

# **Getting Started with MySQL**

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## Abstract

MySQL is the world's most popular open-source database. Despite its powerful features, MySQL is simple to set up and easy to use. Below are some instructions to help you get MySQL up and running in a few easy steps. We also explain how to perform some basic operations with MySQL using the `mysql` client.

### Notes

- The following instructions do not necessarily apply to versions of MySQL older than MySQL 5.7.
- These are instructions for a fresh installation only. If you are already using MySQL and want to upgrade to a newer version, see [Upgrading MySQL](#).

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For help with using MySQL, please visit the [MySQL Forums](#), where you can discuss your issues with other MySQL users.

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## Installing and Starting MySQL

There are different ways to install MySQL. The following covers the easiest methods for installing and starting MySQL on different platforms.

- **Linux.** The easiest way to install MySQL is to use the [MySQL repositories](#):
  - For Yum-based Linux distributions like Oracle Linux, Red Hat Enterprise Linux, and Fedora, follow the instructions in [A Quick Guide to Using the MySQL Yum Repository](#). If your system cannot use the [MySQL Yum repository](#) for some reason, follow the instructions in [Installing MySQL on Linux Using RPM Packages from Oracle](#).
  - For APT-based distributions like Debian and Ubuntu, follow the instructions in [A Quick Guide to Using the MySQL APT Repository](#). If your system cannot use the [MySQL APT repository](#) for some reason, follow the instructions in [Installing MySQL on Linux Using Debian Packages from Oracle](#).
  - For SUSE Linux Enterprise, follow the instructions in [A Quick Guide to Using the MySQL SLES Repository](#). If your system cannot use the [MySQL SUSE repository](#) for some reason, follow the instructions in [Installing MySQL on Linux Using RPM Packages from Oracle](#).

For Linux distributions that do not support the [MySQL repositories](#) or the installation packages mentioned above, you can install MySQL using generic binaries:

- Download the [.tar](#) or [.tar.gz](#) archive for the generic binaries for Linux from the [Download MySQL Community Server](#) page.
- See [Installing MySQL on Unix/Linux Using Generic Binaries](#) for instructions on installing the binaries.
- After installing the binaries, following the instructions given in [Initializing the Data Directory](#). It is especially important to note the random `root` password generated for you during the initialization process; see [Initializing the Data Directory](#) for more detail.
- Next, follow the instructions given in [Starting the Server](#).

Detailed instructions, as well as other methods for installation, can be found in [Installing MySQL on Linux](#).

- **Microsoft Windows.** The recommended way to install MySQL on Microsoft Windows is to use the MySQL Installer; see [MySQL Installer Method](#) on how to download and run the MySQL Installer. For a detailed explanation for each step of the installation wizard, see [MySQL Installer for Windows](#).

If you have chosen to configure MySQL as a Windows service during the installation process, which is the default option (see [Windows Service](#) for details), the MySQL server will start automatically after the installation process is completed.

Detailed information regarding Windows installation, including alternative installation methods and instructions for troubleshooting, can be found in [Installing MySQL on Microsoft Windows](#).

- **macOS.** The recommended way for installing MySQL on macOS is to use the macOS installer package. See [Installing MySQL on macOS Using Native Packages](#) on how to download and run the installer package, and how to start the MySQL server afterward.

Detailed information regarding installation on macOS can be found in [Installing MySQL on macOS](#).

- **Other platforms.** For installations on other platforms (for example, FreeBSD and Solaris), as well as installation methods not covered above, see [Installing MySQL](#).

## Connecting to the MySQL Server with the mysql Client

Once your MySQL server is up and running, you can connect to it as the superuser `root` with the `mysql` client.

- On Linux, enter the following command at the command line terminal (for installation using generic binaries, you might need to go first to the `bin` folder under the base directory of your MySQL installation):

```
$> mysql -u root -p
```

- On Windows, click **Start, All Programs, MySQL, MySQL 5.7 Command Line Client** (or **MySQL 8.0 Command Line Client**, respectively). If you did not install MySQL with the MySQL Installer, open a command prompt, go to the `bin` folder under the base directory of your MySQL installation, and issue the following command:

```
C:\> mysql -u root -p
```

You are then asked for the `root` password, which was assigned in different manners according to the way you installed MySQL. The installation and initialization instructions given above already explain the `root` password, but here is a quick summary:

- For installations using the MySQL Yum repository, MySQL SUSE repository, or RPM packages directly downloaded from Oracle, the generated `root` password is in the error log. View it with, for example, the following command:

```
$> sudo grep 'temporary password' /var/log/mysqld.log
```

- For installations using the MySQL APT repository or Debian packages directly downloaded from Oracle, you should have already assigned the `root` password yourself; if you have not done that for some reason, see the "Important" note [here](#) or [How to Reset the Root Password](#).
- For installations on Linux using the generic binaries followed by a data directory initialization using `mysqld --initialize` as discussed in [Initializing the Data Directory](#), the generated `root` password is displayed in the standard error stream during the data directory's initialization:

```
[Warning] A temporary password is generated for root@localhost:
iTag*AfrH5ej
```

### Note

Depending on the configuration you used to initialize the MySQL server, the error output might have been directed to the [MySQL error log](#); go there and check for the password if you do not see the above message on your screen. The error log is a file with a `.err` extension, usually found under the server's data directory (the location of which depends on the server's configuration, but is likely to be the `data` folder under the base directory of your MySQL installation, or the `/var/lib/mysql` folder).

If you have initialized the data directory with `mysqld --initialize-insecure` instead, the `root` password is empty.

- For installations on Windows using the MySQL Installer and OS X using the installer package, you should have assigned a `root` password yourself.

If you have forgotten the `root` password you have chosen or have problems finding the temporary `root` password generated for you, see [How to Reset the Root Password](#).

Once you are connected to the MySQL server, a welcome message is displayed and the `mysql>` prompt appears, which looks like this:

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 4
Server version: 5.7.32 MySQL Community Server (GPL)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

At this point, if you have logged in using a temporary `root` password that was generated during the installation or initialization process (which will be the case if you installed MySQL using the MySQL Yum repository, or using RPM packages or generic binaries from Oracle), change your `root` password by typing the following statement at the prompt:

```
mysql> ALTER USER 'root'@'localhost' IDENTIFIED BY 'new_password';
```

Until you change your `root` password, you will not be able to exercise any of the superuser privileges, even if you are logged in as `root`.

Here are a few useful things to remember when using the `mysql` client:

- Client commands (for example, `help`, `quit`, and `clear`) and keywords in SQL statements (for example, `SELECT`, `CREATE TABLE`, and `INSERT`) are not case-sensitive.
- Column names are case-sensitive. Table names are case-sensitive on most Unix-like platforms, but not case-sensitive on Windows platforms. Case-sensitivity during string comparison depends on the character collation you use. In general, it is a good idea to treat all identifiers (database names, table names, column names, etc.) and strings as case-sensitive. See [Identifier Case Sensitivity](#) and [Case Sensitivity in String Searches](#) for details.
- You can type your SQL statements on multiple lines by pressing `Enter` in the middle of it. Typing a semicolon (`;`) followed by an `Enter` ends an SQL statement and sends it to the server for execution; the same happens when a statement is ended with `\g` or `\G` (with the latter, returned results are displayed vertically). However, client commands (for example, `help`, `quit`, and `clear`) do not require a terminator.

To disconnect from the MySQL server, type `QUIT` or `\q` at the client:

```
mysql> QUIT
```

## Some Basic Operations with MySQL

Here are some basic operations with the MySQL server. [SQL Statements](#) explains in detail the rich syntax and functionality of the SQL statements that are illustrated below.

**Showing existing databases.** Use a `SHOW DATABASES` statement:

```
mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
```

```
| performance_schema |
| sys                |
+-----+
4 rows in set (0.00 sec)
```

**Creating a new database.** Use a [CREATE DATABASE](#) statement:

```
mysql> CREATE DATABASE pets;
Query OK, 1 row affected (0.01 sec)
```

Check if the database has been created:

```
mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| mysql         |
| performance_schema |
| pets          |
| sys          |
+-----+
5 rows in set (0.00 sec)
```

**Creating a table inside a database.** First, pick the database in which you want to create the table with a [USE](#) statement:

```
mysql> USE pets
Database changed
```

The [USE](#) statement tells MySQL to use `pets` as the default database for subsequent statements. Next, create a table with a [CREATE TABLE](#) statement:

```
CREATE TABLE cats
(
  id            INT unsigned NOT NULL AUTO_INCREMENT, # Unique ID for the record
  name          VARCHAR(150) NOT NULL,                # Name of the cat
  owner         VARCHAR(150) NOT NULL,                # Owner of the cat
  birth         DATE NOT NULL,                        # Birthday of the cat
  PRIMARY KEY   (id)                                  # Make the id the primary key
);
```

Data types you can use in each column are explained in [Data Types](#). [Primary Key Optimization](#) explains the concept of a primary key. What follows a `#` on each line is a comment, which is ignored by the `mysql` client; see [Comments](#) for other comment styles.

Check if the table has been created with a [SHOW TABLES](#) statement:

```
mysql> SHOW TABLES;
+-----+
| Tables_in_pets |
+-----+
| cats           |
+-----+
1 row in set (0.00 sec)
```

[DESCRIBE](#) shows information on all columns of a table:

```
mysql> DESCRIBE cats;
+-----+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| id    | int(10) unsigned | NO   | PRI | NULL    | auto_increment |
| name  | varchar(150)    | NO   |     | NULL    |                |
| owner | varchar(150)    | NO   |     | NULL    |                |
| birth | date            | NO   |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)
```

**Adding records into a table.** Use, for example, an [INSERT...VALUES](#) statement:

```
INSERT INTO cats ( name, owner, birth) VALUES
( 'Sandy', 'Lennon', '2015-01-03' ),
( 'Cookie', 'Casey', '2013-11-13' ),
( 'Charlie', 'River', '2016-05-21' );
```

See [Literal Values](#) for how to write string, date, and other kinds of literals in MySQL.

**Retrieving records from a table.** Use a [SELECT](#) statement, and "\*" to match all columns:

```
mysql> SELECT * FROM cats;
+-----+-----+-----+-----+
| id | name | owner | birth |
+-----+-----+-----+-----+
| 1 | Sandy | Lennon | 2015-01-03 |
| 2 | Cookie | Casey | 2013-11-13 |
| 3 | Charlie | River | 2016-05-21 |
+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

To select specific columns and rows by a certain condition using the [WHERE](#) clause:

```
mysql> SELECT name FROM cats WHERE owner = 'Casey';
+-----+
| name |
+-----+
| Cookie |
+-----+
1 row in set (0.00 sec)
```

**Deleting a record from a table.** Use a [DELETE](#) statement to delete a record from a table, specifying the criterion for deletion with the [WHERE](#) clause:

```
mysql> DELETE FROM cats WHERE name='Cookie';
Query OK, 1 row affected (0.05 sec)

mysql> SELECT * FROM cats;
+-----+-----+-----+-----+
| id | name | owner | birth |
+-----+-----+-----+-----+
| 1 | Sandy | Lennon | 2015-01-03 |
| 3 | Charlie | River | 2016-05-21 |
+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

**Adding or deleting a column from a table.** Use an [ALTER TABLE...ADD](#) statement to add a column. You can use, for example, an [AFTER](#) clause to specify the location of the new column:

```
mysql> ALTER TABLE cats ADD gender CHAR(1) AFTER name;
Query OK, 0 rows affected (0.24 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

Use [DESCRIBE](#) to check the result:

```
mysql> DESCRIBE cats;
+-----+-----+-----+-----+-----+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| id | int(10) unsigned | NO | PRI | NULL | auto_increment |
| name | varchar(150) | NO | | NULL | |
| gender | char(1) | YES | | NULL | |
| owner | varchar(150) | NO | | NULL | |
| birth | date | NO | | NULL | |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

[SHOW CREATE TABLE](#) shows a [CREATE TABLE](#) statement, which provides even more details on the table:

```
mysql> SHOW CREATE TABLE cats\G
***** 1. row *****
      Table: cats
Create Table: CREATE TABLE `cats` (
  `id` int(10) unsigned NOT NULL AUTO_INCREMENT,
  `name` varchar(150) NOT NULL,
  `gender` char(1) DEFAULT NULL,
  `owner` varchar(150) NOT NULL,
  `birth` date NOT NULL,
  PRIMARY KEY (`id`)
) ENGINE=InnoDB AUTO_INCREMENT=4 DEFAULT CHARSET=latin1
1 row in set (0.00 sec)
```

Use [ALTER TABLE...DROP](#) to delete a column:

```
mysql> ALTER TABLE cats DROP gender;
Query OK, 0 rows affected (0.19 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
mysql> DESCRIBE cats;
+-----+-----+-----+-----+-----+-----+
| Field | Type                | Null | Key | Default | Extra          |
+-----+-----+-----+-----+-----+-----+
| id    | int(10) unsigned    | NO   | PRI | NULL    | auto_increment |
| name  | varchar(150)        | NO   |     | NULL    |                |
| owner | varchar(150)        | NO   |     | NULL    |                |
| birth | date                | NO   |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)
```

See the [Tutorial](#) for more instructions on how to work with the MySQL server.

## Other Important Tasks to Perform

**Create more user accounts.** `root` is a superuser account for administration of the MySQL server which should not be used for general operations. On how to create user accounts of various kinds, see [Adding Accounts, Assigning Privileges, and Dropping Accounts](#).

**Configure MySQL to be managed with systemd.** If you have installed MySQL on a systemd platform using generic binaries and want it to be managed with systemd, see [Managing MySQL Server with systemd](#).

## Troubleshooting

The following are resources for troubleshooting some problems you might run into:

- [Troubleshooting Problems Starting the MySQL Server](#)
- [Troubleshooting Problems Connecting to MySQL](#)
- [How to Reset the Root Password](#)
- [Common Errors When Using MySQL Programs](#)

## Other Helpful Resources

- [MySQL Reference Manual](#) (select the version with the version switch)
- [Download MySQL Community Server](#)
- [Installing MySQL](#)
- [Using Option Files](#)
- [Tutorial](#) on using the `mysql` client program to work with MySQL

- [What Is New in MySQL 8.0](#)
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