



# Ubuntu上的MySQL 8.4.5安装：一行命令背后的系统级操作实录 | 不只是apt install那么简单

原创

听见风的声音

2025-07-10

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## 1 前言

MySQL数据库的最常用的方式是用二进制包，这种方式下数据库软件的安装位置、数据库数据文件的位置都是可控的，这种方式稍微复杂一点，安装时要创建用户、创建数据文件目录、解决软件依赖、手动初始化数据库等。使用rpm或者apt包安装就简单多了，可是对DBA来说又不太透明，很多细节不容易搞清楚，本文除了介绍软件包安装步骤外，主要时说明白这种安装方式隐藏的细节。

## 2 安装MySQL

### 2.1 下载MySQL官方APT仓库包

下载地址<https://dev.mysql.com/downloads/repo/apt/>

```
root@myserver:~# wget https://repo.mysql.com//mysql-apt-config_0.8.34-1_all.deb
root@myserver:~# ls -l
total 20
-rw-r--r-- 1 root root 18108 Apr  2 16:51 mysql-apt-config_0.8.34-1_all.deb
```

### 2.2 安装的APT仓库包、更新APT仓库

安装时指定下载包的全路径或者用当前路径指定，只写文件名默认会从Ubuntu官网安装，官网没有指定包时会报错。

```
root@myserver:~# apt install ./mysql-apt-config_0.8.34-1_all.deb
Note, selecting 'mysql-apt-config' instead of './mysql-apt-config_0.8.34-1_all.deb'
The following packages were automatically installed and are no longer required:
  linux-headers-6.11.0-8      linux-modules-6.11.0-8-generic      linux-tools-6.11.0-8
  linux-headers-6.11.0-8-generic  linux-modules-extra-6.11.0-8-generic  linux-tools-6.11.0-8
Use 'apt autoremove' to remove them.
Installing:
  mysql-apt-config
Summary:
  Upgrading: 0, Installing: 1, Removing: 0, Not Upgrading: 189
  Download size: 0 B / 18.1 kB
  Space needed: 35.8 kB / 50.3 GB available
# 更新本地APT仓库
root@myserver:~# apt-get update
Get:1 file:/cdrom/oracular InRelease
Ign:1 file:/cdrom/oracular InRelease
Get:2 file:/cdrom/oracular Release
Err:2 file:/cdrom/oracular Release
  File not found - /cdrom/dists/oracular/Release (2: No such file or directory)
Get:3 http://repo.mysql.com/apt/ubuntu oracular InRelease [22.7 kB]
#省略多行
Get:39 http://mirrors.tuna.tsinghua.edu.cn/ubuntu oracular-backports/multiverse amd64 Comp
Reading package lists... Done
E: The repository 'file:/cdrom/oracular Release' no longer has a Release file.
N: Updating from such a repository can't be done securely, and is therefore disabled by def
N: See apt-secure(8) manpage for repository creation and user configuration details.
```

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2.3 安装MySQL数据库，不指定版本会默认安装当前APT库的最新版本

```
root@myserver:~# apt-get install mysql-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
#系统上下面的包已经不在需要了，可以删除
The following packages were automatically installed and are no longer required:
  linux-headers-6.11.0-8 linux-headers-6.11.0-8-generic linux-modules-6.11.0-8-generic linu
  linux-tools-6.11.0-8 linux-tools-6.11.0-8-generic
Use 'apt autoremove' to remove them.
# 将要安装的另外的包
The following additional packages will be installed:
  libmecab2 mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client mysql-common mysql-comm
  mysql-community-client-plugins mysql-community-server mysql-community-server-core
#将要安装的新的包
The following NEW packages will be installed:
  libmecab2 mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client mysql-common mysql-comm
  mysql-community-client-plugins mysql-community-server mysql-community-server-core mysql-s
0 upgraded, 12 newly installed, 0 to remove and 189 not upgraded.
Need to get 44.2 MB of archives.
After this operation, 292 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://repo.mysql.com/apt/ubuntu oracular/mysql-8.4-lts amd64 mysql-common amd64 8.4.
#省略多行
Get:12 http://repo.mysql.com/apt/ubuntu oracular/mysql-8.4-lts amd64 mysql-server amd64 8.4
Fetched 44.2 MB in 32s (1,395 kB/s)
Preconfiguring packages ...
Selecting previously unselected package mysql-common.
(Reading database ... 126484 files and directories currently installed.)
Preparing to unpack .../00-mysql-common_8.4.5-1ubuntu24.10_amd64.deb ...
Unpacking mysql-common (8.4.5-1ubuntu24.10) ...
#省略多行
reading /usr/share/mecab/dic/ipadic/Noun.csv ... 60477
emitting double-array: 100% |#####|
reading /usr/share/mecab/dic/ipadic/matrix.def ... 1316x1316
emitting matrix      : 100% |#####|

done!
update-alternatives: using /var/lib/mecab/dic/ipadic to provide /var/lib/mecab/dic/debian (
Setting up mysql-community-client-core (8.4.5-1ubuntu24.10) ...
#省略多行
No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

数据库的安装过程中会弹出菜单，提示输入root密码。

3 APT安装解析

3.1 安装程序创建的系统服务

```
# 查看安装程序创建的服务
root@myserver:~# systemctl status mysql
○ mysql.service - MySQL Community Server
   Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
   Active: inactive (dead)
     Docs: man:mysqld(8)
           http://dev.mysql.com/doc/refman/en/using-systemd.html
# 查看服务的配置文件
root@myserver:~# cat /usr/lib/systemd/system/mysql.service
# MySQL systemd service file
[Unit]
Description=MySQL Community Server
Documentation=man:mysqld(8)
Documentation=http://dev.mysql.com/doc/refman/en/using-systemd.html
After=network-online.target
Wants=network-online.target
[Install]
WantedBy=multi-user.target
[Service]
User=mysql
Group=mysql
Type=notify
ExecStartPre+=/usr/share/mysql-8.4/mysql-systemd-start pre
ExecStart=/usr/sbin/mysqld
TimeoutSec=0
LimitNOFILE = 10000
Restart=on-failure
RestartPreventExitStatus=1
```

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```
# Always restart when mysqld exits with exit code of 16. This special exit code
# is used by mysqld for RESTART SQL.
RestartForceExitStatus=16
# Set enviroment variable MYSQLD_PARENT_PID. This is required for restart.
Environment=MYSQLD_PARENT_PID=1
```

上面文件中值得注意的是ExecStartPre和ExecStart两行，前者执行每个启动服务上系统执行的准备脚本，后者执行服务启动时执行的命令。服务执行的命令使用的是默认的配置，检查一下默认配置下数据文件的路径

```
root@myserver:~# mysqld --verbose --help|grep -i datadir
-h, --datadir=name Path to the database root directory
                        'innodb-data-home-dir;innodb-undo-directory;datadir'
datadir                                /var/lib/mysql/
```

看一下这个目录下的文件

```
root@myserver:~# ls -l /var/lib/mysql/
total 91212
-rw-r----- 1 mysql mysql      56 Jul  8 02:22 auto.cnf
-rw-r----- 1 mysql mysql     506 Jul  8 02:22 binlog.000001
-rw-r----- 1 mysql mysql      16 Jul  8 02:22 binlog.index
-rw----- 1 mysql mysql    1705 Jul  8 02:22 ca-key.pem
-rw-r--r-- 1 mysql mysql    1108 Jul  8 02:22 ca.pem
-rw-r--r-- 1 mysql mysql    1108 Jul  8 02:22 client-cert.pem
-rw----- 1 mysql mysql    1709 Jul  8 02:22 client-key.pem
-rw-r----- 1 mysql mysql   6291456 Jul  8 02:22 '#ib_16384_0.dblwr'
-rw-r----- 1 mysql mysql  14680064 Jul  8 02:22 '#ib_16384_1.dblwr'
-rw-r----- 1 mysql mysql      3599 Jul  8 02:22 ib_buffer_pool
-rw-r----- 1 mysql mysql  12582912 Jul  8 02:22 ibdata1
drwxr-x--- 2 mysql mysql    4096 Jul  8 02:22 '#innodb_redo'
drwxr-x--- 2 mysql mysql    4096 Jul  8 02:22 '#innodb_temp'
drwxr-x--- 2 mysql mysql    4096 Jul  8 02:22 mysql
-rw-r----- 1 mysql mysql 26214400 Jul  8 02:22 mysql.ibd
-rw-r----- 1 mysql mysql      124 Jul  8 02:22 mysql_upgrade_history
drwxr-x--- 2 mysql mysql    4096 Jul  8 02:22 performance_schema
-rw----- 1 mysql mysql    1709 Jul  8 02:22 private_key.pem
-rw-r--r-- 1 mysql mysql      452 Jul  8 02:22 public_key.pem
-rw-r--r-- 1 mysql mysql    1108 Jul  8 02:22 server-cert.pem
-rw----- 1 mysql mysql    1705 Jul  8 02:22 server-key.pem
drwxr-x--- 2 mysql mysql    4096 Jul  8 02:22 sys
-rw-r----- 1 mysql mysql  16777216 Jul  8 02:22 undo_001
-rw-r----- 1 mysql mysql  16777216 Jul  8 02:22 undo_002
```

启动数据库并登录

```
root@myserver:~# systemctl start mysql
root@myserver:~# mysql -uroot -p*****
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.4.5 MySQL Community Server - GPL
Copyright (c) 2000, 2025, Oracle and/or its affiliates.
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affiliates. Other names may be trademarks of their respective
owners.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

3.2 MySQL各类文件的安装位置

不同于二进制安装方式，使用安装包安装MySQL的文件被分散到不同的位置，下面简单介绍一下  
客户端文件安装到/bin目录下

```
root@myserver:/bin# ls -l /bin/mysql*
-rwxr-xr-x 1 root root 7676776 Mar 31 08:33 /bin/mysql
-rwxr-xr-x 1 root root 7333976 Mar 31 08:33 /bin/mysqladmin
-rwxr-xr-x 1 root root 7745864 Mar 31 08:33 /bin/mysqlbinlog
-rwxr-xr-x 1 root root 7347096 Mar 31 08:33 /bin/mysqlcheck
-rwxr-xr-x 1 root root 169064 Mar 31 08:33 /bin/mysql_config_editor
-rwxr-xr-x 1 root root 27399 Mar 31 08:33 /bin/mysqld_multi
-rwxr-xr-x 1 root root 29137 Mar 31 08:33 /bin/mysqld_safe
-rwxr-xr-x 1 root root 7431320 Mar 31 08:33 /bin/mysqldump
-rwxr-xr-x 1 root root 7719 Mar 31 08:33 /bin/mysqldumpslow
-rwxr-xr-x 1 root root 7317880 Mar 31 08:33 /bin/mysqlimport
-rwxr-xr-x 1 root root 7389120 Mar 31 08:33 /bin/mysql_migrate_keyring
-rwxr-xr-x 1 root root 7310008 Mar 31 08:33 /bin/mysql_secure_installation
-rwxr-xr-x 1 root root 7324696 Mar 31 08:33 /bin/mysqlshow
-rwxr-xr-x 1 root root 7335480 Mar 31 08:33 /bin/mysqlslap
-rwxr-xr-x 1 root root 80880 Mar 31 08:33 /bin/mysql_tzinfo_to_sql--
```

服务器文件安装到/sbin目录下

```
root@myserver:/bin# ls -l /sbin/mysql*
-rwxr-xr-x 1 root root 64341688 Mar 31 08:33 /sbin/mysqld
-rwxr-xr-x 1 root root 3125 Sep 18 2024 /sbin/mysqld_qslower-bpfcc
```

库文件和plugin安装到/lib/mysql

```
root@myserver:/lib/mysql/private# ls -l /lib/mysql
total 8
drwxr-xr-x 2 root root 4096 Jul 8 02:22 plugin
drwxr-xr-x 3 root root 4096 Jul 8 02:22 private
```

配置文件放到/etc/mysql目录下

```
root@myserver:~# ls -l /etc/mysql
total 16
drwxr-xr-x 2 root root 4096 Jul 8 02:22 conf.d
lrwxrwxrwx 1 root root 24 Jul 8 02:22 my.cnf -> /etc/alternatives/my.cnf
-rw-r--r-- 1 root root 1498 Mar 31 08:33 my.cnf.fallback
-rw-r--r-- 1 root root 1591 Jul 9 02:14 mysql.cnf
drwxr-xr-x 2 root root 4096 Jul 9 02:14 mysql.conf.d
```

错误日志在/var/log/msyql目录下

```
root@myserver:~# ls -l /var/log/mysql
total 12
-rw-r----- 1 mysql adm 8338 Jul 9 02:15 error.log
```

3.3 更改数据文件目录

关闭数据库后移动数据文件目录至新位置

```
root@myserver:/# mv /var/lib/mysql/ /opt
#检查一下目录权限
root@myserver:/# ls -l /opt/mysql
total 103504
-rw-r----- 1 mysql mysql 56 Jul 8 02:22 auto.cnf
-rw-r----- 1 mysql mysql 506 Jul 8 02:22 binlog.000001
-rw-r----- 1 mysql mysql 158 Jul 8 02:30 binlog.000002
.....
-rw-r----- 1 mysql mysql 16777216 Jul 8 02:32 undo_002
```

进行到这里，有两种方法可以更改数据库的数据文件路径，常用的方式通过my.cnf来改，这里介绍另一种方式，通过设置systemctl的环境变量来改，和MySQL服务相关的变量名称是MYSQLD\_OPTS，步骤如下：

```
root@myserver:/var/lib# systemctl set-environment MYSQLD_OPTS="--data_dir=/opt/mysql"
root@myserver:/var/lib# systemctl start mysql
--登录数据库
```

数据库成功启动了。但是，这种方式有一个弊端如下：



```
--登录数据库查看数据文件路径
mysql> show variables like 'data%';
+-----+-----+
| Variable_name | Value          |
+-----+-----+
| datadir       | /var/lib/mysql/ |
+-----+-----+
1 row in set (0.00 sec)
```

这里的路径显示的还是MySQL的默认设置，同实际使用的不符。

#### 4 MySQL的自动适应性配置参数

自动适应性配置参数（Auto Adapting Configuration Parameters）是MySQL 8.4的新特性。激活这个特性后，MySQL的配置参数会根据运行MySQL的服务器的配置来决定。这个特性是否开启由参数innodb\_dedicated\_server来决定。为了向后保持兼容，这个特定默认是关闭的，innodb\_dedicated\_server的设置为off，在这种情况下，数据库缓冲池的相关设置如下：

```
mysql> show variables like '%pool%';
+-----+-----+
| Variable_name          | Value          |
+-----+-----+
| innodb_buffer_pool_chunk_size | 134217728      |
| innodb_buffer_pool_dump_at_shutdown | ON             |
| innodb_buffer_pool_dump_now    | OFF            |
| innodb_buffer_pool_dump_pct    | 25             |
| innodb_buffer_pool_filename    | ib_buffer_pool |
| innodb_buffer_pool_in_core_file | OFF            |
| innodb_buffer_pool_instances  | 1              |
| innodb_buffer_pool_load_abort   | OFF            |
| innodb_buffer_pool_load_at_startup | ON             |
| innodb_buffer_pool_load_now     | OFF            |
--缓冲的大小时0.125GB，和chunk_size相等，这台机器的物理内存是8G，这个设置显然太小
| innodb_buffer_pool_size        | 134217728      |
+-----+-----+
11 rows in set (0.00 sec)
```

启动这个特性，只需要设置innodb\_dedicated\_server为on即可，编辑一下mysqld进程配置文件搜索路径下任意my.cnf文件，加入一下内容

```
root@myserver:/etc/mysql# cat /etc/alternatives/my.cnf
!includedir /etc/mysql/conf.d/
!includedir /etc/mysql/mysql.conf.d/
[mysqld]
    max_connections = 1000 #这个参数也建议设置一下
    innodb_dedicated_server = ON
```

重启数据库，检查一下缓冲池的设置

```
mysql> show variables like '%pool%';
+-----+-----+
| Variable_name          | Value          |
+-----+-----+
| innodb_buffer_pool_chunk_size | 134217728      |
| innodb_buffer_pool_dump_at_shutdown | ON             |
| innodb_buffer_pool_dump_now    | OFF            |
| innodb_buffer_pool_dump_pct    | 25             |
| innodb_buffer_pool_filename    | ib_buffer_pool |
| innodb_buffer_pool_in_core_file | OFF            |
| innodb_buffer_pool_instances  | 1              |
| innodb_buffer_pool_load_abort   | OFF            |
| innodb_buffer_pool_load_at_startup | ON             |
| innodb_buffer_pool_load_now     | OFF            |
--缓冲池设置为5.25GBytes，这台机器的内存为8GB
| innodb_buffer_pool_size        | 5637144576     |
+-----+-----+
11 rows in set (0.00 sec)
```

innodb缓冲池设置的公式如下：

M指服务器的物理内存

128 MB if M < 1 GB

M \* 0.50 GB if 1 GB ≤ M ≤ 4 GB

M \* 0.75 GB if M > 4 GB

#### 5 后记

这是第一次在Ubuntu上安装MySQL数据库，整个安装过程很简单，安装完之后也可以更改数据文件路径，设置数据库配置参数，只要明白了安装背后的细节，这种安装方式也是可以控制的，而且非常方面，和windows下安装差不多。

 墨力计划mysqlmysql8.4

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