# MySQL and Linux/Unix

**Abstract**

This is the MySQL Linux extract from the MySQL 5.6 Reference Manual.



For help with using MySQL, please visit either the MySQL Forums or MySQL Mailing Lists, where you can discuss your issues with other MySQL users.

For additional documentation on MySQL products, including translations of the documentation into other languages, and downloadable versions in variety of formats, including HTML and PDF formats, see the MySQL Documentation Library.



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# Preface and Legal Notices

This is the MySQL Linux extract from the MySQL 5.6 Reference Manual.

## Legal Notices

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

# Chapter 1 Installing MySQL on Unix/Linux Using Generic Binaries

Oracle provides a set of binary distributions of MySQL. These include generic binary distributions in the form of compressed `tar` files (files with a `.tar.gz` extension) for a number of platforms, and binaries in platform-specific package formats for selected platforms.

This section covers the installation of MySQL from a compressed `tar` file binary distribution. For other platform-specific package formats, see the other platform-specific sections. For example, for Windows distributions, see Installing MySQL on Microsoft Windows.

To obtain MySQL, see How to Get MySQL.

MySQL compressed `tar` file binary distributions have names of the form `mysql-VERSION-OS.tar.gz`, where *`VERSION`* is a number (for example, `5.6.34`), and *`OS`* indicates the type of operating system for which the distribution is intended (for example, `pc-linux-i686` or `winx64`).

> **Warning**
>
> If you have previously installed MySQL using your operating system native package management system, such as `yum` or `apt-get`, you may experience problems installing using a native binary. Make sure your previous MySQL installation has been removed entirely (using your package management system), and that any additional files, such as old versions of your data files, have also been removed. You should also check for configuration files such as `/etc/my.cnf` or the `/etc/mysql` directory and delete them.
>
> For information about replacing third-party packages with official MySQL packages, see the related Apt guide or Yum guide.

> **Warning**
>
> MySQL has a dependency on the `libaio` library. Data directory initialization and subsequent server startup steps will fail if this library is not installed locally. If necessary, install it using the appropriate package manager. For example, on Yum-based systems:
>
> ```
> shell> yum search libaio  # search for info
> shell> yum install libaio # install library
> ```
>
> Or, on APT-based systems:
>
> ```
> shell> apt-cache search libaio # search for info
> shell> apt-get install libaio1 # install library
> ```

If you run into problems and need to file a bug report, please use the instructions in How to Report Bugs or Problems.

On Unix, to install a compressed `tar` file binary distribution, unpack it at the installation location you choose (typically `/usr/local/mysql`). This creates the directories shown in the following table.

**Table 1.1 MySQL Installation Layout for Generic Unix/Linux Binary Package**

| Directory | Contents of Directory |
| --- | --- |
| `bin`, `scripts` | `mysqld` server, client and utility programs |

| Directory | Contents of Directory |
|---|---|
| `data` | Log files, databases |
| `docs` | MySQL manual in Info format |
| `man` | Unix manual pages |
| `include` | Include (header) files |
| `lib` | Libraries |
| `share` | Miscellaneous support files, including error messages, sample configuration files, SQL for database installation |
| `sql-bench` | Benchmarks |

Debug versions of the `mysqld` binary are available as `mysqld-debug`. To compile your own debug version of MySQL from a source distribution, use the appropriate configuration options to enable debugging support. See Installing MySQL from Source.

To install and use a MySQL binary distribution, the command sequence looks like this:

```
shell> groupadd mysql
shell> useradd -r -g mysql -s /bin/false mysql
shell> cd /usr/local
shell> tar zxvf /path/to/mysql-VERSION-OS.tar.gz
shell> ln -s full-path-to-mysql-VERSION-OS mysql
shell> cd mysql
shell> chown -R mysql .
shell> chgrp -R mysql .
shell> scripts/mysql_install_db --user=mysql
shell> chown -R root .
shell> chown -R mysql data
shell> bin/mysqld_safe --user=mysql &
# Next command is optional
shell> cp support-files/mysql.server /etc/init.d/mysql.server
```

> **Note**
>
> This procedure assumes that you have `root` (administrator) access to your system. Alternatively, you can prefix each command using the `sudo` (Linux) or `pfexec` (OpenSolaris) command.

> **Note**
>
> The procedure does not assign passwords to MySQL accounts. To do so, use the instructions in Securing the Initial MySQL Accounts.

As of MySQL 5.6.8, `mysql_install_db` creates a default option file named `my.cnf` in the base installation directory. This file is created from a template included in the distribution package named `my-default.cnf`. For more information, see Using a Sample Default Server Configuration File.

A more detailed version of the preceding description for installing a binary distribution follows.

## Create a mysql User and Group

If your system does not already have a user and group to use for running `mysqld`, you may need to create one. The following commands add the `mysql` group and the `mysql` user. You might want to call the user and group something else instead of `mysql`. If so, substitute the appropriate name in the following instructions. The syntax for `useradd` and `groupadd` may differ slightly on different versions of Unix, or they may have different names such as `adduser` and `addgroup`.

```
shell> groupadd mysql
shell> useradd -r -g mysql -s /bin/false mysql
```

> **Note**
>
> Because the user is required only for ownership purposes, not login purposes, the `useradd` command uses the `-r` and `-s /bin/false` options to create a user that does not have login permissions to your server host. Omit these options if your `useradd` does not support them.

## Obtain and Unpack the Distribution

Pick the directory under which you want to unpack the distribution and change location into it. The example here unpacks the distribution under `/usr/local`. The instructions, therefore, assume that you have permission to create files and directories in `/usr/local`. If that directory is protected, you must perform the installation as `root`.

```
shell> cd /usr/local
```

Obtain a distribution file using the instructions in How to Get MySQL. For a given release, binary distributions for all platforms are built from the same MySQL source distribution.

Unpack the distribution, which creates the installation directory. `tar` can uncompress and unpack the distribution if it has `z` option support:

```
shell> tar zxvf /path/to/mysql-VERSION-OS.tar.gz
```

The `tar` command creates a directory named `mysql-VERSION-OS`.

To install MySQL from a compressed `tar` file binary distribution, your system must have GNU `gunzip` to uncompress the distribution and a reasonable `tar` to unpack it. If your `tar` program supports the `z` option, it can both uncompress and unpack the file.

GNU `tar` is known to work. The standard `tar` provided with some operating systems is not able to unpack the long file names in the MySQL distribution. You should download and install GNU `tar`, or if available, use a preinstalled version of GNU tar. Usually this is available as `gnutar`, `gtar`, or as `tar` within a GNU or Free Software directory, such as `/usr/sfw/bin` or `/usr/local/bin`. GNU `tar` is available from http://www.gnu.org/software/tar/.

If your `tar` does not have `z` option support, use `gunzip` to unpack the distribution and `tar` to unpack it. Replace the preceding `tar` command with the following alternative command to uncompress and extract the distribution:

```
shell> gunzip < /path/to/mysql-VERSION-OS.tar.gz | tar xvf -
```

Next, create a symbolic link to the installation directory created by `tar`:

```
shell> ln -s full-path-to-mysql-VERSION-OS mysql
```

The `ln` command makes a symbolic link to the installation directory. This enables you to refer more easily to it as `/usr/local/mysql`. To avoid having to type the path name of client programs always when you are working with MySQL, you can add the `/usr/local/mysql/bin` directory to your `PATH` variable:

```
shell> export PATH=$PATH:/usr/local/mysql/bin
```

## Perform Postinstallation Setup

The remainder of the installation process involves setting distribution ownership and access permissions, initializing the data directory, starting the MySQL server, and setting up the configuration file. For instructions, see Postinstallation Setup and Testing.

# Chapter 2 Installing MySQL on Linux

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Linux supports a number of different solutions for installing MySQL. We recommend that you use one of the distributions from Oracle, for which several methods for installation are available:

- Installing with Yum using the MySQL Yum repository. For details, see Section 2.1, “Installing MySQL on Linux Using the MySQL Yum Repository”.
- Installing with APT using the MySQL APT Repository. For details, see Section 2.3, “Installing MySQL on Linux Using the MySQL APT Repository”.
- Installing with Zypper using the MySQL SLES Repository. For details, see Section 2.4, “Installing MySQL on Linux Using the MySQL SLES Repository”.
- Installing using a precompiled RPM package. For more information, see Section 2.5, “Installing MySQL on Linux Using RPM Packages from Oracle”.
- Installing using a precompiled Debian package. For more information, see Section 2.6, “Installing MySQL on Linux Using Debian Packages from Oracle”.
- Installing from a generic binary package in `.tar.gz` format. See Chapter 1, *Installing MySQL on Unix/Linux Using Generic Binaries* for more information.
- Installing using Oracle's Unbreakable Linux Network (ULN). For more information, see Installing MySQL Using Unbreakable Linux Network (ULN).
- Extracting and compiling MySQL from a source distribution. For detailed instructions, see Installing MySQL from Source.

As an alternative, you can use the package manager on your system to automatically download and install MySQL with packages from the native software repositories of your Linux distribution. These native packages are often several versions behind the currently available release. You will also normally be unable to install development milestone releases (DMRs), as these are not usually made available in the native repositories. For more information on using the native package installers, see Section 2.7, “Installing MySQL on Linux from the Native Software Repositories”.

> **Note**
>
> For many Linux installations, you will want to set up MySQL to be started automatically when your machine starts. Many of the native package installations perform this operation for you, but for source, binary and RPM solutions you may need to set this up separately. The required script, `mysql.server`, can be found in the `support-files` directory under the MySQL installation directory or in a MySQL source tree. You can install it as `/etc/init.d/mysql` for automatic MySQL startup and shutdown. See `mysql.server` — MySQL Server Startup Script.

## 2.1 Installing MySQL on Linux Using the MySQL Yum Repository

MySQL provides a Yum-style software repository for the following Linux platforms:

- EL5, EL6, and EL7-based platforms (for example, the corresponding versions of Red Hat Enterprise Linux, Oracle Linux, and CentOS)
- Fedora 23 and 24

Currently, the MySQL Yum repository for the above-mentioned platforms provides RPM packages for installing the MySQL server, client, MySQL Workbench, MySQL Utilities, Connector/ODBC, and Connector/Python (not all packages are available for all the platforms; see Installing Additional MySQL Products and Components with Yum for details).

## Before You Start

As a popular, open-source software, MySQL, in its original or re-packaged form, is widely installed on many systems from various sources, including different software download sites, software repositories, and so on. The following instructions assume that MySQL is not already installed on your system using a third-party-distributed RPM package; if that is not the case, follow the instructions given in Upgrading MySQL with the MySQL Yum Repository or Section 2.2, “Replacing a Third-Party Distribution of MySQL Using the MySQL Yum Repository”.

## Steps for a Fresh Installation of MySQL

Follow the steps below to install the latest GA release of MySQL (from the MySQL 5.7 series currently) with the MySQL Yum repository:

## Adding[1] the MySQL Yum Repository

First, add the MySQL Yum repository to your system's repository list. This is a one-time operation, which can be performed by installing an RPM provided by MySQL. Follow these steps:

a. Go to the Download MySQL Yum Repository page (http://dev.mysql.com/downloads/repo/yum/) in the MySQL Developer Zone.

b. Select and download the release package for your platform.

c. Install the downloaded release package with the following command (except for EL5-based systems), replacing *platform-and-version-specific-package-name* with the name of the downloaded RPM package:

```
shell> sudo yum localinstall platform-and-version-specific-package-name.rpm
```

For an EL6-based system, the command is in the form of:

```
shell> sudo yum localinstall mysql57-community-release-el6-{version-number}.noarch.rpm
```

For an EL7-based system:

```
shell> sudo yum localinstall mysql57-community-release-el7-{version-number}.noarch.rpm
```

For Fedora 23:

```
shell> sudo dnf install mysql57-community-release-fc23-{version-number}.noarch.rpm
```

For Fedora 24:

```
shell> sudo dnf install mysql57-community-release-fc24-{version-number}.noarch.rpm
```

For an EL5-based system, use the following command instead:

```
shell> sudo rpm -Uvh mysql57-community-release-el5-{version-number}.noarch.rpm
```

The installation command adds the MySQL Yum repository to your system's repository list and downloads the GnuPG key to check the integrity of the software packages. See Signature Checking Using GnuPG for details on GnuPG key checking.

You can check that the MySQL Yum repository has been successfully added by the following command (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> yum repolist enabled | grep "mysql.*-community.*"
```

> **Note**
>
> Once the MySQL Yum repository is enabled on your system, any system-wide update by the `yum update` command (or `dnf upgrade` for dnf-enabled systems) will upgrade MySQL packages on your system and also replace any native third-party packages, if Yum finds replacements for them in the MySQL Yum repository; see Upgrading MySQL with the MySQL Yum Repository and, for a discussion on some possible effects of that on your system, see Upgrading the Shared Client Libraries.

## Selecting a Release Series

When using the MySQL Yum repository, the latest GA series (currently MySQL 5.7) is selected for installation by default. If this is what you want, you can skip to the next step, Installing MySQL.

Within the MySQL Yum repository, different release series of the MySQL Community Server are hosted in different subrepositories. The subrepository for the latest GA series (currently MySQL 5.7) is enabled by default, and the subrepositories for all other series (for example, the MySQL 5.6 series) are disabled by default. Use this command to see all the subrepositories in the MySQL Yum repository, and see which of them are enabled or disabled (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> yum repolist all | grep mysql
```

To install the latest release from the latest GA series, no configuration is needed. To install the latest release from a specific series other than the latest GA series, disable the subrepository for the latest GA series and enable the subrepository for the specific series before running the installation command. If your platform supports `yum-config-manager`, you can do that by issuing these commands, which disable the subrepository for the 5.7 series and enable the one for the 5.6 series:

```
shell> sudo yum-config-manager --disable mysql57-community
shell> sudo yum-config-manager --enable mysql56-community
```

For dnf-enabled platforms:

```
shell> sudo dnf config-manager --disable mysql57-community
shell> sudo dnf config-manager --enable mysql56-community
```

Besides using `yum-config-manager` or the `dnf config-manager` command, you can also select a release series by editing manually the `/etc/yum.repos.d/mysql-community.repo` file. This is a typical entry for a release series' subrepository in the file:

```
[mysql57-community]
name=MySQL 5.7 Community Server
baseurl=http://repo.mysql.com/yum/mysql-5.7-community/el/6/$basearch/
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-mysql
```

Find the entry for the subrepository you want to configure, and edit the `enabled` option. Specify `enabled=0` to disable a subrepository, or `enabled=1` to enable a subrepository. For example, to install MySQL 5.6, make sure you have `enabled=0` for the above subrepository entry for MySQL 5.7, and have `enabled=1` for the entry for the 5.6 series:

```
# Enable to use MySQL 5.6
[mysql56-community]
name=MySQL 5.6 Community Server
baseurl=http://repo.mysql.com/yum/mysql-5.6-community/el/6/$basearch/
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-mysql
```

You should only enable subrepository for one release series at any time. When subrepositories for more than one release series are enabled, the latest series will be used by Yum.

Verify that the correct subrepositories have been enabled and disabled by running the following command and checking its output (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> yum repolist enabled | grep mysql
```

## Installing MySQL

Install MySQL by the following command (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> sudo yum install mysql-community-server
```

This installs the package for MySQL server (`mysql-community-server`) and also packages for the components required to run the server, including packages for the client (`mysql-community-client`), the common error messages and character sets for client and server (`mysql-community-common`), and the shared client libraries (`mysql-community-libs`).

## Starting the MySQL Server

Start the MySQL server with the following command:

```
shell> sudo service mysqld start
```

This is a sample output of the above command:

```
Starting mysqld:[ OK ]
```

You can check the status of the MySQL server with the following command:

```
shell> sudo service mysqld status
```

This is a sample output of the above command:

```
mysqld (pid 3066) is running.
```

## Securing the MySQL Installation

The program `mysql_secure_installation` allows you to perform important operations like setting the root password, removing anonymous users, and so on. Always run it to secure your MySQL installation:

```
shell> mysql_secure_installation
```

It is important to remember the root password you set. See `mysql_secure_installation` — Improve MySQL Installation Security for details.

For more information on the postinstallation procedures, see Postinstallation Setup and Testing.

> **Note**
>
> *Compatibility Information for EL7-based platforms:* The following RPM packages from the native software repositories of the platforms are incompatible with the package from the MySQL Yum repository that installs the MySQL server. Once you have installed MySQL using the MySQL Yum repository, you will not be able to install these packages (and vice versa).
>
> - akonadi-mysql

## Installing Additional MySQL Products and Components with Yum

You can use Yum to install and manage individual components of MySQL. Some of these components are hosted in sub-repositories of the MySQL Yum repository: for example, the MySQL Connectors are to be found in the MySQL Connectors Community sub-repository, and the MySQL Workbench in MySQL Tools Community. You can use the following command to list the packages for all the MySQL components available for your platform from the MySQL Yum repository (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> sudo yum --disablerepo=\* --enablerepo='mysql*-community*' list available
```

Install any packages of your choice with the following command, replacing *`package-name`* with name of the package (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> sudo yum install package-name
```

For example, to install MySQL Workbench on Fedora 24:

```
shell> sudo dnf install mysql-workbench-community
```

To install the shared client libraries (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> sudo yum install mysql-community-libs
```

## Updating MySQL with Yum

Besides installation, you can also perform updates for MySQL products and components using the MySQL Yum repository. See Upgrading MySQL with the MySQL Yum Repository for details.

# 2.2 Replacing a Third-Party Distribution of MySQL Using the MySQL Yum Repository

For supported Yum-based platforms (see Section 2.1, “Installing MySQL on Linux Using the MySQL Yum Repository”, for a list), you can replace a third-party distribution of MySQL with the latest GA release (from the MySQL 5.7 series currently) from the MySQL Yum repository. According to how your third-party distribution of MySQL was installed, there are different steps to follow:

# Replacing a Native Third-Party Distribution of MySQL

If you have installed a third-party distribution of MySQL from a native software repository (that is, a software repository provided by your own Linux distribution), follow these steps:

## 1. Backing Up Your Database

To avoid loss of data, always back up your database before trying to replace your MySQL installation using the MySQL Yum repository. See Backup and Recovery, on how to back up your database.

## 2. Adding the MySQL Yum Repository

Add the MySQL Yum repository to your system's repository list by following the instructions given in Adding the MySQL Yum Repository.

## 3. Replacing the Native Third-Party Distribution by a Yum Update or a DNF Upgrade

By design, the MySQL Yum repository will replace your native, third-party MySQL with the latest GA release (from the MySQL 5.7 series currently) from the MySQL Yum repository when you perform a `yum update` command (or `dnf upgrade` for dnf-enabled systems) on the system, or a `yum update mysql-server` (or `dnf upgrade mysql-server` for dnf-enabled systems).

After updating MySQL using the Yum repository, applications compiled with older versions of the shared client libraries should continue to work. However, *if you want to recompile applications and dynamically link them with the updated libraries*, see Upgrading the Shared Client Libraries, for some special considerations.

# Replacing a Nonnative Third-Party Distribution of MySQL

If you have installed a third-party distribution of MySQL from a nonnative software repository (that is, a software repository not provided by your own Linux distribution), follow these steps:

## 1. Backing Up Your Database

To avoid loss of data, always back up your database before trying to replace your MySQL installation using the MySQL Yum repository. See Backup and Recovery, on how to back up your database.

## 2. Stopping Yum from Receiving MySQL Packages from Third-Party, Nonnative Repositories

Before you can use the MySQL Yum repository for installing MySQL, you must stop your system from receiving MySQL packages from any third-party, nonnative Yum repositories.

For example, if you have installed MariaDB using their own software repository, get a list of the installed MariaDB packages using the following command (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> yum list installed mariadb\*
```

This is a sample output for the command:

```
MariaDB-common.i686                     10.0.4-1                        @mariadb
MariaDB-compat.i686                     10.0.4-1                        @mariadb
MariaDB-server.i686                     10.0.4-1                        @mariadb
```

From the command output, we can identify the installed packages (`MariaDB-common`, `MariaDB-compat`, and `MariaDB-server`) and the source of them (a nonnative software repository named `mariadb`).

As another example, if you have installed Percona using their own software repository, get a list of the installed Percona packages using the following command (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> yum list installed Percona\*
```

This is a sample output for the command:

```
Percona-Server-client-55.i686     5.5.39-rel36.0.el6          @percona-release-i386
Percona-Server-server-55.i686     5.5.39-rel36.0.el6          @percona-release-i386
Percona-Server-shared-55.i686     5.5.39-rel36.0.el6          @percona-release-i386
percona-release.noarch            0.1-3                       @/percona-release-0.1-3.noarch
```

From the command output, we can identify the installed packages (`Percona-Server-client`, `Percona-Server-server`, `Percona-Server-shared`, and `percona-release.noarch`) and the source of them (a nonnative software repository named `percona-release`).

If you are not sure which third-party MySQL fork you have installed, this command should reveal it and list the RPM packages installed for it, as well as the third-party repository that supplies the packages (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> yum --disablerepo=\* provides mysql\*
```

The next step is to stop Yum from receiving packages from the nonnative repository. If the `yum-config-manager` utility is supported on your platform, you can, for example, use this command for stopping delivery from MariaDB (on dnf-enabled systems, use the `dnf config-manager` command instead of `yum-config-manager`):

```
shell> sudo yum-config-manager --disable mariadb
```

And use this command for stopping delivery from Percona (on dnf-enabled systems, use the `dnf config-manager` command instead of `yum-config-manager`):

```
shell> sudo yum-config-manager --disable percona-release
```

You can perform the same task by removing the entry for the software repository existing in one of the repository files under the `/etc/yum.repos.d/` directory. This is how the entry typically looks like for MariaDB:

```
[mariadb] name = MariaDB
 baseurl = [base URL for repository]
 gpgkey = [URL for GPG key]
 gpgcheck =1
```

The entry is usually found in the file `/etc/yum.repos.d/MariaDB.repo` for MariaDB—delete the file, or remove entry from it (or from the file in which you find the entry).

> **Note**
>
> This step is not necessary for an installation that was configured with a Yum repository release package (like Percona) if you are going to remove the release package (`percona-release.noarch` for Percona), as shown in the uninstall command for Percona in Step 3 below.

### 3 Uninstalling the Nonnative Third-Party MySQL Distribution of MySQL

The nonnative third-party MySQL distribution must first be uninstalled before you can use the MySQL Yum repository to install MySQL. For the MariaDB packages found in Step 2 above, uninstall them with the following command (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> sudo yum remove MariaDB-common MariaDB-compat MariaDB-server
```

For the Percona packages we found in Step 2 above (for dnf-enabled systems, replace `yum` in the command with `dnf`):

```
shell> sudo yum remove Percona-Server-client-55 Percona-Server-server-55 \
  Percona-Server-shared-55.i686 percona-release
```

### 4 Installing MySQL with the MySQL Yum Repository

Then, install MySQL with the MySQL Yum repository by following the instructions given in Section 2.1, “Installing MySQL on Linux Using the MySQL Yum Repository”: .

**Important**

- If you have chosen to replace your third-party MySQL distribution with a newer version of MySQL from the MySQL Yum repository, remember to run `mysql_upgrade` after the server starts, to check and possibly resolve any incompatibilities between the old data and the upgraded software. `mysql_upgrade` also performs other functions; see `mysql_upgrade` — Check and Upgrade MySQL Tables for details.
- *For EL7-based platforms:* See Compatibility Information for EL7-based platforms [9].

## 2.3 Installing MySQL on Linux Using the MySQL APT Repository

The MySQL APT repository provides `deb` packages for installing and managing the MySQL server, client, and other components on the following Linux platforms: :

- Debian 7.x (“wheezy”)
- Debian 8.x (“jessie”)
- Ubuntu 12.04 LTS (“Precise Pangolin”)
- Ubuntu 14.04 LTS (“Trusty Tahr”)
- Ubuntu 15.10 (“Wily Werewolf”)

Instructions for using the MySQL APT Repository are available in A Quick Guide to Using the MySQL APT Repository.

## 2.4 Installing MySQL on Linux Using the MySQL SLES Repository

The MySQL SLES repository provides RPM packages for installing and managing the MySQL server, client, and other components on SUSE Enterprise Linux Server.

Instructions for using the MySQL SLES repository are available in A Quick Guide to Using the MySQL SLES Repository.

> **Note**
>
> The MySQL SLES repository is now in development release. We encourage you to try it and provide us with feedback. Please report any bugs or inconsistencies you observe to our Bugs Database.

## 2.5 Installing MySQL on Linux Using RPM Packages from Oracle

> **Note**
>
> To install or upgrade to MySQL 5.6.11 or later, be sure to read the special instructions at the end of this section.

The recommended way to install MySQL on RPM-based Linux distributions that use `glibc` is by using the RPM packages provided by Oracle. There are two sources for obtaining the Community versions of the RPM packages:

- From the MySQL software repositories, for the following platforms:
  - For EL5, EL6, or EL7-based platforms and Fedora 23 or 24, use the MySQL Yum repository (see Section 2.1, “Installing MySQL on Linux Using the MySQL Yum Repository” for details).
  - For SUSE Enterprise Linux Server, use the MySQL SLES repository (see Section 2.4, “Installing MySQL on Linux Using the MySQL SLES Repository” for details).
- From the MySQL Downloads page in the MySQL Developer Zone, which provides RPM packages that work for different platforms.

*The discussion in this section applies only to the RPM packages downloaded from the MySQL Developer Zone.* Installations created with these packages result in files under the system directories shown in the following table.

**Table 2.1 MySQL Installation Layout for Linux RPM Packages from the MySQL Developer Zone**

| Directory | Contents of Directory |
|---|---|
| `/usr/bin` | Client programs and scripts |
| `/usr/sbin` | The `mysqld` server |
| `/var/lib/mysql` | Log files, databases |
| `/usr/share/info` | MySQL manual in Info format |
| `/usr/share/man` | Unix manual pages |
| `/usr/include/mysql` | Include (header) files |
| `/usr/lib/mysql` | Libraries |
| `/usr/share/mysql` | Miscellaneous support files, including error messages, character set files, sample configuration files, SQL for database installation |
| `/usr/share/sql-bench` | Benchmarks |

> **Note**
>
> RPM distributions of MySQL are also provided by other vendors. Be aware that they may differ from those built by Oracle in features, capabilities, and conventions (including communication setup), and that the instructions in this manual do not necessarily apply to installing them. The vendor's instructions should be consulted instead. Because of these differences, RPM packages built by Oracle check whether such RPMs built by other vendors are installed. If so, the RPM does not install and produces a message explaining this.

> Conflicts can arise when an RPM from another vendor is already installed, such as when a vendor's conventions about which files belong with the server and which belong with the client library differ from the breakdown used for Oracle packages. In such cases, attempts to install an Oracle RPM with `rpm -i` may result in messages that files in the RPM to be installed conflict with files from an installed package (denoted `mysql-libs` in the following paragraphs).
>
> Each MySQL release provides a `MySQL-shared-compat` package that is meant to replace `mysql-libs` and provides a replacement-compatible client library for older MySQL series. `MySQL-shared-compat` is set up to make `mysql-libs` obsolete, but `rpm` explicitly refuses to replace obsoleted packages when invoked with `-i` (unlike `-U`), which is why installation with `rpm -i` produces a conflict.
>
> `MySQL-shared-compat` can safely be installed alongside `mysql-libs` because libraries are installed to different locations. Therefore, it is possible to install `MySQL-shared-compat` first, then manually remove `mysql-libs` before continuing with the installation. After `mysql-libs` is removed, the dynamic linker stops looking for the client library in the location where `mysql-libs` puts it, and the library provided by the `MySQL-shared-compat` package takes over.
>
> Another alternative is to install packages using `yum`. In a directory containing all RPM packages for a MySQL release, `yum install MySQL*rpm` installs them in the correct order and removes `mysql-libs` in one step without conflicts.

In most cases, you need install only the `MySQL-server` and `MySQL-client` packages to get a functional standard MySQL installation. The other packages are not required for a standard installation.

As of MySQL 5.6.8, new RPM install operations (not upgrades) invoke `mysql_install_db` with the `--random-passwords` option that provides for more secure MySQL installation. Invoking `mysql_install_db` with `--random-passwords` causes it to assign a random password to the MySQL `root` accounts, set the “password expired” flag for those accounts, and not create anonymous-user MySQL accounts. It will be necessary after installation to start the server, connect as `root` using the initial random password, and assign a new `root` password. Until this is done, `root` cannot do anything else. This must be done for each `root` account you intend to use. To change the password, you can use the `SET PASSWORD` statement (for example, with the `mysql` client). You can also use `mysqladmin` or `mysql_secure_installation`. For additional details, see `mysql_install_db` — Initialize MySQL Data Directory. (Install operations using RPMs for Unbreakable Linux Network are unaffected because they do not use `mysql_install_db`.)

> **Important**
>
> **RPMs for MySQL Cluster.** Standard MySQL server RPMs built by MySQL do not provide support for the `NDBCLUSTER` storage engine. For more information about installing MySQL Cluster from RPMs, see MySQL Cluster Installation.
>
> When upgrading a MySQL Cluster RPM installation, you must upgrade *all* installed RPMs, including the `Server` and `Client` RPMs.

For upgrades, if your installation was originally produced by installing multiple RPM packages, it is best to upgrade all the installed packages, not just some. For example, if you previously installed the server and client RPMs, do not upgrade just the server RPM.

If the data directory exists at RPM installation time, the installation process does not modify existing data. This has the effect, for example, that accounts in the grant tables are not initialized to the default set of accounts.

If you get a dependency failure when trying to install MySQL packages (for example, `error: removing these packages would break dependencies: libmysqlclient.so.10 is needed by ...`), you should also install the `MySQL-shared-compat` package, which includes the shared libraries for older releases for backward compatibility.

The following list shows the available RPM packages. The names shown here use a suffix of `.linux_glibc2.5.i386.rpm`, but particular packages can have different suffixes, described later. If you plan to install multiple RPM packages, you may wish to download the RPM Bundle `tar` file instead, which contains multiple RPM packages so that you need not download them separately.

- `MySQL-server-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The MySQL server. You need this unless you only want to connect to a MySQL server running on another machine.

- `MySQL-client-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The standard MySQL client programs. You probably always want to install this package.

- `MySQL-devel-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The libraries and include files needed to compile other MySQL clients, such as the Perl MySQL module. Install this RPM if you intend to compile C API applications.

- `MySQL-shared-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The shared libraries (`libmysqlclient.so*`) that certain languages and applications need to dynamically load and use MySQL. It contains single-threaded and thread-safe libraries. Install this RPM if you intend to compile or run C API applications that depend on the shared client library.

- `MySQL-shared-compat-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The shared libraries for older releases, but not the libraries for the current release. It contains single-threaded and thread-safe libraries. Install this package if you have applications installed that are dynamically linked against older versions of MySQL but you want to upgrade to the current version without breaking the library dependencies.

  As of MySQL 5.6.5, the `MySQL-shared-compat` RPM package enables users of Red Hat-provided `mysql-*-5.1` RPM packages to migrate to Oracle-provided `MySQL-*-5.5` packages. `MySQL-shared-compat` replaces the Red Hat `mysql-libs` package by replacing `libmysqlclient.so` files of the latter package, thus satisfying dependencies of other packages on `mysql-libs`. This change affects only users of Red Hat (or Red Hat-compatible) RPM packages. Nothing is different for users of Oracle RPM packages.

- `MySQL-embedded-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The embedded MySQL server library.

- `MySQL-test-`*`VERSION`*`.linux_glibc2.5.i386.rpm`

  The MySQL test suite.

- `MySQL-`*`VERSION`*`.src.rpm`

  The source code for all of the previous packages. It can also be used to rebuild the RPMs on other architectures (for example, SPARC).

In RPM package names, the suffix (following the *`VERSION`* value) has the following syntax:

```
.PLATFORM.CPU.rpm
```

The *`PLATFORM`* and *`CPU`* values indicate the type of system for which the package is built. *`PLATFORM`* indicates the platform and *`CPU`* indicates the processor type or family.

All packages are dynamically linked against `glibc` 2.5. The *`PLATFORM`* value indicates whether the package is platform independent or intended for a specific platform, as shown in the following table.

**Table 2.2 MySQL Linux RPM Package Platforms**

| *`PLATFORM`* Value | Intended Use |
|---|---|
| `linux_glibc25` | Platform independent, should run on any Linux distribution that supports `glibc` 2.5 |
| `rhel5` | Red Hat Enterprise Linux 5 |
| `el6`, `el7` | Enterprise Linux 6 or 7 |
| `sles11`, `sles12` | SUSE Linux Enterprise Server 11 or 12 |

In MySQL 5.6, only `linux_glibc2.5` packages are available currently.

The *`CPU`* value indicates the processor type or family for which the package is built, as shown in the following table.

**Table 2.3 MySQL Linux RPM Package CPU Identifiers**

| *`CPU`* Value | Intended Processor Type or Family |
|---|---|
| `i386`, `i686` | Pentium processor or better, 32 bit |
| `x86_64` | 64-bit x86 processor |

To see all files in an RPM package (for example, a `MySQL-server` RPM), run a command like this (modify the platform and CPU identifiers appropriately for your system):

```
shell> rpm -qpl MySQL-server-VERSION.linux_glibc2.5.i386.rpm
```

To perform a standard minimal installation, install the server and client RPMs:

```
shell> rpm -i MySQL-server-VERSION.linux_glibc2.5.i386.rpm
shell> rpm -i MySQL-client-VERSION.linux_glibc2.5.i386.rpm
```

To install only the client programs, install just the client RPM:

```
shell> rpm -i MySQL-client-VERSION.linux_glibc2.5.i386.rpm
```

RPM provides a feature to verify the integrity and authenticity of packages before installing them. To learn more about this feature, see Verifying Package Integrity Using MD5 Checksums or GnuPG.

The server RPM places data under the `/var/lib/mysql` directory. The RPM also creates a login account for a user named `mysql` (if one does not exist) to use for running the MySQL server, and creates the appropriate entries in `/etc/init.d/` to start the server automatically at boot time. (This means that if you have performed a previous installation and have made changes to its startup script, you may want to make a copy of the script so that you can reinstall it after you install a newer RPM.) See Starting and Stopping MySQL Automatically, for more information on how MySQL can be started automatically at system startup.

In MySQL 5.6, for a new installation using RPM packages, the server boot scripts are installed, but the MySQL server is not started at the end of the installation, since the status of the server during an unattended installation is not known.

In MySQL 5.6, for an upgrade installation using RPM packages, if the MySQL server is running when the upgrade occurs, the MySQL server is stopped, the upgrade occurs, and the MySQL server is restarted. If the MySQL server is not already running when the RPM upgrade occurs, the MySQL server is not started at the end of the installation.

> **Note**
>
> Upgrading from a community version to a commercial version of MySQL requires that you first uninstall the community version and then install the commercial version. In this case, you must restart the server manually after the upgrade.

If something goes wrong, you can find more information in the binary installation section. See Chapter 1, *Installing MySQL on Unix/Linux Using Generic Binaries*.

> **Note**
>
> The accounts created in the MySQL grant tables for an RPM installation initially have no passwords. After starting the server, you should assign passwords to them using the instructions in Postinstallation Setup and Testing.

An RPM installation creates a user named `mysql` and a group named `mysql` on the system using the `useradd`, `groupadd`, and `usermod` commands. Those commands require appropriate administrative privileges, which is required for locally managed users and groups (as listed in the `/etc/passwd` and `/etc/group` files) by the RPM installation process being run by `root`.

If you log in as the `mysql` user, you may find that MySQL displays “Invalid (old?) table or database name” errors that mention `.mysqlgui`, `lost+found`, `.mysqlgui`, `.bash_history`, `.fonts.cache-1`, `.lesshst`, `.mysql_history`, `.profile`, `.viminfo`, and similar files created by MySQL or operating system utilities. You can safely ignore these error messages or remove the files or directories that cause them if you do not need them.

For nonlocal user management (LDAP, NIS, and so forth), the administrative tools may require additional authentication (such as a password), and will fail if the installing user does not provide this authentication. Even if they fail, the RPM installation will not abort but succeed, and this is intentional. If they failed, some of the intended transfer of ownership may be missing, and it is recommended that the system administrator then manually ensures some appropriate user and group exists and manually transfers ownership following the actions in the RPM spec file.

In MySQL 5.6.11, the RPM spec file has been updated, which has the following consequences:

- For a non-upgrade installation (no existing MySQL version installed), it is possible to install MySQL using `yum`.
- For upgrades, it is necessary to clean up any earlier MySQL installations. In effect, the update is performed by removing the old installations and installing the new one.

Additional details follow.

For a non-upgrade installation of MySQL 5.6.11 or later, it is possible to install using `yum`:

```
shell> yum install MySQL-server-NEWVERSION.linux_glibc2.5.i386.rpm
```

For upgrades to MySQL 5.6.11 or later, perform the upgrade by removing the old installation and installing the new one:

1. Remove the existing 5.6.*X* installation. *`OLDVERSION`* is the version to remove.

   ```
   shell> rpm -e MySQL-server-OLDVERSION.linux_glibc2.5.i386.rpm
   ```

   Repeat this step for all installed MySQL RPMs.

2. Install the new version. *`NEWVERSION`* is the version to install.

   ```
   shell> rpm -ivh MySQL-server-NEWVERSION.linux_glibc2.5.i386.rpm
   ```

Alternatively, the removal and installation can be done using `yum`:

```
shell> yum remove MySQL-server-OLDVERSION.linux_glibc2.5.i386.rpm
shell> yum install MySQL-server-NEWVERSION.linux_glibc2.5.i386.rpm
```

For some Linux distributions, it might be necessary to increase the limit on number of file descriptors available to `mysqld`. See File Not Found and Similar Errors

# 2.6 Installing MySQL on Linux Using Debian Packages from Oracle

Oracle provides Debian packages for installing MySQL on Debian or Debian-like Linux systems. The packages are available through two different channels:

- The MySQL APT Repository, supporting the Debian 7 and 8, and Ubuntu 12, 14, and 15 platforms. For details, see Section 2.3, “Installing MySQL on Linux Using the MySQL APT Repository”.
- The MySQL Developer Zone's Download Area. For details, see How to Get MySQL. The following are some information on the Debian packages available there and the instructions for installing them:
  - You may also need to install the `libaio` library if it is not already present on your system:

    ```
    shell> sudo apt-get install libaio1
    ```

  - *For Debian 7 and 8, and Ubuntu 12, 14, and 15*:
    - Various Debian packages are provided in the MySQL Developer Zone for installing different components of MySQL. The preferred method is to use the tarball bundle, which contains the packages needed for a basic setup of MySQL. The tarball bundles have names in the format of `mysql-server_`*`MVER`*`-`*`DVER`*`_`*`CPU`*`.deb-bundle.tar`. *`MVER`* is the MySQL version and *`DVER`* is the Linux distribution version. The *`CPU`* value indicates the processor type or family for which the package is built, as shown in the following table:

      **Table 2.4 MySQL Debian 7 and 8, and Ubuntu 12, 14, and 15 Installation Packages CPU Identifiers**

      | *`CPU`* Value | Intended Processor Type or Family |
      |---|---|
      | `i386` | Pentium processor or better, 32 bit |
      | `amd64` | 64-bit x86 processor |

    - After downloading the tarball, unpack it with the following command:

      ```
      shell> tar -xvf mysql-server_MVER-DVER_CPU.deb-bundle.tar
      ```

    - In general, install the `deb` packages unpacked from the tarball with the command (see explanations below for the extra steps required for installing the server package):

      ```
      shell> sudo dpkg -i package-name.deb
      ```

      There are four packages to install:

      - The database common files (install this package before the other ones):

        ```
        shell> sudo dpkg -i mysql-common_MVER-DVER_CPU.deb
        ```

      - The MySQL server:

        Install first the package for the database common files (see the last bullet), and then pre-configure your server installation by the following command:

```
shell> dpkg-preconfigure mysql-community-server_MVER-DVER_CPU.deb
```

There are then two requests for you:

- Supply a password for the root user for your MySQL installation.

  **Important**

  Make sure you remember the root password you set. Users who want to set a password later can leave the **password** field blank in the dialogue box and just press **OK**. However, it is very important that you set the password soon using the program mysql_secure_installation, as people can gain anonymous access to your MySQL server until you have secured the database's root account with a password.

- Indicate if you want to install the test database with “Yes” or “No”. Installation of the test database is not recommended for production environments.

Next, install the server package with the following command:

```
shell> sudo dpkg -i mysql-community-server_MVER-DVER_CPU.deb
```

- The MySQL client:

```
shell> sudo dpkg -i mysql-community-client_MVER-DVER_CPU.deb
```

- The MySQL shared client library:

```
shell> sudo dpkg -i libmysqlclient18_MVER-DVER_CPU.deb
```

Here are where the files are installed on the system:

- All configuration files (like `my.cnf`) are under `/etc`
- All binaries, libraries, headers, etc., are under `/usr`
- The data directory is under `/var`

- *For Debian 6:*

  - Debian package files directly downloaded from the MySQL Developer Zone have names in the `mysql-MVER-DVER-CPU.deb` format. *MVER* is the MySQL version and *DVER* is the Debian version. The *CPU* value indicates the processor type or family for which the package is built, as shown in the following table:

    **Table 2.5 MySQL Debian 6 Installation Package CPU Identifiers**

    | *CPU* Value | Intended Processor Type or Family |
    |---|---|
    | `i686` | Pentium processor or better, 32 bit |
    | `x86_64` | 64-bit x86 processor |

  - After downloading a Debian package, use the following command to install it;

    ```
    shell> dpkg -i mysql-MVER-DVER-CPU.deb
    ```

    The Debian package installs files under the `/opt/mysql/server-5.6` directory.

    **Note**

    Debian distributions of MySQL are also provided by other vendors. Be aware that they may differ from those built by Oracle in features, capabilities, and

conventions (including communication setup), and that the instructions in this manual do not necessarily apply to installing them. The vendor's instructions should be consulted instead.

## 2.7 Installing MySQL on Linux from the Native Software Repositories

Many Linux distributions include a version of the MySQL server, client tools, and development components in their native software repositories and can be installed with the platforms' standard package management systems. This section provides basic instructions for installing MySQL using those package management systems.

**Important**

Native packages are often several versions behind the currently available release. You will also normally be unable to install development milestone releases (DMRs), as these are not usually made available in the native repositories. Before proceeding, we recommend that you check out the other installation options described in Chapter 2, *Installing MySQL on Linux*.

Distribution specific instructions are shown below:

- **Red Hat Linux, Fedora, CentOS**

  **Note**

  For EL5, EL6, or EL7-based Linux platforms and Fedora 23 or 24, you can install MySQL using the MySQL Yum repository instead of the platform's native software repository. See Section 2.1, “Installing MySQL on Linux Using the MySQL Yum Repository” for details.

  For Red Hat and similar distributions, the MySQL distribution is divided into a number of separate packages, `mysql` for the client tools, `mysql-server` for the server and associated tools, and `mysql-libs` for the libraries. The libraries are required if you want to provide connectivity from different languages and environments such as Perl, Python and others.

  To install, use the `yum` command to specify the packages that you want to install. For example:

```
root-shell> yum install mysql mysql-server mysql-libs mysql-server
Loaded plugins: presto, refresh-packagekit
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package mysql.x86_64 0:5.1.48-2.fc13 set to be updated
---> Package mysql-libs.x86_64 0:5.1.48-2.fc13 set to be updated
---> Package mysql-server.x86_64 0:5.1.48-2.fc13 set to be updated
--> Processing Dependency: perl-DBD-MySQL for package: mysql-server-5.1.48-2.fc13.x86_64
--> Running transaction check
---> Package perl-DBD-MySQL.x86_64 0:4.017-1.fc13 set to be updated
--> Finished Dependency Resolution
Dependencies Resolved
================================================================================
 Package               Arch          Version               Repository      Size
================================================================================
Installing:
 mysql                 x86_64        5.1.48-2.fc13         updates        889 k
 mysql-libs            x86_64        5.1.48-2.fc13         updates        1.2 M
 mysql-server          x86_64        5.1.48-2.fc13         updates        8.1 M
Installing for dependencies:
 perl-DBD-MySQL        x86_64        4.017-1.fc13          updates        136 k
Transaction Summary
================================================================================
Install       4 Package(s)
Upgrade       0 Package(s)
```

```
Total download size: 10 M
Installed size: 30 M
Is this ok [y/N]: y
Downloading Packages:
Setting up and reading Presto delta metadata
Processing delta metadata
Package(s) data still to download: 10 M
(1/4): mysql-5.1.48-2.fc13.x86_64.rpm                     | 889 kB     00:04
(2/4): mysql-libs-5.1.48-2.fc13.x86_64.rpm                | 1.2 MB     00:06
(3/4): mysql-server-5.1.48-2.fc13.x86_64.rpm              | 8.1 MB     00:40
(4/4): perl-DBD-MySQL-4.017-1.fc13.x86_64.rpm             | 136 kB     00:00
--------------------------------------------------------------------------------
Total                                          201 kB/s |  10 MB     00:52
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing     : mysql-libs-5.1.48-2.fc13.x86_64                         1/4
  Installing     : mysql-5.1.48-2.fc13.x86_64                              2/4
  Installing     : perl-DBD-MySQL-4.017-1.fc13.x86_64                      3/4
  Installing     : mysql-server-5.1.48-2.fc13.x86_64                       4/4
Installed:
  mysql.x86_64 0:5.1.48-2.fc13            mysql-libs.x86_64 0:5.1.48-2.fc13
  mysql-server.x86_64 0:5.1.48-2.fc13
Dependency Installed:
  perl-DBD-MySQL.x86_64 0:4.017-1.fc13
Complete!
```

MySQL and the MySQL server should now be installed. A sample configuration file is installed into `/etc/my.cnf`. An init script, to start and stop the server, will have been installed into `/etc/init.d/mysqld`. To start the MySQL server use `service`:

```
root-shell> service mysqld start
```

To enable the server to be started and stopped automatically during boot, use `chkconfig`:

```
root-shell> chkconfig --levels 235 mysqld on
```

Which enables the MySQL server to be started (and stopped) automatically at the specified the run levels.

The database tables will have been automatically created for you, if they do not already exist. You should, however, run `mysql_secure_installation` to set the root passwords on your server.

- **Debian, Ubuntu, Kubuntu**

  > **Note**
  >
  > For Debian 7 and 8, and Ubuntu 12, 14, and 15, MySQL can be installed using the MySQL APT Repository instead of the platform's native software repository. See Section 2.3, “Installing MySQL on Linux Using the MySQL APT Repository” for details.

  On Debian and related distributions, there are two packages for MySQL in their software repositories, `mysql-client` and `mysql-server`, for the client and server components respectively. You should specify an explicit version, for example `mysql-client-5.1`, to ensure that you install the version of MySQL that you want.

  To download and install, including any dependencies, use the `apt-get` command, specifying the packages that you want to install.

> **Note**
>
> Before installing, make sure that you update your `apt-get` index files to ensure you are downloading the latest available version.

A sample installation of the MySQL packages might look like this (some sections trimmed for clarity):

```
root-shell> apt-get install mysql-client-5.1 mysql-server-5.1
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-headers-2.6.28-11 linux-headers-2.6.28-11-generic
Use 'apt-get autoremove' to remove them.
The following extra packages will be installed:
  bsd-mailx libdbd-mysql-perl libdbi-perl libhtml-template-perl
  libmysqlclient15off libmysqlclient16 libnet-daemon-perl libplrpc-perl mailx
  mysql-common postfix
Suggested packages:
  dbishell libipc-sharedcache-perl tinyca procmail postfix-mysql postfix-pgsql
  postfix-ldap postfix-pcre sasl2-bin resolvconf postfix-cdb
The following NEW packages will be installed
  bsd-mailx libdbd-mysql-perl libdbi-perl libhtml-template-perl
  libmysqlclient15off libmysqlclient16 libnet-daemon-perl libplrpc-perl mailx
  mysql-client-5.1 mysql-common mysql-server-5.1 postfix
0 upgraded, 13 newly installed, 0 to remove and 182 not upgraded.
Need to get 1907kB/25.3MB of archives.
After this operation, 59.5MB of additional disk space will be used.
Do you want to continue [Y/n]? Y
Get: 1 http://gb.archive.ubuntu.com jaunty-updates/main mysql-common 5.1.30really5.0.75-0ubuntu10.5 [63.6
Get: 2 http://gb.archive.ubuntu.com jaunty-updates/main libmysqlclient15off 5.1.30really5.0.75-0ubuntu10.
Fetched 1907kB in 9s (205kB/s)
Preconfiguring packages ...
Selecting previously deselected package mysql-common.
(Reading database ... 121260 files and directories currently installed.)
...
Processing 1 added doc-base file(s)...
Registering documents with scrollkeeper...
Setting up libnet-daemon-perl (0.43-1) ...
Setting up libplrpc-perl (0.2020-1) ...
Setting up libdbi-perl (1.607-1) ...
Setting up libmysqlclient15off (5.1.30really5.0.75-0ubuntu10.5) ...
Setting up libdbd-mysql-perl (4.008-1) ...
Setting up libmysqlclient16 (5.1.31-1ubuntu2) ...
Setting up mysql-client-5.1 (5.1.31-1ubuntu2) ...
Setting up mysql-server-5.1 (5.1.31-1ubuntu2) ...
 * Stopping MySQL database server mysqld
   ...done.
100825 11:46:15  InnoDB: Started; log sequence number 0 46409
100825 11:46:15  InnoDB: Starting shutdown...
100825 11:46:17  InnoDB: Shutdown completed; log sequence number 0 46409
100825 11:46:17 [Warning] Forcing shutdown of 1 plugins
 * Starting MySQL database server mysqld
   ...done.
 * Checking for corrupt, not cleanly closed and upgrade needing tables.
...
Processing triggers for libc6 ...
ldconfig deferred processing now taking place
```

> **Note**
>
> The `apt-get` command will install a number of packages, including the MySQL server, in order to provide the typical tools and application environment. This can mean that you install a large number of packages in addition to the main MySQL package.

During installation, the initial database will be created, and you will be prompted for the MySQL root password (and confirmation). A configuration file will have been created in `/etc/mysql/my.cnf`. An init script will have been created in `/etc/init.d/mysql`.

The server will already be started. You can manually start and stop the server using:

```
root-shell> service mysql [start|stop]
```

The service will automatically be added to the 2, 3 and 4 run levels, with stop scripts in the single, shutdown and restart levels.

- **Gentoo Linux**

  As a source-based distribution, installing MySQL on Gentoo involves downloading the source, patching the Gentoo specifics, and then compiling the MySQL server and installing it. This process is handled automatically by the `emerge` command.

  The MySQL server and client tools are provided within a single package, `dev-db/mysql`. You can obtain a list of the versions available to install by looking at the portage directory for the package:

  ```
  root-shell> ls /usr/portage/dev-db/mysql/mysql-5.6*
  mysql-5.6.27.ebuild
  mysql-5.6.27-r1.ebuild
  mysql-5.6.28.ebuild
  ```

  To install a specific MySQL version, you must specify the entire atom. For example:

  ```
  root-shell> emerge =dev-db/mysql-5.6.27-r1
  ```

  After installation, you should initialize the data directory and set the password for the MySQL *`root`* user (see Chapter 5, *Initializing the Data Directory*). Alternatively, use the configuration interface to perform those tasks:

  ```
  root-shell> emerge --config =dev-db/mysql-5.6.27-r1
  ```

  During installation, a sample configuration file is created for you in `/etc/mysql/my.cnf`, and an init script is created in `/etc/init.d/mysql`.

  To enable MySQL to start automatically at the normal (default) run levels, use this command:

  ```
  root-shell> rc-update add mysql default
  ```

## 2.8 Installing MySQL on Linux with docker

The docker deployment framework supports easy installation and configuration of MySQL servers. For instructions, see https://hub.docker.com/r/mysql/mysql-server/. This page also provides extensive documentation about using MySQL under docker.

## 2.9 Installing MySQL on Linux with juju

The juju deployment framework supports easy installation and configuration of MySQL servers. For instructions, see https://jujucharms.com/mysql/.

# Chapter 3 Installing MySQL on Solaris and OpenSolaris

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MySQL on Solaris and OpenSolaris is available in a number of different formats.

- For information on installing using the native Solaris PKG format, see Section 3.1, “Installing MySQL on Solaris Using a Solaris PKG”.
- On OpenSolaris, the standard package repositories include MySQL packages specially built for OpenSolaris that include entries for the Service Management Framework (SMF) to enable control of the installation using the SMF administration commands. For more information, see Section 3.2, “Installing MySQL on OpenSolaris Using IPS”.
- To use a standard `tar` binary installation, use the notes provided in Chapter 1, *Installing MySQL on Unix/Linux Using Generic Binaries*. Check the notes and hints at the end of this section for Solaris specific notes that you may need before or after installation.

To obtain a binary MySQL distribution for Solaris in tarball or PKG format, http://dev.mysql.com/downloads/mysql/5.6.html.

Additional notes to be aware of when installing and using MySQL on Solaris:

- If you want to use MySQL with the `mysql` user and group, use the `groupadd` and `useradd` commands:

```
groupadd mysql
useradd -g mysql -s /bin/false mysql
```

- If you install MySQL using a binary tarball distribution on Solaris, you may run into trouble even before you get the MySQL distribution unpacked, as the Solaris `tar` cannot handle long file names. This means that you may see errors when you try to unpack MySQL.

  If this occurs, you must use GNU `tar` (`gtar`) to unpack the distribution. In Solaris 10 and OpenSolaris `gtar` is normally located in `/usr/sfw/bin/gtar`, but may not be included in the default path definition.

- When using Solaris 10 for x86_64, you should mount any file systems on which you intend to store `InnoDB` files with the `forcedirectio` option. (By default mounting is done without this option.) Failing to do so will cause a significant drop in performance when using the `InnoDB` storage engine on this platform.
- If you would like MySQL to start automatically, you can copy `support-files/mysql.server` to `/etc/init.d` and create a symbolic link to it named `/etc/rc3.d/S99mysql.server`.
- If too many processes try to connect very rapidly to `mysqld`, you should see this error in the MySQL log:

```
Error in accept: Protocol error
```

  You might try starting the server with the `--back_log=50` option as a workaround for this.

- To configure the generation of core files on Solaris you should use the `coreadm` command. Because of the security implications of generating a core on a `setuid()` application, by default, Solaris

does not support core files on `setuid()` programs. However, you can modify this behavior using `coreadm`. If you enable `setuid()` core files for the current user, they will be generated using the mode 600 and owned by the superuser.

# 3.1 Installing MySQL on Solaris Using a Solaris PKG

You can install MySQL on Solaris and OpenSolaris using a binary package using the native Solaris PKG format instead of the binary tarball distribution.

To use this package, download the corresponding `mysql-VERSION-solaris10-PLATFORM.pkg.gz` file, then uncompress it. For example:

```
shell> gunzip mysql-5.6.34-solaris10-x86_64.pkg.gz
```

To install a new package, use `pkgadd` and follow the onscreen prompts. You must have root privileges to perform this operation:

```
shell> pkgadd -d mysql-5.6.34-solaris10-x86_64.pkg
The following packages are available:
  1  mysql     MySQL Community Server (GPL)
               (i86pc) 5.6.34
Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]:
```

The PKG installer installs all of the files and tools needed, and then initializes your database if one does not exist. To complete the installation, you should set the root password for MySQL as provided in the instructions at the end of the installation. Alternatively, you can run the `mysql_secure_installation` script that comes with the installation.

By default, the PKG package installs MySQL under the root path `/opt/mysql`. You can change only the installation root path when using `pkgadd`, which can be used to install MySQL in a different Solaris zone. If you need to install in a specific directory, use a binary `tar` file distribution.

The `pkg` installer copies a suitable startup script for MySQL into `/etc/init.d/mysql`. To enable MySQL to startup and shutdown automatically, you should create a link between this file and the init script directories. For example, to ensure safe startup and shutdown of MySQL you could use the following commands to add the right links:

```
shell> ln /etc/init.d/mysql /etc/rc3.d/S91mysql
shell> ln /etc/init.d/mysql /etc/rc0.d/K02mysql
```

To remove MySQL, the installed package name is `mysql`. You can use this in combination with the `pkgrm` command to remove the installation.

To upgrade when using the Solaris package file format, you must remove the existing installation before installing the updated package. Removal of the package does not delete the existing database information, only the server, binaries and support files. The typical upgrade sequence is therefore:

```
shell> mysqladmin shutdown
shell> pkgrm mysql
shell> pkgadd -d mysql-5.6.34-solaris10-x86_64.pkg
shell> mysqld_safe &
shell> mysql_upgrade
```

You should check the notes in Upgrading or Downgrading MySQL before performing any upgrade.

# 3.2 Installing MySQL on OpenSolaris Using IPS

OpenSolaris includes standard packages for MySQL in the core repository. The MySQL packages are based on a specific release of MySQL and updated periodically. For the latest release you must

use either the native Solaris PKG, `tar`, or source installations. The native OpenSolaris packages include SMF files so that you can easily control your MySQL installation, including automatic startup and recovery, using the native service management tools.

To install MySQL on OpenSolaris, use the `pkg` command. You will need to be logged in as root, or use the `pfexec` tool, as shown in the example below:

```
shell> pfexec pkg install SUNWmysql56
```

The package set installs three individual packages, `SUNWmysql56lib`, which contains the MySQL client libraries; `SUNWmysql56r` which contains the root components, including SMF and configuration files; and `SUNWmysql56u` which contains the scripts, binary tools and other files. You can install these packages individually if you only need the corresponding components.

The MySQL files are installed into `/usr/mysql` which symbolic links for the sub directories (`bin`, `lib`, etc.) to a version specific directory. For MySQL 5.6, the full installation is located in `/usr/mysql/5.6`. The default data directory is `/var/mysql/5.6/data`. The configuration file is installed in `/etc/mysql/5.6/my.cnf`. This layout permits multiple versions of MySQL to be installed, without overwriting the data and binaries from other versions.

Once installed, you must initialize the data directory (see Chapter 5, *Initializing the Data Directory*), and use the `mysql_secure_installation` to secure your installation.

## Using SMF to manage your MySQL installation

Once installed, you can start and stop your MySQL server using the installed SMF configuration. The service name is `mysql`, or if you have multiple versions installed, you should use the full version name, for example `mysql:version_56`. To start and enable MySQL to be started at boot time:

```
shell> svcadm enable mysql
```

To view the SMF logs, use this command:

```
shell> svcadm enable svc:/application/database/mysql
```

To check whether the MySQL service is running:

```
shell> svcs -xv svc:/application/database/mysql
```

To disable MySQL from starting during boot time, and shut the MySQL server down if it is running:

```
shell> svcadm disable mysql
```

To restart MySQL, for example after a configuration file changes, use the `restart` option:

```
shell> svcadm restart mysql
```

You can also use SMF to configure the data directory and enable full 64-bit mode. For example, to set the data directory used by MySQL:

```
shell> svccfg
svc:> select mysql:version_56
svc:/application/database/mysql:version_56> setprop mysql/data=/data0/mysql
```

By default, the 32-bit binaries are used. To enable the 64-bit server on 64-bit platforms, set the `enable_64bit` parameter. For example:

```
svc:/application/database/mysql:version_56> setprop mysql/enable_64bit=1
```

You must refresh the SMF after setting these options:

```
shell> svcadm refresh mysql
```

# Chapter 4 Installing MySQL on FreeBSD

This section provides information about installing MySQL on variants of FreeBSD Unix.

You can install MySQL on FreeBSD by using the binary distribution provided by Oracle. For more information, see Chapter 1, *Installing MySQL on Unix/Linux Using Generic Binaries*.

The easiest (and preferred) way to install MySQL is to use the `mysql-server` and `mysql-client` ports available at http://www.freebsd.org/. Using these ports gives you the following benefits:

- A working MySQL with all optimizations enabled that are known to work on your version of FreeBSD.
- Automatic configuration and build.
- Startup scripts installed in `/usr/local/etc/rc.d`.
- The ability to use `pkg_info -L` to see which files are installed.
- The ability to use `pkg_delete` to remove MySQL if you no longer want it on your machine.

The MySQL build process requires GNU make (`gmake`) to work. If GNU `make` is not available, you must install it first before compiling MySQL.

To install using the ports system:

```
# cd /usr/ports/databases/mysql56-server
# make
...
# cd /usr/ports/databases/mysql56-client
# make
...
```

The standard port installation places the server into `/usr/local/libexec/mysqld`, with the startup script for the MySQL server placed in `/usr/local/etc/rc.d/mysql-server`.

Some additional notes on the BSD implementation:

- To remove MySQL after installation using the ports system:

  ```
  # cd /usr/ports/databases/mysql56-server
  # make deinstall
  ...
  # cd /usr/ports/databases/mysql56-client
  # make deinstall
  ...
  ```

- If you get problems with the current date in MySQL, setting the `TZ` variable should help. See Environment Variables.

# Chapter 5 Initializing the Data Directory

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After installing MySQL, you must initialize the data directory, including the tables in the `mysql` system database. For some MySQL installation methods, data directory initialization may be done automatically, as described in Postinstallation Setup and Testing. For other installation methods, including installation from generic binary and source distributions, you must initialize the data directory yourself.

This section describes how to initialize the data directory on Unix and Unix-like systems. (For Windows, see Windows Postinstallation Procedures.) For some suggested commands that you can use to test whether the server is accessible and working properly, see Testing the Server.

In the examples shown here, the server runs under the user ID of the `mysql` login account. This assumes that such an account exists. Either create the account if it does not exist, or substitute the name of a different existing login account that you plan to use for running the server. For information about creating the account, see Creating a `mysql` System User and Group, in Chapter 1, *Installing MySQL on Unix/Linux Using Generic Binaries*.

1. Change location into the top-level directory of your MySQL installation, represented here by *`BASEDIR`*:

   ```
   shell> cd BASEDIR
   ```

   *`BASEDIR`* is likely to be something like `/usr/local/mysql`, `/usr/local`, or `/usr/bin` (for installation wtih MySQL Yum repository, or other means). The following steps assume that you have changed location to this directory.

   You will find several files and subdirectories in the *`BASEDIR`* directory. The most important for installation purposes are the `bin` and `scripts` subdirectories, which contain the server as well as client and utility programs.

2. If necessary, ensure that the distribution contents are accessible to `mysql`. If you installed the distribution as `mysql`, no further action is required. If you installed the distribution as `root`, its contents will be owned by `root`. Change its ownership to `mysql` by executing the following commands as `root` in the installation directory. The first command changes the owner attribute of the files to the `mysql` user. The second changes the group attribute to the `mysql` group.

   ```
   shell> chown -R mysql .
   shell> chgrp -R mysql .
   ```

3. If necessary, initialize the data directory, including the `mysql` database containing the initial MySQL grant tables that determine how users are permitted to connect to the server.

   Typically, data directory initialization need be done only the first time you install MySQL. If you are upgrading an existing installation, you should run `mysql_upgrade` instead (see `mysql_upgrade` — Check and Upgrade MySQL Tables). However, the command that initializes the data directory does not overwrite any existing privilege tables, so it should be safe to run in any circumstances.

   ```
   shell> scripts/mysql_install_db --user=mysql
   ```

   It is important to make sure that the database directories and files are owned by the `mysql` login account so that the server has read and write access to them when you run it later. To ensure this

if you run `mysql_install_db` as `root`, include the `--user` option as shown. Otherwise, you should execute the program while logged in as `mysql`, in which case you can omit the `--user` option from the command.

The `mysql_install_db` command creates the server's data directory. Under the data directory, it creates directories for the `mysql` database that holds the grant tables and the `test` database that you can use to test MySQL. The program also creates privilege table entries for the initial account or accounts. `test_`. For a complete listing and description of the grant tables, see The MySQL Access Privilege System.

It might be necessary to specify other options such as `--basedir` or `--datadir` if `mysql_install_db` does not identify the correct locations for the installation directory or data directory. For example:

```
shell> scripts/mysql_install_db --user=mysql \
         --basedir=/opt/mysql/mysql \
         --datadir=/opt/mysql/mysql/data
```

For a more secure installation, invoke `mysql_install_db` with the `--random-passwords` option. This causes it to assign a random password to the MySQL `root` accounts, set the "password expired" flag for those accounts, and remove the anonymous-user MySQL accounts. For additional details, see `mysql_install_db` — Initialize MySQL Data Directory. (Install operations using RPMs for Unbreakable Linux Network are unaffected because they do not use `mysql_install_db`.)

If you do not want to have the `test` database, you can remove it after starting the server, using the instructions in Securing the Initial MySQL Accounts.

If you have trouble with `mysql_install_db` at this point, see Section 5.1, "Problems Running mysql_install_db".

4. After initializing the data directory, you can establish the final installation ownership settings. To leave the installation owned by `mysql`, no action is required here. Otherwise, most of the MySQL installation can be owned by `root` if you like. The exception is that the data directory must be owned by `mysql`. To accomplish this, run the following commands as `root` in the installation directory. For some distribution types, the data directory might be named `var` rather than `data`; adjust the second command accordingly.

   ```
   shell> chown -R root .
   shell> chown -R mysql data
   ```

   If the plugin directory (the directory named by the `plugin_dir` system variable) is writable by the server, it may be possible for a user to write executable code to a file in the directory using `SELECT ... INTO DUMPFILE`. This can be prevented by making the plugin directory read only to the server or by setting the `secure_file_priv` system variable at server startup to a directory where `SELECT` writes can be performed safely.

5. To specify options that the MySQL server should use at startup, put them in a `/etc/my.cnf` or `/etc/mysql/my.cnf` file. See Server Configuration Defaults. If you do not do this, the server starts with its default settings.

6. If you want MySQL to start automatically when you boot your machine, see Starting and Stopping MySQL Automatically.

Data directory initialization creates time zone tables in the `mysql` database but does not populate them. To do so, use the instructions in MySQL Server Time Zone Support.

# 5.1 Problems Running mysql_install_db

The purpose of the `mysql_install_db` program is to initialize the data directory, including the tables in the `mysql` system database. It does not overwrite existing MySQL privilege tables, and it does not affect any other data.

To re-create your privilege tables, first stop the `mysqld` server if it is running. Then rename the `mysql` directory under the data directory to save it, and run `mysql_install_db`. Suppose that your current directory is the MySQL installation directory and that `mysql_install_db` is located in the `bin` directory and the data directory is named `data`. To rename the `mysql` database and re-run `mysql_install_db`, use these commands.

```
shell> mv data/mysql data/mysql.old
shell> scripts/mysql_install_db --user=mysql
```

When you run `mysql_install_db`, you might encounter the following problems:

- **`mysql_install_db` fails to install the grant tables**

  You may find that `mysql_install_db` fails to install the grant tables and terminates after displaying the following messages:

  ```
  Starting mysqld daemon with databases from XXXXXX
  mysqld ended
  ```

  In this case, you should examine the error log file very carefully. The log should be located in the directory `XXXXXX` named by the error message and should indicate why `mysqld` did not start. If you do not understand what happened, include the log when you post a bug report. See How to Report Bugs or Problems.

- **There is a `mysqld` process running**

  This indicates that the server is running, in which case the grant tables have probably been created already. If so, there is no need to run `mysql_install_db` at all because it needs to be run only once, when you first install MySQL.

- **Installing a second `mysqld` server does not work when one server is running**

  This can happen when you have an existing MySQL installation, but want to put a new installation in a different location. For example, you might have a production installation, but you want to create a second installation for testing purposes. Generally the problem that occurs when you try to run a second server is that it tries to use a network interface that is in use by the first server. In this case, you should see one of the following error messages:

  ```
  Can't start server: Bind on TCP/IP port:
  Address already in use
  Can't start server: Bind on unix socket...
  ```

  For instructions on setting up multiple servers, see Running Multiple MySQL Instances on One Machine.

- **You do not have write access to the `/tmp` directory**

  If you do not have write access to create temporary files or a Unix socket file in the default location (the `/tmp` directory) or the `TMPDIR` environment variable, if it has been set, an error occurs when you run `mysql_install_db` or the `mysqld` server.

  You can specify different locations for the temporary directory and Unix socket file by executing these commands prior to starting `mysql_install_db` or `mysqld`, where *`some_tmp_dir`* is the full path name to some directory for which you have write permission:

  ```
  shell> TMPDIR=/some_tmp_dir/
  ```

```
shell> MYSQL_UNIX_PORT=/some_tmp_dir/mysql.sock
shell> export TMPDIR MYSQL_UNIX_PORT
```

Then you should be able to run `mysql_install_db` and start the server with these commands:

```
shell> scripts/mysql_install_db --user=mysql
shell> bin/mysqld_safe --user=mysql &
```

If `mysql_install_db` is located in the `scripts` directory, modify the first command to `scripts/mysql_install_db`.

See How to Protect or Change the MySQL Unix Socket File, and Environment Variables.

There are some alternatives to running the `mysql_install_db` program provided in the MySQL distribution:

- If you want the initial privileges to be different from the standard defaults, use account-management statements such as `CREATE USER`, `GRANT`, and `REVOKE` to change the privileges *after* the grant tables have been set up. In other words, run `mysql_install_db`, and then use `mysql -u root mysql` to connect to the server as the MySQL `root` user so that you can issue the necessary statements. (See Account Management Statements.)

  To install MySQL on several machines with the same privileges, put the `CREATE USER`, `GRANT`, and `REVOKE` statements in a file and execute the file as a script using `mysql` after running `mysql_install_db`. For example:

  ```
  shell> scripts/mysql_install_db --user=mysql
  shell> bin/mysql -u root < your_script_file
  ```

  This enables you to avoid issuing the statements manually on each machine.

- It is possible to re-create the grant tables completely after they have previously been created. You might want to do this if you are just learning how to use `CREATE USER`, `GRANT`, and `REVOKE` and have made so many modifications after running `mysql_install_db` that you want to wipe out the tables and start over.

  To re-create the grant tables, stop the server if it is running and remove the `mysql` database directory. Then run `mysql_install_db` again.