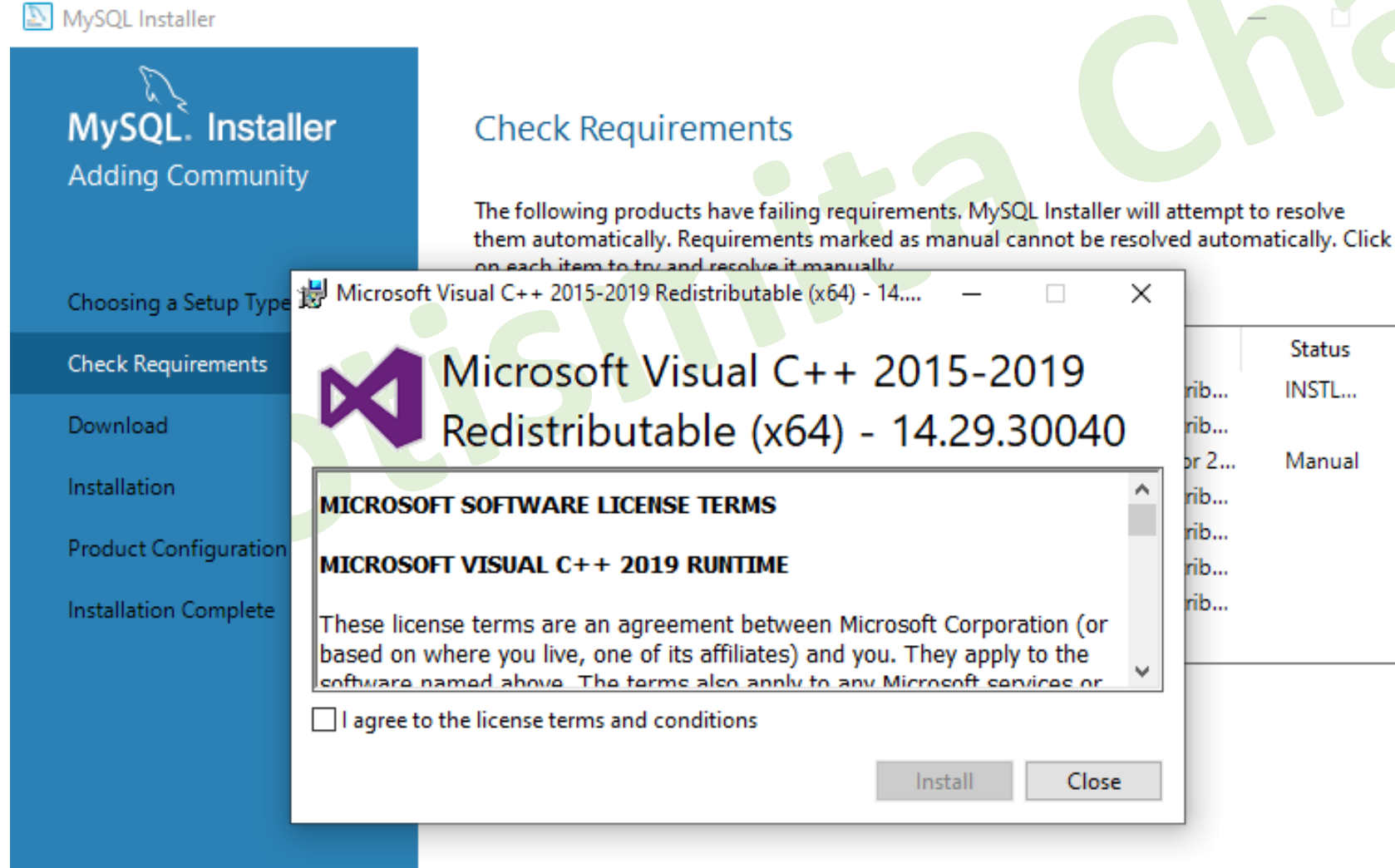
## Check Requirements

The following products have failing requirements. MySQL Installer will attempt to resolve them automatically. Requirements marked as manual cannot be resolved automatically. Click on each item to try and resolve it manually.

For Product	Requirement	Status
<input type="radio"/> MySQL Server 8.0.26	Microsoft Visual C++ 2019 Redistrib...	
<input type="radio"/> MySQL Workbench 8.0.26	Microsoft Visual C++ 2019 Redistrib...	
<input type="radio"/> MySQL for Visual Studio 1.2.10	Visual Studio version 2015, 2017 or 2...	Manual
<input type="radio"/> MySQL Shell 8.0.26	Microsoft Visual C++ 2019 Redistrib...	
<input type="radio"/> MySQL Router 8.0.26	Microsoft Visual C++ 2019 Redistrib...	
<input type="radio"/> Connector/ODBC 8.0.26	Microsoft Visual C++ 2019 Redistrib...	
<input type="radio"/> Connector/C++ 8.0.26	Microsoft Visual C++ 2017 Redistrib...	

# Installation

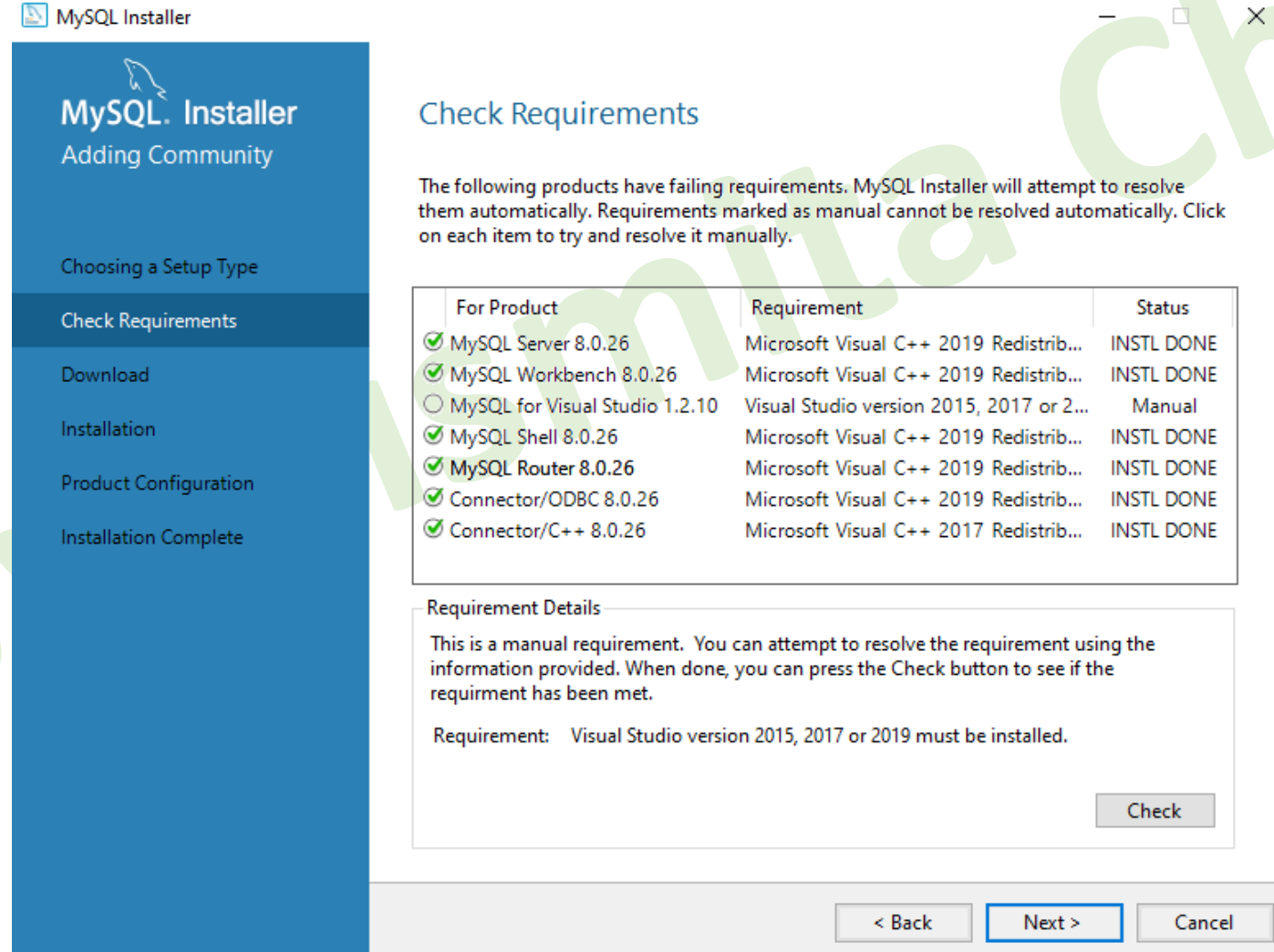
Select I agree,  
then Next





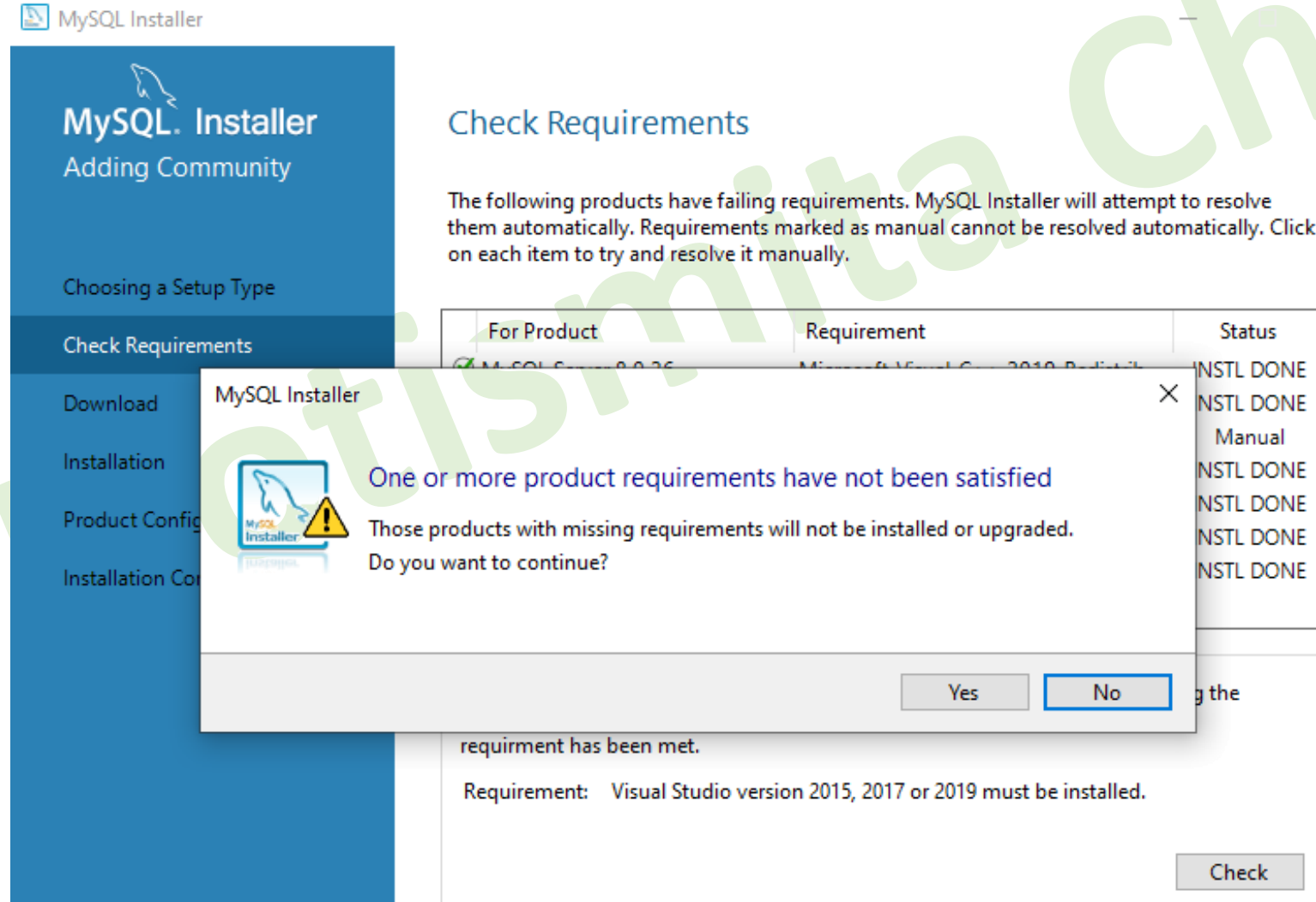
# Installation

Select Next



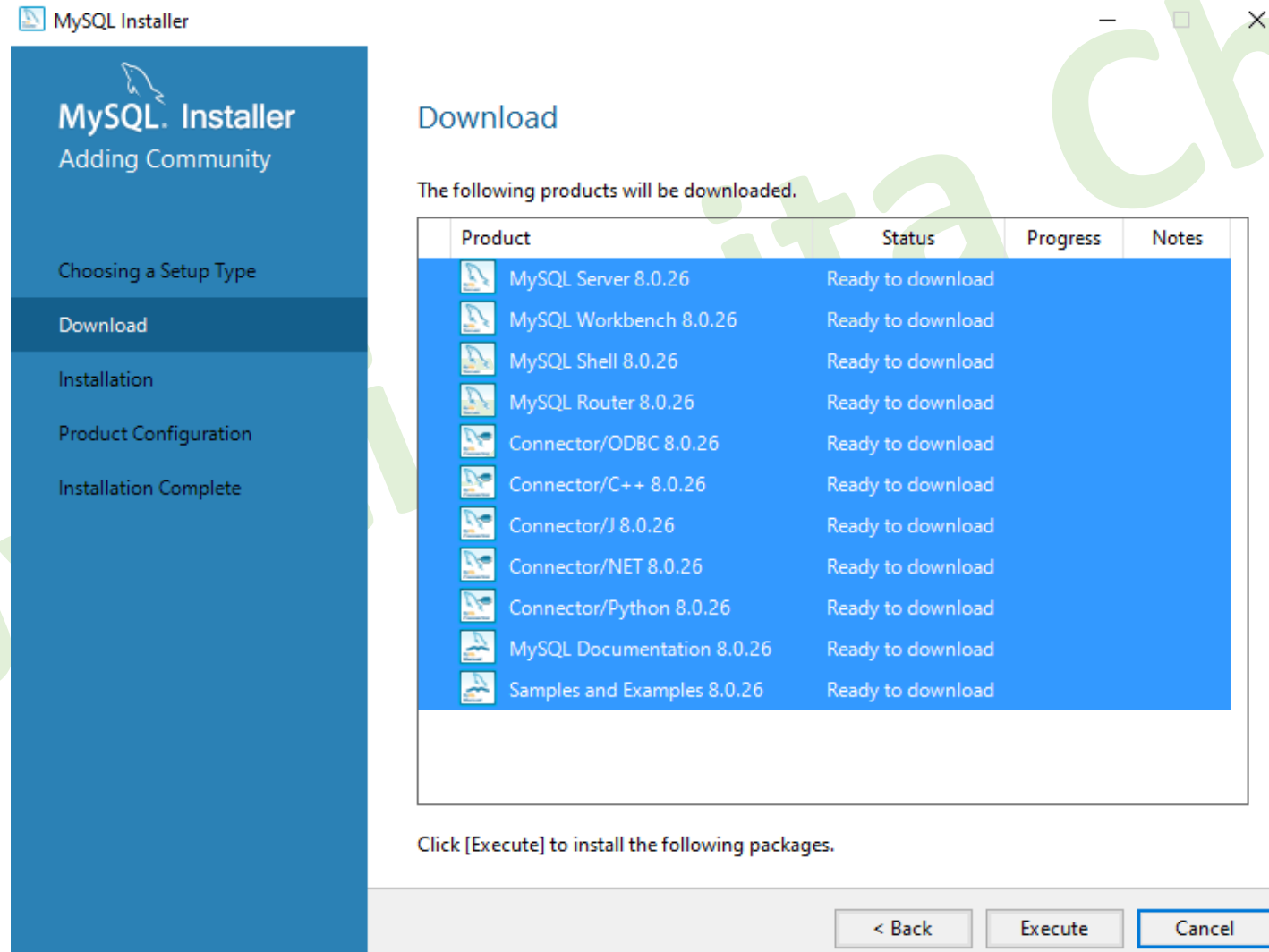
# Installation

Select Yes



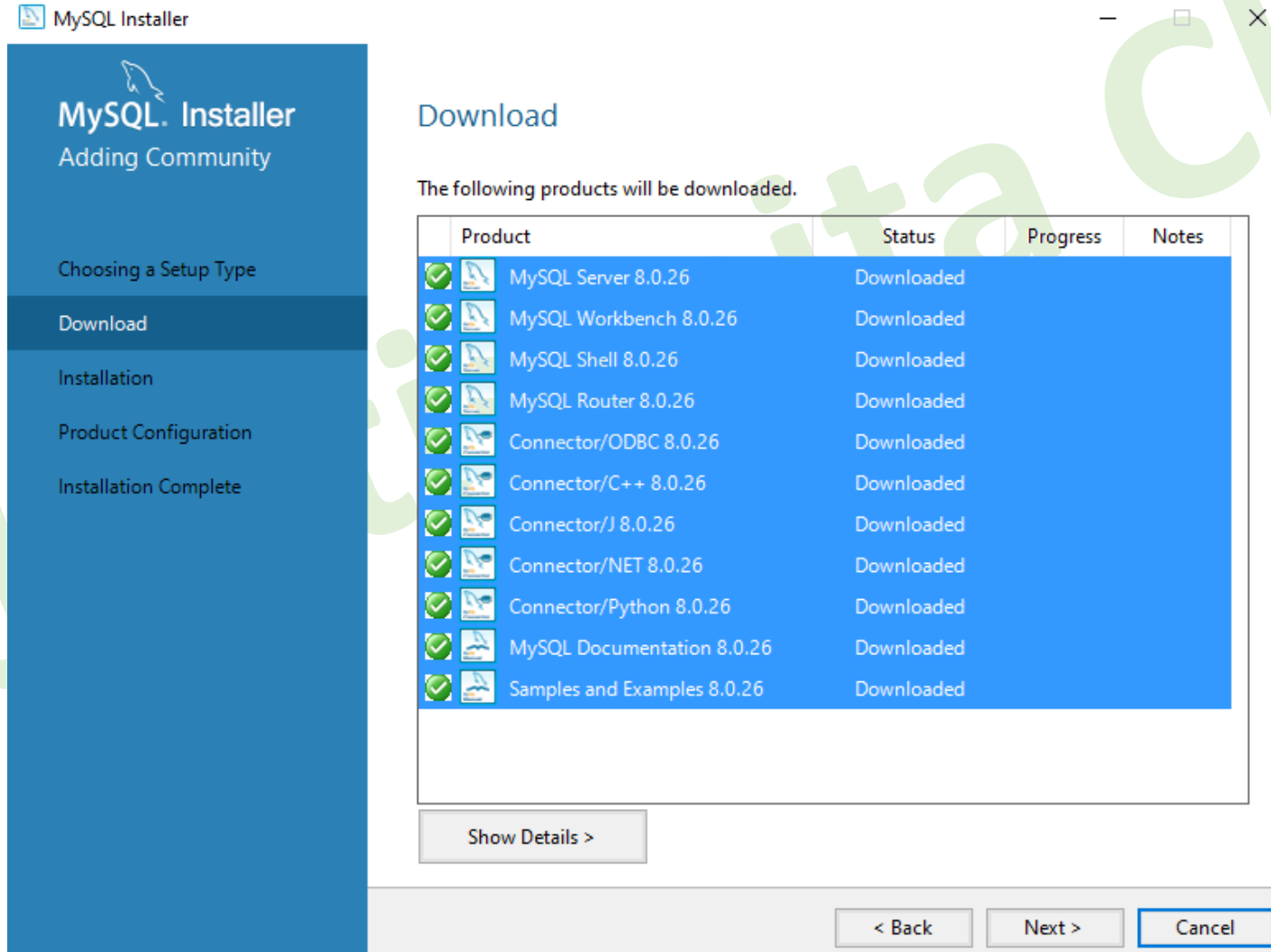
# Installation

Select Execute



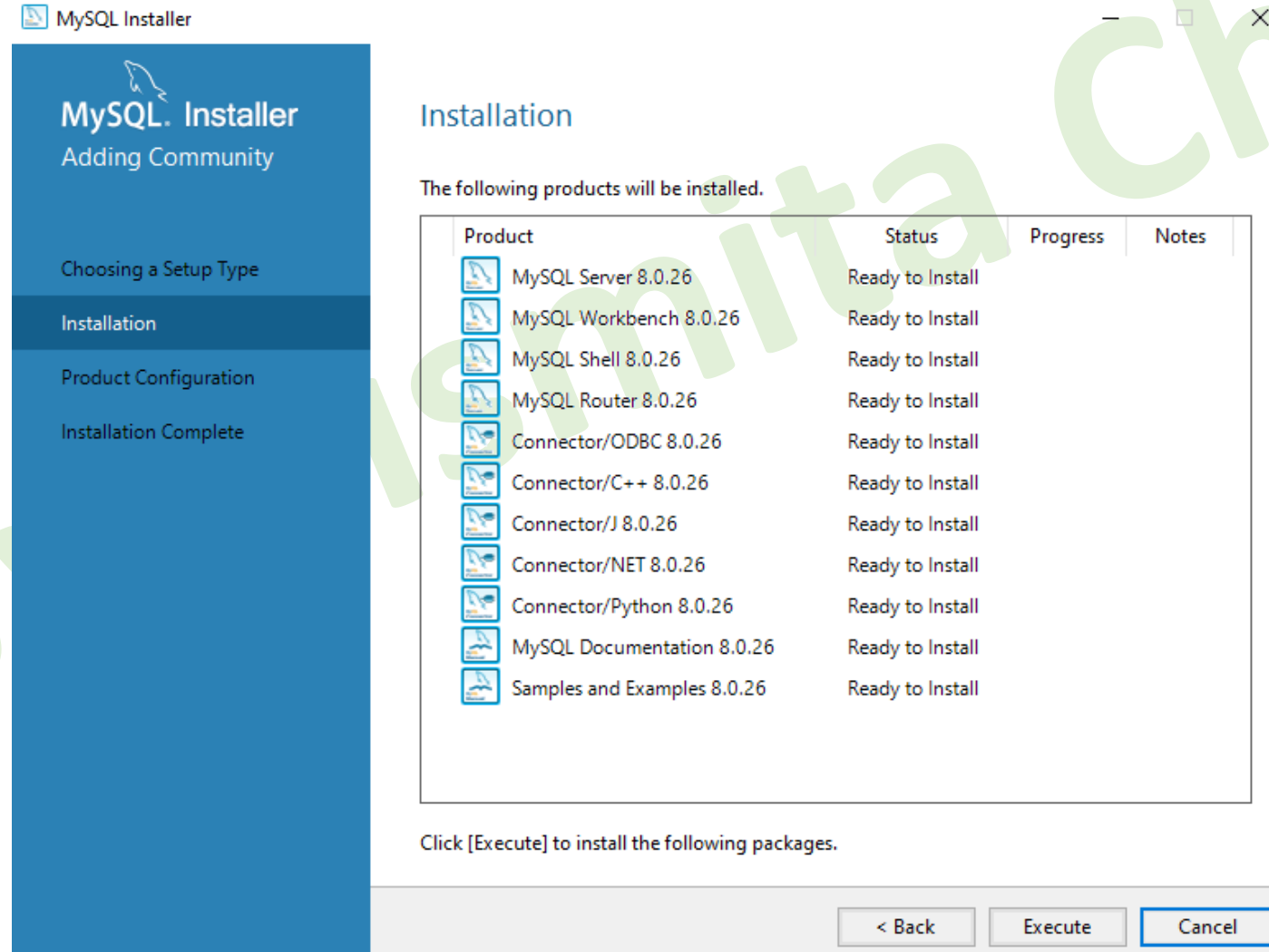
# Installation

Select Next



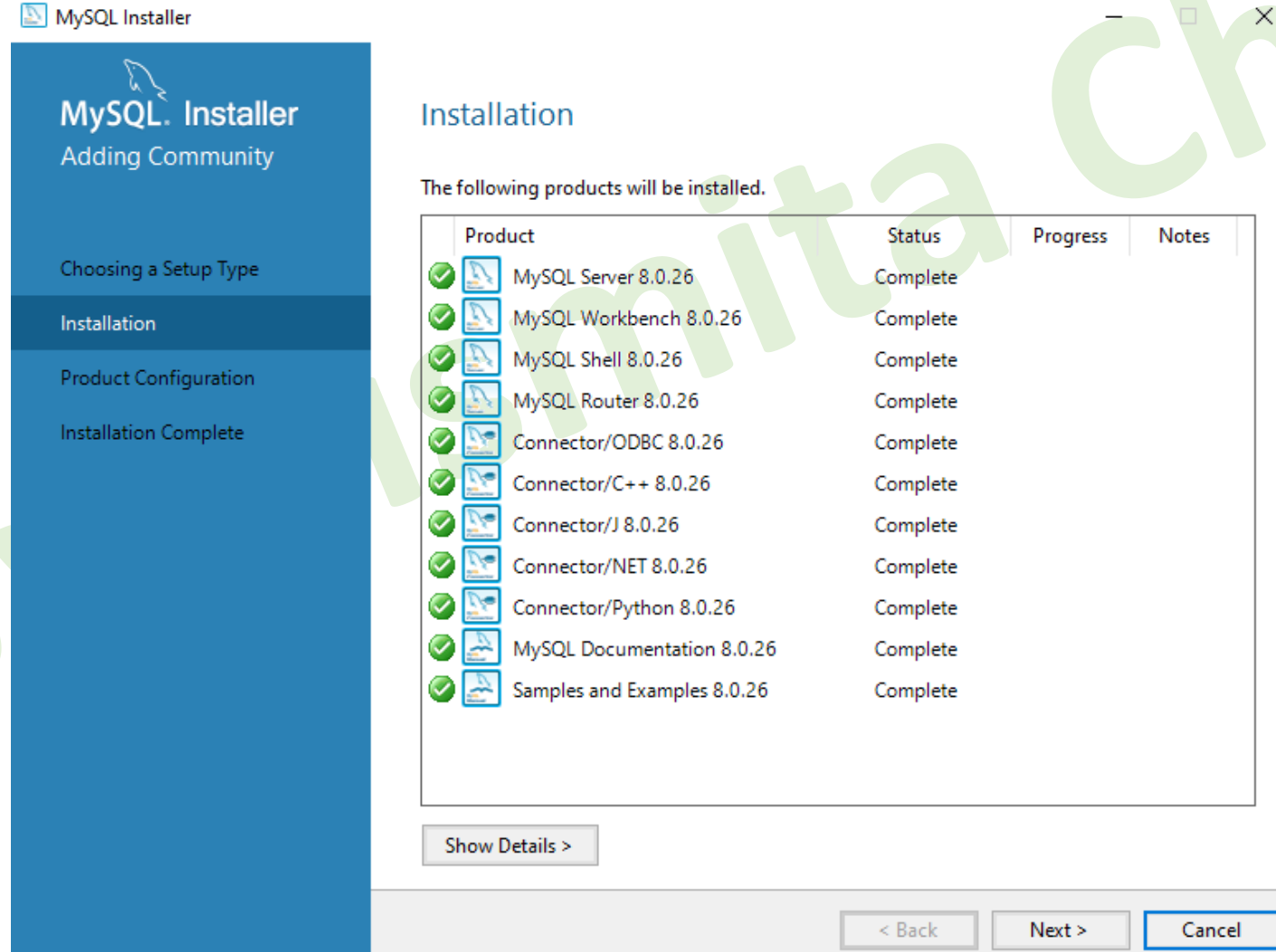
# Installation

Select Execute



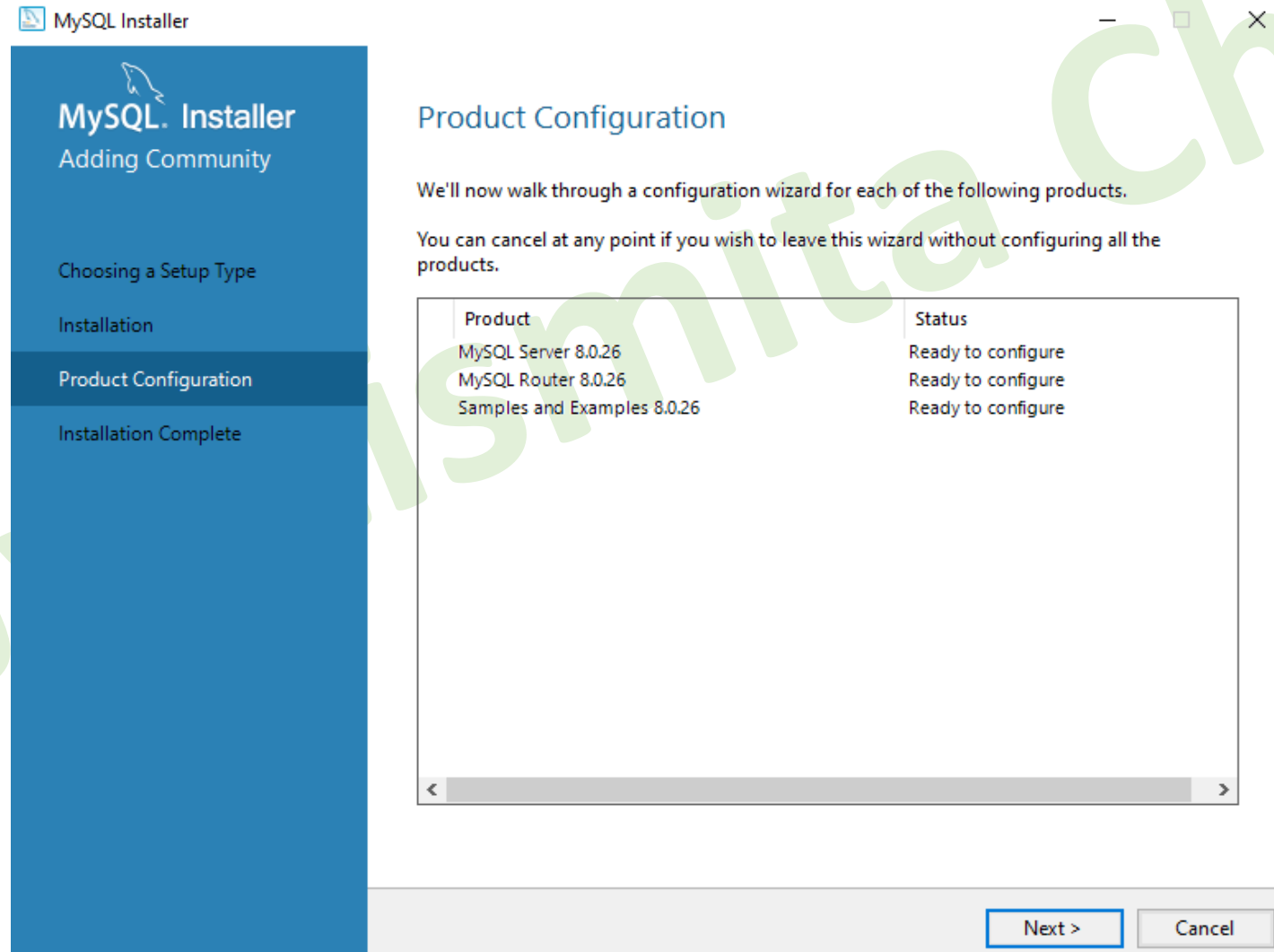
# Installation

Select Next



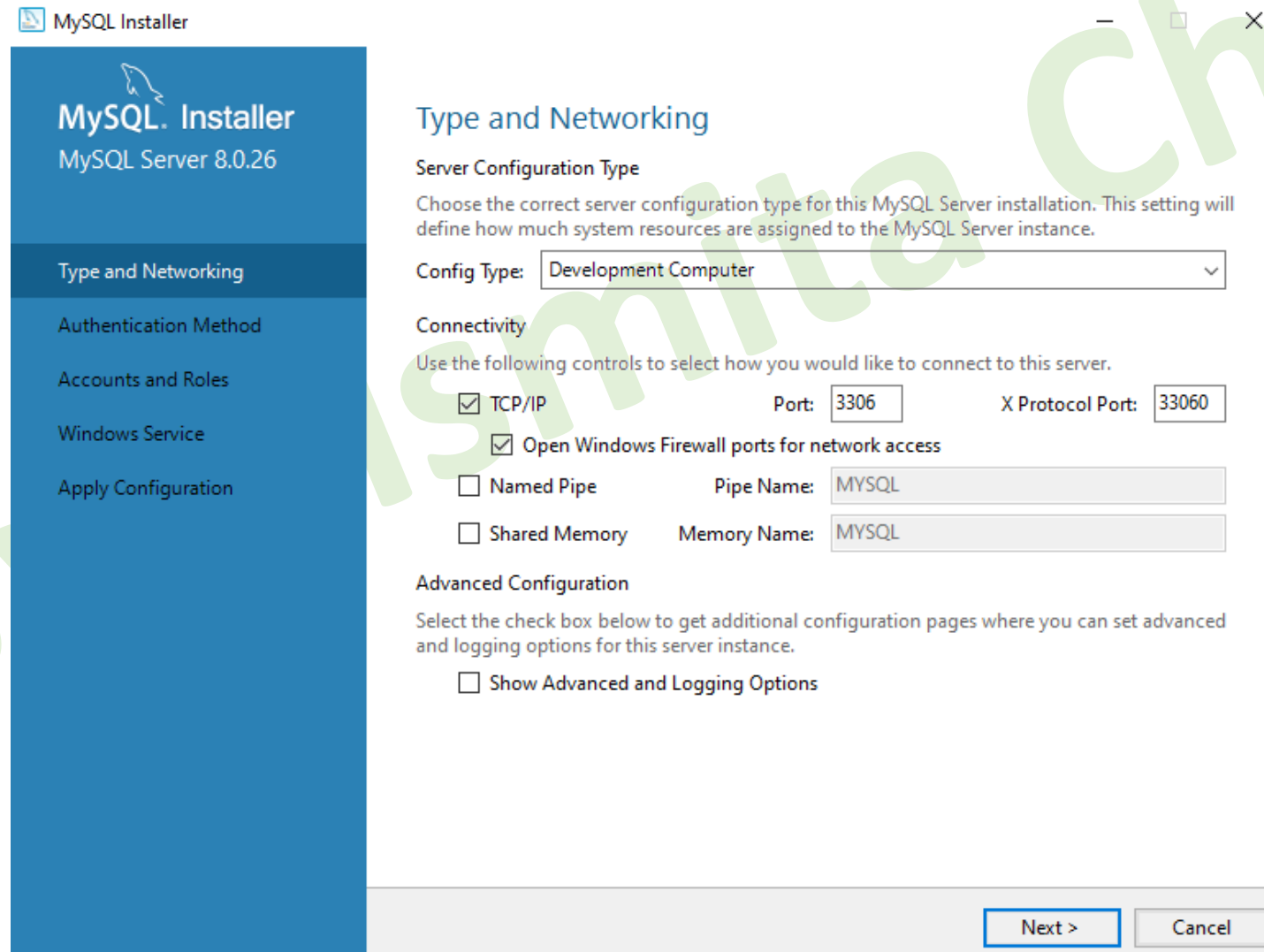
# Installation

Select Next



# Installation

Select Next



The image shows the MySQL Installer window for MySQL Server 8.0.26. The left sidebar contains the following steps: Type and Networking (selected), Authentication Method, Accounts and Roles, Windows Service, and Apply Configuration. The main area is titled 'Type and Networking' and contains the following sections:

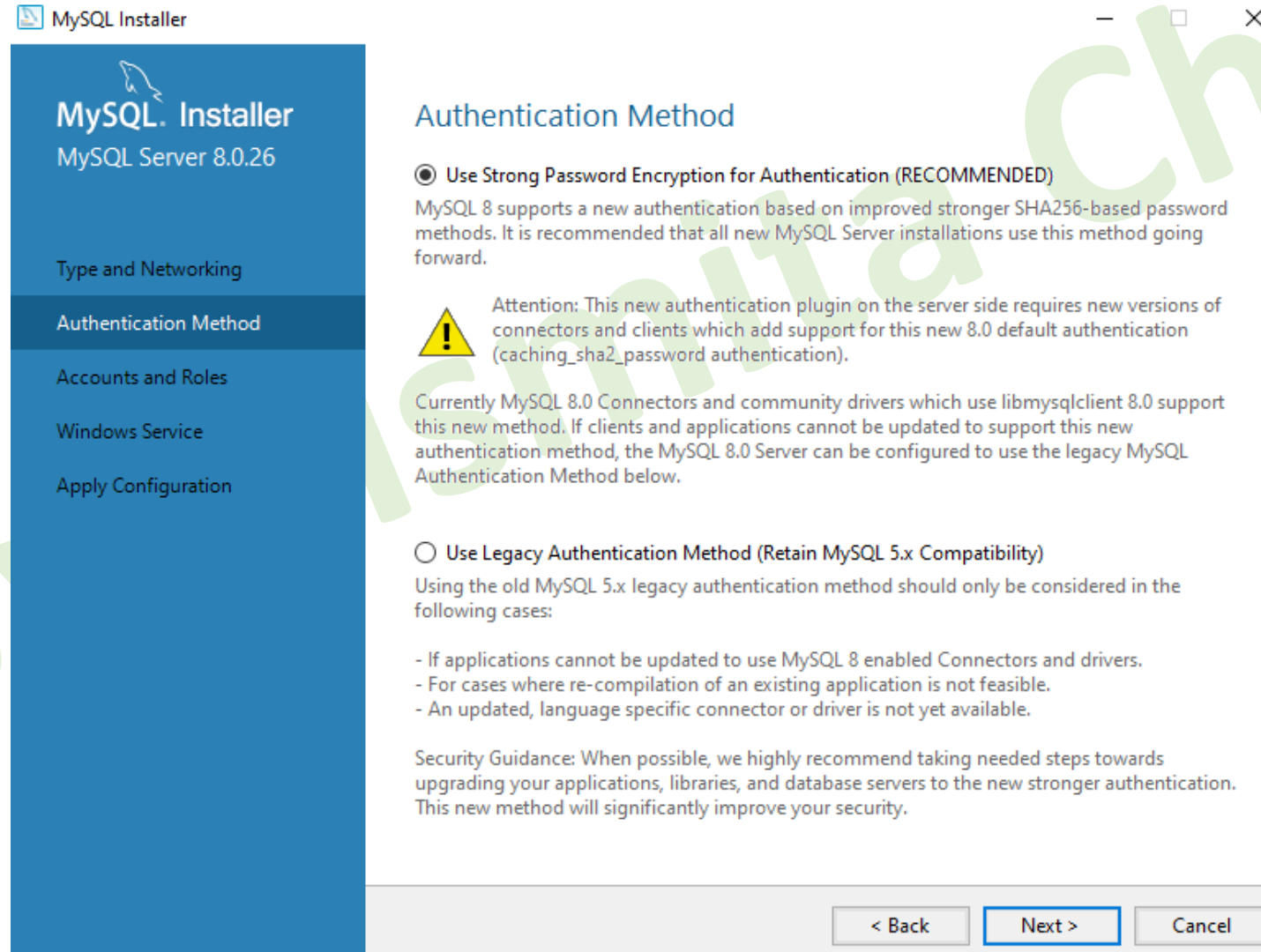
- Server Configuration Type**  
Choose the correct server configuration type for this MySQL Server installation. This setting will define how much system resources are assigned to the MySQL Server instance.  
Config Type:
- Connectivity**  
Use the following controls to select how you would like to connect to this server.
  - ☒ TCP/IP Port:  X Protocol Port:
  - ☒ Open Windows Firewall ports for network access
  - ☐ Named Pipe Pipe Name:
  - ☐ Shared Memory Memory Name:
- Advanced Configuration**  
Select the check box below to get additional configuration pages where you can set advanced and logging options for this server instance.
  - ☐ Show Advanced and Logging Options

At the bottom right, there are two buttons: 'Next >' and 'Cancel'.



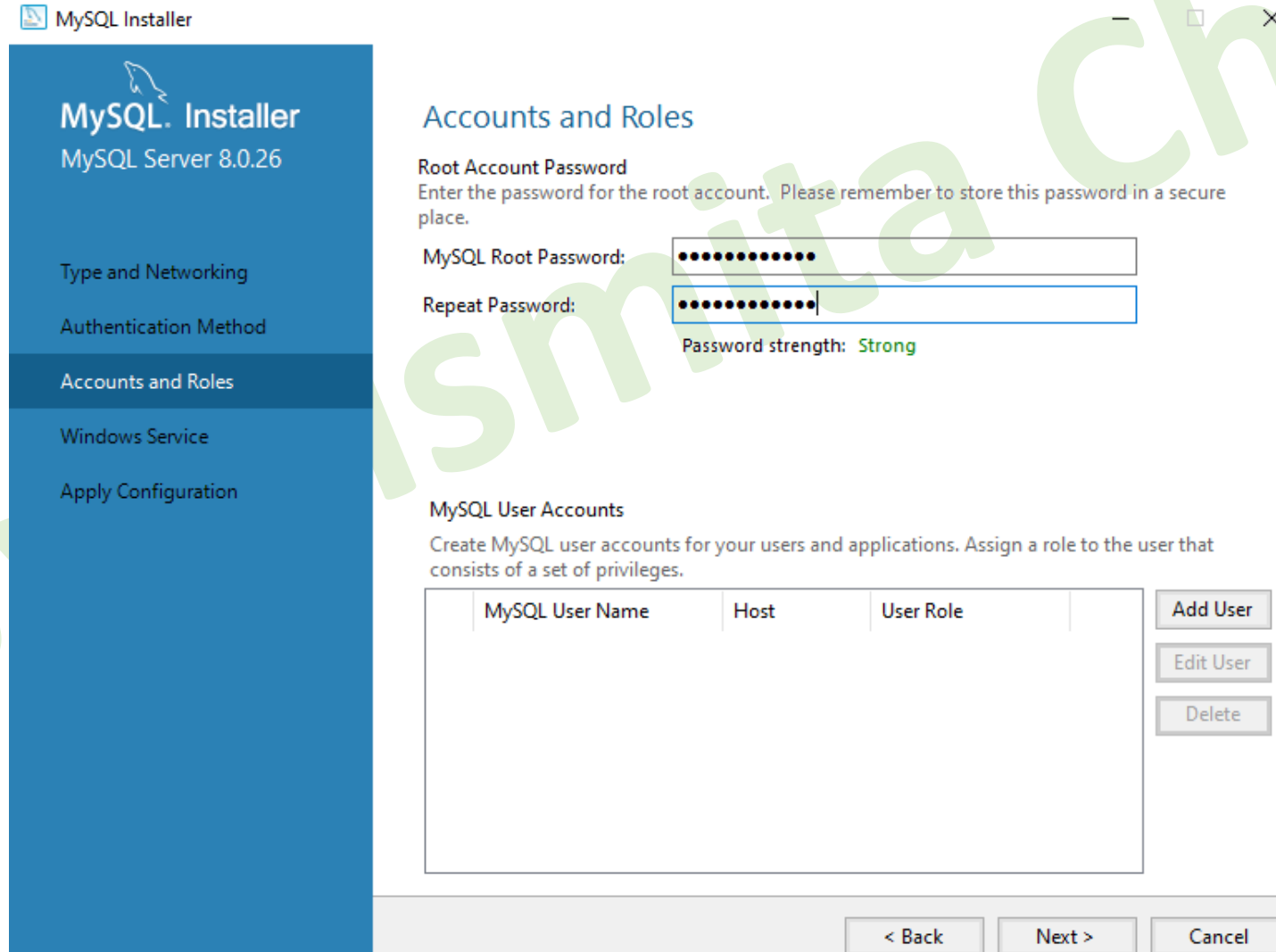
# Installation

Select Next



# Installation

Select Next



The image shows the MySQL Installer window for MySQL Server 8.0.26. The left sidebar contains the following steps: Type and Networking, Authentication Method, Accounts and Roles (selected), Windows Service, and Apply Configuration. The main area is titled 'Accounts and Roles' and contains the following sections:

**Root Account Password**  
Enter the password for the root account. Please remember to store this password in a secure place.

MySQL Root Password:

Repeat Password:

Password strength: **Strong**

**MySQL User Accounts**  
Create MySQL user accounts for your users and applications. Assign a role to the user that consists of a set of privileges.

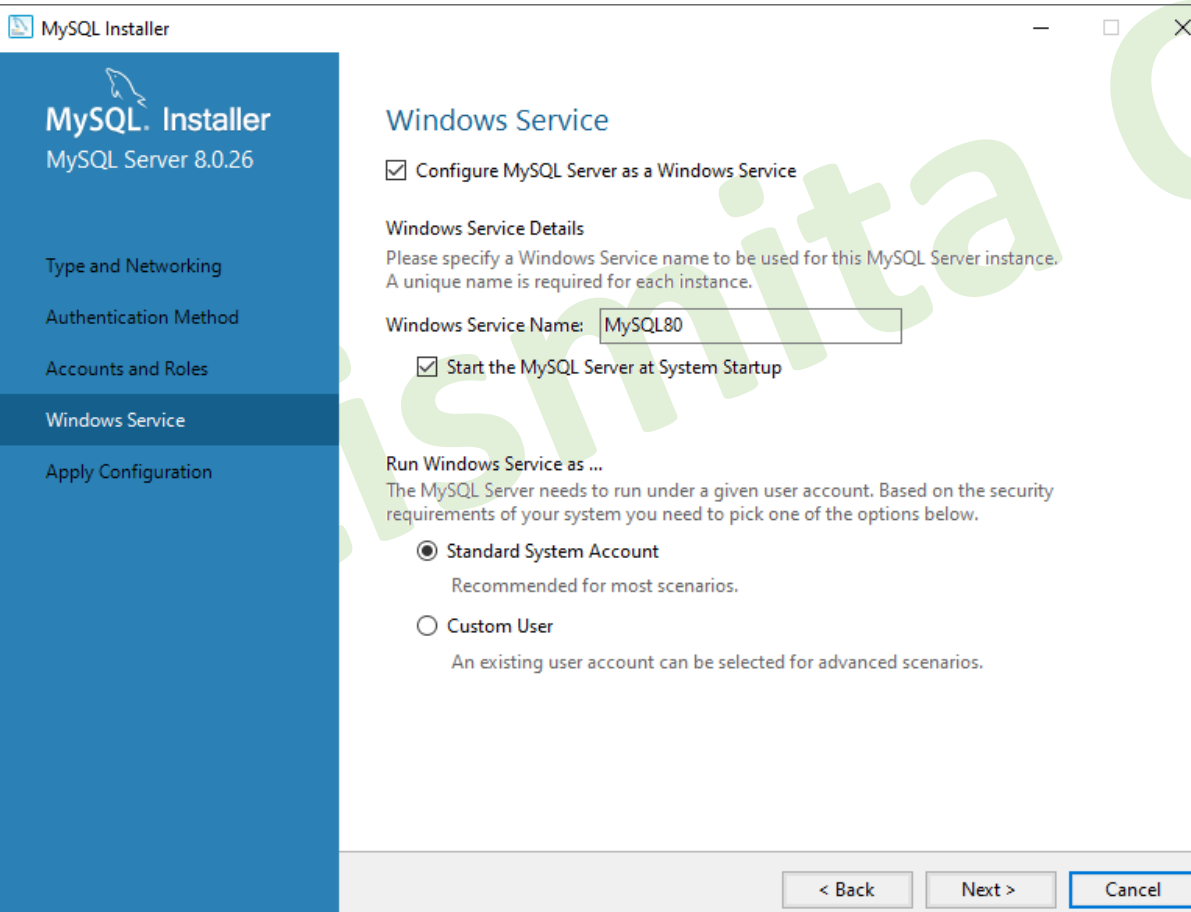
MySQL User Name	Host	User Role
-----------------	------	-----------

Buttons: Add User, Edit User, Delete

Navigation: < Back, Next >, Cancel

# Installation

Select Next



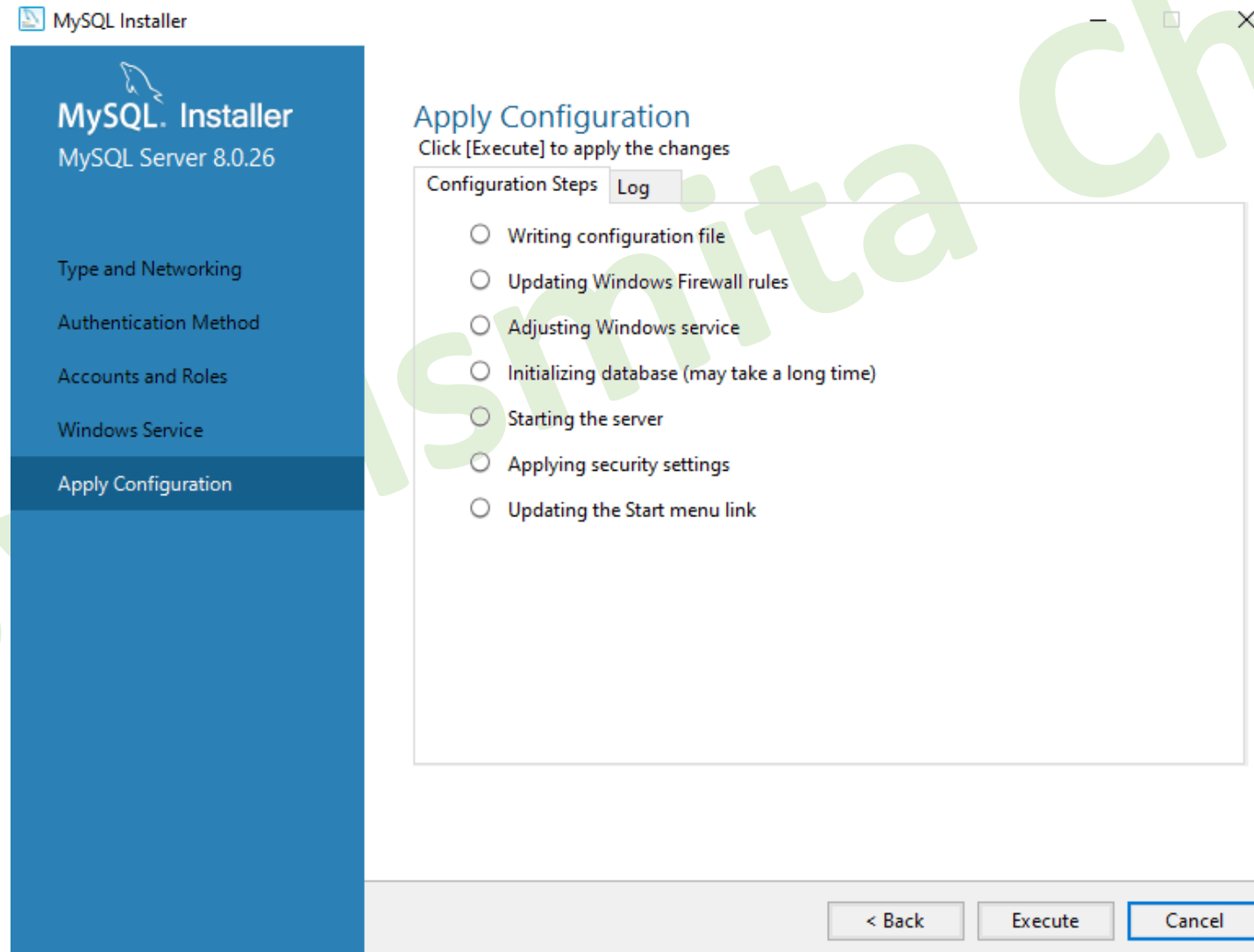
The image shows the MySQL Installer window for MySQL Server 8.0.26. The left sidebar contains a list of configuration steps: Type and Networking, Authentication Method, Accounts and Roles, Windows Service (which is the active step), and Apply Configuration. The main area is titled 'Windows Service' and contains the following options:

- ☒ Configure MySQL Server as a Windows Service
- Windows Service Details**  
Please specify a Windows Service name to be used for this MySQL Server instance. A unique name is required for each instance.  
Windows Service Name:
- ☒ Start the MySQL Server at System Startup
- Run Windows Service as ...**  
The MySQL Server needs to run under a given user account. Based on the security requirements of your system you need to pick one of the options below.
  - ☒ Standard System Account  
Recommended for most scenarios.
  - ☐ Custom User  
An existing user account can be selected for advanced scenarios.

At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'.

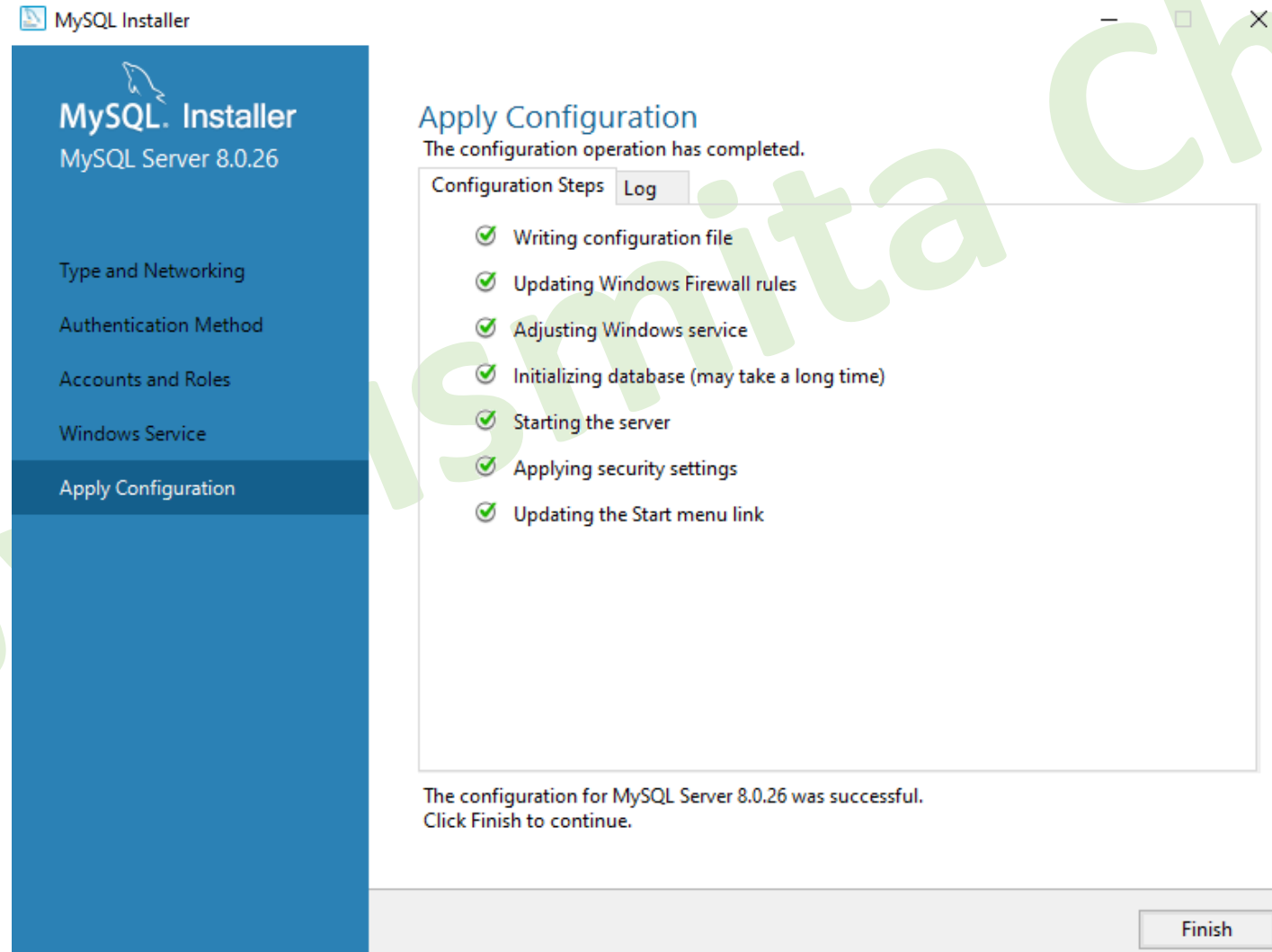
# Installation

Select Execute



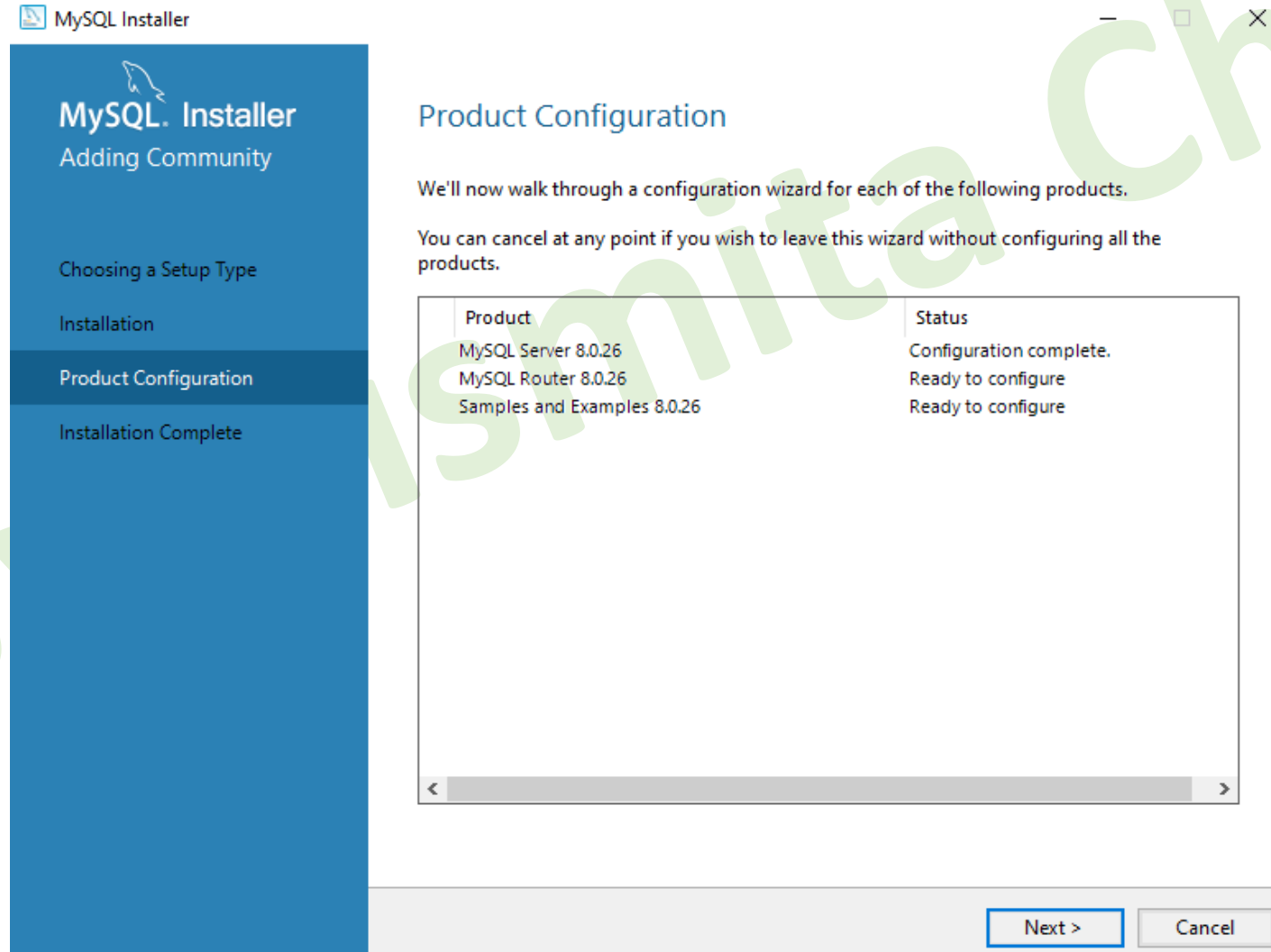
# Installation

Select Finish



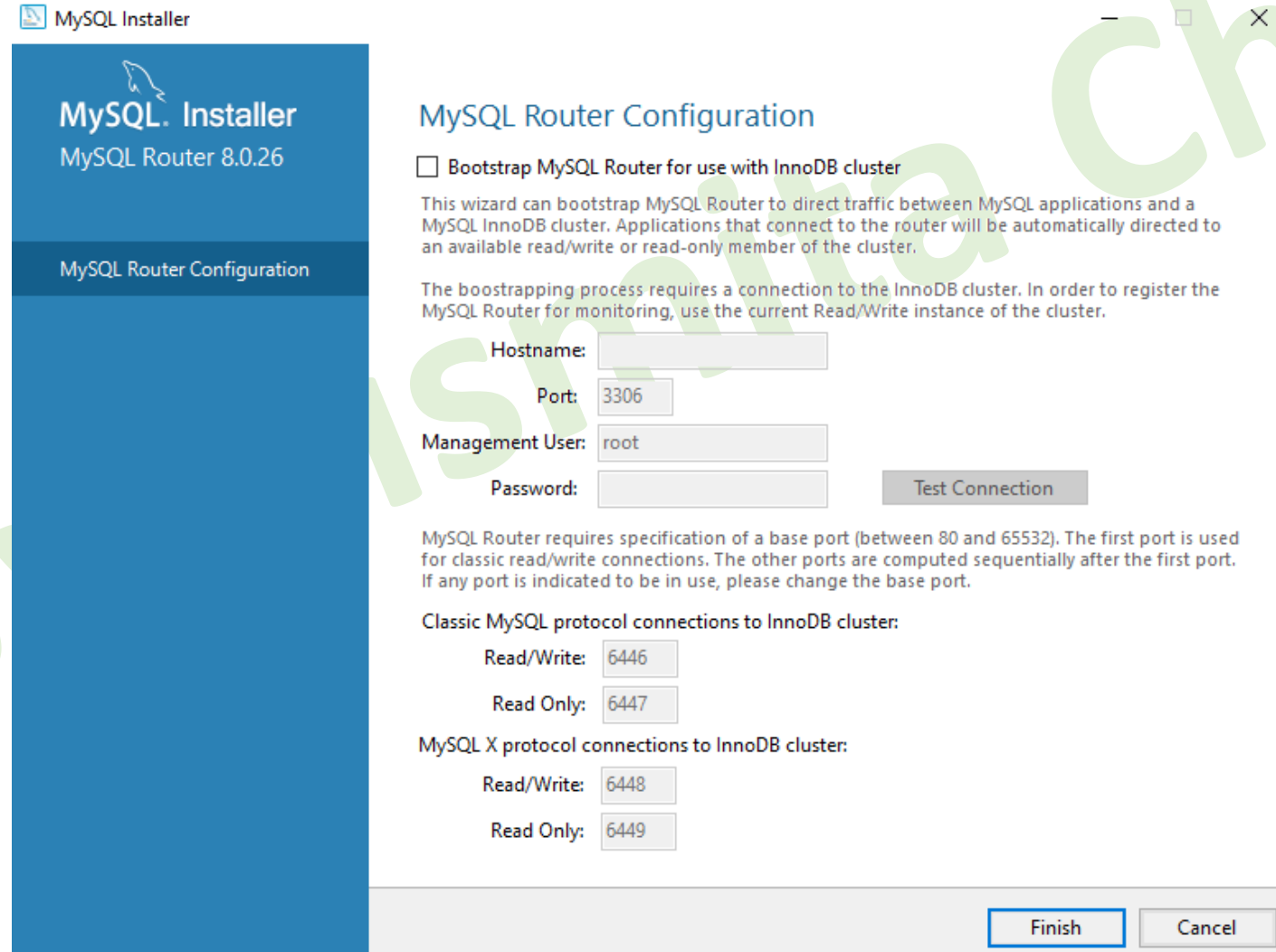
# Installation

Select Next



# Installation

Select Finish



MySQL Installer  
MySQL Router 8.0.26

MySQL Router Configuration

☐ Bootstrap MySQL Router for use with InnoDB cluster

This wizard can bootstrap MySQL Router to direct traffic between MySQL applications and a MySQL InnoDB cluster. Applications that connect to the router will be automatically directed to an available read/write or read-only member of the cluster.

The bootstrapping process requires a connection to the InnoDB cluster. In order to register the MySQL Router for monitoring, use the current Read/Write instance of the cluster.

Hostname:

Port:

Management User:

Password:

MySQL Router requires specification of a base port (between 80 and 65532). The first port is used for classic read/write connections. The other ports are computed sequentially after the first port. If any port is indicated to be in use, please change the base port.

Classic MySQL protocol connections to InnoDB cluster:

Read/Write:

Read Only:

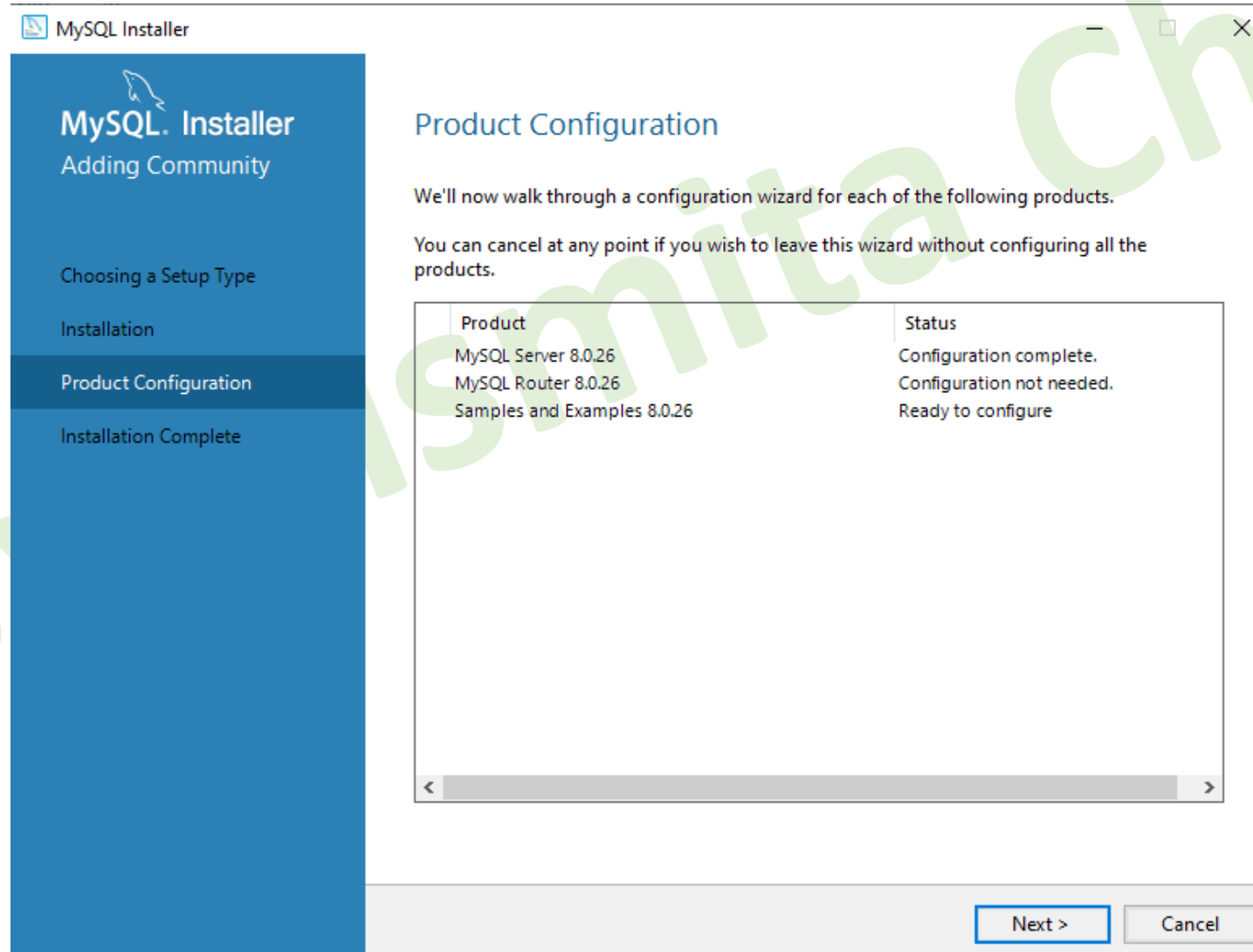
MySQL X protocol connections to InnoDB cluster:

Read/Write:

Read Only:

# Installation

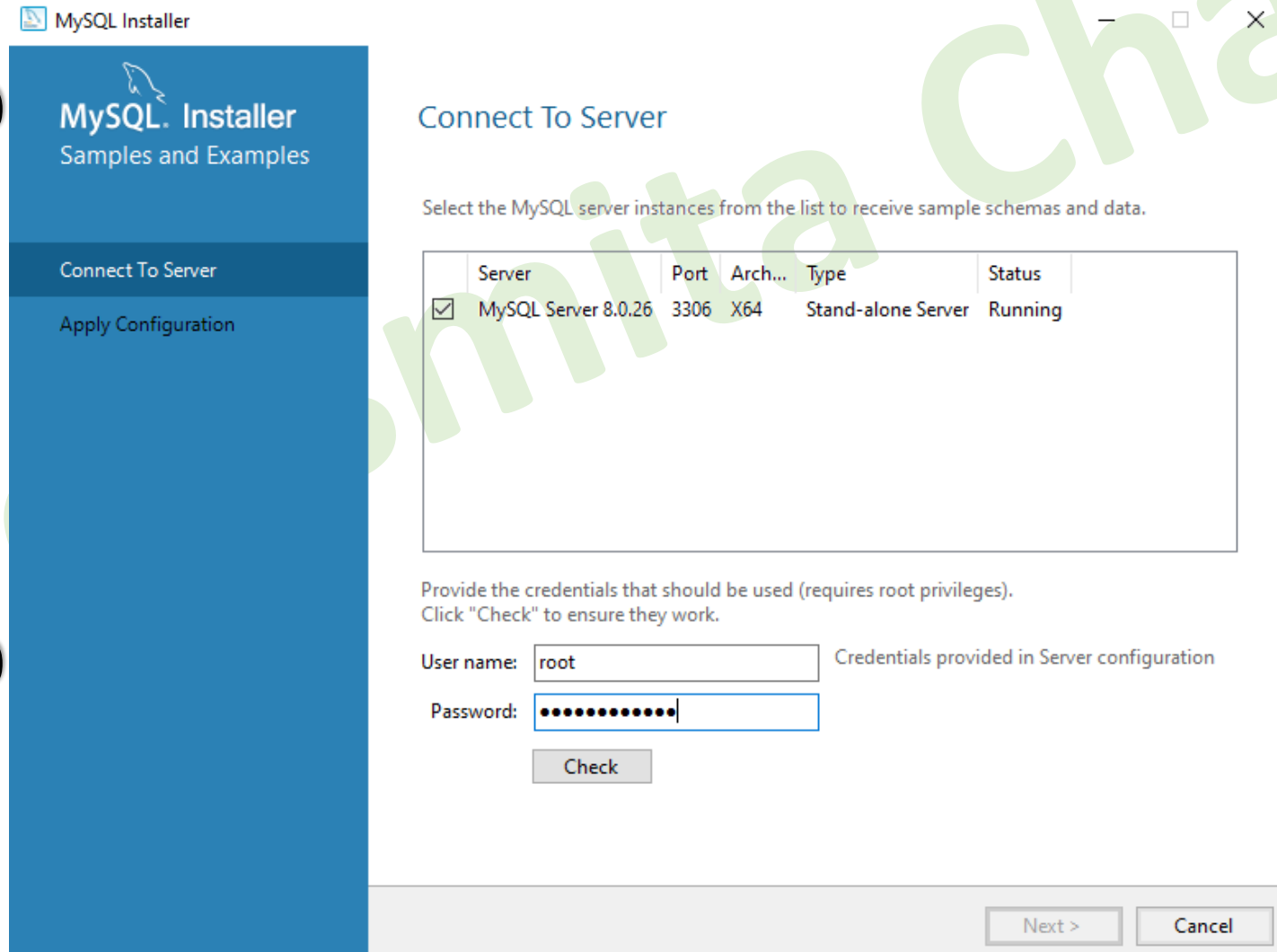
Select Next





# Installation

Type the same  
password you  
already entered in  
your Server  
Configuration stage



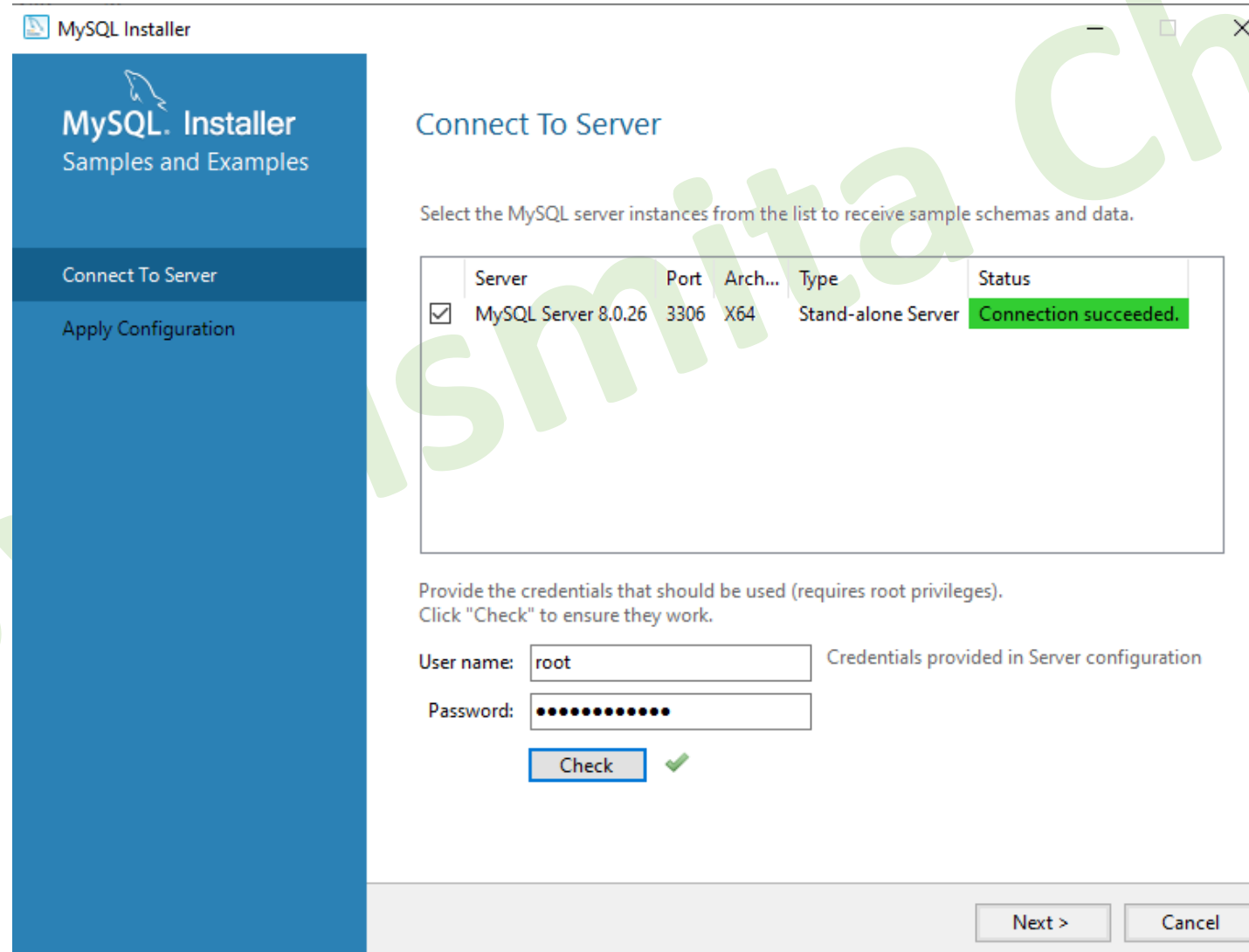
The image shows the 'Connect To Server' window of the MySQL Installer. The window has a blue sidebar on the left with the MySQL logo and the text 'MySQL. Installer Samples and Examples'. The main area is white and contains the following elements:

- A title bar with 'MySQL Installer' and window control buttons.
- A sidebar with two buttons: 'Connect To Server' (highlighted) and 'Apply Configuration'.
- A heading 'Connect To Server'.
- A instruction: 'Select the MySQL server instances from the list to receive sample schemas and data.'
- A table with the following data:

	Server	Port	Arch...	Type	Status
<input checked="" type="checkbox"/>	MySQL Server 8.0.26	3306	X64	Stand-alone Server	Running
- A text prompt: 'Provide the credentials that should be used (requires root privileges). Click "Check" to ensure they work.'
- A 'User name:' field with the value 'root' and a note 'Credentials provided in Server configuration'.
- A 'Password:' field with masked characters (dots).
- A 'Check' button.
- At the bottom right, 'Next >' and 'Cancel' buttons.

# Installation

Select Check and  
then Next



The screenshot shows the 'MySQL Installer' window with the 'Connect To Server' tab selected. The left sidebar contains 'MySQL. Installer Samples and Examples', 'Connect To Server', and 'Apply Configuration'. The main area is titled 'Connect To Server' and contains instructions to select MySQL server instances. A table lists one instance: 'MySQL Server 8.0.26' on port '3306', 'X64' architecture, 'Stand-alone Server' type, with a status of 'Connection succeeded.'. Below the table, there are fields for 'User name' (root) and 'Password' (masked with dots), with a 'Check' button and a green checkmark icon. At the bottom right are 'Next >' and 'Cancel' buttons.

MySQL Installer

MySQL. Installer  
Samples and Examples

Connect To Server

Apply Configuration

### Connect To Server


Select the MySQL server instances from the list to receive sample schemas and data.

Server	Port	Arch...	Type	Status
<input checked="" type="checkbox"/> MySQL Server 8.0.26	3306	X64	Stand-alone Server	Connection succeeded.

Provide the credentials that should be used (requires root privileges).  
Click "Check" to ensure they work.

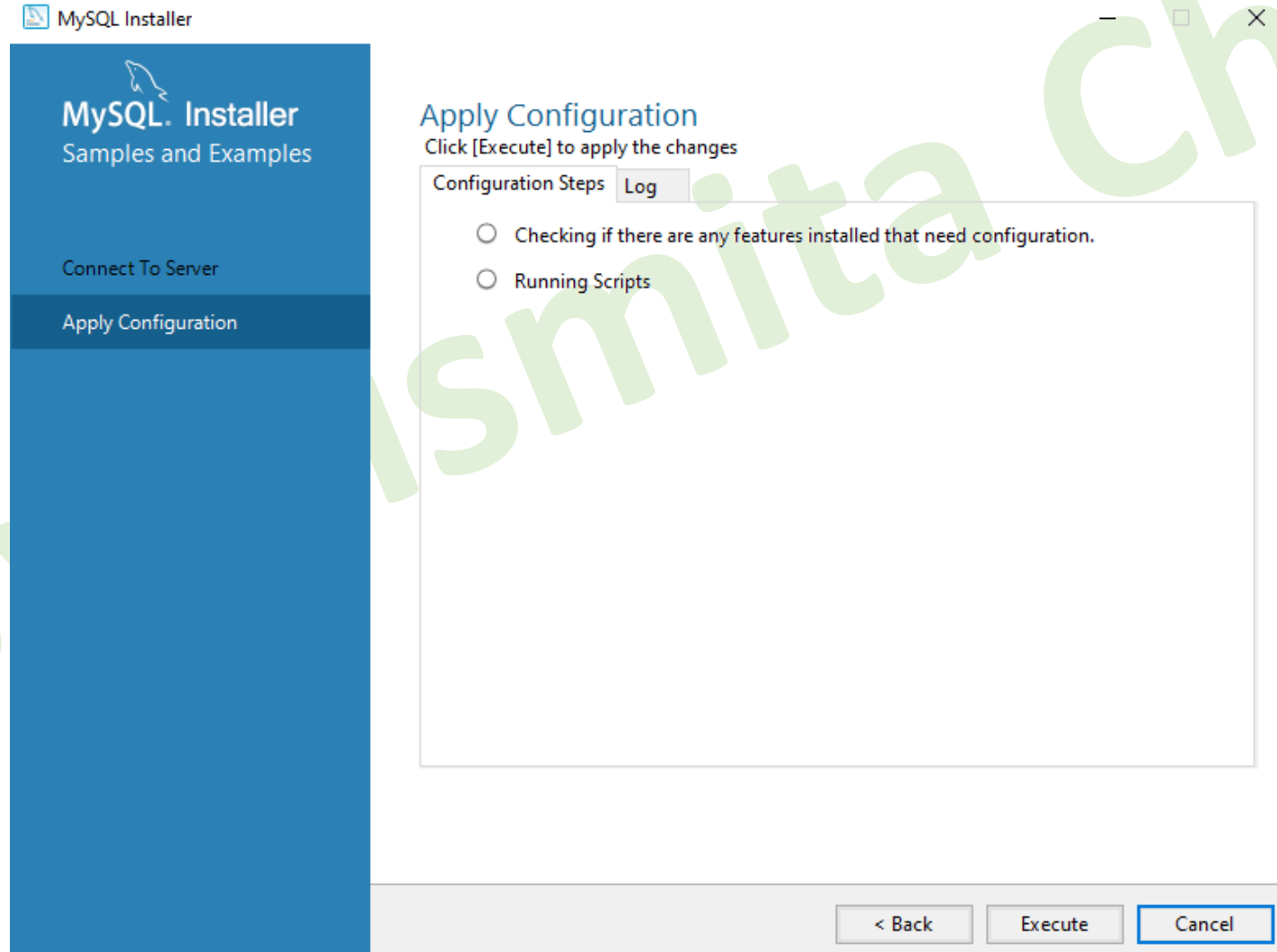
User name:  Credentials provided in Server configuration

Password:



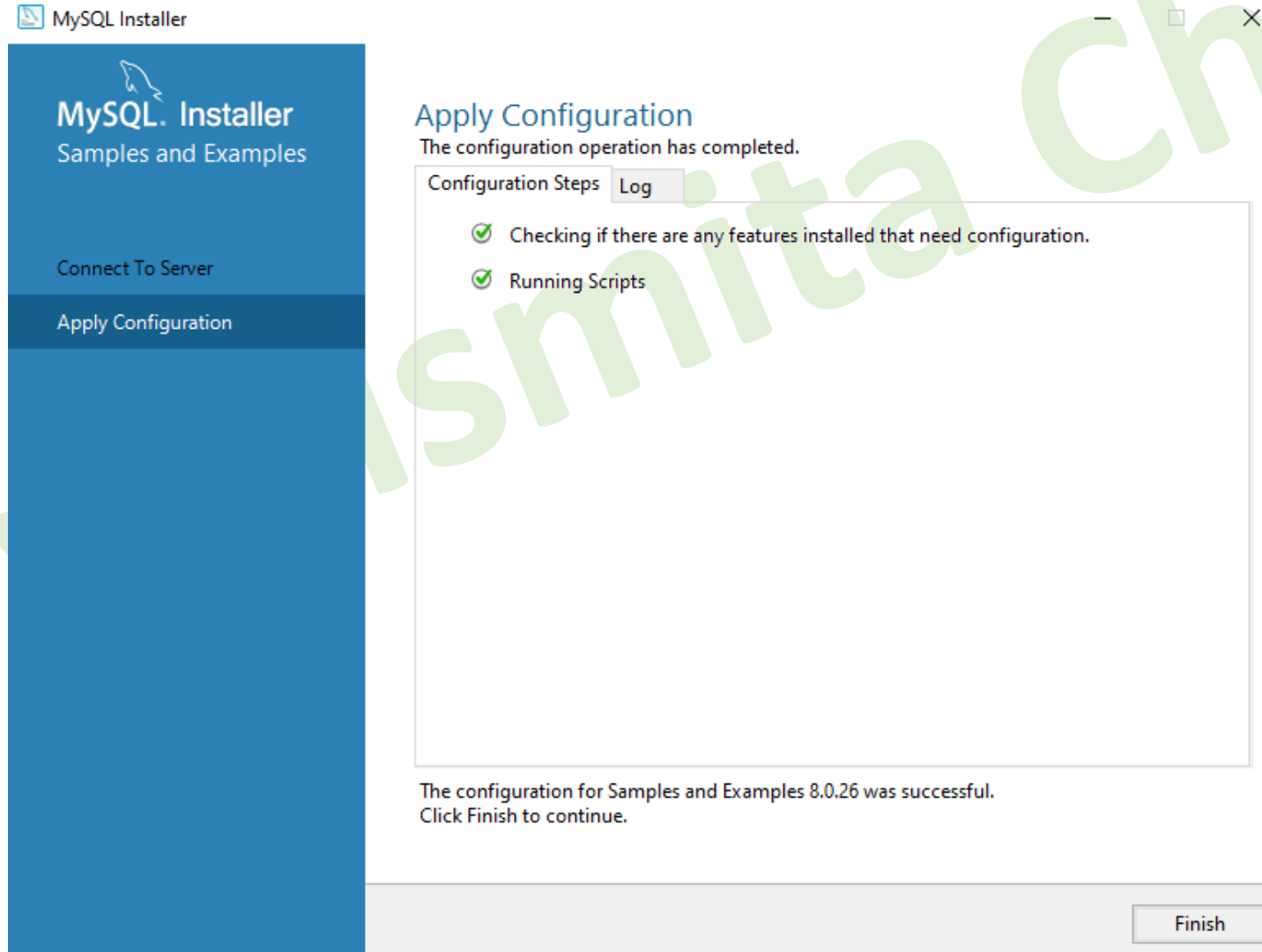
# Installation

Select Execute



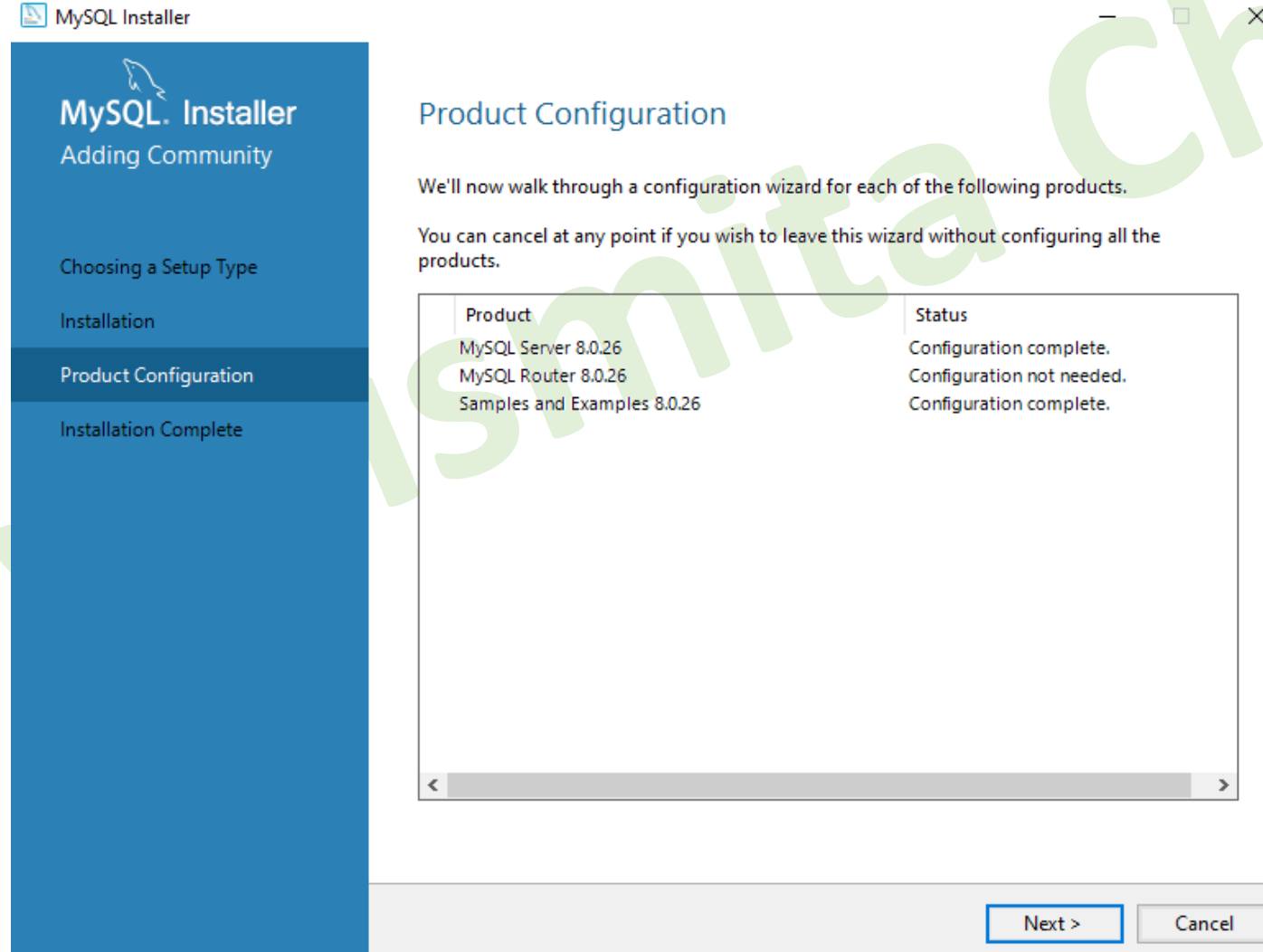
# Installation

Select Finish



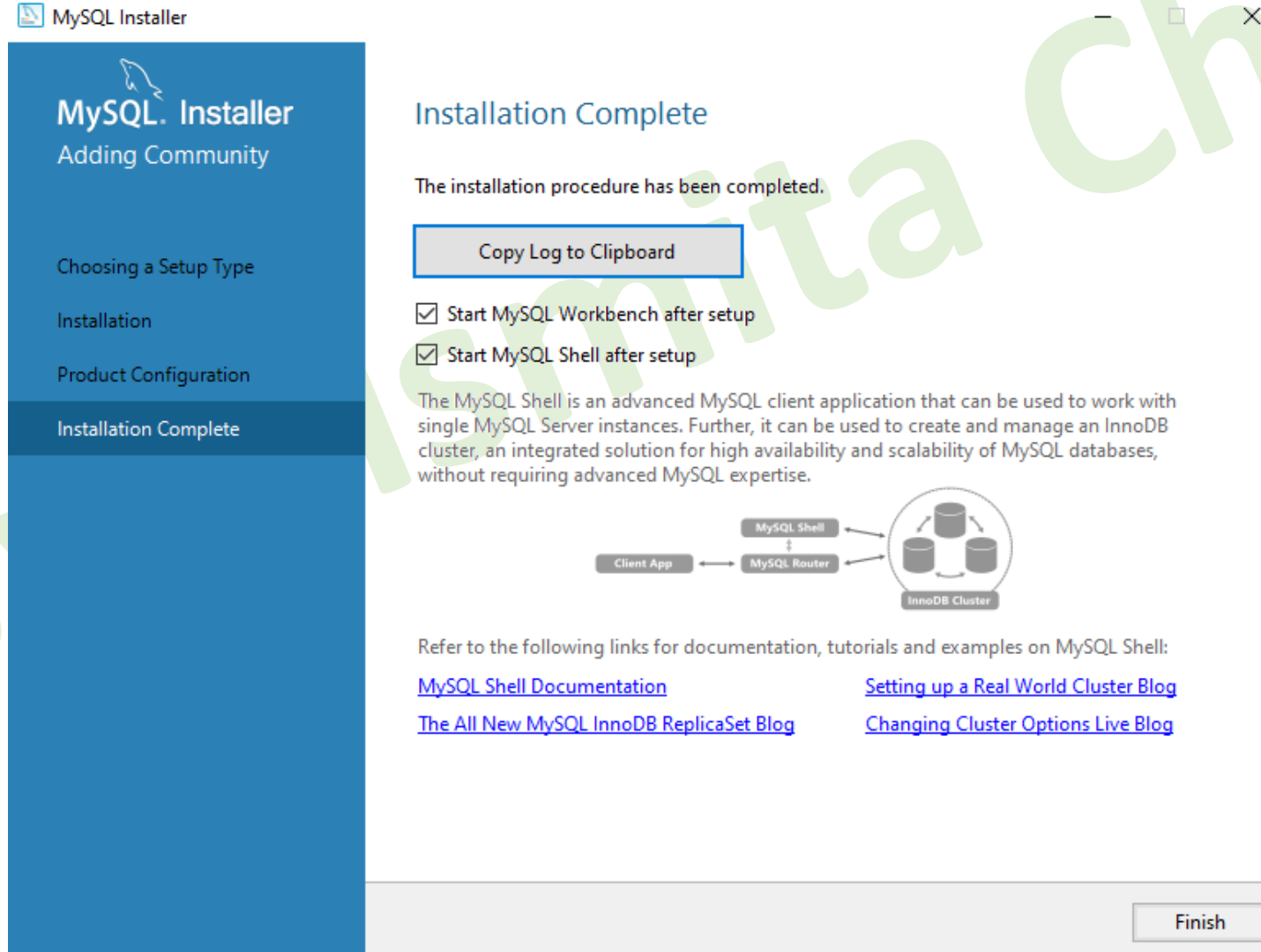
# Installation

Select Next



# Installation

Select Finish



# Installation: View of Shell

 C:\Program Files\MySQL\MySQL Shell 8.0\bin\mysqlsh.exe

```
MySQL Shell 8.0.26
```

```
Copyright (c) 2016, 2021, Oracle and/or its affiliates.
```

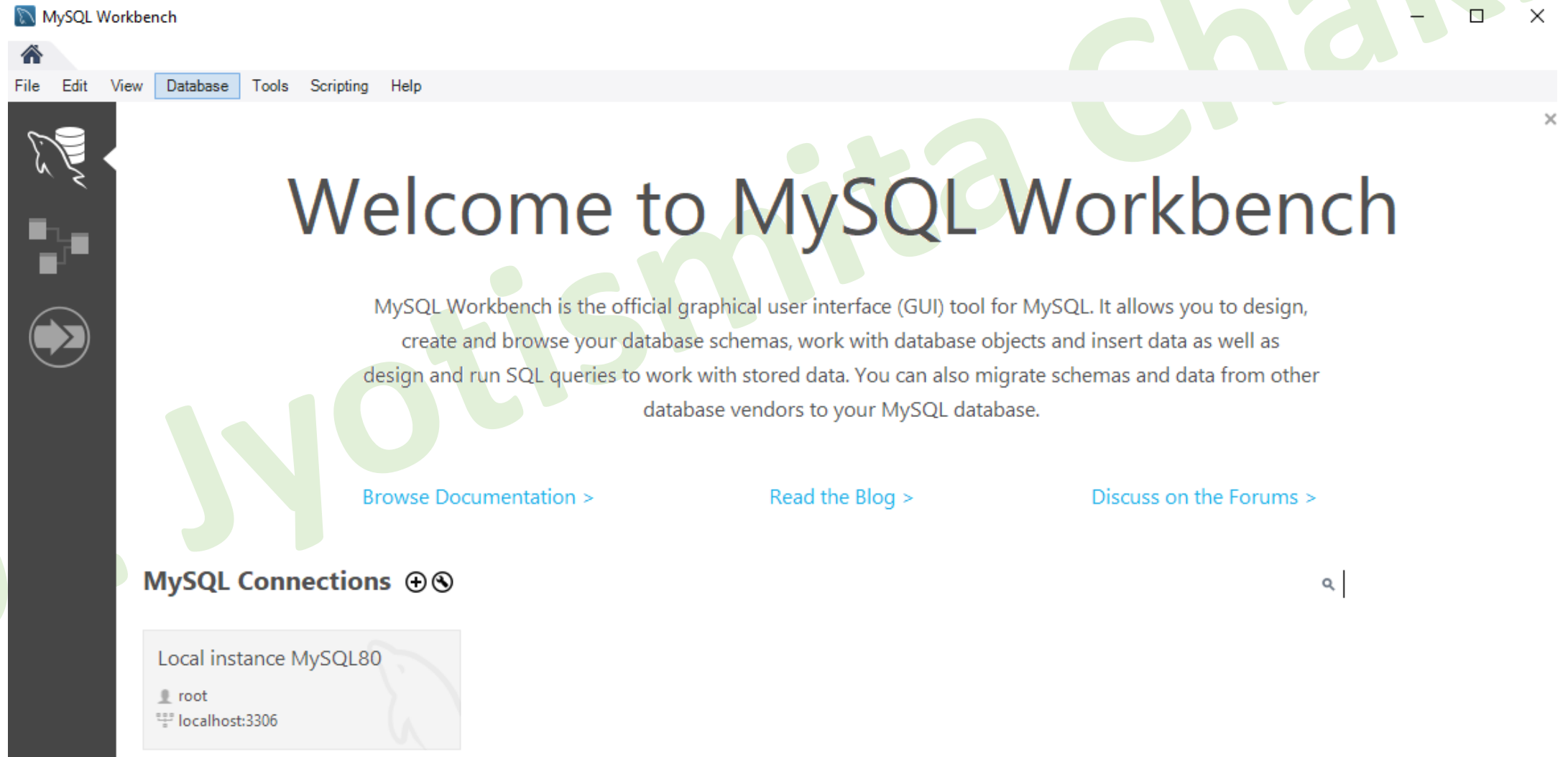
```
Oracle is a registered trademark of Oracle Corporation and/or its affiliates.
```

```
Other names may be trademarks of their respective owners.
```

```
Type '\help' or '\?' for help; '\quit' to exit.
```

```
MySQL JS >
```

# Installation: View of Workbench





# SQL: Data Definition Language (DDL)

- The DDL commands in SQL are used to create database schema and to define the type and structure of the data that will be stored in a database.
- SQL DDL commands are further divided into the following major categories:
  - CREATE: The CREATE query is used to create a database or objects such as tables, views, stored procedures, etc.
  - ALTER: alters the structure of the existing database
  - DROP: delete objects from the database
  - TRUNCATE: remove all records from a table, including all spaces allocated for the records are removed

# SQL: DDL: CREATE

- Database

- `CREATE DATABASE LibraryDB;`

- Table

- CREATE TABLE Books

- (

- Id INT (1),

- Name VARCHAR (50),

- Price INT (10)

- );

# Data type

- A Data Type in SQL server is defined as the type of data that any column or variable can store.
- It is a type of data that an object holds like integer, character, string, etc.
- An SQL developer must decide what type of data that will be stored inside each column when creating a table.
- While creating any table or variable, in addition to specifying the name, you also set the Type of Data it will store.
- The data type is a guideline for SQL to understand what type of data is expected inside of each column, and it also identifies how SQL will interact with the stored data.
- In MySQL there are three main data types: string, numeric, and date and time.

# Data Type: String

Data type	Description
CHAR(size)	A FIXED length string (can contain letters, numbers, and special characters). The <i>size</i> parameter specifies the column length in characters - can be from 0 to 255. Default is 1
VARCHAR(size)	A VARIABLE length string (can contain letters, numbers, and special characters). The <i>size</i> parameter specifies the maximum column length in characters - can be from 0 to 65535
BINARY(size)	Equal to CHAR(), but stores binary byte strings. The <i>size</i> parameter specifies the column length in bytes. Default is 1
VARBINARY(size)	Equal to VARCHAR(), but stores binary byte strings. The <i>size</i> parameter specifies the maximum column length in bytes.
TINYBLOB	For BLOBs (Binary Large Objects). Max length: 255 bytes
TINYTEXT	Holds a string with a maximum length of 255 characters

# Data Type: String

TEXT(size)	Holds a string with a maximum length of 65,535 bytes
BLOB(size)	For BLOBs (Binary Large Objects). Holds up to 65,535 bytes of data
MEDIUMTEXT	Holds a string with a maximum length of 16,777,215 characters
MEDIUMBLOB	For BLOBs (Binary Large Objects). Holds up to 16,777,215 bytes of data
LONGTEXT	Holds a string with a maximum length of 4,294,967,295 characters
LOB	For BLOBs (Binary Large Objects). Holds up to 4,294,967,295 bytes of data
ENUM(val1, val2, val3, ...)	A string object that can have only one value, chosen from a list of possible values. You can list up to 65535 values in an ENUM list. If a value is inserted that is not in the list, a blank value will be inserted. The values are sorted in the order you enter them
SET(val1, val2, val3, ...)	A string object that can have 0 or more values, chosen from a list of possible values. You can list up to 64 values in a SET list

# Data Type: Numeric

Data type	Description
BIT( <i>size</i> )	A bit-value type. The number of bits per value is specified in <i>size</i> . The <i>size</i> parameter can hold a value from 1 to 64. The default value for <i>size</i> is 1.
TINYINT( <i>size</i> )	A very small integer. Signed range is from -128 to 127. Unsigned range is from 0 to 255. The <i>size</i> parameter specifies the maximum display width (which is 255)
BOOL	Zero is considered as false, nonzero values are considered as true.
BOOLEAN	Equal to BOOL
SMALLINT( <i>size</i> )	A small integer. Signed range is from -32768 to 32767. Unsigned range is from 0 to 65535. The <i>size</i> parameter specifies the maximum display width (which is 255)
MEDIUMINT( <i>size</i> )	A medium integer. Signed range is from -8388608 to 8388607. Unsigned range is from 0 to 16777215. The <i>size</i> parameter specifies the maximum display width (which is 255)
INT( <i>size</i> )	A medium integer. Signed range is from -2147483648 to 2147483647. Unsigned range is from 0 to 4294967295. The <i>size</i> parameter specifies the maximum display width (which is 255)

# Data Type: Numeric

INTEGER( <i>size</i> )	Equal to INT( <i>size</i> )
BIGINT( <i>size</i> )	A large integer. Signed range is from -9223372036854775808 to 9223372036854775807. Unsigned range is from 0 to 18446744073709551615. The <i>size</i> parameter specifies the maximum display width (which is 255)
FLOAT( <i>size</i> , <i>d</i> )	A floating point number. The total number of digits is specified in <i>size</i> . The number of digits after the decimal point is specified in the <i>d</i> parameter. This syntax is deprecated in MySQL 8.0.17, and it will be removed in future MySQL versions
FLOAT( <i>p</i> )	A floating point number. MySQL uses the <i>p</i> value to determine whether to use FLOAT or DOUBLE for the resulting data type. If <i>p</i> is from 0 to 24, the data type becomes FLOAT(). If <i>p</i> is from 25 to 53, the data type becomes DOUBLE()
DOUBLE( <i>size</i> , <i>d</i> )	A normal-size floating point number. The total number of digits is specified in <i>size</i> . The number of digits after the decimal point is specified in the <i>d</i> parameter
DOUBLE PRECISION( <i>size</i> , <i>d</i> )	
DECIMAL( <i>size</i> , <i>d</i> )	An exact fixed-point number. The total number of digits is specified in <i>size</i> . The number of digits after the decimal point is specified in the <i>d</i> parameter. The maximum number for <i>size</i> is 65. The maximum number for <i>d</i> is 30. The default value for <i>size</i> is 10. The default value for <i>d</i> is 0.
DEC( <i>size</i> , <i>d</i> )	Equal to DECIMAL( <i>size</i> , <i>d</i> )

# Data Type: Date and Time

Data type	Description
DATE	A date. Format: YYYY-MM-DD. The supported range is from '1000-01-01' to '9999-12-31'
DATETIME( <i>fsp</i> )	A date and time combination. Format: YYYY-MM-DD hh:mm:ss. The supported range is from '1000-01-01 00:00:00' to '9999-12-31 23:59:59'. Adding DEFAULT and ON UPDATE in the column definition to get automatic initialization and updating to the current date and time
TIMESTAMP( <i>fsp</i> )	A timestamp. TIMESTAMP values are stored as the number of seconds since the Unix epoch ('1970-01-01 00:00:00' UTC). Format: YYYY-MM-DD hh:mm:ss. The supported range is from '1970-01-01 00:00:01' UTC to '2038-01-09 03:14:07' UTC. Automatic initialization and updating to the current date and time can be specified using DEFAULT CURRENT_TIMESTAMP and ON UPDATE CURRENT_TIMESTAMP in the column definition
TIME( <i>fsp</i> )	A time. Format: hh:mm:ss. The supported range is from '-838:59:59' to '838:59:59'
YEAR	A year in four-digit format. Values allowed in four-digit format: 1901 to 2155, and 0000. MySQL 8.0 does not support year in two-digit format.



# Primary Key Constraint

- The **PRIMARY KEY** constraint uniquely identifies each record in a table.
- Primary keys must contain UNIQUE values, and cannot contain NULL values.
- A table can have only ONE primary key; and in the table, this primary key can consist of single or multiple columns (fields).

# SQL: DDL: ALTER

- The ALTER command in SQL DDL is used to modify the structure of an already existing table.
- Add primary key:
  - ALTER TABLE Books  
ADD PRIMARY KEY (Id);
- Add new column:
  - ALTER TABLE Books  
ADD Publisher varchar(50),  
ADD Year year;  
ALTER TABLE Books  
ADD AuthorName varchar(50);
- Modify the data type of a column:
  - ALTER TABLE Books  
MODIFY COLUMN Price float(10,2);

# SQL: DDL: ALTER

- Modify the column name:
  - `ALTER TABLE Books`  
`RENAME COLUMN AuthorName TO FirstName,`  
`ADD LastName varchar(50);`
- Modify table name:
  - `ALTER TABLE Books RENAME Book_Details;`
- Drop a column:
  - `ALTER TABLE Book_Details`  
`DROP COLUMN Publisher;`
- Add NOT NULL constraint:
  - `ALTER TABLE Book_Details`  
`MODIFY Name varchar(50) NOT NULL;`

# SQL: DDL: DROP and TRUNCATE

- Drop a column:
  - `ALTER TABLE Book_Details  
DROP COLUMN Publisher;`
- The DROP TABLE statement is used to drop an existing table in a database.
  - `DROP TABLE Book_Details;`
- Drop the database:
  - `DROP DATABASE libraryDB;`
- The TRUNCATE TABLE statement is used to delete the data inside a table, but not the table itself.
  - `TRUNCATE TABLE Book_Details;`