How to Stop Linux From Erasing the File(s) or Folder(s)?

written by sysadmin | 4 October 2025

I want to prevent a specific file or folder from being deleted, even with the root user.

Problem

How to stop Linux from erasing the file(s) or folder(s)?

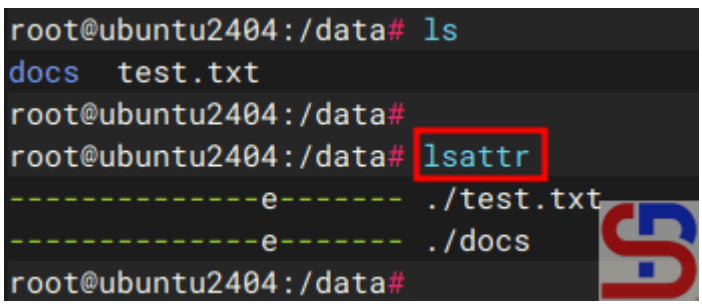
Solution

In Linux, there are two commands you can use to prevent unauthorized changes, protect the critical file(s) or folder(s), and ensure the integrity of the system: the **lsattr** and **chattr** commands.

A. The lsattr command

To see the properties of files or directories on a file system that supports extended attributes, use the lsattr command. So, lsattr command displays special attributes that are not visible with the **ls -l** command. Run the command below to see the list of attributes:

```
lsattr
```



List the attribute(s)

By default, if your server uses the ext4 format, a file or

folder on that Linux server will have the e attribute, or extent format, which is a more efficient file storage method than the traditional block method. Below is a brief explanation of the various attributes:

File/Folder Attributes

Attribute	Explanation
-	Attribute not set
a	Append-only – file can only be opened for appending without modifying existing data on a File, not overwritten or truncated
A	No atime updates – access time is not updated when the file is read
c	Compressed – file is stored compressed on disk (kernel support required).
C	No Copy-on-Write (CoW) – disables CoW for Btrfs files.
d	No dump – file is ignored by the dump backup program.
D	Synchronous directory updates – directory changes are written immediately to disk.
e	Extents – file uses extents to map blocks (default on ext4).
i	Immutable – file cannot be modified, deleted, renamed, or linked (even by root).
j	Data journaling – file data is journaled as well as metadata.
s	Secure deletion – blocks are zeroed when file is deleted (if supported).
S	Synchronous updates – file changes are written immediately to disk.
t	No tail-merging – prevents tail-packing (used in ReiserFS).
T	Top of directory hierarchy – marks directory as top-level for block allocator.

u	Undelete – when deleted, file content can be recovered (if supported).

B. The chattr command

With Linux, users can modify the properties of files and directories with the ‘chattr’ (change attribute) command. Using this command, you can protect a file or directory from deletion or addition, which is very useful for protecting critical files or folders. To use this command, you can follow the format below:

```
chattr [operator][attribute] file(s)/folder(s)
```

You can see the attributes in the table above, while the table below shows the operators you can use:

The Operators in attribute file(s)/folder(s)

Operator	Explanation
+	Add the specified attribute(s) to the file/directory (keep existing ones).
-	Remove the specified attribute(s) from the file/directory.
=	Set the attribute(s) exactly as specified (replace all existing ones).

1. Making a file undeletable

Use the command below to make a file undeletable in a file, for example, test.txt:

```
chattr +i test.txt
```

Then, try deleting the file. It should be undeletable even with the root user, as shown in the image below:

```
root@ubuntu2404:/data# chattr +i test.txt
root@ubuntu2404:/data#
root@ubuntu2404:/data# lsattr
----i---------e------- ./test.txt
--------------e------- ./docs
root@ubuntu2404:/data#
root@ubuntu2404:/data# rm test.txt
rm: cannot remove 'test.txt': Operation not permitted
root@ubuntu2404:/data#
```

Making a file undeletable

You cannot even rename the file or move it to another folder, as shown in the image below:

```
root@ubuntu2404:/data# chattr +i test.txt
root@ubuntu2404:/data#
root@ubuntu2404:/data# mv test.txt example.txt
mv: cannot move 'test.txt' to 'example.txt': Operation not permitted
root@ubuntu2404:/data#
root@ubuntu2404:/data# mv test.txt /tmp/
mv: cannot move 'test.txt' to '/tmp/test.txt': Operation not permitted
root@ubuntu2404:/data#
```

Can not rename or move a file

If you want to really delete a file, you have to run the command below, and you can delete the file like in the image below:

```
root@ubuntu2404:/data# rm test.txt
rm: cannot remove 'test.txt': Operation not permitted
root@ubuntu2404:/data#
root@ubuntu2404:/data# chattr -i test.txt
root@ubuntu2404:/data#
root@ubuntu2404:/data# rm test.txt
root@ubuntu2404:/data#
```

The file can be deleted

2. Append data without modifying existing data on a File

If you want the file to be able to add content without deleting the content that is already in the test.txt file, use the command below

```
chattr +a test.txt
```

Then try running the two commands below:

```
echo "Add test" > test.txt
echo "Just test" >> test.txt
```

And only the second command should be able to be executed, as shown in the image below:

```
root@ubuntu2404:/data# cat test.txt
This is first line
root@ubuntu2404:/data#
root@ubuntu2404:/data# chattr +a test.txt
root@ubuntu2404:/data#
root@ubuntu2404:/data# lsattr
-----a--------e------- ./test.txt
--------------e------- ./docs
root@ubuntu2404:/data#
root@ubuntu2404:/data# echo "Just test" > test.txt
-bash: test.txt: Operation not permitted
root@ubuntu2404:/data#
root@ubuntu2404:/data# echo "Just test" >> test.txt
root@ubuntu2404:/data#
root@ubuntu2404:/data# cat test.txt
This is first line
Just test
root@ubuntu2404:/data#
```

Append a file

To get the file back to “normal”, use the command below:

```
chattr -a test.txt
```

3. Making a folder secure

Use the command below if you want your folder to be undeleted, for example, the docs folder:

```
chattr -R +i docs/
```

Now, try to delete the folder, and it should not be deletable as shown in the image below:

```
root@ubuntu2404:/data# ls docs/
todo.txt
root@ubuntu2404:/data#
root@ubuntu2404:/data# chattr -R +i docs/
root@ubuntu2404:/data#
root@ubuntu2404:/data# rm -rf docs/
rm: cannot remove 'docs/todo.txt': Operation not permitted
root@ubuntu2404:/data#
```

Can not delete the folder

Even you can’t delete the files in the folder, as shown in the image below:

```
root@ubuntu2404:/data# rm -rf docs/todo.txt
rm: cannot remove 'docs/todo.txt': Operation not permitted
root@ubuntu2404:/data#
```

Cannot delete the file in the folder

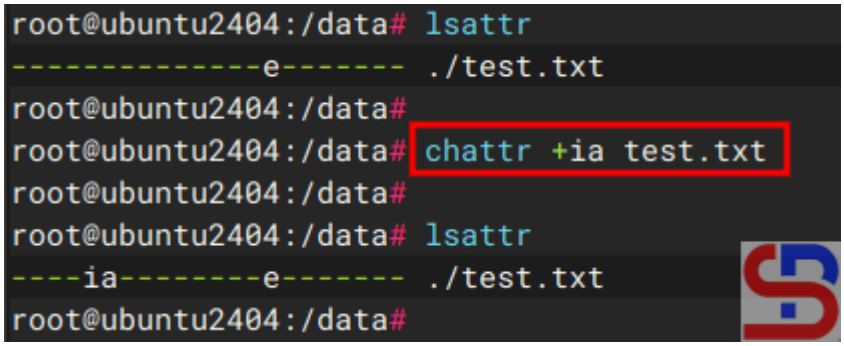
For the folder to be deleted, use the command below:

```
chattr -R +i docs/
```

Note

You can run more than one option to change the attributes of a file in a command. For example, you want the file to be undeletable and appended without deleting the content that was previously present in the test.txt file, then use the command below:

```
chattr +ia test.txt
```



Give more than one attribute for one file

Likewise, you can delete more than one attribute for the test.txt file, then use the command below:

```
chattr -ia test.txt
```



Delete more than one attribute in one file

You can also run and change the attribute in more than one file or folder. For example, you want to change the attributes for test.txt and ok.txt, use the following command:

```
chattr +ia test.txt ok.txt
```

References

geeksforgeeks.org
tecmint.com
howtoforge.com

How to Reset the Password in Ubuntu?

written by sysadmin | 4 October 2025

I want to access the user on the Ubuntu server that has the privilege of root using the sudo command, but I forgot my user password.

Problem

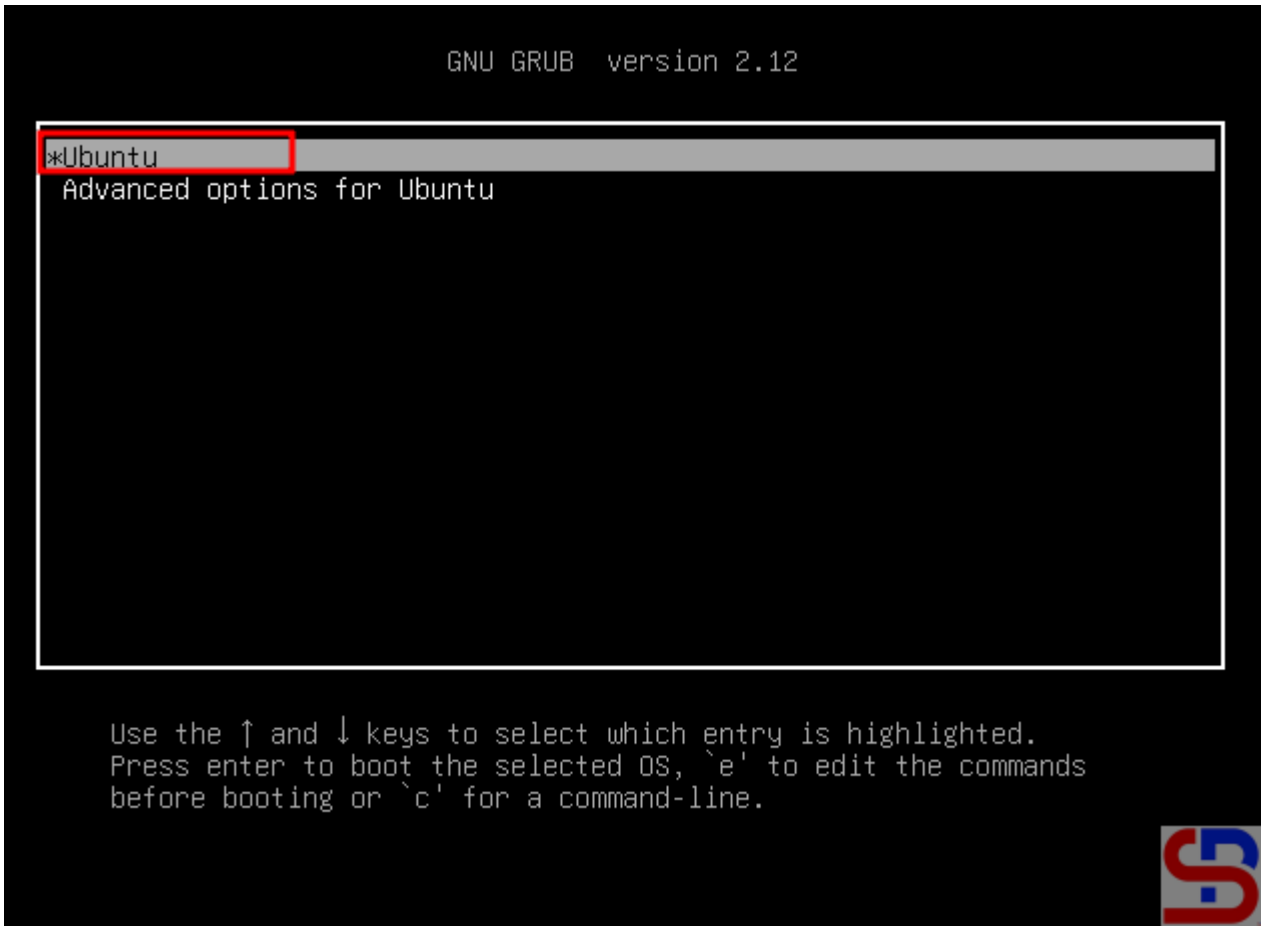
How to reset the password in Ubuntu?

Solution

Here are the steps to reset the password in Ubuntu:

1. Reboot the server

Reboot the server and press the **Esc** key or Shift key, and there should be a display like below:



Choose the Ubuntu

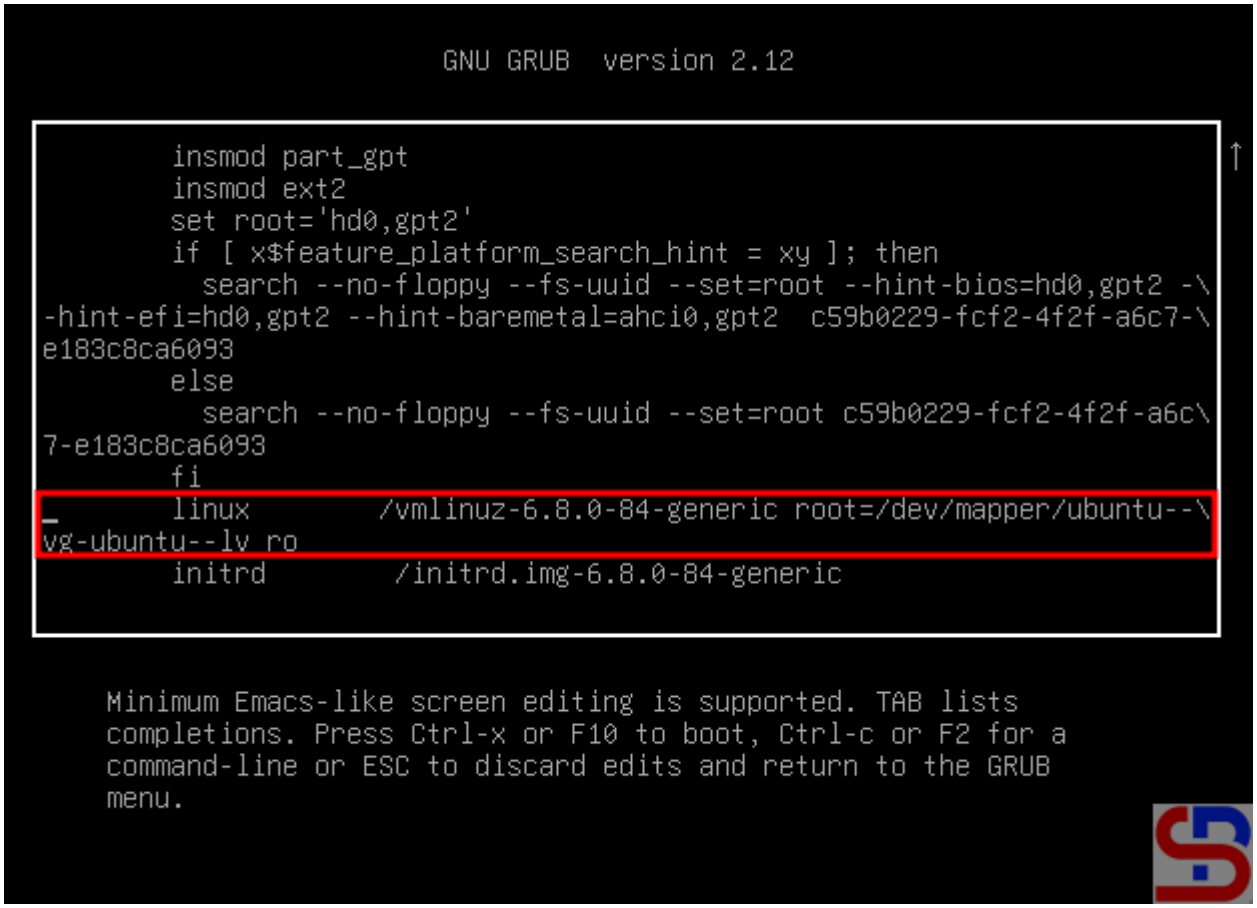
2. Click the first option

To enter recovery mode, select the top part of the image above and push the **e** button, so that there will be a display like the image below:



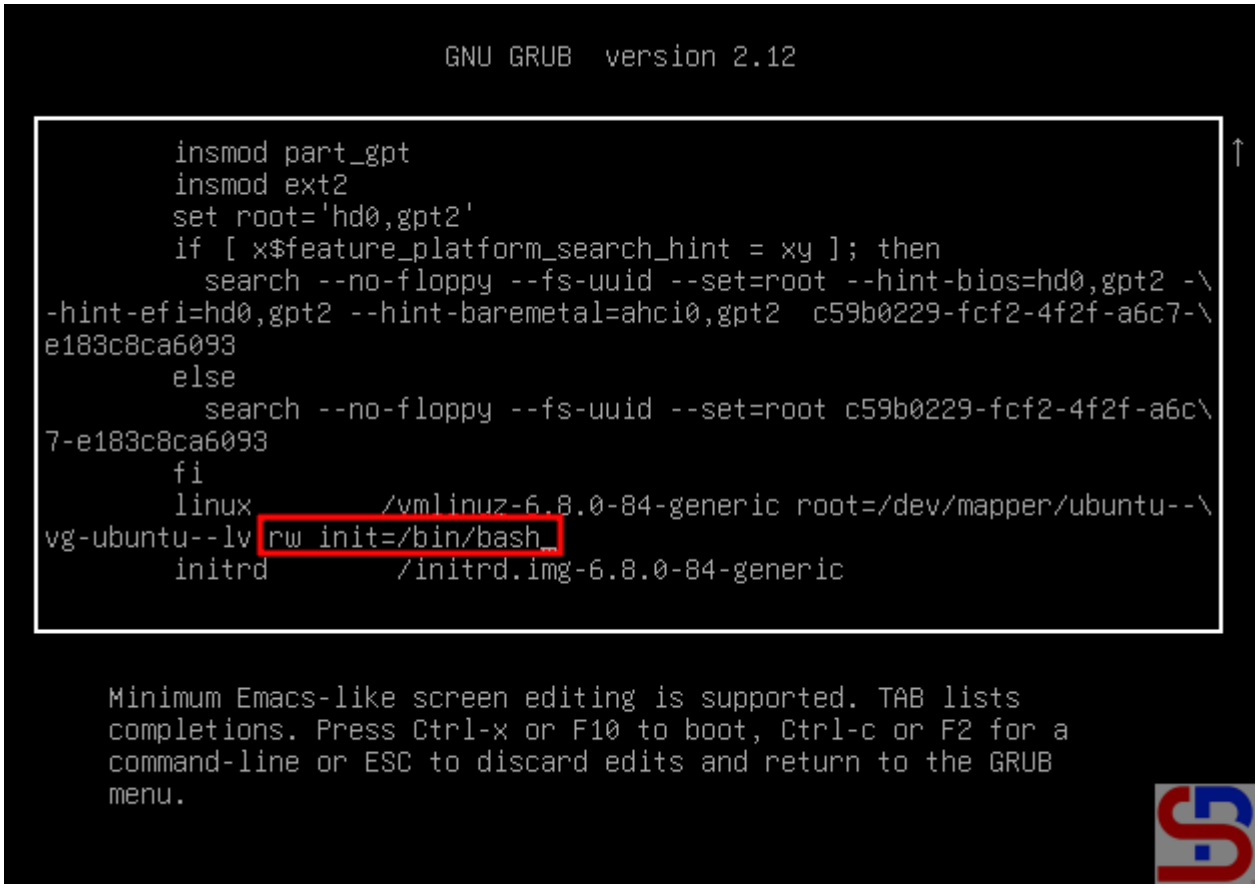
The GRUB options

Find the line starting with **linux**, similar to the picture below:



Find the line starting with linux

Remove everything from **ro** and append **rw init=/bin/bash** to the end of this line, like the picture below:



Change the script

After you change the script, press **F10** or **Ctrl+x** to boot these parameters.

3. Run the commands

In the recovery mode, run the command below:

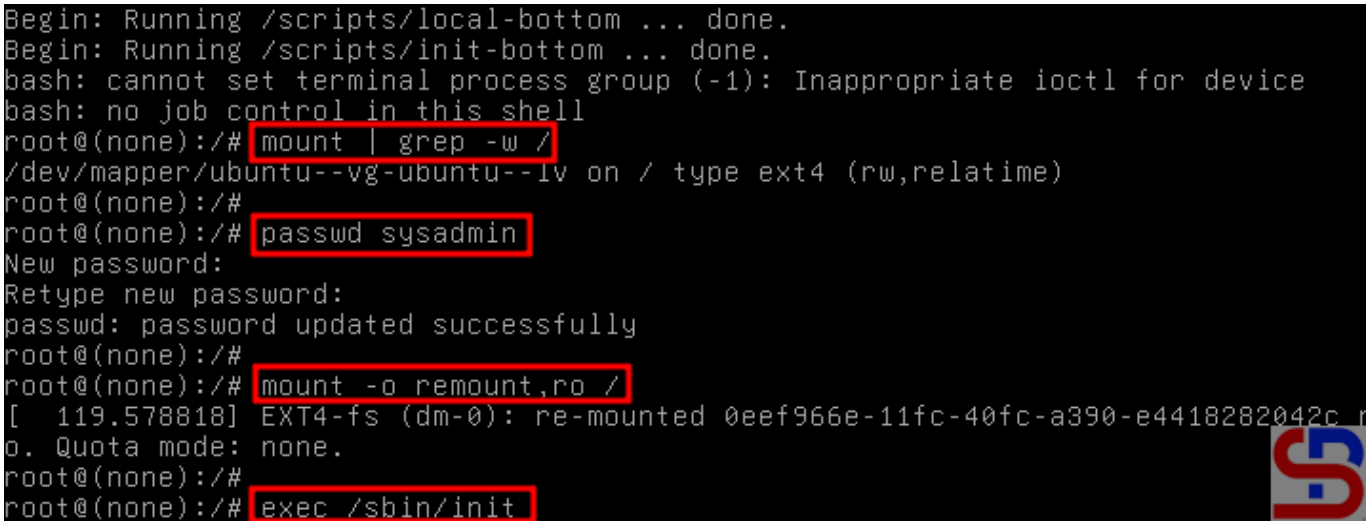
```
mount | grep -w /
```

After that, execute the command below to change the password:

```
passwd
```

After you change the password, run the commands below:

```
mount -o remount,ro /
exec /sbin/init
```



Run the commands

The Linux server will reboot, and after that, try to log in with the new password that you set before.

Note

By default, you cannot log in directly as root on Ubuntu, so you can’t change your password to root because to be root on Ubuntu, you only need to use your sudo command and enter your user password.

References

tecmint.com
askubuntu.com
infotechys.com

How to Display the Progress Bar in Linux Commands?

written by sysadmin | 4 October 2025

The previous article has explained how to display progress in a process, but unfortunately, this application is limited

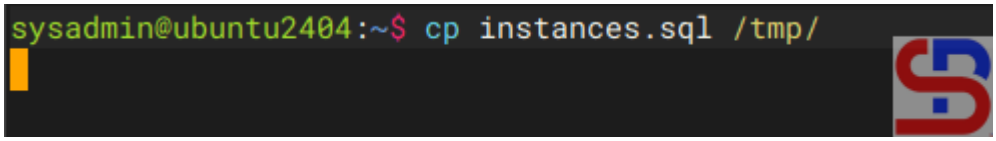
to displaying the copy and move process. This article will explain how to display a progress that not only displays the copy and move process, but can also display the backup process and restore a database.

Problem

How to display the progress bar in Linux commands?

Solution

By default, Linux commands do not display a progress bar, so you don't know when the process is complete, like in the image below:



Copy the file without using pv application

Therefore, Andrew Wood, An Experienced Unix Sysadmin, created an application to display a progress bar named Pipe Viewer or PV. To install the application, use the command below:

RockyLinux/AlmaLinux/CentOS

```
yum install epel-release
yum install pv
```

Ubuntu/Debian

```
sudo apt update
sudo apt install pv
```

OpenSUSE

```
sudo zypper install pv
```

If you want to install pv applications in addition to the operating system shown above, you can go to this page. Here are some methods when using the pv application:

A. Copy

1. Copy the file

Use the format below to copy the file:

```
pv file1 > /folder/filename
```

So, if you want to copy an instances.sql to the /tmp folder, use the command below:

```
pv instances.sql > /tmp/instance.sql
```



Copy the file using pv application

2. Copy more than one file

If you want to copy more than one file to the folder, use the format below:

```
tar cf - file1 file2 file3 | pv | tar xf - -C /folder
```

Here is the command to copy more than one file to the /tmp folder

```
tar cf - babel.sql babel.sql.gz babel.sql.tar.gz  | pv | tar xf - -C /tmp
```



Copy more than one file in pv application

3. Copy the folder

If you want to copy the folder, use the format below:

```
tar cf - folder_name/ | pv | tar xf - -C /folder
```

If you want to copy the example folder to the /tmp folder, use the command below:

```
tar cf - example/ | pv | tar xf - -C /tmp
```



Copy some files using pv application

4. Copy more than one folder

If you want to copy more than one folder, use the format below:

```
tar cf - folder1/ folder2/ | pv | tar xf - -C /folder
```

So, if you want to copy more than one folder to the /tmp directory, use the command below:

```
tar cf - example/ test-project/ | pv | tar xf - -C /tmp
```



Copy some folders using pv application

B. Move

If you want to use the move command on the PV application, then you can actually use the command to copy number 1, but add the command **&& rm -rf file1/folder1** behind it.

1. Move the file

So, if you want to move an instances.sql to the /tmp folder, use the command below:

```
pv instances.sql > /tmp/instance.sql && rm -rf instances.sql
```



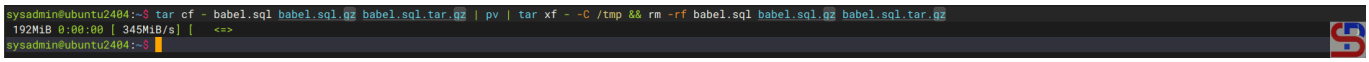
Move the file in pv application

2. Move more than one file

If you want to move some files to the /tmp folder, use the

command below:

```
tar cf - babel.sql babel.sql.gz babel.sql.tar.gz  | pv | tar xf - -C /tmp && rm -rf babel.sql babel.sql.gz babel.sql.tar.gz
```

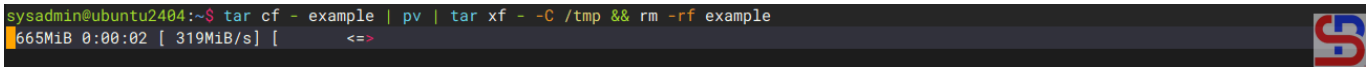


Move more than one file in pv application

3. Move the folder

If you want to move a folder to the /tmp folder, use the command below:

```
tar cf - example/ | pv | tar xf - -C /tmp && rm -rf example/
```



Move the folder in pv application

4. Move more than one folder

If you want to move some folders to the /tmp folder, use the command below:

```
tar cf - example/ test-project/ | pv | tar xf - -C /tmp && rm -rf example/ test-project/
```



Move more than one folder in pv application

C. Compress

1. Using gz

Use the format below to run the gz command in pv application:

```
pv filename | gzip > filename.gz
```

For example, you want to compress babel.sql using gz, so use the command below:

```
pv babel.sql | gzip > babel.sql.gz
```



Compress the file using gz in pv application

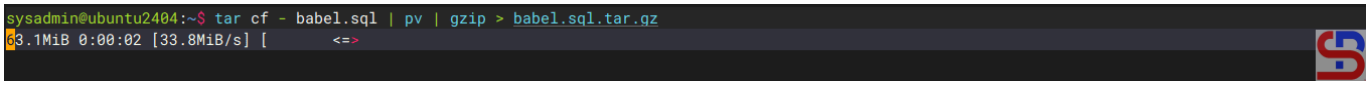
2. Using tar

Use the format below to run the tar command in pv application:

```
tar cf - filename | pv | gzip > filename.tar.gz
```

For example, you want to compress babel.sql using tar, use the command below:

```
tar cf - babel.sql | pv | gzip > babel.sql.tar.gz
```



Compress the file using tar in pv application

3. Using bz2

Use the format below to run the tar command in pv application:

```
pv filename | bzip2 > filename.bz2
```

For example, you want to compress babel.sql using bz2, use the command below:

```
pv babel.sql | bzip2 > babel.sql.bz2
```



Compress the file using bzip2 in pv application

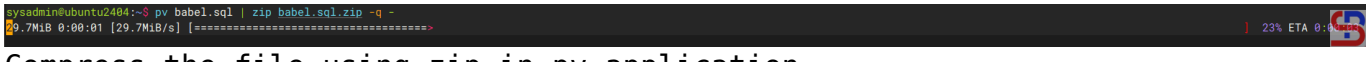
4. Using zip

Use the format below to run the tar command in pv application:

```
pv filename | zip filename.zip -q -
```

For example, you want to compress babel.sql using bz2, use the command below:

```
pv babel.sql | zip babel.sql.zip -q -
```



Compress the file using zip in pv application

D. Extract

1. Using gunzip

Use the format below to extract the gz compression in pv application:

```
pv filename.gz | gunzip > filename
```

For example, you want to extract babel.sql.gz, so use the command below:

```
pv babel.sql.gz | gunzip > babel.sql
```



Extract the file using gunzip in pv application

2. Using tar.gz

Use the format below to extract the gz compression in pv application:

```
pv filename.tar.gz | tar zxf -
```

For example, you want to extract babel.sql.tar.gz, so use the command below:

```
pv babel.sql.tar.gz | tar xzf -
```



Extract the file using tar in pv application

3. Using bunzip2

Use the format below to extract the bz2 compression in pv application:

```
pv filename.sql.bz2 | bunzip2 > filename.sql
```

For example, you want to extract babel.sql.bz2, so use the command below:

```
pv babel.sql.bz2 | bunzip2 > babel.sql
```



Extract using bunzip2 in pv application

4. Using unzip

Use the format below to extract the zip compression in pv application:

```
unzip filename.zip | pv
```

For example, you want to extract babel.sql.zip, so use the command below:

```
unzip babel.sql.zip | pv
```



Extract the file in pv application

E. Backup DB

If you use MariaDB, you can use the commands below:

1. Without compressing the database

Use the format below to back up the database without compression in pv application:

```
mariadb-dump -u username -p dbname | pv > dbname.sql
```

So, use the command below to back up the database without compression in pv application:

```
mariadb-dump -uroot -p babel | pv > babel.sql
```



Backup database without compression in pv application

2. Back up the database using gz

Use the format below to back up the database using gz compression in pv application:

```
mariadb-dump -u username -p dbname | pv | gzip > dbname.sql.gz
```

Use the command below to back up the database using gz compression in pv application:

```
mariadb-dump -uroot -p babel | pv | gzip > babel.sql.gz
```



Backup using gz compression in pv application

3. Backup the database using bz2

Use the format below to back up the database using bz2 compression in pv application:

```
mariadb-dump -u username -p dbname | pv | bzip2 > dbname.sql.bz2
```

Use the command below to back up the database using bz2 compression in pv application:

```
mysqldump -uroot -p babel | pv | bzip2 > babel.sql.bz2
```



Backup using bz2 compression in pv application

F. Restore DB

If you use MariaDB, you can use the commands below:

1. Restore the database without compression

Use the format below to restore the database without compression in pv application:

```
pv backup_file.sql | mariadb -u username -p
```

So, use the command below to restore the database without compression in pv application:

```
pv babel.sql | mariadb -uroot -p
```



Restore the database without compression in pv application

2. Restore the database with gz compression

Use the format below to restore the database using gz compression in pv application:

```
pv backup_file.gz | gunzip | mysql -u username -p
```

Use the command below to restore the database using gz compression in pv application:

```
pv babel.sql.gz | gunzip | mariadb -uroot -p
```



Restore the database using gz in pv application

3. Restore the database with bz2 compression

Use the format below to restore the database using bz2 compression in pv application:

```
pv backup_file.sql.bz2 | mariadb -u username -p
```

Use the command below to restore the database using bz2 compression in pv application:

```
pv babel.sql.bz2 | bunzip2 | mariadb -uroot -p babel
```



Restore the database using bz2 in pv application

Note

If you are using a MySQL database, then you can use the commands in point E to back up the database and the commands in point F to restore the database by changing the mariadb-dump command to mysqldump and changing the mariadb command to mysql.

References

superuser.com
howtogeek.com
dba.stackexchange.com
tecmint.com
catonmat.net

How to Restore the Database in MariaDB?

written by sysadmin | 4 October 2025

The previous articles have explained how to perform a database backup in MariaDB. This article will explain how to perform a database restore in MariaDB.

Problem

How to restore the database in MariaDB?

Solution

There are several methods to perform the database restore in MariaDB:

1. Restore the entire database

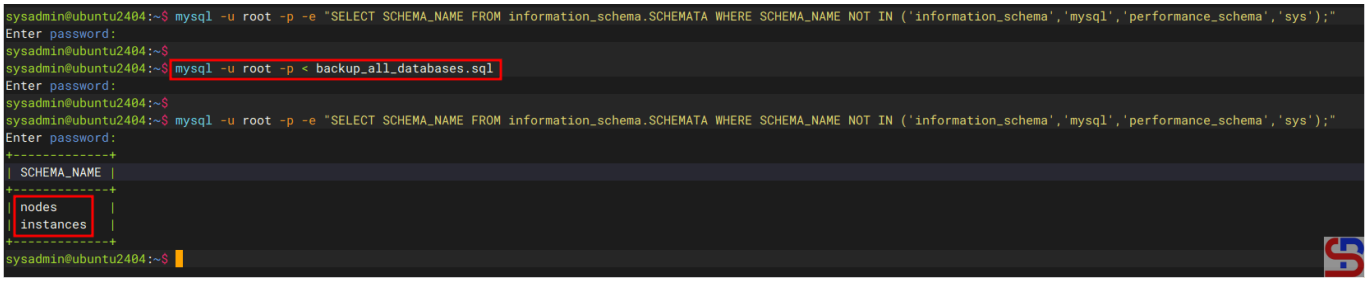
To restore the backup file of the entire database, use the format below:

```
mysql -u username -p < backup_file.sql
```

Use the command below if your backup file name is backup_all_databases.sql:

```
mysql -u root -p < backup_all_databases.sql
```

After you run the above command, the database will be restored in MariaDB as shown in the image below:



Restore all databases in MariaDB

2. Restore a database

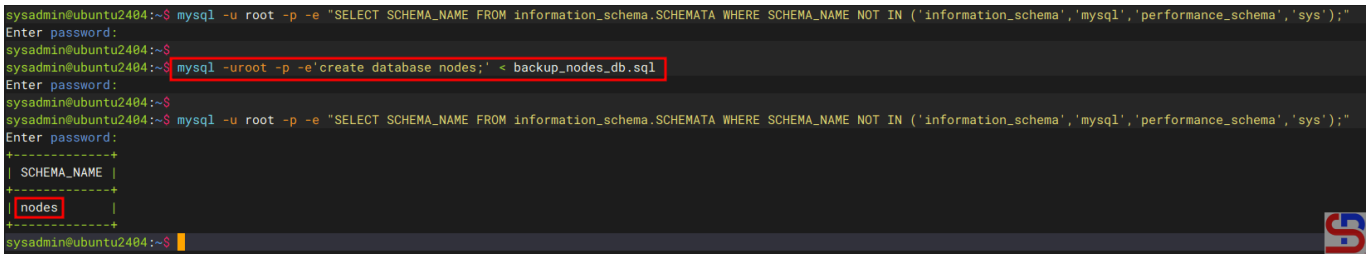
Use the following format to restore a database's backup file:

```
mysql -u username -p -e'create database new_database;' < backup_file.sql
```

If you want to restore the nodes database, then you can use the command below:

```
mysql -uroot -p -e'create database nodes;' < backup_nodes_db.sql
```

After you run the command above, MariaDB will restore the database like in the image below:



Restore a database in MariaDB

3. Restore the table(s)

If you want to restore the table(s), you can follow the format below:

```
mysql -u username -p db_name < table_backup_file.sql
```

So, use the command below if you want to restore the tables in the nodes database:

```
mysql -u root -p nodes < table_backup_file.sql
```

4. Restore a compressed backup file

There are two methods to restore a compressed backup file:

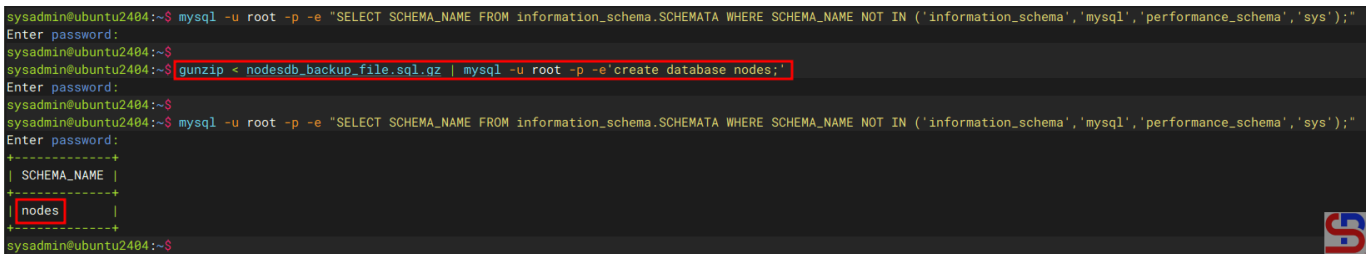
a. Restore the .gz backup file

If you want to restore a .gz backup file, use the format below:

```
gunzip < database.sql.gz | mysql -u username -p -e'create database new_database;'
```

For example, if you want to restore a database that uses .gz compression, then use the command below:

```
gunzip < nodes_backup_db.sql.gz | mysql -u root -p -e'create database nodes;'
```



Restore a database that is compressed using .gz compression

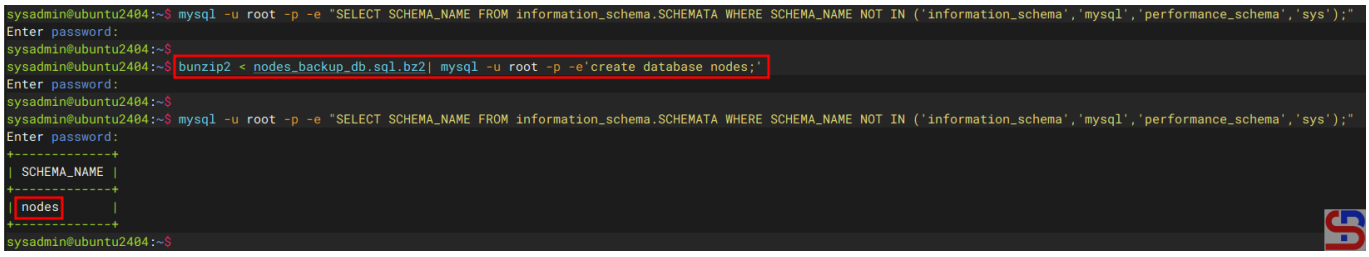
b. Restore the .gz backup file

If you want to restore a .bz2 backup file, use the format below (but make sure your server has already installed the bzip2 package):

```
bunzip2 < database.sql.bz2 | mysql -u username -p -e'create database new_database;'
```

For example, if you want to restore a database that uses .bz2 compression, then use the command below:

```
bunzip2 < nodes.sql.bz2 | mysql -u root -p -e'create database nodes;'
```



Restore a database that is compressed using .bz2 compression

Note

You can restore a database backup file that is compressed using method number 4, whether you compress when backing up the database or after backing up the database.

References

mariadb.com
stackoverflow.com
serverfault.com
bitbook.io

How to Back up the Database in MariaDB?

written by sysadmin | 4 October 2025

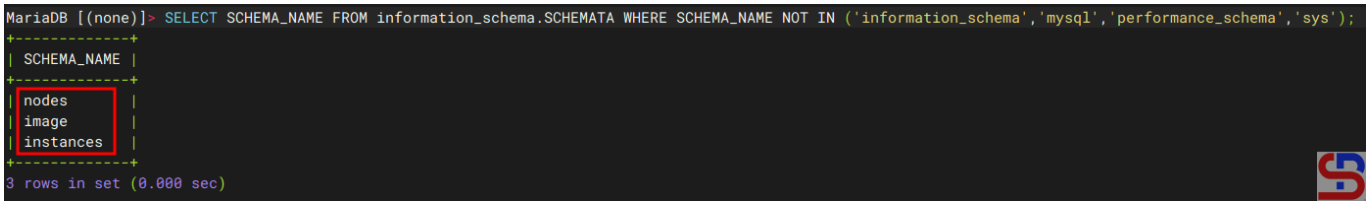
I want to back up the database in MariaDB.

Problem

How to back up the database in MariaDB?

Solution

Before doing a backup, it is highly recommended to ensure that there are no transactions in the database. Maybe you can turn off the application that is connected to the database or turn off the connection to the database so that it will produce a good backup file. In this article, I have 3 databases to use as an example, like the image below:



Example of databases

And below are the commands to back up the MariaDB database:

1. Back up the entire database

If you want to back up all databases in MariaDB, use the format below:

```
mariadb-dump -u username -p --all-databases > backup_file_name.sql
```

So, run the command below to back up your entire database:

```
mariadb-dump -u root -p --all-databases > backup_all_databases.sql
```

2. Backup a database

If you want to back up a database in MariaDB, use the format below:

```
mariadb-dump -u username -p db_name > backup_file_name.sql
```

So, run the command below if you want to back up the nodes database:

```
mariadb-dump -u root -p nodes > backup_nodes_db.sql
```

3. Backup more than one database

If you want to back up more than one database, use the format below:

```
mariadb-dump -u username -p db1_name db2_name > backup_file_name.sql
```

So, if you want to back up the nodes and image databases, use the format below:

```
mariadb-dump -uroot -p --databases nodes image >
backup_nodes_and_image_db.sql
```

4. Backup database only

When you back up a database, by default, the database will be backed up in its entirety, both the database and the database structure. But sometimes you just want to back up the database without the structure, so you can use the format below:

```
mariadb-dump -u username -p --no-create-db --no-create-info db_name > dbname_db_only.sql
```

So, if you want to back up the database only for the nodes database, you can use the command below:

```
mariadb-dump -u root -p --no-create-db --no-create-info nodes > nodes_db_only.sql
```

5. Backup the database structure only

If you want to back up the database structure only, without the need to back up the database, then you can use the format below:

```
mariadb-dump -u username -p -—no-data db_name > dbname_structure_only.sql
```

So, use the command below if you want to back up the structure only for the nodes database:

```
mariadb-dump -u root -p --no-data nodes > nodes_structure_only.sql
```

6. Backup table only

If you want to back up the specific table only in a database, you can use the format below:

```
mariadb-dump -u username -p db_name table1 table2 > backup_table1_table2_dbname.sql
```

So, if you want to back up 2 tables in the nodes database for babel and category tables, use the command below:

```
mariadb-dump -uroot -p nodes babel category > backup_babel_category_nodes.sql
```

7. Backup with compression

By default, when people perform database backups, they will usually use .sql as an extension of the database backup file. But actually, you can compress the database backup files when you do a backup. There are 2 methods of compressing database backups, namely using the tar.gz method and the .bz2 method. If you want to use the first method, use the format below:

```
mariadb-dump -u username -p db_name | gzip -9 -c > db_backup_file.sql.gz
```

Suppose you want to compress the nodes database, then use the command below:

```
mariadb-dump -u root -p nodes | gzip -9 -c > nodesdb_backup_file.sql.gz
```

And if you want to use bz2 compression when backing up databases, then make sure that the bz2 package is already installed on your server. If the package is not already installed, use the command below:

RockyLinux/AlmaLinux/CentOS

```
dnf install bzip2
```

Ubuntu/Debian

```
sudo install bzip2
```

OpenSUSE

```
zypper install bzip2
```

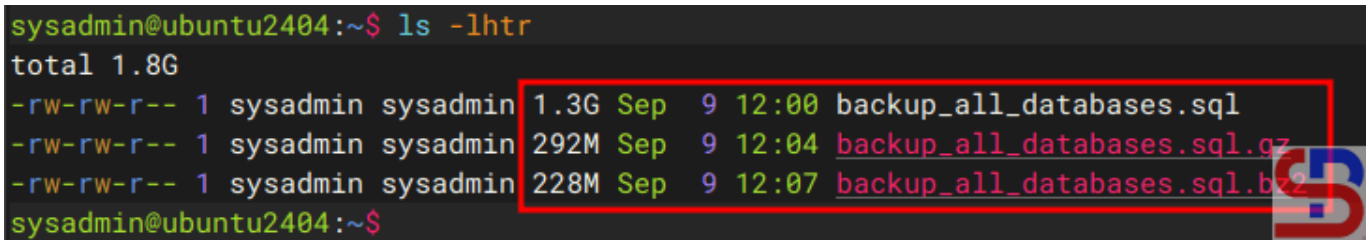
After you install the package, try to back up your database using the format below:

```
mariadb-dump -u username -p db_name | bzip2 > database.sql.bz2
```

If you want to back up your database, for example nodes database, run the below command:

```
mariadb-dump -u root -p nodes | bzip2 > nodes_backup_db.sql.bz2
```

Below is a comparison image of the size of the backup file that does not use compression, uses .tar.gz compression, and .bz2 compression:



Comparison size file

Warning
If you use compression when backing up the database, it will take longer than if you don’t use compression. And if you use bz2 compression, then the time spent will be longer than using .tar.gz.

Note

You should know that the mariadb-dump command has many useful options, including the **--single-transaction** and **--lock-tables** options. If you have a database that uses the **InnoDB storage engine**, then you should use the **--single-transaction** option because this option starts a transaction before dumping and reads data from a consistent snapshot without locking the tables for extended periods, allowing concurrent reads and writes. However, if you are using the **MyISAM** storage engine, you can use the **--lock-tables** option when backing up the database in MariaDB. If your database has a different storage engine, it is recommended to back up the database partially; some tables that use InnoDB use the

--single-transaction option, and some tables that use MyISAM use the --lock-tables option when backing up the database.

References

mariadb.com
tecmint.com
linode.com
serversforhackers.com

How to Display the Storage Engine in MariaDB?

written by sysadmin | 4 October 2025

If you are a user of the MariaDB database, you should know about the term storage engine.

Problem

How to display the storage engine in MariaDB?

Solution

A database engine (or storage engine) is the underlying software component that a database management system (DBMS) uses to create, read, update, and delete (CRUD) data from a database. To see a list of all available storage engines on the server, use the command below in the MariaDB prompt:

```
SHOW ENGINES;
```

and it will appear as shown in the image below:

```
MariaDB [nodes]> SHOW ENGINES;
+--------------------+---------+------------------------------------------------------------------------------------------------------------+--------------+------+------------+
| Engine             | Support | Comment                                                                                                    | Transactions | XA   | Savepoints |
+--------------------+---------+------------------------------------------------------------------------------------------------------------+--------------+------+------------+
| CSV                | YES     | Stores tables as CSV files                                                                                 | NO           | NO   | NO         |
| MRG_MyISAM         | YES     | Collection of identical MyISAM tables                                                                      | NO           | NO   | NO         |
| MEMORY             | YES     | Hash based, stored in memory, useful for temporary tables                                                  | NO           | NO   | NO         |
| Aria               | YES     | Crash-safe tables with MyISAM heritage. Used for internal temporary tables and privilege tables            | NO           | NO   | NO         |
| MyISAM             | YES     | Non-transactional engine with good performance and small data footprint                                    | NO           | NO   | NO         |
| SEQUENCE           | YES     | Generated tables filled with sequential values                                                             | YES          | NO   | YES        |
| InnoDB             | DEFAULT | Supports transactions, row-level locking, foreign keys and encryption for tables                           | YES          | YES  | YES        |
| PERFORMANCE_SCHEMA | YES     | Performance Schema                                                                                         | NO           | NO   | NO         |
+--------------------+---------+------------------------------------------------------------------------------------------------------------+--------------+------+------------+
8 rows in set (0.000 sec)
```

Display all the storage engines in MariaDB

From the image above, you can see that InnoDB is the default storage engine in MariaDB. You can also use the command below to see the default storage engine in MariaDB:

```
SHOW GLOBAL VARIABLES LIKE 'default_storage_engine';
```

```
MariaDB [nodes]> SHOW GLOBAL VARIABLES LIKE 'default_storage_engine';
+------------------------+--------+
| Variable_name          | Value  |
+------------------------+--------+
| default_storage_engine | InnoDB |
+------------------------+--------+
1 row in set (0.006 sec)
```

Display the default storage engine in MariaDB

You can change the default storage engine by using the command below, which changes the default storage engine to MyISAM:

```
SET GLOBAL default_storage_engine='MyISAM';
```

Or you can use the below command if the session default storage engine supersedes the global default during this session:

```
SET SESSION default_storage_engine='MyISAM';
```

You should know that the storage engine is used per table and not per database, and to see it, you can use the command below:

```
SELECT TABLE_NAME, ENGINE
```

```
FROM information_schema.TABLES
WHERE TABLE_SCHEMA = 'nodes';
```

and the result will look like below:

```
MariaDB [nodes]> SELECT TABLE_NAME, ENGINE
    -> FROM information_schema.TABLES
    -> WHERE TABLE_SCHEMA = 'nodes';
+------------------------+--------+
| TABLE_NAME             | ENGINE |
+------------------------+--------+
| flaggedrevs            | InnoDB |
| flaggedrevs_statistics | InnoDB |
| category               | InnoDB |
| babel                  | InnoDB |
+------------------------+--------+
4 rows in set (0.000 sec)
```

Display the storage engine used in the table

From the image above, it can be seen that all tables in the nodes database use InnoDB, so it can be said that the nodes database uses InnoDB. However, one database (schema) can have a table with a different engine, and the query below is the sample to create 2 tables that use different storage engines:

```
CREATE TABLE product (
    id INT PRIMARY KEY,
    name VARCHAR(100)
) ENGINE=InnoDB;

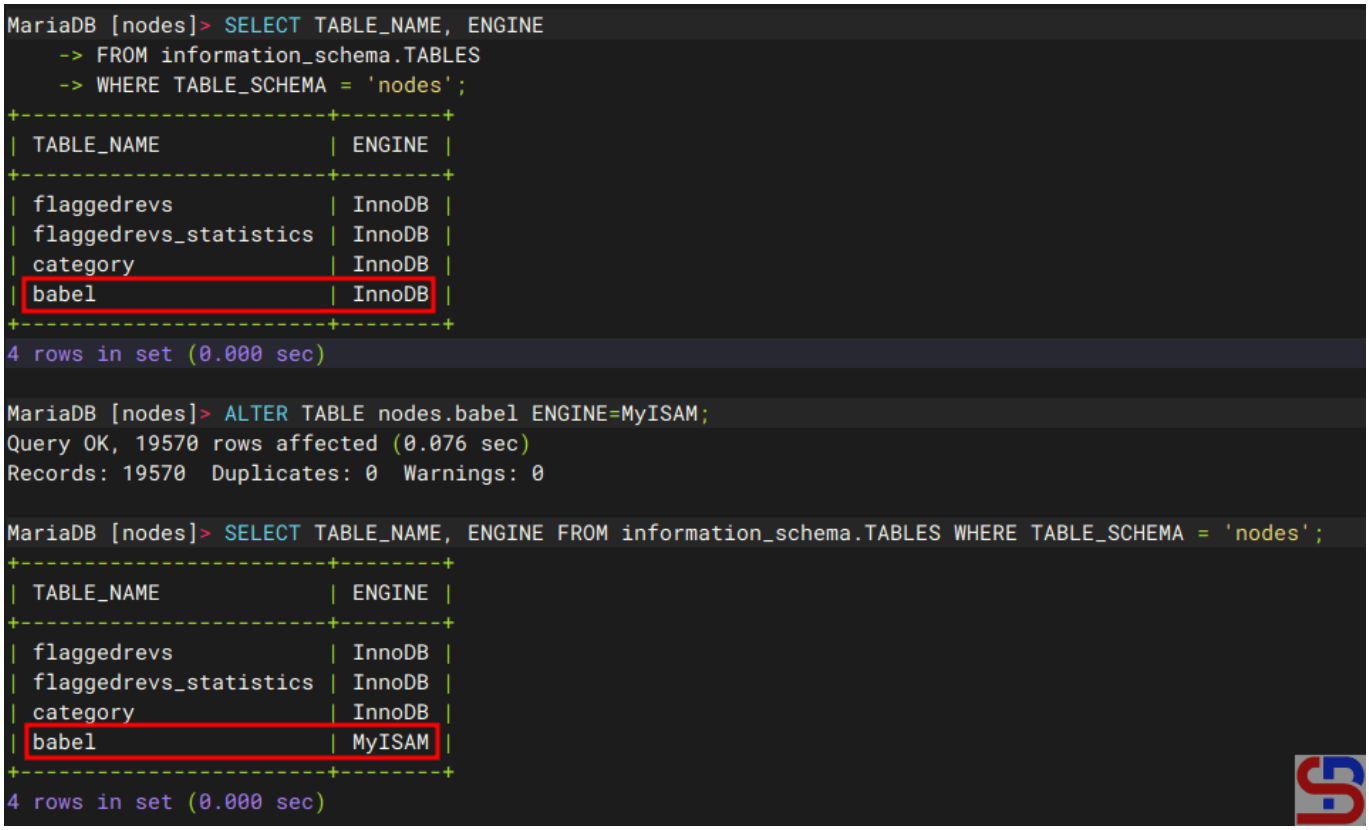
CREATE TABLE access_log (
    id INT PRIMARY KEY AUTO_INCREMENT,
    time DATETIME,
    user VARCHAR(50)
) ENGINE=MyISAM;
```

where the product table uses InnoDB and the table access_log uses MyISAM. If a database uses various storage engines and you want to know how many storage engines are used, you can use the query below:

```
SELECT ENGINE, COUNT(*) AS Number_of_tables
FROM information_schema.TABLES
WHERE TABLE_SCHEMA = 'db_name'
GROUP BY ENGINE;
```

You can change the storage engine of a table by using the query below, for example, change it to MyISAM:

```
ALTER TABLE database_name.table_name ENGINE=MyISAM;
```



Change the storage engine in the table

Note

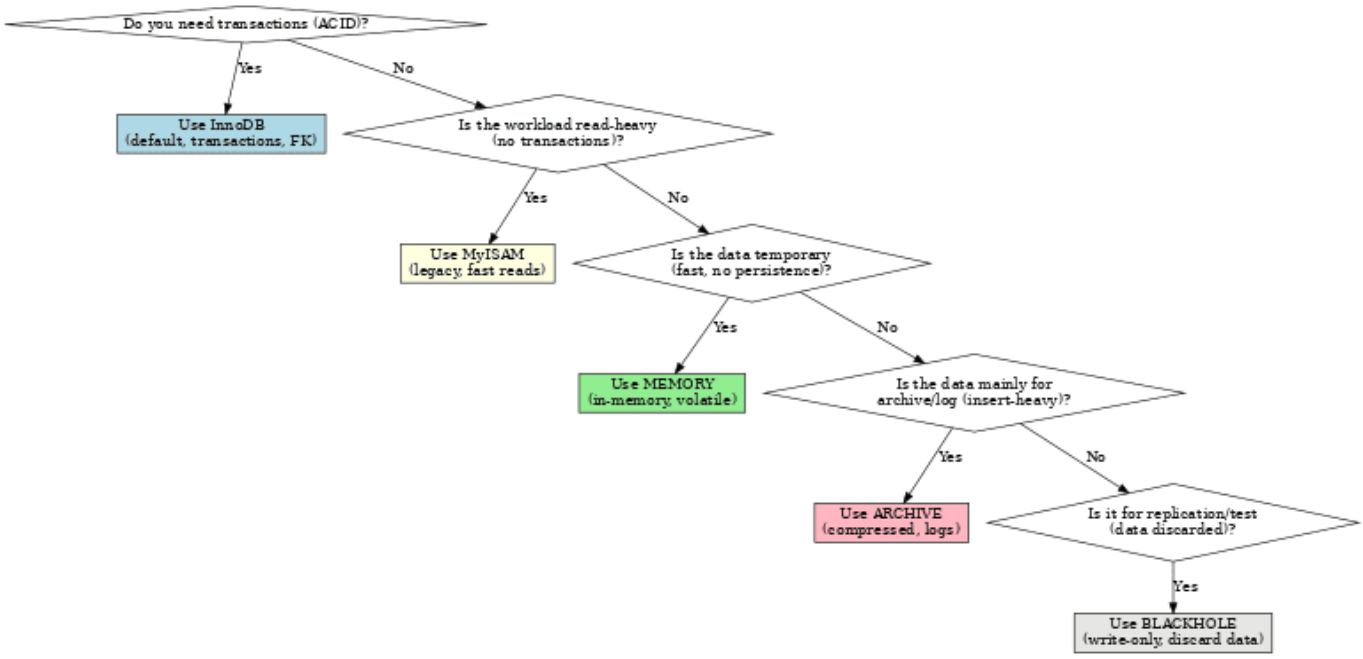
As explained above, there are many storage engines that you can use. But before you decide to use a storage engine, you should first find out the advantages and disadvantages of each storage engine, and to briefly see the differences between storage engines in the image below:

COMPARISON OF STORAGE ENGINES IN MARIADB/MYSQL

Feature / Engine	InnoDB (default)	MyISAM	MEMORY	ARCHIVE	BLACKHOLE
Transactions (ACID)	✅	❌	❌	❌	❌
Foreign Keys	✅	❌	❌	❌	❌
Locking	Row-level	Table-level	Table-level	Table-level	N/A
Crash recovery	Yes (redo /undo logs)	Limited (can lose data)	Data lost (in RAM)	Yes (insert only, compressed	Accepts writes but discards data
Read/Write speed	Balanced	Very fast on reads, slower writes	Extremely fast (in-memory)	Optimized for inserts only	None
Storage usage	General pur-pose apps, OLTP, most modern apps	Read-footprint workloads, legacy apps	RAM only	Very small (compressed)	Replication (pass-through), testing

Comparison between the storage engines

And below is a flowchart to determine the storage engines you will use:



Flowchart to choose the storage engine

However, as far as I know, among the many choices of storage engines, generally people use 2 types of storage engines, namely InnoDB and MyISAM. Maybe you can see the difference between the two through this site.

References

en.wikipedia.org
slideshare.net
medium.com
supportsages.com
mariadb.com
dev.mysql.com
managedserver.eu

How to Display All Databases Created by the User in MariaDB?

written by sysadmin | 4 October 2025

By default, in MariaDB, 4 databases are automatically created by the database system, namely **information_schema**, **mysql**, **performance_schema**, and **sys**. But I just want to display a database created by the user and not the default system databases.

Problem

How to display all databases created by the user in MariaDB?

Solution

If you use the **show databases** command after you access successfully accessing MariaDB, it will display all databases created by the user and default system databases, as shown below:

```
MariaDB [(none)]> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| instances          |
| mysql              |
| nodes              |
| performance_schema |
| sys                |
+--------------------+
6 rows in set (0.001 sec)
```

Display all databases

If you want to list only User-Created Databases, you can use a query as below:

```
SELECT SCHEMA_NAME
FROM information_schema.SCHEMATA
WHERE SCHEMA_NAME NOT IN
('information_schema','mysql','performance_schema','sys');
```

and it will display like the image below:

```
MariaDB [(none)]> SELECT SCHEMA_NAME
    -> FROM information_schema.SCHEMATA
    -> WHERE SCHEMA_NAME NOT IN ('information_schema','mysql','performance_schema','sys');
+-------------+
| SCHEMA_NAME |
+-------------+
| nodes       |
| instances   |
+-------------+
2 rows in set (0.006 sec)
```

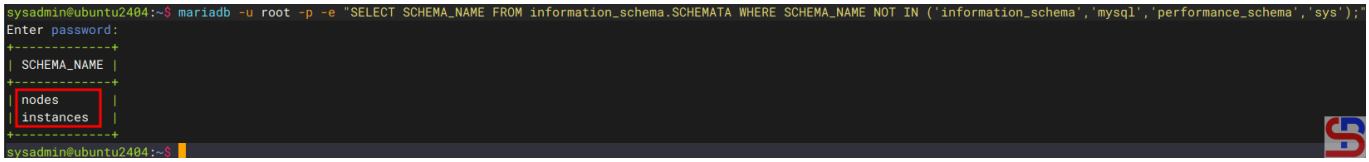
Display only User-Created Databases

Note

If you want to run the Linux command to display all databases created by the user only, use the command below:

```
mysql -u root -p -e "SELECT SCHEMA_NAME FROM information_schema.SCHEMATA
WHERE SCHEMA_NAME NOT IN
('information_schema','mysql','performance_schema','sys');"
```

And you will see the result like the image below:



Display only User-Created Databases using the Linux command

References

stackoverflow.com
kinsta.com