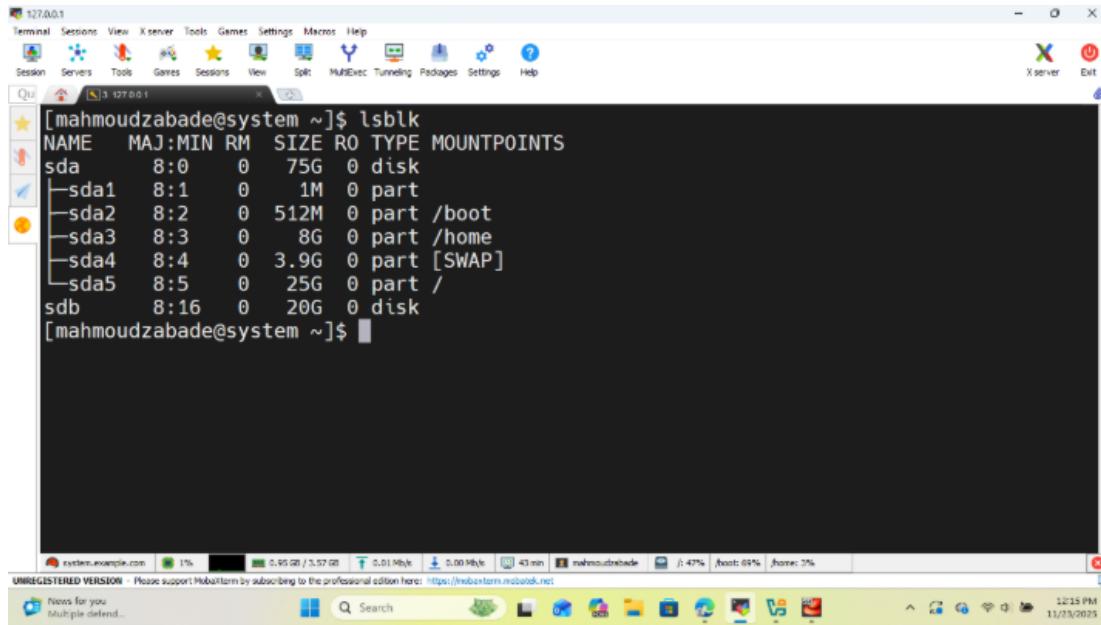


# Task1

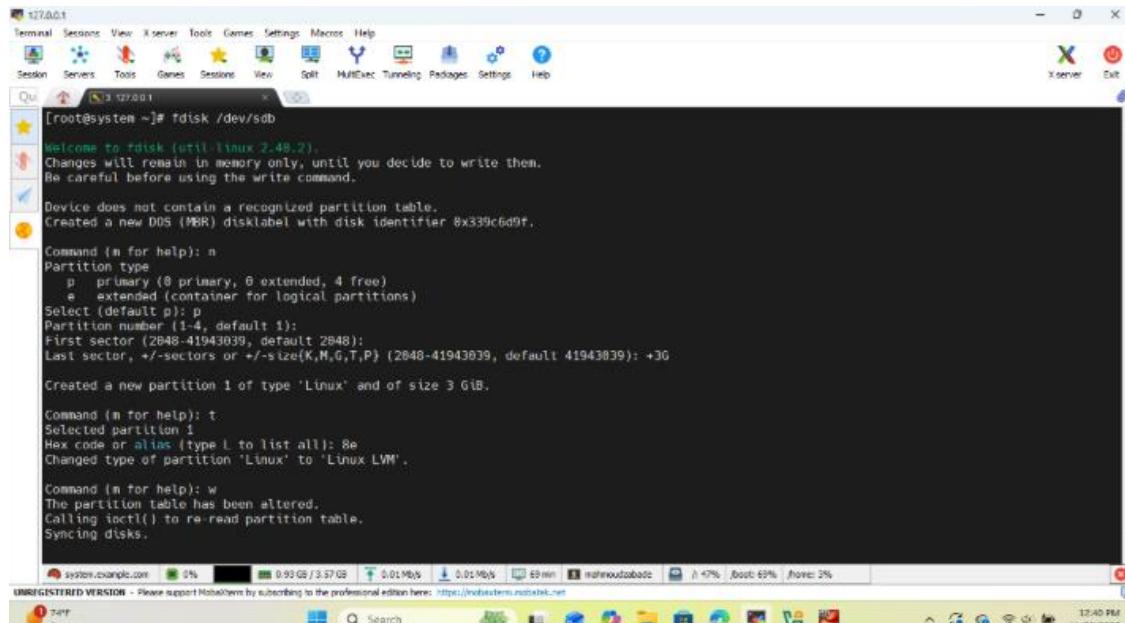
## Part1: LVM

### 1- Prepare the Disk



```
[mahmoudzabade@system ~]$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda      8:0    0   75G  0 disk 
├─sda1   8:1    0     1M  0 part 
├─sda2   8:2    0   512M 0 part /boot
├─sda3   8:3    0     8G  0 part /home
├─sda4   8:4    0   3.9G 0 part [SWAP]
└─sda5   8:5    0   25G  0 part /
sdb      8:16   0   20G  0 disk 
[mahmoudzabade@system ~]$
```

### 2- Create a partition



```
[root@system ~]# fdisk /dev/sdb
Welcome to fdisk (util-linux 2.48.2).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DDS (MBR) disklabel with disk identifier 8x39c6d9f.

Command (m for help): n
Partition type
   p  primary (0 primary, 0 extended, 4 free)
   e  extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-41943039, default 2048):
Last sector, +/sectors or +/-size{K,M,G,T,P} (2048-41943039, default 41943039): +3G

Created a new partition 1 of type 'Linux' and of size 3 GiB.

Command (m for help): t
Selected partition 1
Hex code or alias (type L to list all): 8e
Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

### 3- Create Physical Volume (PV)

The screenshot shows a terminal window titled "Qu" with the IP address "3.127.0.1". The terminal session is running as root. The user has run the command "pvcreate /dev/sdb1". The output shows that the physical volume was successfully created, with a size of 3.00 GiB. The terminal window has a dark background and light-colored text. The status bar at the bottom shows system information like battery level, network speed, and disk usage.

```
[root@system ~]# pvcreate /dev/sdb1
Physical volume "/dev/sdb1" successfully created.
[root@system ~]# pvdisplay
"/dev/sdb1" is a new physical volume of "3.00 GiB"
--- NEW Physical volume ---
  PV Name           /dev/sdb1
  VG Name
  PV Size          3.00 GiB
  Allocatable      NO
  PE Size          0
  Total PE         0
  Free PE          0
  Allocated PE     0
  PV UUID          y6d754-LPLG-KVMm-01ht-yo2P-0Lb7-FJrP2h

[root@system ~]#
```

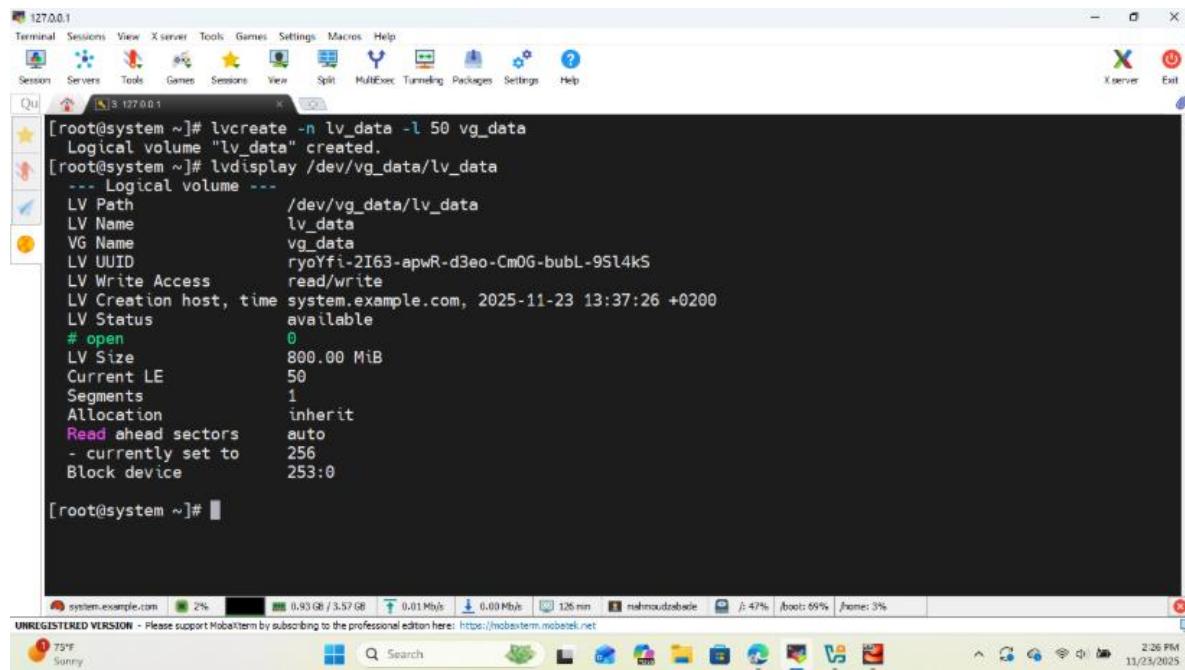
### 4- Create Volume Group (VG)

The screenshot shows a terminal window titled "Qu" with the IP address "3.127.0.1". The terminal session is running as root. The user has run the command "vgcreate -s 16M vg\_data /dev/sdb1". The output shows that the volume group "vg\_data" was successfully created. The terminal window has a dark background and light-colored text. The status bar at the bottom shows system information like battery level, network speed, and disk usage.

```
[root@system ~]# vgcreate -s 16M vg_data /dev/sdb1
Volume group "vg_data" successfully created.
[root@system ~]# vgdisplay vg_data
--- Volume group ---
  VG Name           vg_data
  System ID
  Format           lvm2
  Metadata Areas   1
  Metadata Sequence No  1
  VG Access        read/write
  VG Status        resizable
  MAX LV
  Cur LV
  Open LV
  Max PV
  Cur PV
  Act PV
  VG Size          2.98 GiB
  PE Size          16.00 MiB
  Total PE         191
  Alloc PE / Size  0 / 0
  Free PE / Size  191 / 2.98 GiB
  VG UUID          1VuVv-4QzQ-W98r-F2Sf-0h0k-f3qb-tG4qk0

[root@system ~]#
```

## 5- Create Logical Volume (LV)

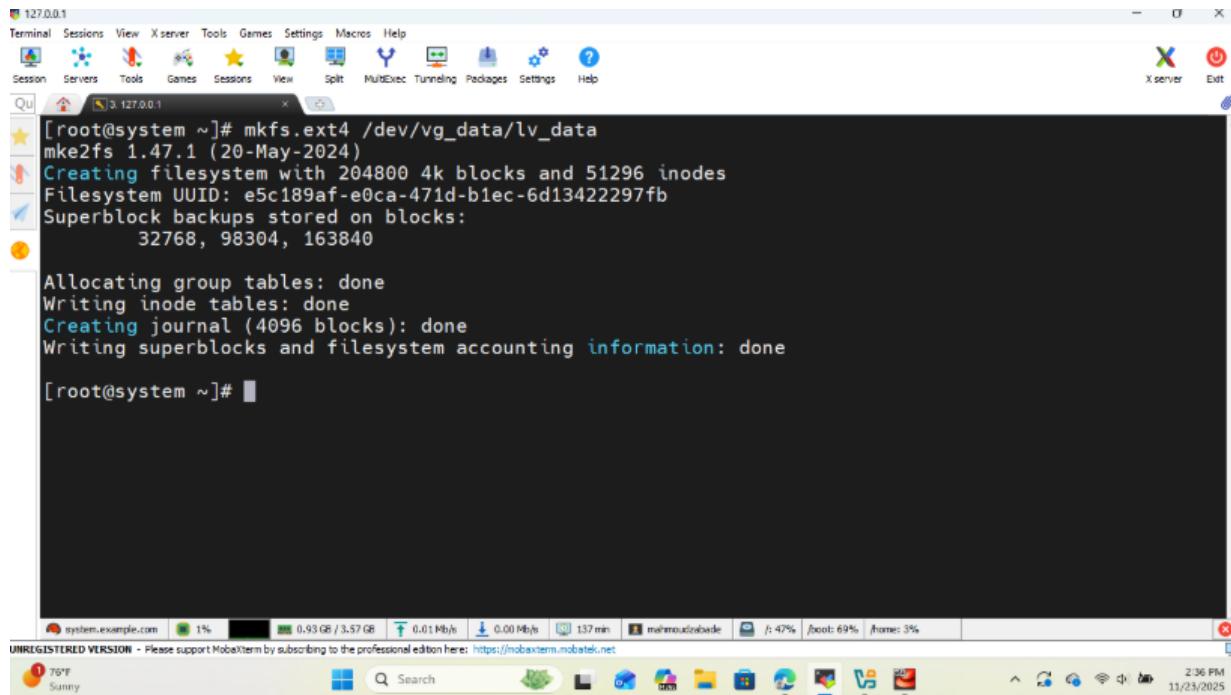


```
[root@system ~]# lvcreate -n lv_data -l 50 vg_data
Logical volume "lv_data" created.
[root@system ~]# lvdisplay /dev/vg_data/lv_data
--- Logical volume ---
LV Path          /dev/vg_data/lv_data
LV Name          lv_data
VG Name          vg_data
LV UUID          ryoifi-2I63-apwR-d3eo-Cm0G-bubL-9S14k5
LV Write Access  read/write
LV Creation host, time system.example.com, 2025-11-23 13:37:26 +0200
LV Status        available
# open           0
LV Size          800.00 MiB
Current LE       50
Segments         1
Allocation       inherit
Read ahead sectors  auto
- currently set to 256
Block device     253:0

[root@system ~]#
```

The screenshot shows a terminal window titled '127.0.0.1' running on Mobatek. The user has run the command 'lvcreate -n lv\_data -l 50 vg\_data' to create a logical volume named 'lv\_data' with a size of 50 logical extents from the volume group 'vg\_data'. The terminal then displays the details of the newly created logical volume using 'lvdisplay /dev/vg\_data/lv\_data'. The output includes information such as the path, name, UUID, write access, creation time, status, size, current logical extent, segments, allocation policy, and block device.

## 6- Create Ext4 Filesystem



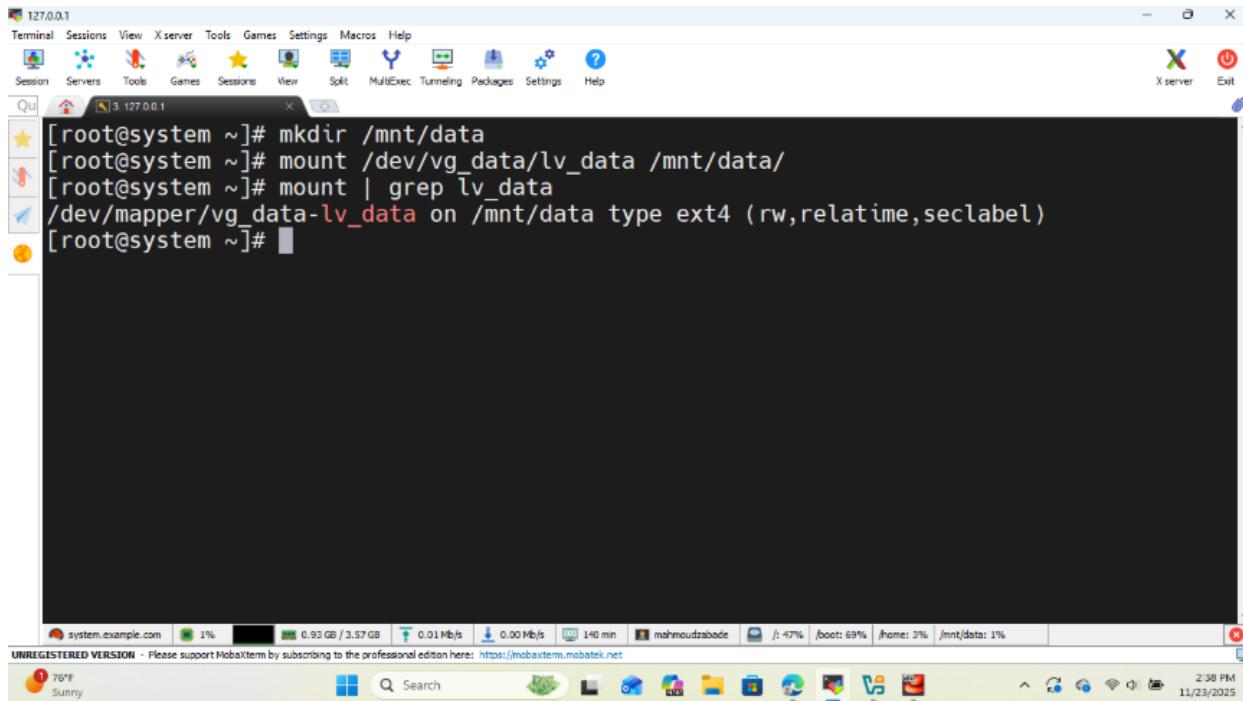
```
[root@system ~]# mkfs.ext4 /dev/vg_data/lv_data
mke2fs 1.47.1 (20-May-2024)
Creating filesystem with 204800 4k blocks and 51296 inodes
Filesystem UUID: e5c189af-e0ca-471d-b1ec-6d13422297fb
Superblock backups stored on blocks:
      32768, 98304, 163840

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

[root@system ~]#
```

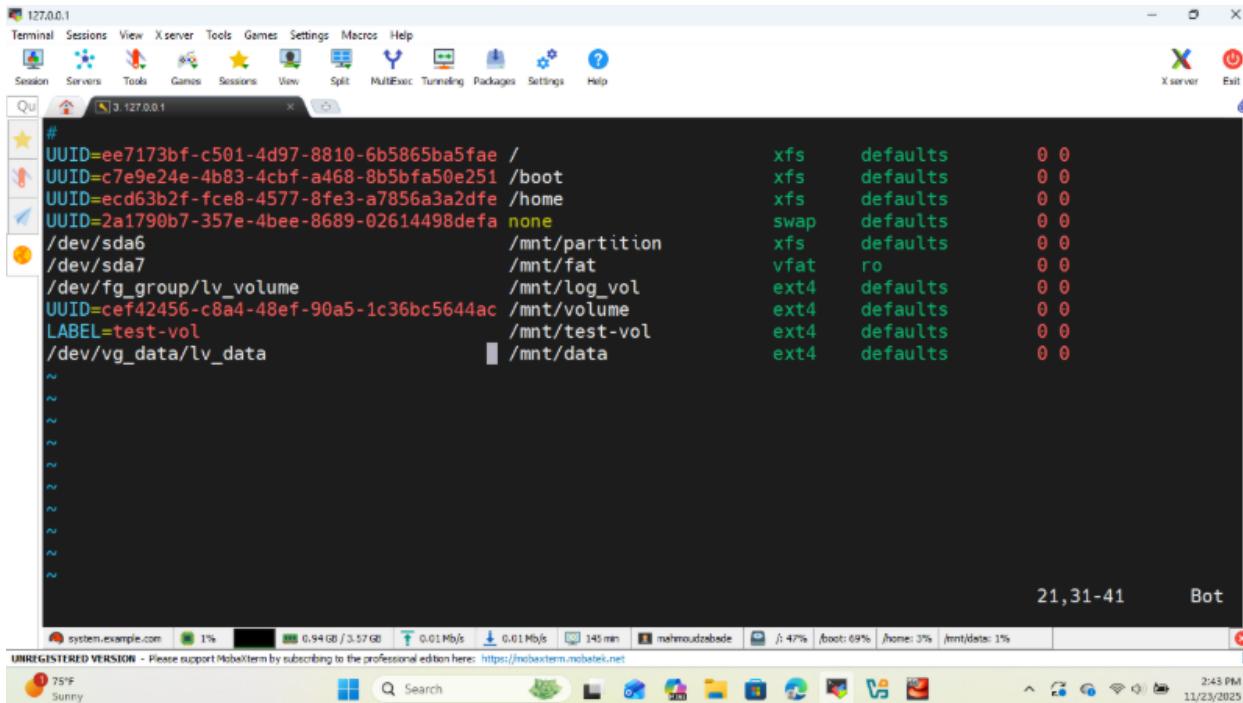
The screenshot shows a terminal window titled '127.0.0.1' running on Mobatek. The user has run the command 'mkfs.ext4 /dev/vg\_data/lv\_data' to create an Ext4 filesystem on the logical volume 'lv\_data'. The terminal displays the process of creating the filesystem, including the creation of the filesystem with 204800 4k blocks and 51296 inodes, the assignment of a UUID, and the storage of superblock backups. It also shows the allocation of group tables, writing of inode tables, creation of a journal, and the final writing of superblocks and filesystem accounting information.

## 7- Mount the LV



```
[root@system ~]# mkdir /mnt/data
[root@system ~]# mount /dev/vg_data/lv_data /mnt/data/
[root@system ~]# mount | grep lv_data
/dev/mapper/vg_data-lv_data on /mnt/data type ext4 (rw,relatime,seclabel)
[root@system ~]#
```

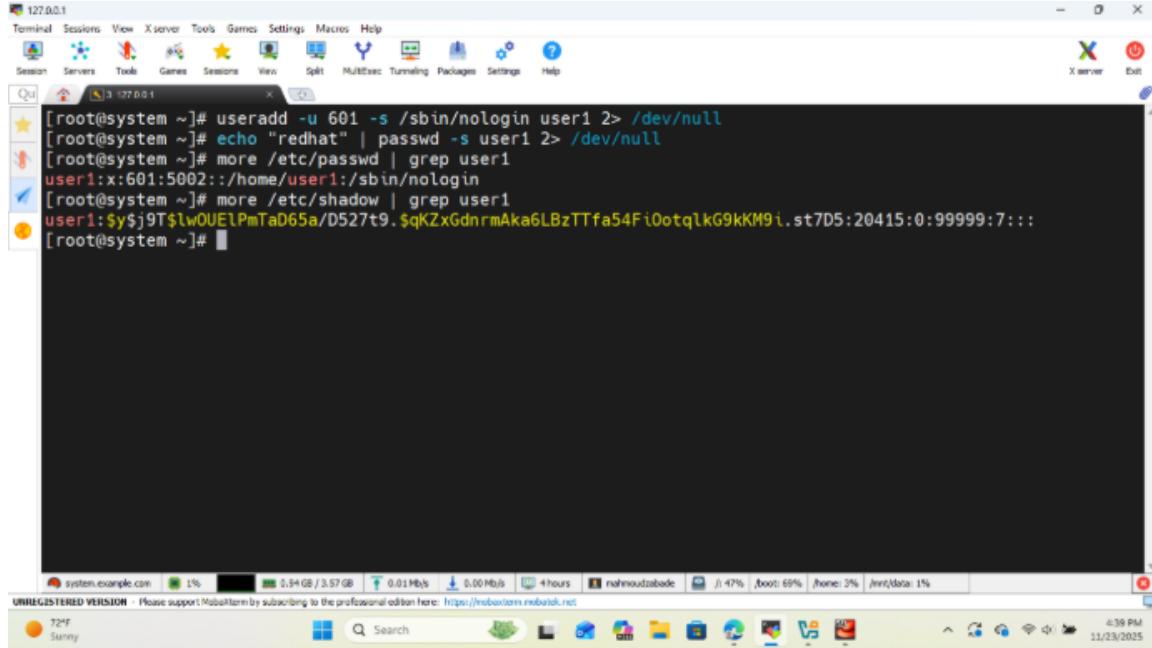
## 8- Configure Automatic Mount



```
#  
UUID=ee7173bf-c501-4d97-8810-6b5865ba5fae / xfs defaults 0 0  
UUID=c7e9e24e-4b83-4cbf-a468-8b5bfa50e251 /boot xfs defaults 0 0  
UUID=ecd63b2f-fce8-4577-8fe3-a7856a3a2dfa /home xfs defaults 0 0  
UUID=2a1790b7-357e-4bee-8689-02614498defa none swap defaults 0 0  
/dev/sda6 /mnt/partition xfs defaults 0 0  
/dev/sda7 /mnt/fat vfat ro 0 0  
/dev/fq_group/lv_volume /mnt/log_vol ext4 defaults 0 0  
UUID=cef42456-c8a4-48ef-90a5-1c36bc5644ac /mnt/volume ext4 defaults 0 0  
LABEL=test-vol /mnt/test-vol ext4 defaults 0 0  
/dev/vg_data/lv_data /mnt/data ext4 defaults 0 0
```

## Part2: Users, Groups and Permissions

### 1- Create user1



The screenshot shows a terminal window titled "127.0.0.1" with the following command history:

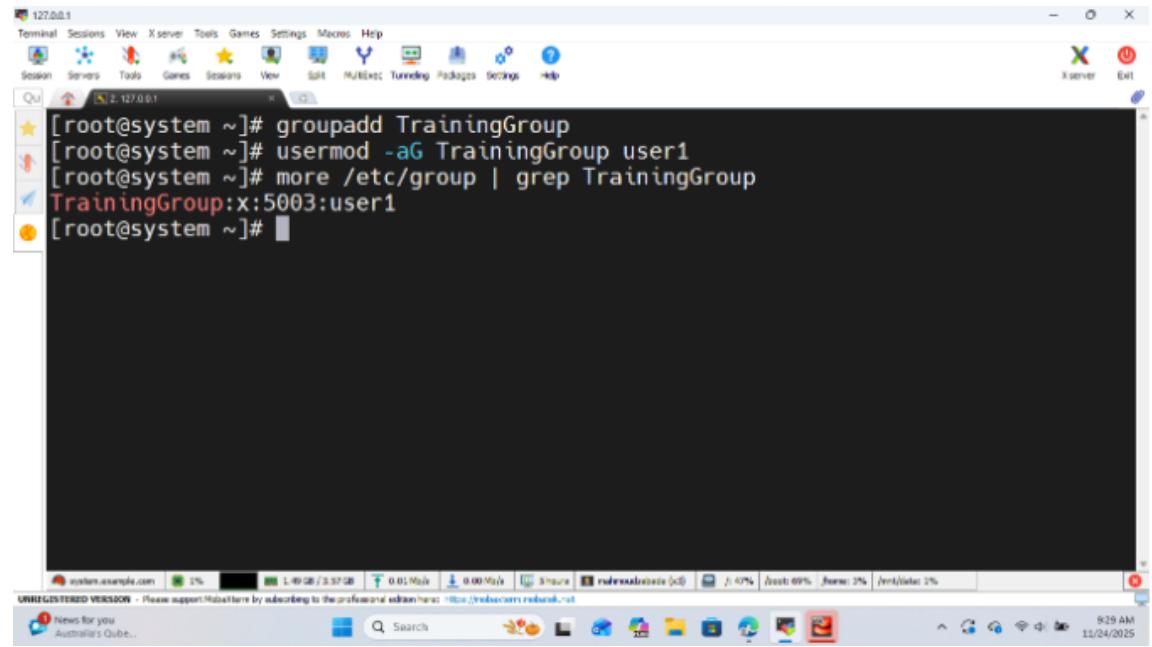
```
[root@system ~]# useradd -u 601 -s /sbin/nologin user1 2> /dev/null
[root@system ~]# echo "redhat" | passwd -s user1 2> /dev/null
[root@system ~]# more /etc/passwd | grep user1
user1:x:601:5002::/home/user1:/sbin/nologin
[root@system ~]# more /etc/shadow | grep user1
user1:$j9T$lwOUEPmTaD65a/D527t9.$qKZxGdnrmAka6LBzTTfa54Fi0otqlkG9kKM9i.st7D5:20415:0:99999:7:::
[root@system ~]#
```

The terminal window has a menu bar with options like Terminal, Sessions, View, Xserver, Tools, Games, Settings, Macros, Help, and a toolbar with icons for Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunnelling, Packages, Settings, and Help.

The status bar at the bottom shows system information: system.example.com, 1%, 0.94 GB / 3.57 GB, 0.01 Mb/s, 4 hours, mahmoudzabade, 47%, boot: 69%, home: 2%, /mnt/data: 1%. It also displays an unregistered version message: "UNREGISTERED VERSION - Please support Mobaxterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net".

The desktop taskbar at the bottom includes icons for system status (72°F Sunny), search, file manager, and other application icons. The date and time are shown as 4:39 PM 11/23/2025.

### 2- Create TrainingGroup and add user1 into it



The screenshot shows a terminal window titled "127.0.0.1" with the following command history:

```
[root@system ~]# groupadd TrainingGroup
[root@system ~]# usermod -aG TrainingGroup user1
[root@system ~]# more /etc/group | grep TrainingGroup
TrainingGroup:x:5003:user1
[root@system ~]#
```

The terminal window has a menu bar with options like Terminal, Sessions, View, Xserver, Tools, Games, Settings, Macros, Help, and a toolbar with icons for Session, Servers, Tools, Games, Sessions, View, Split, MultiExec, Tunnelling, Packages, Settings, and Help.

The status bar at the bottom shows system information: system.example.com, 1%, 1.49 GB / 3.57 GB, 0.01 Mb/s, 4 hours, mobaxterm (x86), 47%, boot: 69%, home: 2%, /mnt/data: 2%. It also displays an unregistered version message: "UNREGISTERED VERSION - Please support Mobaxterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net".

The desktop taskbar at the bottom includes icons for system status (News for you, Australia's Quite...), search, file manager, and other application icons. The date and time are shown as 9:29 AM 11/24/2025.

### 3- Create admin group

```
[root@system ~]# groupadd admin
[root@system ~]# more /etc/group | grep admin
printadmin:x:992:
admin:x:5004:
[root@system ~]#
```

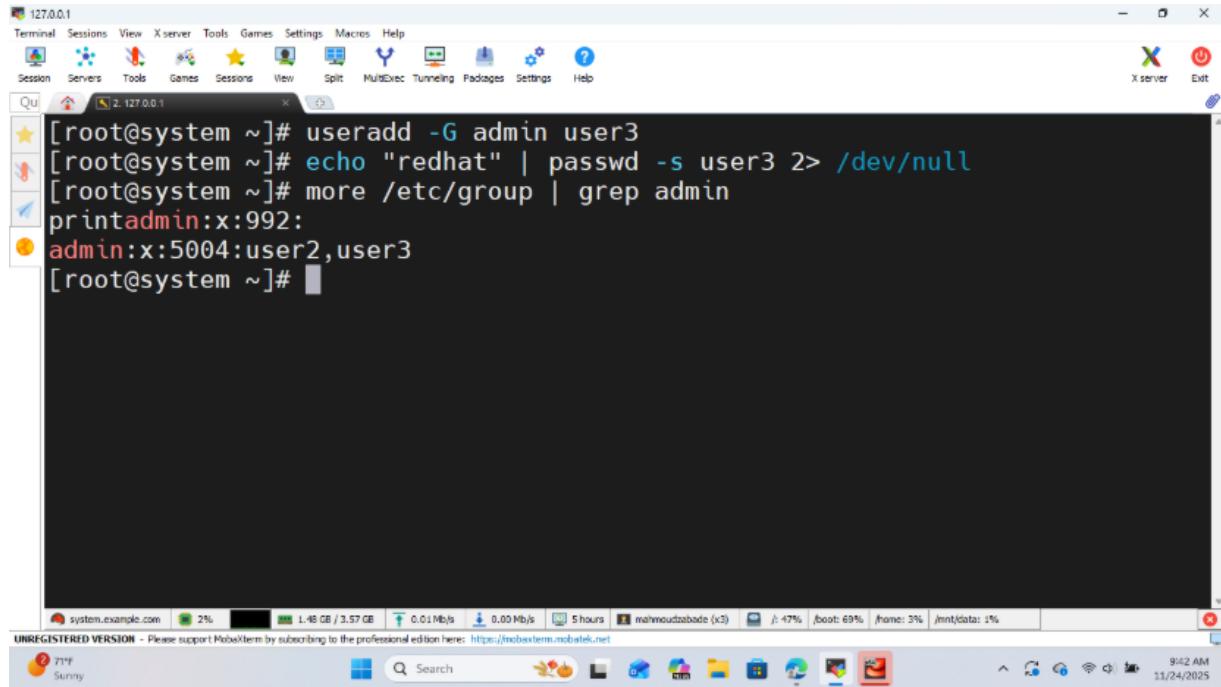
The screenshot shows a terminal window titled "Qu" connected to "2.127.0.0.1". The terminal content displays the creation of a new group named "admin" and the addition of two users, "admin" and "user2", to this group. The terminal window is part of the Mobaxterm interface, which includes a menu bar with "Terminal", "Sessions", "View", "X server", "Tools", "Games", "Settings", "Macros", and "Help". Below the menu is a toolbar with icons for "Session", "Servers", "Tools", "Games", "Sessions", "View", "Split", "MultiExec", "Tunneling", "Packages", "Settings", and "Help". On the right side of the terminal window are "X server" and "Exit" buttons. At the bottom of the screen is a taskbar with various icons and system status information.

### 4- Create user2 and assign it to admin group

```
[root@system ~]# useradd -G admin user2
[root@system ~]# echo "redhat" | passwd -s user2 2> /dev/null
[root@system ~]#
```

The screenshot shows a terminal window titled "Qu" connected to "2.127.0.0.1". The terminal content displays the creation of a new user account named "user2" and the assignment of the "admin" group to this user. This is achieved by running the "useradd" command with the "-G" option followed by "admin", and then using the "passwd" command with the "-s" option and the password "redhat". The terminal window is part of the Mobaxterm interface, which includes a menu bar with "Terminal", "Sessions", "View", "X server", "Tools", "Games", "Settings", "Macros", and "Help". Below the menu is a toolbar with icons for "Session", "Servers", "Tools", "Games", "Sessions", "View", "Split", "MultiExec", "Tunneling", "Packages", "Settings", and "Help". On the right side of the terminal window are "X server" and "Exit" buttons. At the bottom of the screen is a taskbar with various icons and system status information.

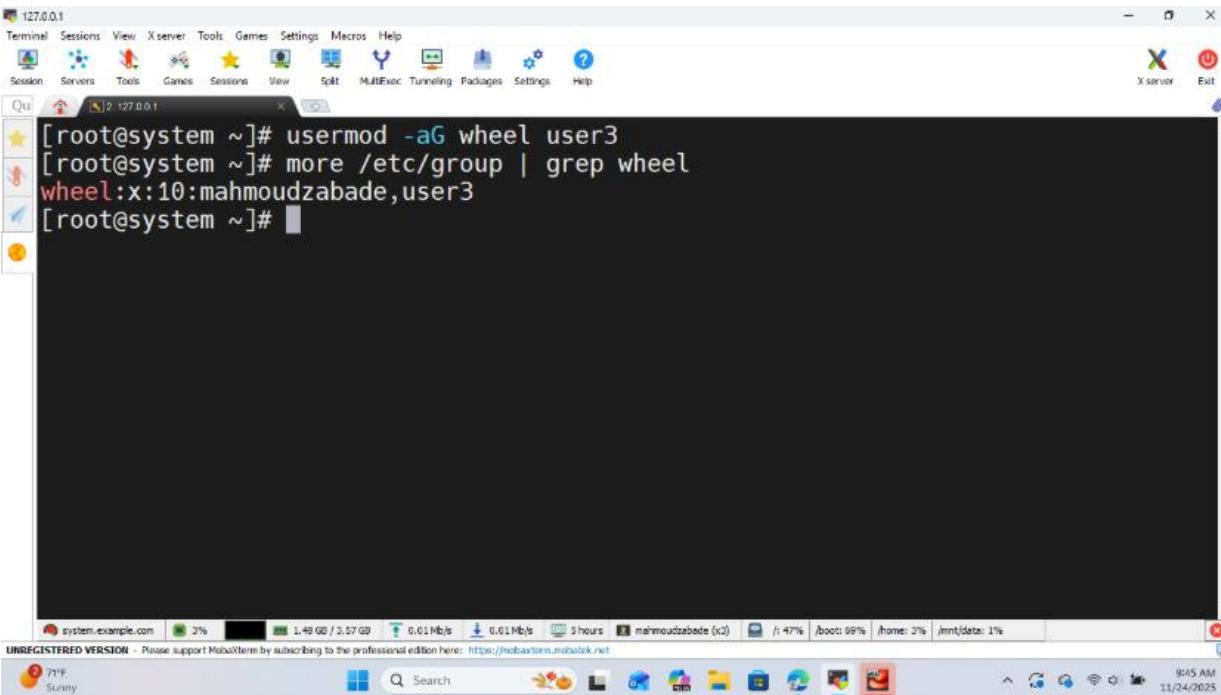
## 5- Create user3 and assign it to admin group



```
[root@system ~]# useradd -G admin user3
[root@system ~]# echo "redhat" | passwd -s user3 2> /dev/null
[root@system ~]# more /etc/group | grep admin
printadmin:x:992:
admin:x:5004:user2,user3
[root@system ~]#
```

The screenshot shows a terminal window titled '2. 127.0.0.1' running on MobaXterm. The terminal displays the command to create a new user 'user3' and add it to the 'admin' group. It also shows the password being set for the user. The bottom status bar indicates system information like CPU usage, memory, and disk space.

## 6- Give user3 root permissions

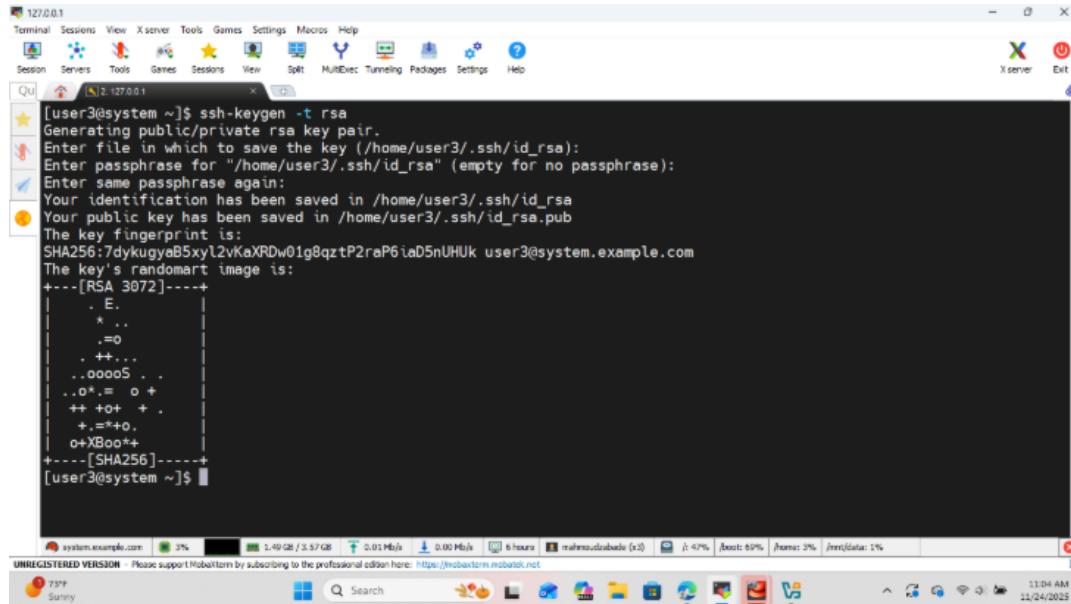


```
[root@system ~]# usermod -aG wheel user3
[root@system ~]# more /etc/group | grep wheel
wheel:x:10:mahmoudzabade,user3
[root@system ~]#
```

The screenshot shows a terminal window titled '2. 127.0.0.1' running on MobaXterm. The terminal displays the command to add the 'user3' user to the 'wheel' group, which grants root privileges. The bottom status bar indicates system information like CPU usage, memory, and disk space.

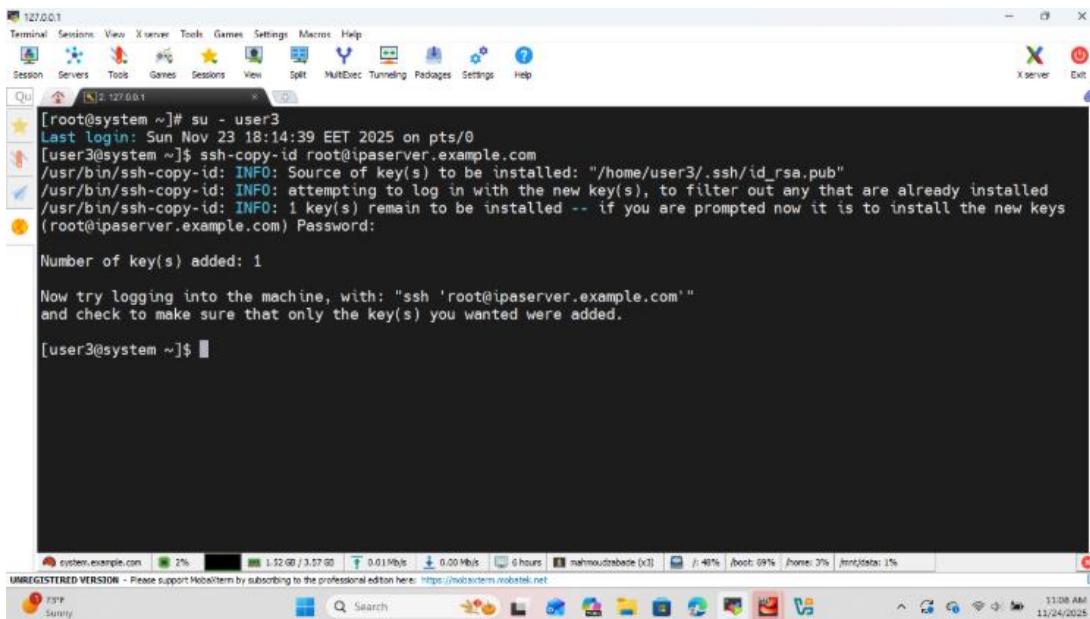
## Part3: SSH

### 1- Generate SSH Key on Local VM



```
[user3@system ~]$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/user3/.ssh/id_rsa):
Enter passphrase for "/home/user3/.ssh/id_rsa" (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/user3/.ssh/id_rsa
Your public key has been saved in /home/user3/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:7dykugyaB5xyl2vKaXRDw01g8qztP2raP6iaD5nUHUK user3@system.example.com
The key's randomart image is:
+---[RSA 3072]----+
| . E. |
| * .. |
| .=o |
| .++.. |
| ..oooS .. |
| ..o*.= o + |
| ++ o+ + . |
| .+=*o. |
| o+XBoo+ |
+---[SHA256]----+
[user3@system ~]$
```

### 2- Copy Public Key to Remote VM



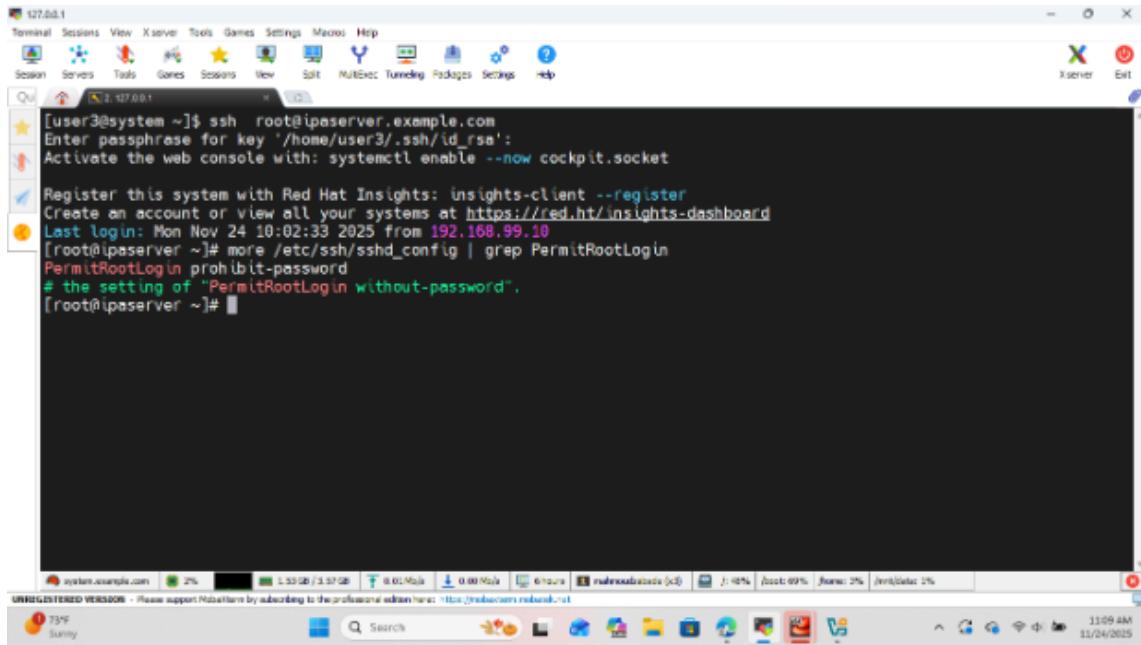
```
[root@system ~]# su - user3
Last login: Sun Nov 23 18:14:39 EET 2025 on pts/0
[user3@system ~]$ ssh-copy-id root@ipaserver.example.com
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/user3/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
(root@ipaserver.example.com) Password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'root@ipaserver.example.com'"
and check to make sure that only the key(s) you wanted were added.

[user3@system ~]$
```

### 3- Test Password less SSH

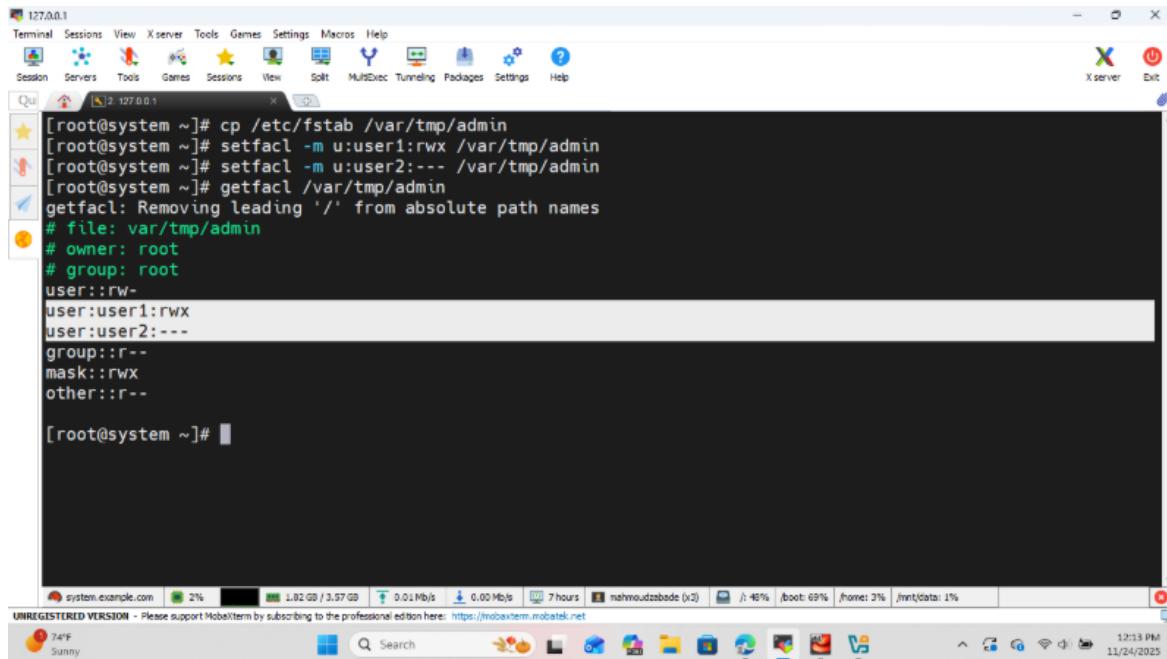


```
[user3@system ~]$ ssh root@ipaserver.example.com
Enter passphrase for key '/home/user3/.ssh/id_rsa':
Activate the web console with: systemctl enable --now cockpit.socket

Register this system with Red Hat Insights: insights-client --register
Create an account or view all your systems at https://red.ht/insights-dashboard
>Last login: Mon Nov 24 10:02:33 2025 from 192.168.99.10
[root@ipaserver ~]# more /etc/ssh/sshd_config | grep PermitRootLogin
PermitRootLogin prohibit-password
# the setting of "PermitRootLogin without-password".
[root@ipaserver ~]#
```

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## Part4: Permissions

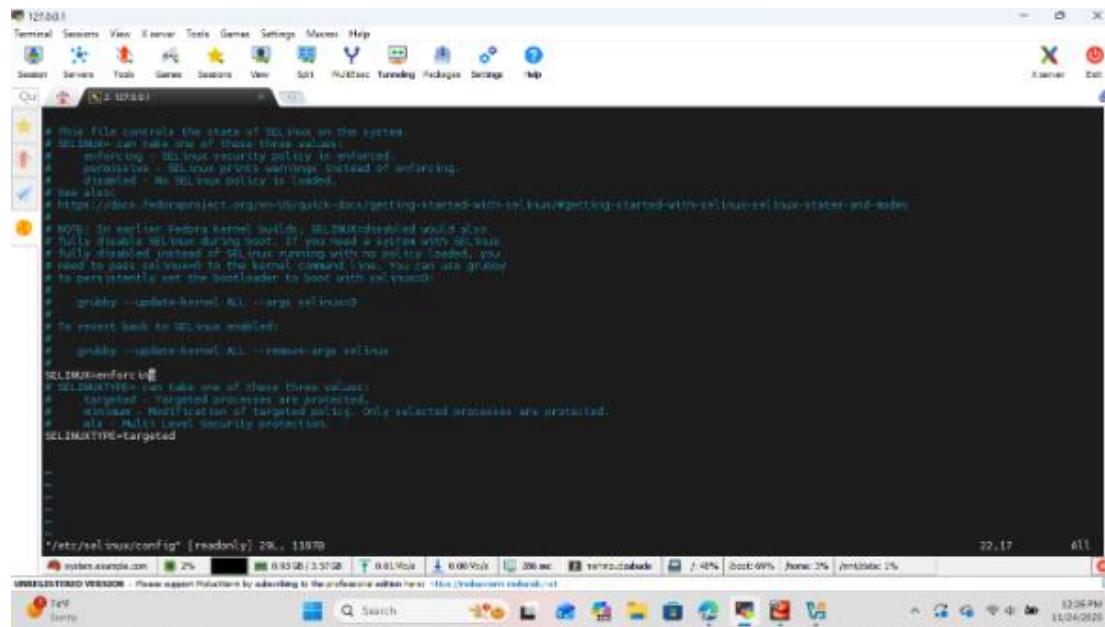


```
[root@system ~]# cp /etc/fstab /var/tmp/admin
[root@system ~]# setfacl -m u:user1:rwx /var/tmp/admin
[root@system ~]# setfacl -m u:user2:--- /var/tmp/admin
[root@system ~]# getfacl /var/tmp/admin
getfacl: Removing leading '/' from absolute path names
# file: var/tmp/admin
# owner: root
# group: root
user::rw-
user:user1:rwx
user:user2:---
group::r--
mask::rwx
other::r--
```

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## Part 5: SELinux

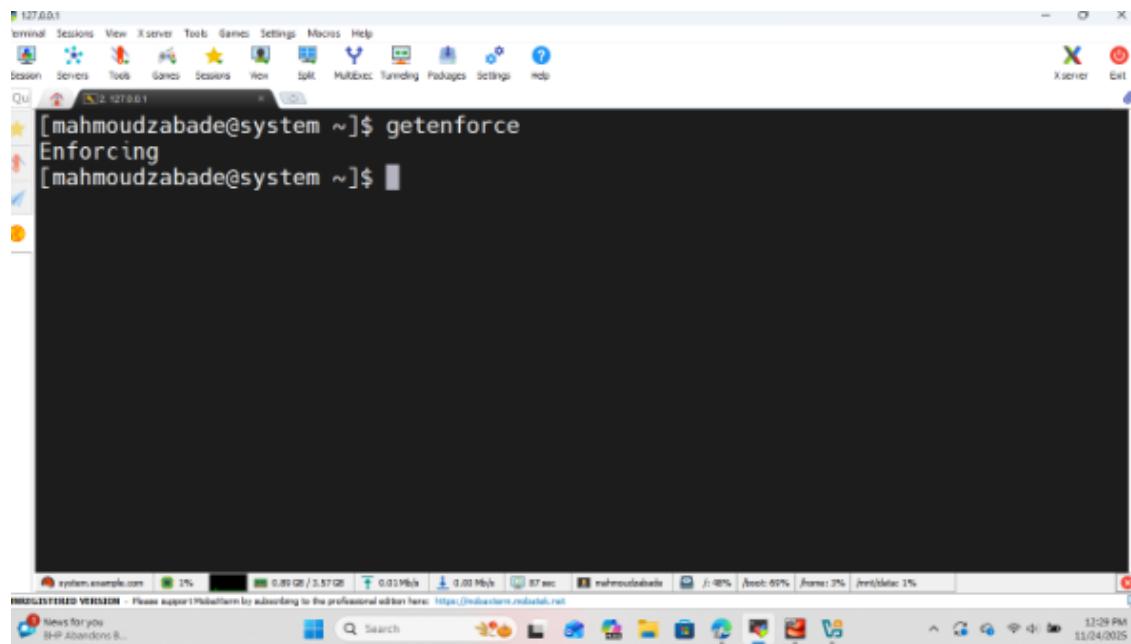
### 1- Open /etc/selinux/config file and change the mode into enforcing



```
127.0.0.1
Terminal Sessions View Xserver Tools Games Settings Mouse Help
Server Servers Tools Games Sessions View Split Multiboot Tutorials Packages Settings Help
Qua S: 427.0.0.1
This file controls the state of SELinux on this system
SELINUX can take one of these three values:
    enforcing - SELinux security policy is enforced
    permissive - SELinux prints warnings instead of enforcing
    disabled - No SELinux policy is loaded
See also:
    http://www.fedoraproject.org/en-US/quick-docs/getting-started-with-selinux/Writing-a-started-with-selinux-selinux-states-and-titles
Note: In newer Fedora kernel builds, SELinux-enabled would also
      imply disabling SELinux. To do so, you need a kernel with SELinux
      built-in, but disabled. To do this, you need to edit the kernel command line. You can use grub2
      to persistently set the bootloader to boot with selinux=0
      or
      grub2 --update-kernel=ALL --force-args selinux=0
To revert back to previous settings:
      grub2 --update-kernel=ALL --remove-args selinux
SELINUXTYPE=enforcing
SELINUXTYPE can take one of these three values:
    targeted - Targeted processes are protected
    permissive - Modification of targeted policy; only selected processes are protected
    disabled - Full SELinux security protection
SELINUXTYPE=targeted

"/etc/selinux/config" (readonly) 29 / 11879
32.17 611
system.example.com 2% 0.93 GB / 3.57 GB 0.01 MB/s 0.00 MB/s 200 ms matmosdatabase 748% boot:69% home:2% jenkins:1%
UNREGISTERED VERSION - Please support Indicatech by subscribing to the professional edition here: https://indicatech.industries/
12:28 PM 11/24/2025
```

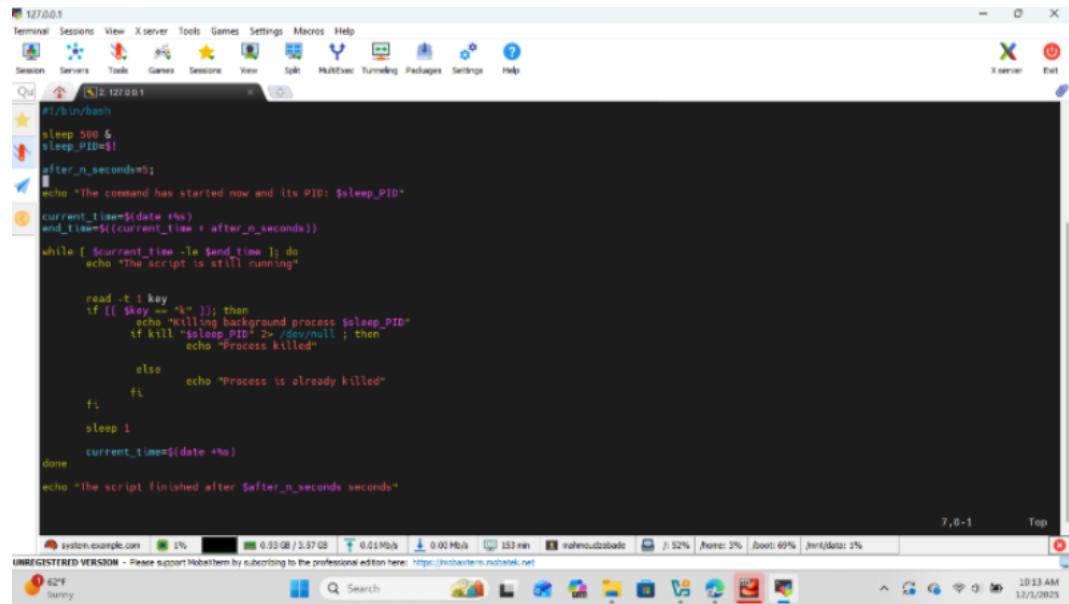
### 2- Reboot and check the SELinux mode



```
127.0.0.1
Terminal Sessions View Xserver Tools Games Settings Mouse Help
Server Servers Tools Games Sessions View Split Multiboot Tutorials Packages Settings Help
Qua S: 127.0.0.1
[mahmoudzabade@system ~]$ getenforce
Enforcing
[mahmoudzabade@system ~]$ ■
127.0.0.1
system.example.com 2% 0.89 GB / 3.57 GB 0.01 MB/s 0.00 MB/s 87 ms matmosdatabase 748% boot:69% home:2% jenkins:1%
UNREGISTERED VERSION - Please support Indicatech by subscribing to the professional edition here: https://indicatech.industries/
News for you
8-HP Abandon B...
Search 12:29 PM 11/24/2025
```

## Part 6: bash script and processes

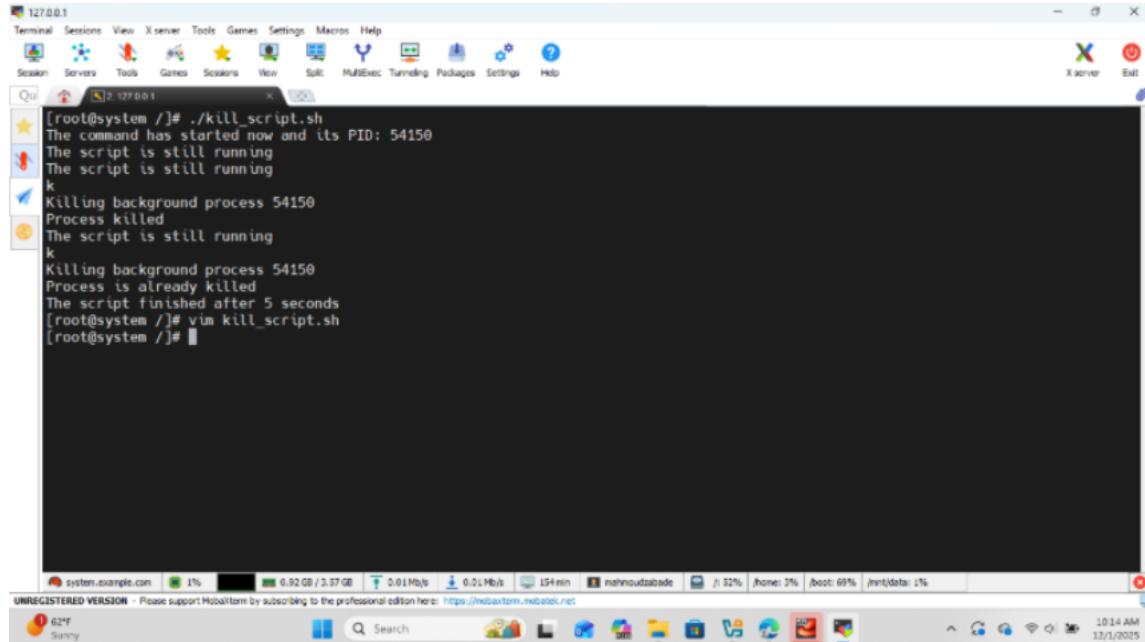
1- shell script that will run for n seconds and the process will be killed after the user enters 'k' character.



```
#!/bin/bash
sleep 500 &
sleep_PID=$!
after_n_seconds=5
echo "The command has started now and its PID: $sleep_PID"
current_time=$(date +%s)
end_time=$((current_time + after_n_seconds))
while [ $(current_time -w $end_time) -gt 0 ]; do
    echo "The script is still running"

    read -t 1 key
    if [[ $key == "k" ]]; then
        echo "Killing background process $sleep_PID"
        if kill "$sleep_PID" > /dev/null ; then
            echo "Process killed"
        else
            echo "Process is already killed"
        fi
        sleep 1
    current_time=$(date +%s)
done
echo "The script finished after $after_n_seconds seconds"
```

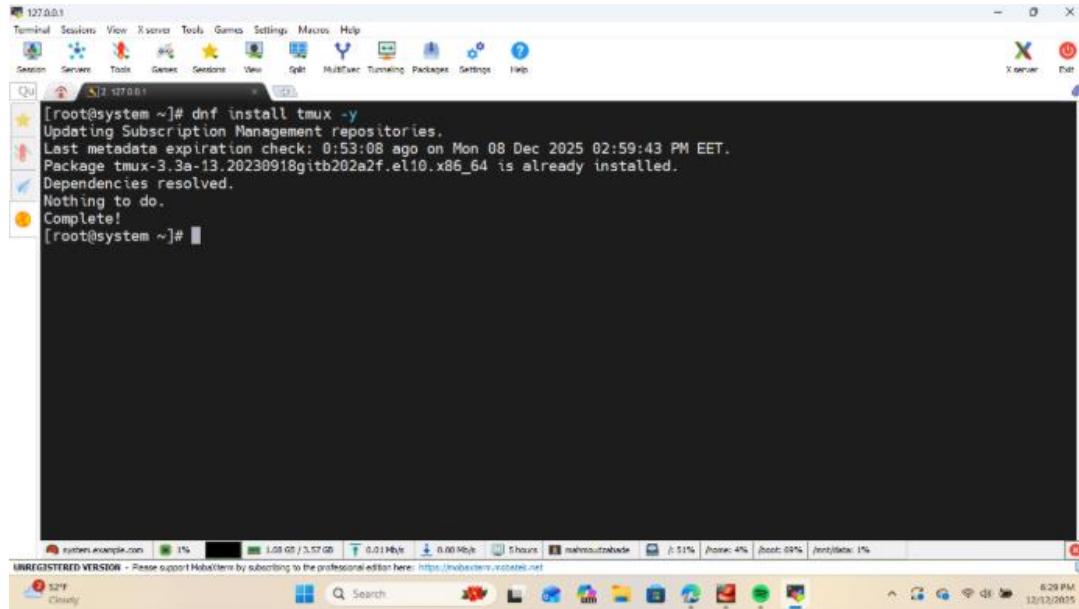
2- shell Run the script and check the results



```
[root@system /]# ./kill_script.sh
The command has started now and its PID: 54150
The script is still running
The script is still running
k
Killing background process 54150
Process killed
The script is still running
k
Killing background process 54150
Process is already killed
The script finished after 5 seconds
[root@system /]# vim kill_script.sh
[root@system /]#
```

## Part 7: Yum Repo

### 1- Install tmux

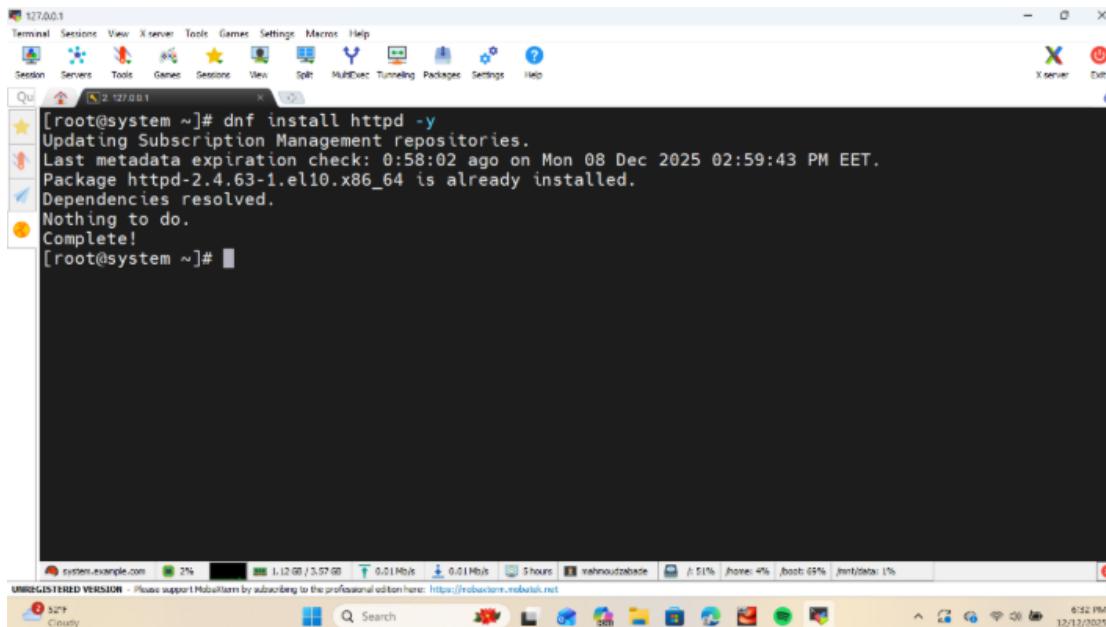


The screenshot shows a terminal window titled '127.0.0.1' running on the Xserver application. The window contains the following command and its output:

```
[root@system ~]# dnf install tmux -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:53:08 ago on Mon 08 Dec 2025 02:59:43 PM EET.
Package tmux-3.3a-13.20230918gitb202a2f.el10.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@system ~]#
```

The Xserver interface includes a toolbar at the top with various icons for Sessions, Tools, Games, etc. Below the terminal window is a status bar showing network activity and system statistics. The desktop background is visible at the bottom.

### 2- Install Apache server



The screenshot shows a terminal window titled '127.0.0.1' running on the Xserver application. The window contains the following command and its output:

```
[root@system ~]# dnf install httpd -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:58:02 ago on Mon 08 Dec 2025 02:59:43 PM EET.
Package httpd-2.4.63-1.el10.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@system ~]#
```

The Xserver interface includes a toolbar at the top with various icons for Sessions, Tools, Games, etc. Below the terminal window is a status bar showing network activity and system statistics. The desktop background is visible at the bottom.

### 3- Install MySQL

- install MySQL repository

```
Terminal Sessions View Xfce4 Tools Games Settings Macros Help
Session Servers Tools Games Sensors View SSH Network Tiling Padots Settings Help
[Qu] [S 107.61] x 13
[root@system ~]# curl -J https://repo.mysql.com/mysql-8.0-community-release-el8.rpm
  % Total    % Received =========  Speed   Estimated Time    Time
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--
Last metadata expiration check: 1:00:00 ago on Mon 08 Dec 2015 02:50:43 PM EET.
mysql80-community-release-el8.rpm
Dependencies resolved.

Package          Architecture Version       Repository      Size
Installing:
mysql80-community-release.noarch        el8_64        @mainline      13 B

Transaction Summary
Install 1 Package

Total size: 13 B
Installed size: 13 B
Is this ok [y/N]: y
Downloading Packages:
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction install
Preparing...                          1/1
  Installing : mysql80-community-release-el8-5.noarch           1/1
Installed products updated.

Installed:
  mysql80-community-release-el8-5.noarch

Complete!
[root@system ~]#
```

- search of MySQL server and from which repo

```
[root@system ~]# dnf info mysql-community-server
Updating Subscription Management repositories.
Last metadata expiration check: 0:07:00 ago on Mon 08 Dec 2025 04:06:05 PM EET.
Available Packages
Name        : mysql-community-server
Version     : 8.0.44
Release     : 1.el9
Architecture: x86_64
Size        : 50 M
Source      : mysql-community-8.0.44-1.el9.src.rpm
Repository   : mysql80-community
Summary     : A very fast and reliable SQL database server
URL         : http://www.mysql.com/
License      : Copyright (c) 2000, 2025, Oracle and/or its affiliates. Under GPLv2 license as shown in the
               Description field.
Description  : The MySQL(TM) software delivers a very fast, multi-threaded, multi-user,
               and robust SQL (Structured Query Language) database server. MySQL Server
               is intended for mission-critical, heavy-load production systems as well
               as for embedding into mass-deployed software. MySQL is a trademark of
               Oracle and/or its affiliates
:
:
:
The MySQL software has Dual Licensing, which means you can use the MySQL
```

- install MySQL server

The screenshot shows a terminal window titled '127.0.1' running on a Linux system. The user is attempting to install MySQL Community Server using 'dnf'. The command entered is 'dnf install mysql-community-server -y'. The output shows several dependency conflicts, particularly with MariaDB packages. The terminal window has a light blue background and uses color-coded icons for different session types (yellow star, green checkmark, red error, orange warning). The bottom of the window shows a status bar with system information like CPU usage and memory.

```
[root@system ~]# dnf install mysql-community-server -y
Last metadata expiration check: 0:18:21 ago on Mon 08 Dec 2025 04:06:05 PM EET.
Error:
  Problem: problem with installed package mariadb-client-utils-3:10.11.11-1.el10.x86_64
    - package mariadb-client-utils-3:10.11.11-1.el10.x86_64 from @System requires mariadb(x86-64) = 3:10.11.11-1.el10, but none of the providers can be installed
      - package mariadb-client-utils-3:10.11.11-1.el10.x86_64 from AppStream requires mariadb(x86-64) = 3:10.11.11-1.el10, but none of the providers can be installed
        - package mariadb-client-utils-3:10.11.11-1.el10.x86_64 from zabbix requires mariadb(x86-64) = 3:10.11.11-1.el10, but none of the providers can be installed
          - package mariadb-3:10.11.11-1.el10.x86_64 from @System conflicts with mysql-server provided by mysql-community-server-8.0.44-1.el9.x86_64 from mysql80-community
            - package mariadb-3:10.11.11-1.el10.x86_64 from AppStream conflicts with mysql-server provided by mysql-community-server-8.0.44-1.el9.x86_64 from mysql80-community
              - package mariadb-3:10.11.11-1.el10.x86_64 from zabbix conflicts with mysql-server provided by mysql-community-server-8.0.44-1.el9.x86_64 from mysql80-community
                - cannot install the best candidate for the job
                  (try to add '--allow-rasing' to command line to replace conflicting packages or '--skip-broken' to skip uninstalled packages or '--nobeast' to use not only best candidate packages)
[root@system ~]#
```

## 4- Install Zabbix packages

- **Install Zabbix repo**

The screenshot shows a terminal window titled '127.0.1' running on a Linux system. The user is downloading a Zabbix repository rpm file using 'rpm'. The command entered is 'rpm -Uvh https://repo.zabbix.com/zabbix/7.0/rhel/10/x86\_64/zabbix-release-latest-7.0.el10.noarch.rpm'. The output shows the download and verification process. The terminal window has a light blue background and uses color-coded icons for different session types. The bottom of the window shows a status bar with system information like CPU usage and memory.

```
[root@system ~]# rpm -Uvh https://repo.zabbix.com/zabbix/7.0/rhel/10/x86_64/zabbix-release-latest-7.0.el10.noarch.rpm
Retrieving https://repo.zabbix.com/zabbix/7.0/rhel/10/x86_64/zabbix-release-latest-7.0.el10.noarch.rpm
warning: /var/tmp/rpm-tmp.nbcPBV: Header V4 RSA/SHA512 Signature, key ID b5333005: NOKEY
Preparing...                                           ###### [100%]
Verifying...                                         ###### [100%]
  package zabbix-release-7.0-7.el10.noarch is already installed
[root@system ~]#
```

- **Download (mirror) all the rpm files**

```
[root@system zabbix]# sudo resync -s /var/www/html/zabbix --re
root@zabbix: ~$ sudo resync -s /var/www/html/zabbix --re
[10/251]: zabbix-agent - 7.0.21-re 174 MB/s | 636 KB  00:00
[11/251]: zabbix-agent2 - 7.0.21 - 1.7 MB/s | 6.2 MB  00:03
[12/251]: zabbix-agent2 - 7.0.15 - 1.2 MB/s | 6.2 MB  00:05
[13/251]: zabbix-agent2 - 7.0.17 - 1.9 MB/s | 6.2 MB  00:03
[14/251]: zabbix-agent2 - 7.0.38 - 2.5 MB/s | 6.3 MB  00:02
[15/251]: zabbix-agent2 - 7.0.38 - 2.6 MB/s | 6.3 MB  00:02
[16/251]: zabbix-agent2 - 7.0.19 - 2.6 MB/s | 6.3 MB  00:02
[17/251]: zabbix-agent2 - 7.0.29 - 2.5 MB/s | 6.3 MB  00:02
[18/251]: zabbix-agent2 - 7.0.21 - 2.1 MB/s | 6.3 MB  00:02
[19/251]: zabbix-agent2 - 7.0.23 - 2.5 MB/s | 6.3 MB  00:02
[20/251]: zabbix-agent2 - 7.0.16 - 439 KB/s | 6.2 MB  00:14
[21/251]: zabbix-agent2-plugin - 884 KB/s | 1.5 MB  00:02
[22/251]: zabbix-agent2-plugin - 1.5 MB/s | 1.5 MB  00:01
[23/251]: zabbix-agent2-plugin - 1.7 MB/s | 1.5 MB  00:00
```

- Download the dependencies

Here are all the dependencies needed for all the packages

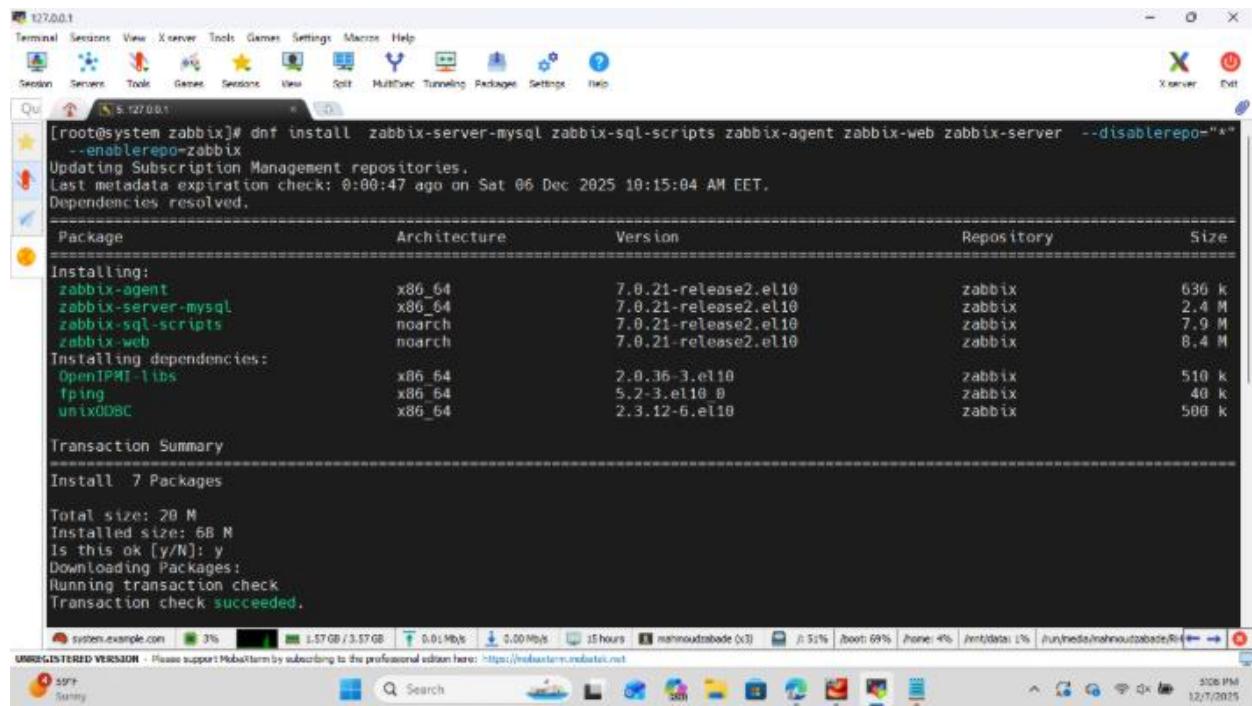
## Download the dependencies

```
[root@system zabbix]# dnf --enablerepo=AppStream --enablerepo=BaseOS download msqlx-filesystem php-bcmath php-common php-fpm php-gd php-ldap php-mbstring php-mysqlnd php-xsl OpenIPMI libx unixODBC
Updating Subscription Management repositories.
Last metadata expiration check: 0:00:40 ago on Sat 06 Dec 2025 09:21:02 AM EET.
[root@system zabbix]# [root@system zabbix]#
```

- **Create the metadata file**

```
[root@system zabbix]# createrepo /zabbix/
Directory walk started
Directory walk done - 263 packages
Temporary output repo path: /zabbix/.repodata
Pool started (with 5 workers)
Pool finished
[root@system zabbix]# ls
fping-5.2-3.el10.x86_64.rpm
mysql-filesystem-1.26.3-1.el10.noarch.rpm
OpenIPMI-libs-2.0.36-3.el10.x86_64.rpm
php-bcmath-0.3.15-1.el10.x86_64.rpm
php-common-0.3.15-1.el10.x86_64.rpm
php-fpm-0.3.15-1.el10.x86_64.rpm
php-gd-0.3.15-1.el10.x86_64.rpm
php-ldap-0.3.15-1.el10.x86_64.rpm
php-mbstring-0.3.15-1.el10.x86_64.rpm
php-mysqlnd-0.3.15-1.el10.x86_64.rpm
php-xml-0.3.15-1.el10.x86_64.rpm
repodata
unixODBC-2.3.12-6.el10.x86_64.rpm
zabbix-agent2-7.0.14-release1.el10.x86_64.rpm
zabbix-agent2-7.0.15-release1.el10.x86_64.rpm
zabbix-agent2-7.0.16-release1.el10.x86_64.rpm
zabbix-agent2-7.0.17-release1.el10.x86_64.rpm
zabbix-agent2-7.0.18-release1.el10.x86_64.rpm
zabbix-agent2-7.0.19-release1.el10.x86_64.rpm
zabbix-agent2-7.0.20-release1.el10.x86_64.rpm
zabbix-proxy-pgsql-7.0.18-release3.el10.x86_64.rpm
zabbix-proxy-pgsql-7.0.19-release1.el10.x86_64.rpm
zabbix-proxy-pgsql-7.0.20-release1.el10.x86_64.rpm
zabbix-proxy-pgsql-7.0.21-release1.el10.x86_64.rpm
zabbix-proxy-pgsql-7.0.21-release2.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.14-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.15-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.16-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.17-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.18-release3.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.19-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.20-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.21-release1.el10.x86_64.rpm
zabbix-proxy-sqlite3-7.0.22-release2.el10.x86_64.rpm
zabbix-release-7.0-7.el10.noarch.rpm
zabbix-release-7.0-7.el10.noarch.rpm
zabbix-selinux-policy-7.0.14-release1.el10.x86_64.rpm
zabbix-selinux-policy-7.0.15-release1.el10.x86_64.rpm
zabbix-selinux-policy-7.0.16-release1.el10.x86_64.rpm
zabbix-selinux-policy-7.0.17-release1.el10.x86_64.rpm
```

- **Install the packages**



```
[root@system zabbix]# dnf install zabbix-server-mysql zabbix-sql-scripts zabbix-agent zabbix-web zabbix-server --disablerepo="*"
--enablerepo=zabbix
Updating Subscription Management repositories.
Last metadata expiration check: 0:00:47 ago on Sat 06 Dec 2025 10:15:04 AM EET.
Dependencies resolved.
=====
| Package           | Architecture | Version      | Repository | Size |
| =====
| Installing:
|   zabbix-agent    | x86_64       | 7.0.21-release2.el10 | zabbix     | 636 K
|   zabbix-server-mysql | x86_64       | 7.0.21-release2.el10 | zabbix     | 2.4 M
|   zabbix-sql-scripts | noarch      | 7.0.21-release2.el10 | zabbix     | 7.9 M
|   zabbix-web      | noarch      | 7.0.21-release2.el10 | zabbix     | 8.4 M
| Installing dependencies:
|   OpenIPMI-libs   | x86_64       | 2.0.36-3.el10     | zabbix     | 510 k
|   fping            | x86_64       | 5.2-3.el10.0      | zabbix     | 40 k
|   unixODBC        | x86_64       | 2.3.12-6.el10     | zabbix     | 500 K
|
Transaction Summary
=====
Install 7 Packages
```

Total size: 20 M  
Installed size: 68 M  
Is this ok [y/N]: y  
Downloading Packages:  
Running transaction check  
Transaction check succeeded.

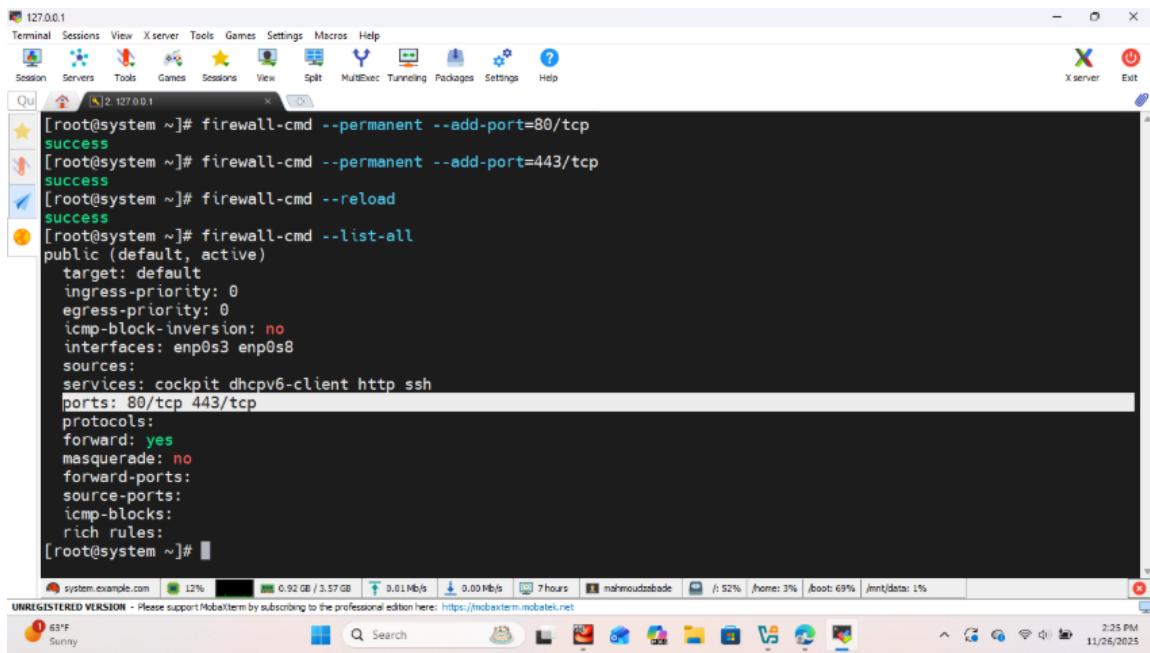
system.example.com 3% 1.57 GB / 3.57 GB 0.01Mbps 0.00Mbps 18 Hours 1/51 /boot: 69% /home: 4% /tmp/data1: 1% /run/media/mahnoutabde/80

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Sunny

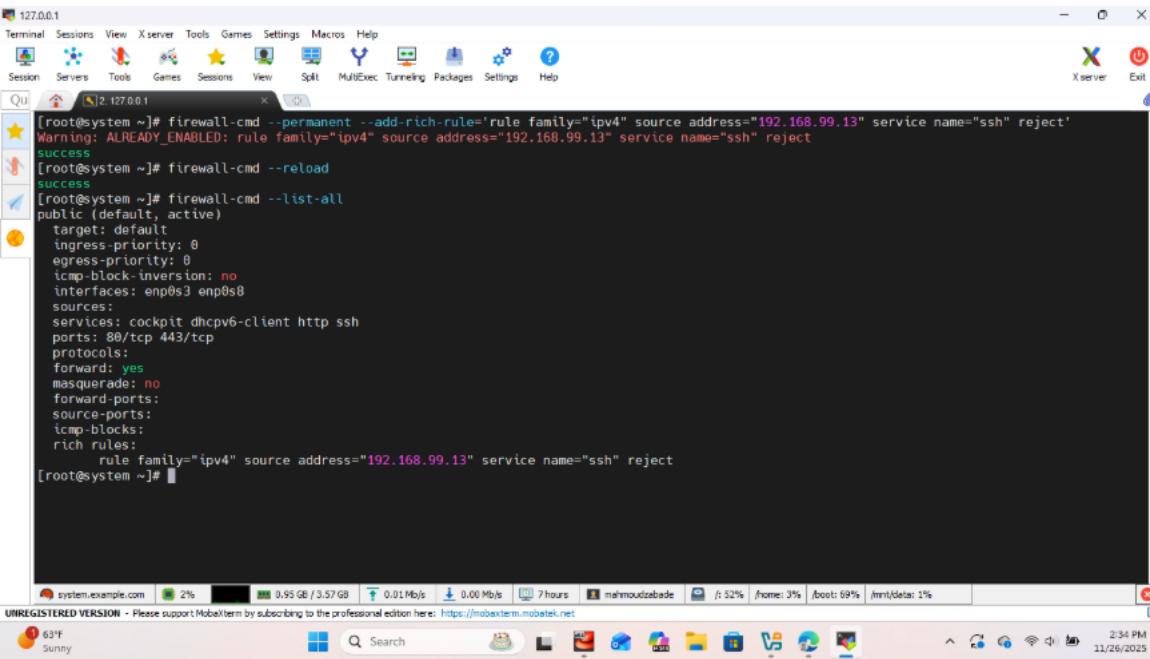
## Part 8: Network management

1- Open Port 80 & 443 and make the changes permanent



```
[root@system ~]# firewall-cmd --permanent --add-port=80/tcp
success
[root@system ~]# firewall-cmd --permanent --add-port=443/tcp
success
[root@system ~]# firewall-cmd --reload
success
[root@system ~]# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3 enp0s8
  sources:
    services: cockpit dhcpv6-client http ssh
  ports: 80/tcp 443/tcp
  protocols:
    forward: yes
    masquerade: no
    forward-ports:
    source-ports:
    icmp-blocks:
    rich rules:
[root@system ~]#
```

## 2- Add rich rule to prevent specific IP



```
[root@system ~]# firewall-cmd --permanent --add-rich-rule='rule family="ipv4" source address="192.168.99.13" service name="ssh" reject'
Warning: ALREADY_ENABLED: rule family="ipv4" source address="192.168.99.13" service name="ssh" reject
success
[root@system ~]# firewall-cmd --reload
success
[root@system ~]# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3 enp0s8
  sources:
    services: cockpit dhcpv6-client http ssh
  ports: 80/tcp 443/tcp
  protocols:
    forward: yes
    masquerade: no
    forward-ports:
    source-ports:
    icmp-blocks:
    rich rules:
      rule family="ipv4" source address="192.168.99.13" service name="ssh" reject
[root@system ~]#
```

## Part 9: Cronjob

### 1-Edit the crontab for the root user

A screenshot of a Linux desktop environment. In the foreground, a terminal window titled '127.0.0.1' shows the command: [root@system ~]# crontab -l. The output is: \* 30 1 \* \* /task\_script.sh. Below the terminal is a system tray with icons for battery (63% Sunny), signal strength, and date/time (11/06/2015 4:02 PM). The desktop background is a light blue gradient.

```
[root@system ~]# crontab -l
* 30 1 * * * /task_script.sh
```

## 2- Shell script to print the logged users with into a log file

A screenshot of a Linux desktop environment. In the foreground, a terminal window titled '127.0.0.1' shows the execution of a shell script named 'task\_script.sh'. The script content is displayed in the terminal. The desktop background is a light blue gradient.

```
[root@system ~]# cat /task_script.sh
#!/bin/bash
output_file=/var/log/user_Tags.log
time=$(date)
users=$(who | cut -d ' ' -f 1 | sort -u | tr '\n' ' ' | sed 's/ /$/')
if [ -z "$users" ]; then
    users="No users logged in"
fi
echo "$time - $users" >> "$output_file"
```

## Part 10: MariaDB

### 1- Install MariaDB from the local repo that was created earlier.

- Download MariaDB packages to the local repo

```
[root@system zabbix]# dnf download --resolve mariadb-server mariadb
Updating Subscription Management repositories.
Extra Packages for Enterprise Linux 10 - x86_64
AppStream Repo
[root@system zabbix]# createrepo --update /zabbix/
Directory walk started
Directory walk done - 269 packages
Loader information about 265 packages
Temporary output repopath: /zabbix/.repodata/
Pool started (with 5 workers)
Pool finished
[root@system zabbix]#
```

system.example.com 1% 1.21 GB / 3.57 GB 0.01 Mb/s 16 min mahmoudzabade (x3) / 51% /boot: 69% /home: 4% /mnt/data: 1% /run/media/mahmoudzabade/RHEL 4:29 PM  
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56°F Mostly sunny

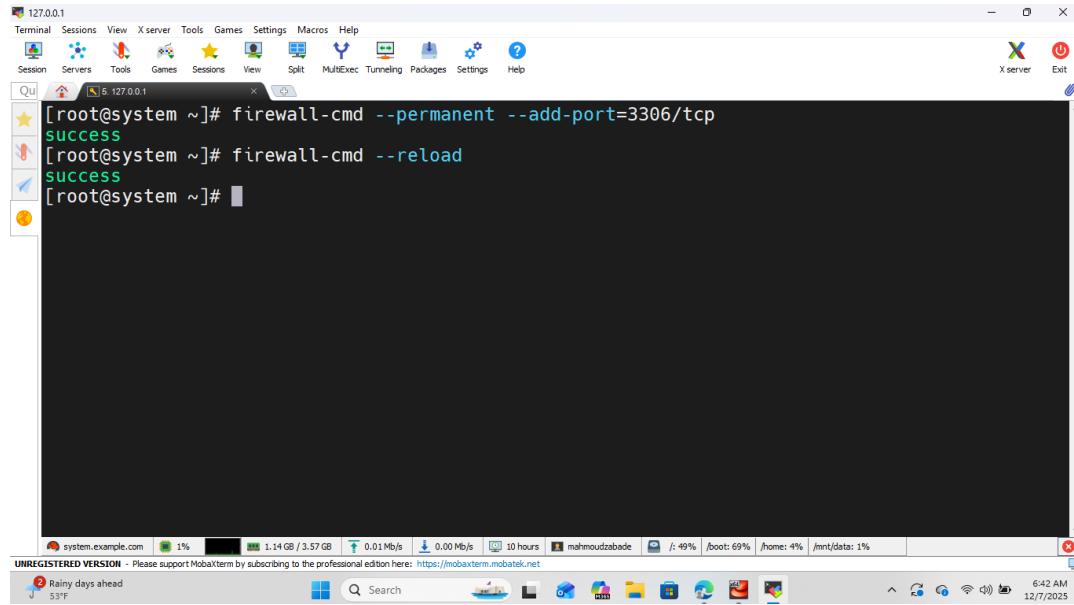
- Install MariaDB

```
[root@system zabbix]# dnf install mariadb-server --disablerepo="" --enablerepo=zabbix
Updating Subscription Management repositories.
zabbix Official Repository - x86_64
Dependencies resolved.
=====
| Package           | Architecture | Version      | Repository | Size   |
| ======           | ======       | ======       | ======     | ===== |
| Installing:      |              |              |            |        |
| mariadb-server   | x86_64       | 3:10.11.11-1.el10 | zabbix    | 9.9 M |
| Installing:      |              |              |            |        |
| mariadb          | x86_64       | 3:10.11.11-1.el10 | zabbix    | 1.6 M |
| Installing:      |              |              |            |        |
| mariadb-backup   | x86_64       | 3:10.11.11-1.el10 | zabbix    | 6.6 M |
| mariadb-client-utils | x86_64       | 3:10.11.11-1.el10 | zabbix    | 41 k  |
| mariadb-gssapi-server | x86_64       | 3:10.11.11-1.el10 | zabbix    | 18 k   |
| mariadb-server-utils | x86_64       | 3:10.11.11-1.el10 | zabbix    | 262 k  |
| Transaction Summary |
| Install 6 Packages |
Total download size: 40 M
Installed size: 116 M
Is this ok [y/N]: y
Downloading Packages:
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing:           1/1
  Installing : mariadb-client-utils-3:10.11.11-1.el10.x86_64 1/6
  Installing : mariadb-backup-3:10.11.11-1.el10.x86_64 2/6
  Installing : mariadb-gssapi-server-3:10.11.11-1.el10.x86_64 3/6
  Installing : mariadb-server-utils-3:10.11.11-1.el10.x86_64 4/6
  Running scriptlet: mariadb-server-3:10.11.11-1.el10.x86_64 5/6
```

system.example.com 1% 1.29 GB / 3.57 GB 0.01 Mb/s 21 min mahmoudzabade (x3) / 51% /boot: 69% /home: 4% /mnt/data: 1% /run/media/mahmoudzabade/RHEL 4:35 PM  
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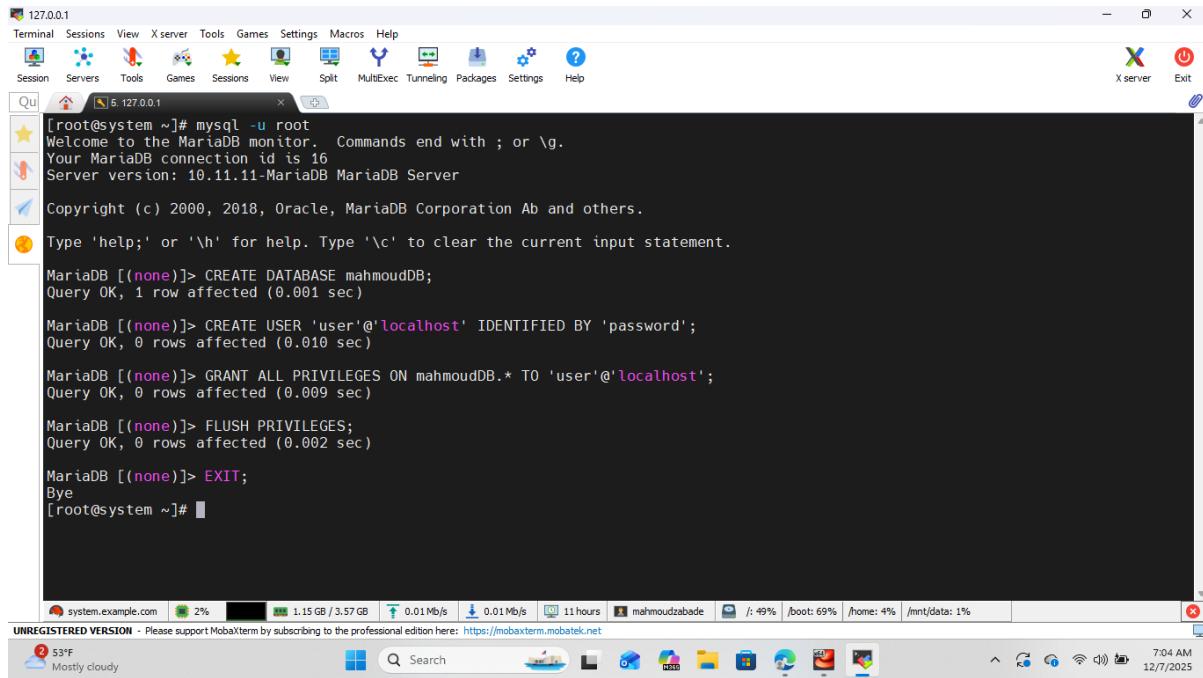
1 inch of rain

## 2- Open ports in the iptables from MariaDB.



```
[root@system ~]# firewall-cmd --permanent --add-port=3306/tcp
success
[root@system ~]# firewall-cmd --reload
success
[root@system ~]#
```

### 3- Create database, user (note: handle permissions).



```
[root@system ~]# mysql -u root
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 16
Server version: 10.11.11-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]> CREATE DATABASE mahmoudDB;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> CREATE USER 'user'@'localhost' IDENTIFIED BY 'password';
Query OK, 0 rows affected (0.010 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON mahmoudDB.* TO 'user'@'localhost';
Query OK, 0 rows affected (0.009 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.002 sec)

MariaDB [(none)]> EXIT;
Bye
[root@system ~]#
```

### 4- Connect to the database created in step 3 using the new user (with password)

```
[root@system ~]# mysql -u user -p mahmoudDB
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 17
Server version: 10.11.11-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [mahmoudDB]> 
```

The desktop taskbar at the bottom shows system status: 2%, 1.15 GB / 3.57 GB, 0.01 Mb/s, 11 hours, mahmoudzabade, /: 49%, /boot: 69%, /home: 4%, /mnt/data: 1%. The date and time are 7:06 AM, 12/7/2025.

## 5- Create a schema

```
[root@system ~]# mysql -u user -p mahmoudDB
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 17
Server version: 10.11.11-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [mahmoudDB]> CREATE TABLE students (
->     student_number VARCHAR(20) PRIMARY KEY,
->     firstname VARCHAR(50),
->     lastname VARCHAR(50),
->     program VARCHAR(30),
->     grad_year INT
-> );
Query OK, 0 rows affected (0.044 sec)

MariaDB [mahmoudDB]> INSERT INTO students (student_number, firstname, lastname, program, grad_year) VALUES
-> ('110-001', 'Allen', 'Brown', 'mechanical', 2017),
-> ('110-002', 'David', 'Brown', 'mechanical', 2017),
-> ('110-003', 'Mary', 'Green', 'mechanical', 2018),
-> ('110-004', 'Dennis', 'Green', 'electrical', 2018),
-> ('110-005', 'Joseph', 'Black', 'electrical', 2018),
-> ('110-006', 'Dennis', 'Black', 'electrical', 2020),
-> ('110-007', 'Ritchie', 'Salt', 'computer science', 2020),
-> ('110-008', 'Robert', 'Salt', 'computer science', 2020),
-> ('110-009', 'David', 'Suzuki', 'computer science', 2020),
-> ('110-010', 'Mary', 'Chen', 'computer science', 2020);
```

The desktop taskbar at the bottom shows system status: 1%, 1.15 GB / 3.57 GB, 0.00 Mb/s, 11 hours, mahmoudzabade, /: 49%, /boot: 69%, /home: 4%, /mnt/data: 1%. The date and time are 7:10 AM, 12/7/2025.

## 6- Verify that the schema is created successfully

127.0.0.1

Terminal Sessions View Xserver Tools Games Settings Macros Help

Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help

X server Exit

Qu 5. 127.0.0.1

```
-> ('110-010', 'Mary', 'Chen', 'computer science', 2020);
Query OK, 10 rows affected (0.011 sec)
Records: 10 Duplicates: 0 Warnings: 0

MariaDB [mahmoudDB]> SELECT * FROM students;
+-----+-----+-----+-----+-----+
| student_number | firstname | lastname | program | grad_year |
+-----+-----+-----+-----+-----+
| 110-001 | Allen | Brown | mechanical | 2017 |
| 110-002 | David | Brown | mechanical | 2017 |
| 110-003 | Mary | Green | mechanical | 2018 |
| 110-004 | Dennis | Green | electrical | 2018 |
| 110-005 | Joseph | Black | electrical | 2018 |
| 110-006 | Dennis | Black | electrical | 2020 |
| 110-007 | Ritchie | Salt | computer science | 2020 |
| 110-008 | Robert | Salt | computer science | 2020 |
| 110-009 | David | Suzuki | computer science | 2020 |
| 110-010 | Mary | Chen | computer science | 2020 |
+-----+-----+-----+-----+
10 rows in set (0.001 sec)

MariaDB [mahmoudDB]> EXIT;
Bye
[root@system ~]#
```

system.example.com 1% 1.16 GB / 3.57 GB 0.01Mb/s 0.00 Mb/s 11 hours mahmoudzabade : 49% /boot: 69% /home: 4% /mnt/data: 1%

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7:12 AM 12/7/2025