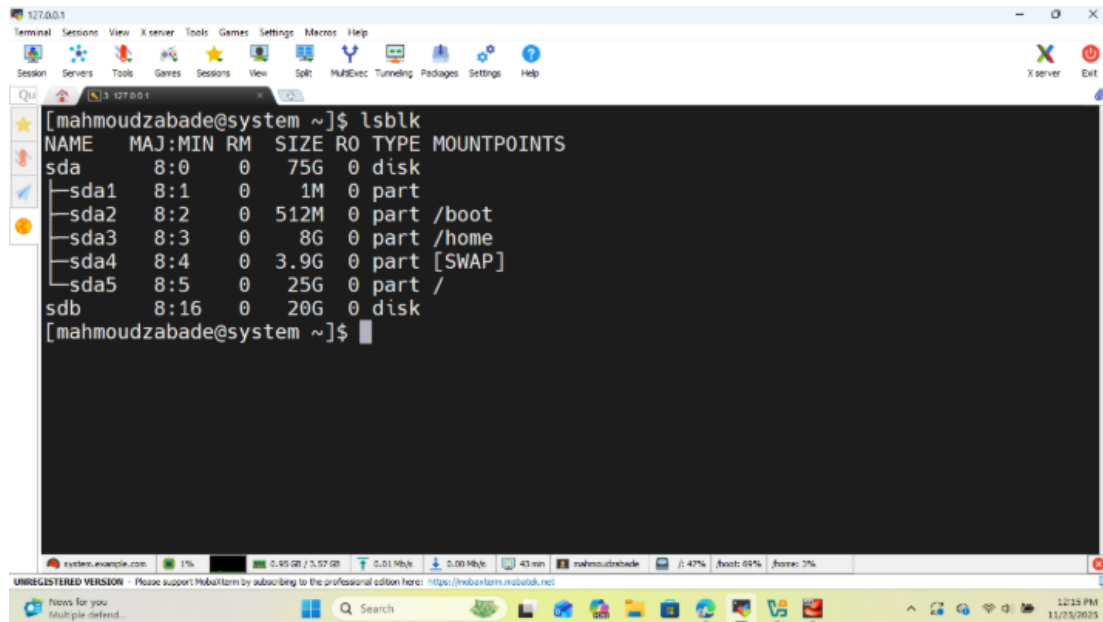


Task1

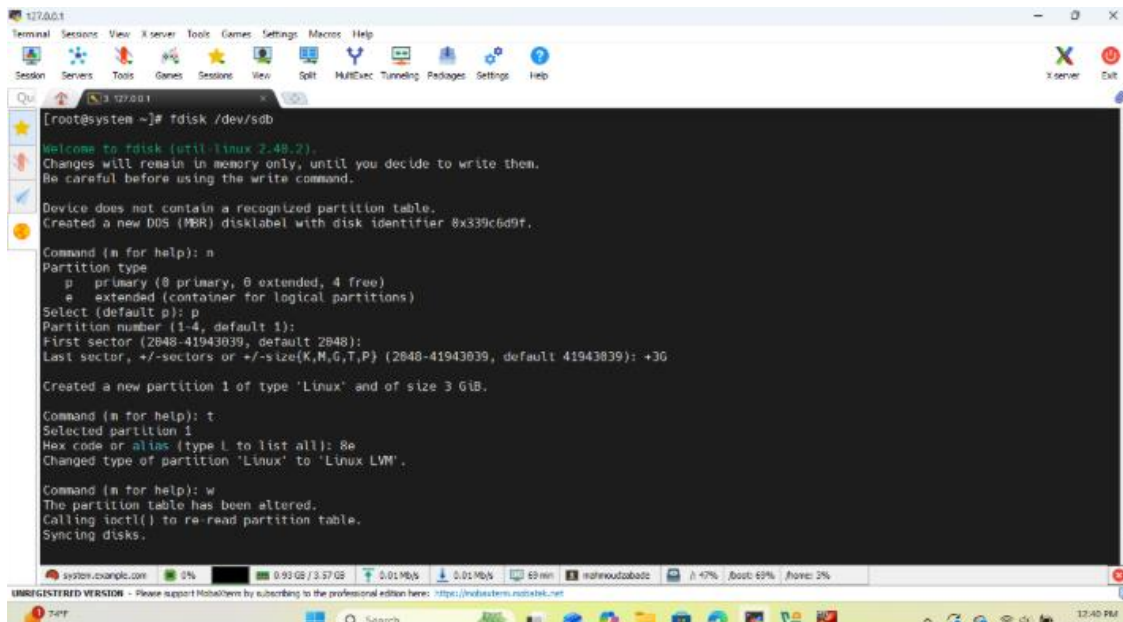
Part1: LVM

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
```

2- Create a partition



```
[root@system ~]# fdisk /dev/sdb
Welcome to fdisk (util-linux 2.40.2).
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 DOS (MBR) disklabel with disk identifier 8x339c6d9f.

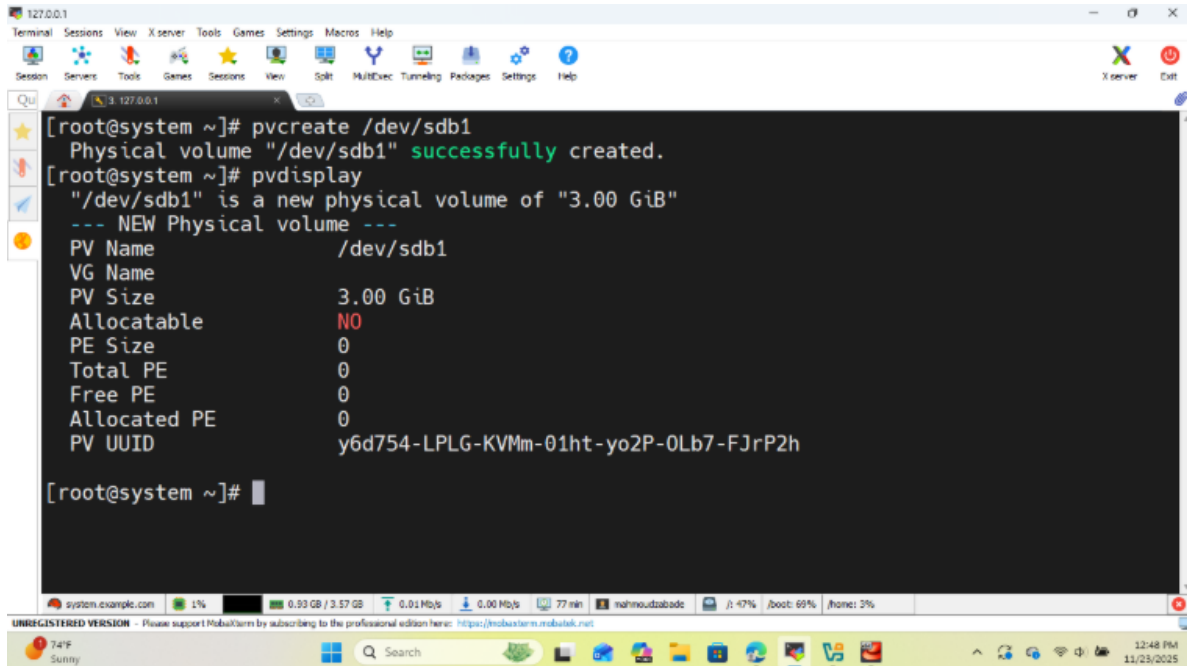
Command (m for help): n
Partition type
  p   primary (0 primary, 0 extended, 4 free)
  e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-41943039, default 2048):
Last sector, +/-sectors or +/-size(K,M,G,T,P) (2048-41943039, default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



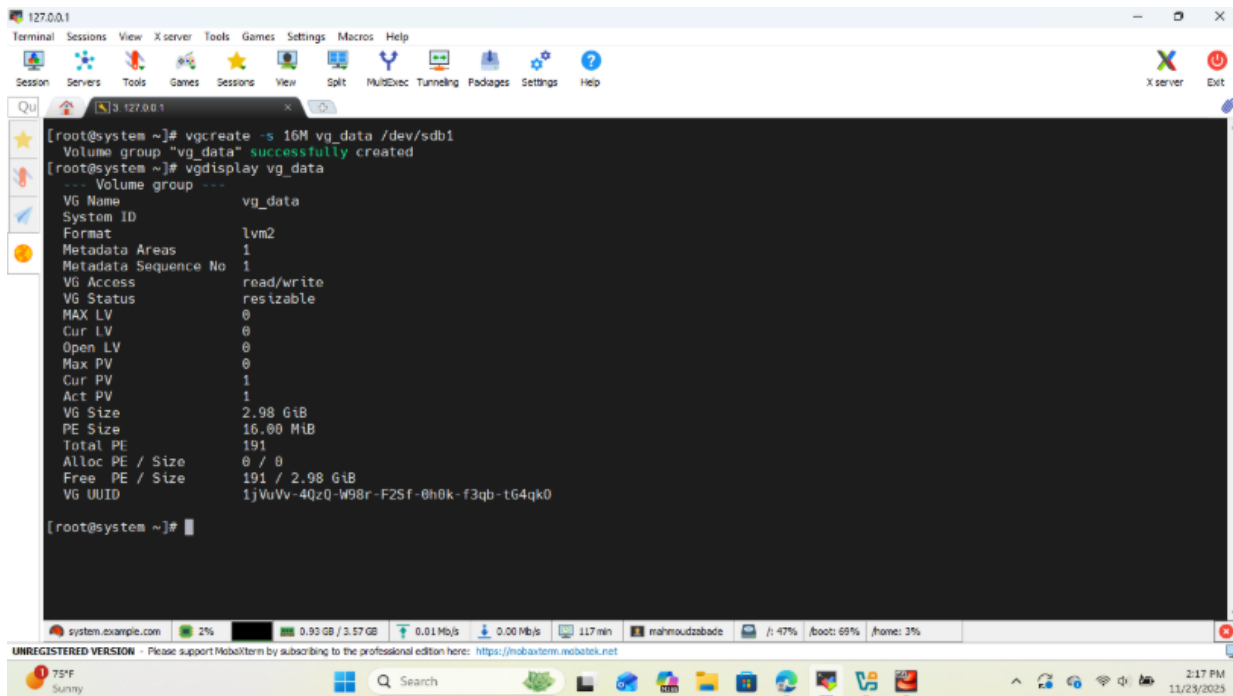
The screenshot shows a terminal window with the following commands and output:

```
[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 ~]#
```

The terminal window is titled "127.0.0.1" and has a menu bar with "Terminal", "Sessions", "View", "X server", "Tools", "Games", "Settings", "Macros", and "Help". The status bar at the bottom shows system information like "74°F Sunny" and "11/23/2025".

4- Create Volume Group (VG)



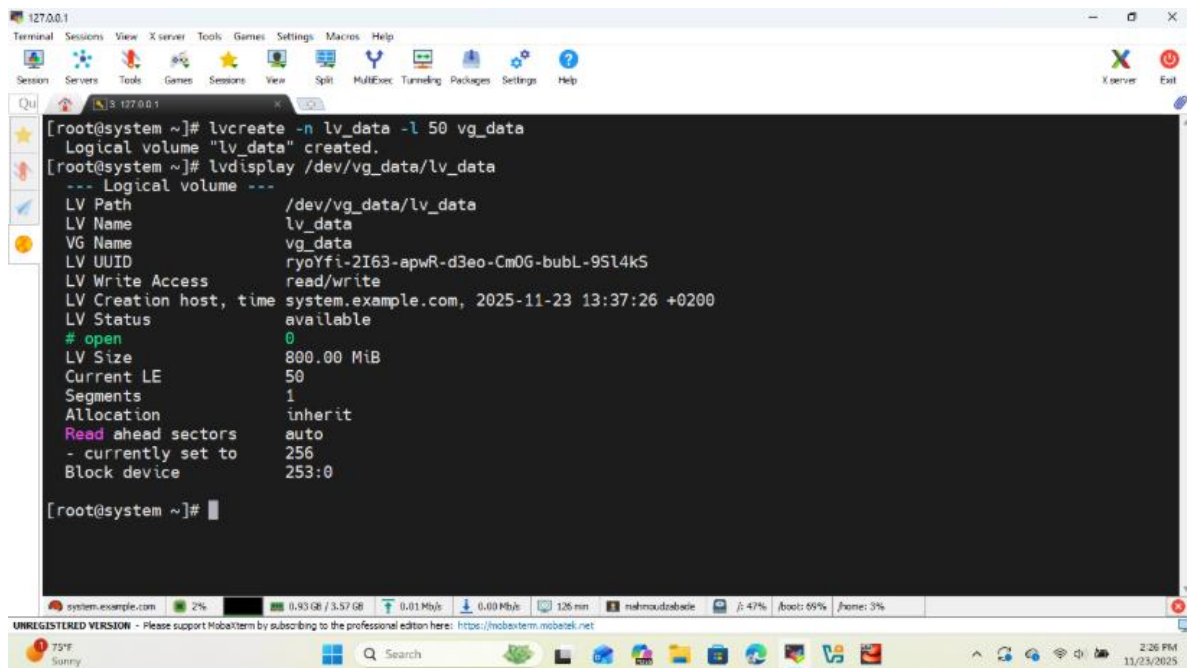
The screenshot shows a terminal window with the following commands and output:

```
[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                 0
Cur LV                 0
Open LV                 0
Max PV                 0
Cur PV                 1
Act PV                 1
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                1jVuVv-4QzQ-W98r-F2Sf-0h0k-f3qb-t64qk0

[root@system ~]#
```

The terminal window is titled "127.0.0.1" and has a menu bar with "Terminal", "Sessions", "View", "X server", "Tools", "Games", "Settings", "Macros", and "Help". The status bar at the bottom shows system information like "75°F Sunny" and "11/23/2025".

5- Create Logical Volume (LV)



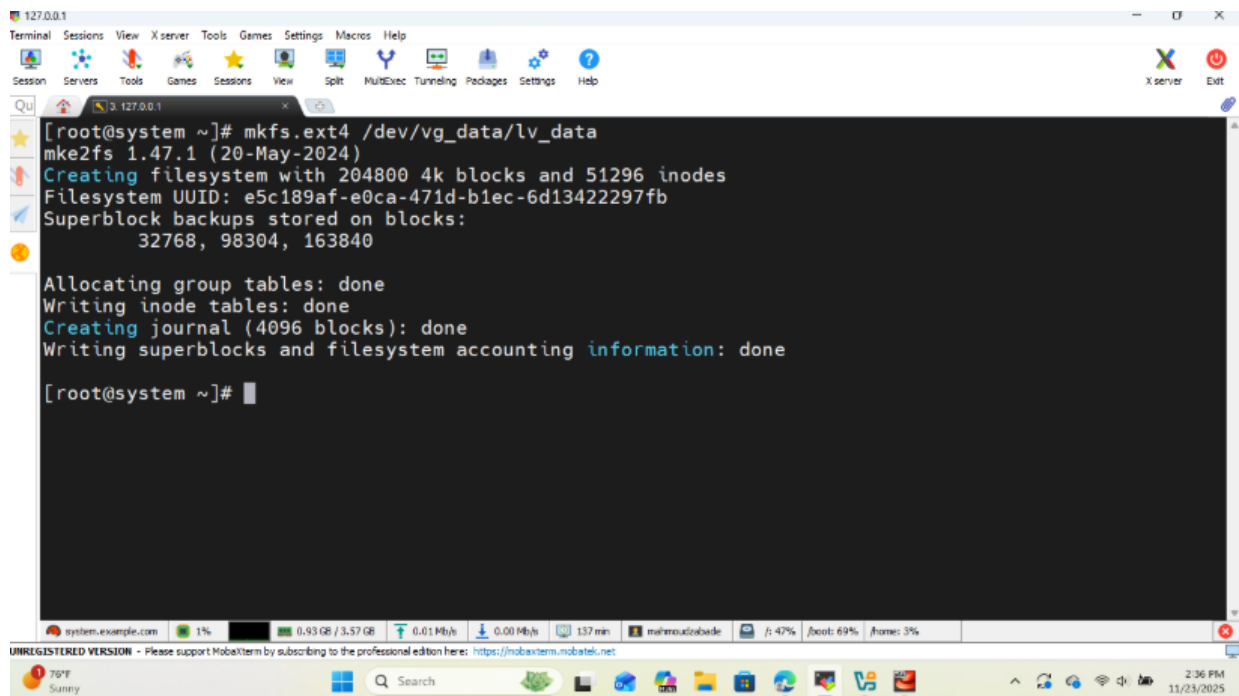
The screenshot shows a terminal window titled '127.0.0.1' with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal content is as follows:

```
[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                 ryoYfi-2I63-apwR-d3eo-Cm0G-bubL-9S14kS
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 bottom status bar of the terminal shows system information: system.example.com, 2%, 0.93 GB / 3.57 GB, 0.01 Mbit/s, 0.00 Mbit/s, 126 min, mehrouzabade, 47%, /boot: 69%, /home: 3%, and a weather widget for 73°F Sunny.

6- Create Ext4 Filesystem



The screenshot shows a terminal window titled '127.0.0.1' with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal content is as follows:

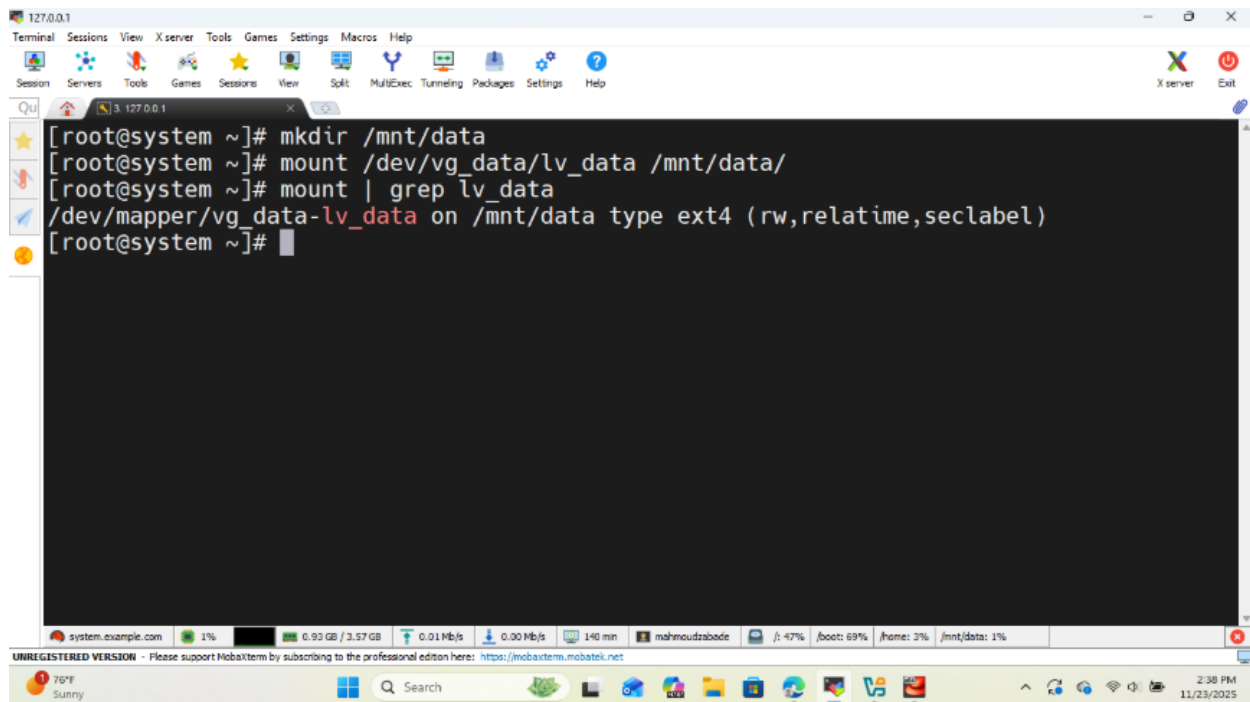
```
[root@system ~]# mkfs.ext4 /dev/vg_data/lv_data
mke2fs 1.47.1 (20-May-2024)
Creating filesystem with 204800 4k blocks and 51296 inodes
Filesystem UUID: e5c189af-e0ca-471d-b1ec-6d13422297fb
Superblock backups stored on blocks:
    32768, 98304, 163840

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

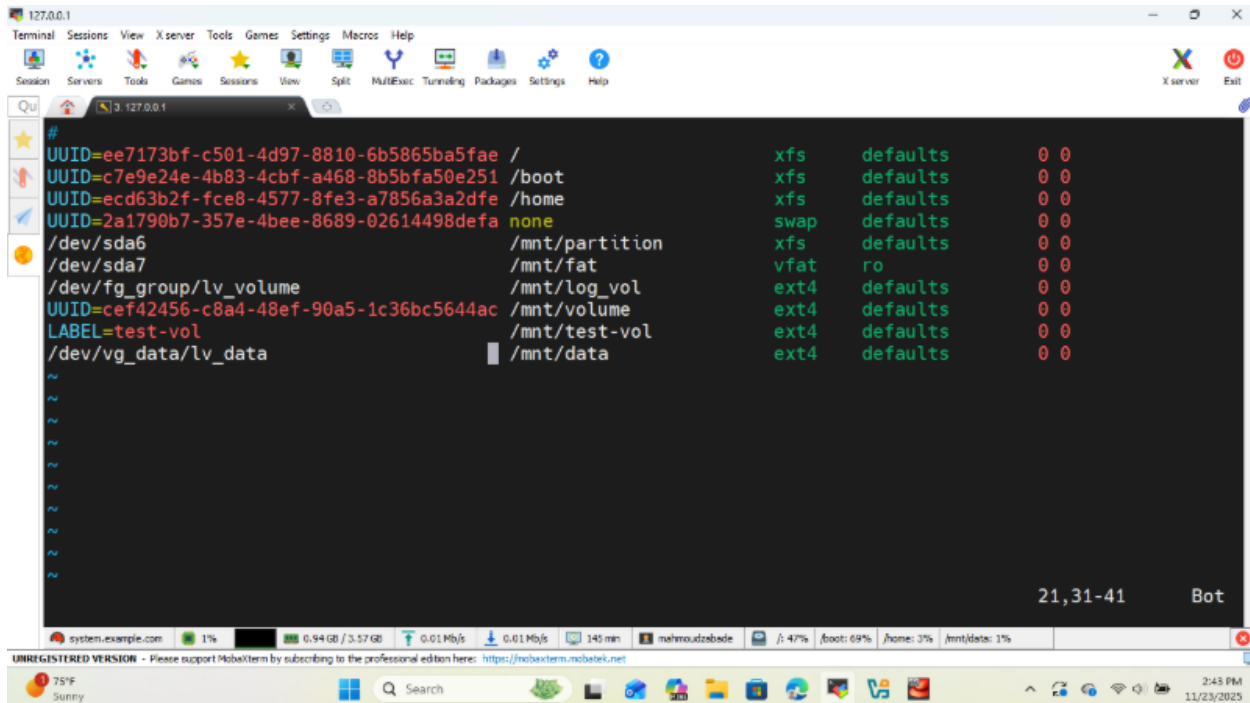
[root@system ~]#
```

The bottom status bar of the terminal shows system information: system.example.com, 1%, 0.93 GB / 3.57 GB, 0.01 Mbit/s, 0.00 Mbit/s, 137 min, mehrouzabade, 47%, /boot: 69%, /home: 3%, and a weather widget for 78°F Sunny.

7- Mount the LV

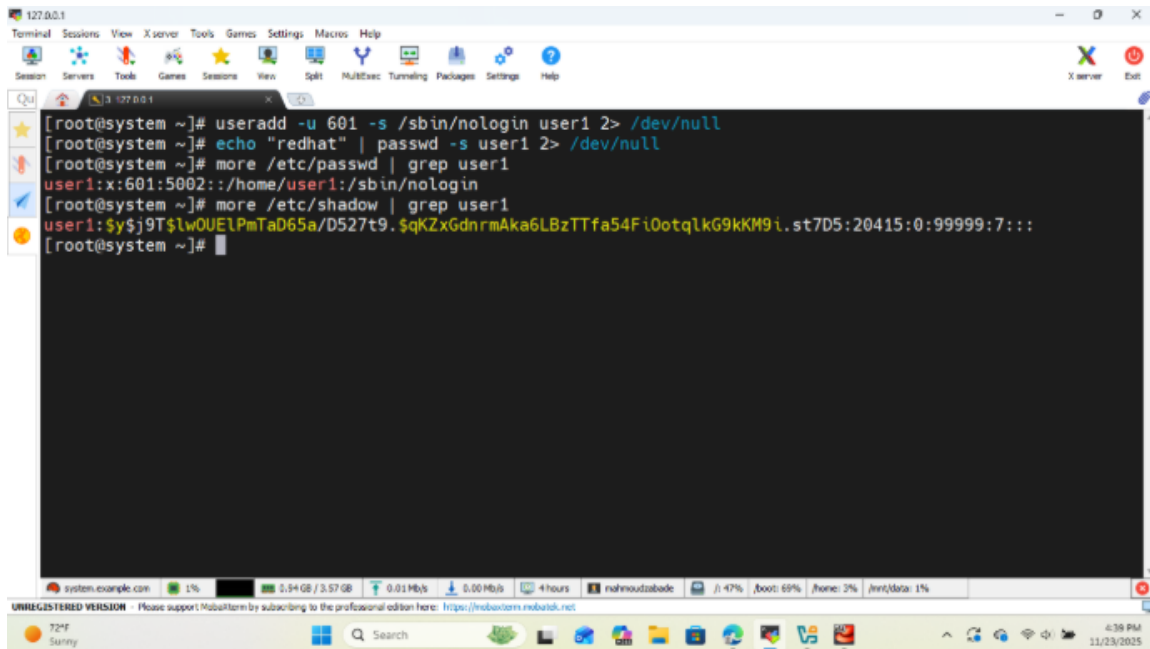


8- Configure Automatic Mount



Part2: Users, Groups and Permissions

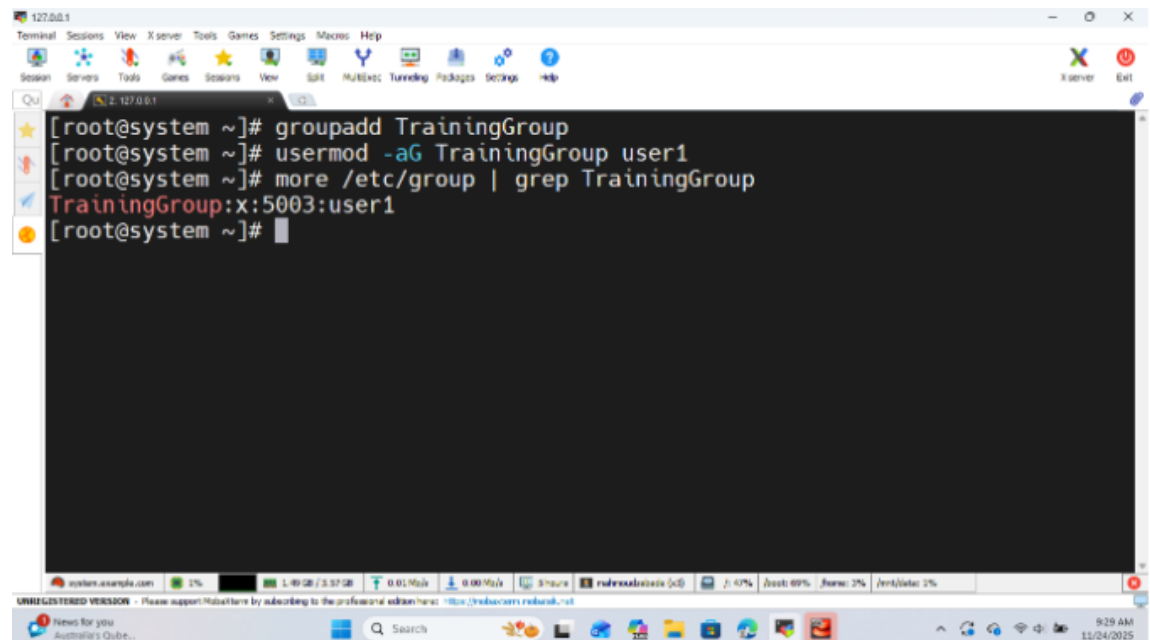
1- Create user1



A terminal window titled '127.0.0.1' showing the creation of a new user 'user1'. The user is created with UID 601, shell /sbin/nologin, and home directory /home/user1. The password is set to 'redhat'. The terminal output is as follows:

```
[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:$y$j9T$lwOUElPmTaD65a/D527t9.$qKZxGdnrmAka6LBzTTfa54Fi0otqLkG9kKM9i.st7D5:20415:0:99999:7:::
[root@system ~]#
```

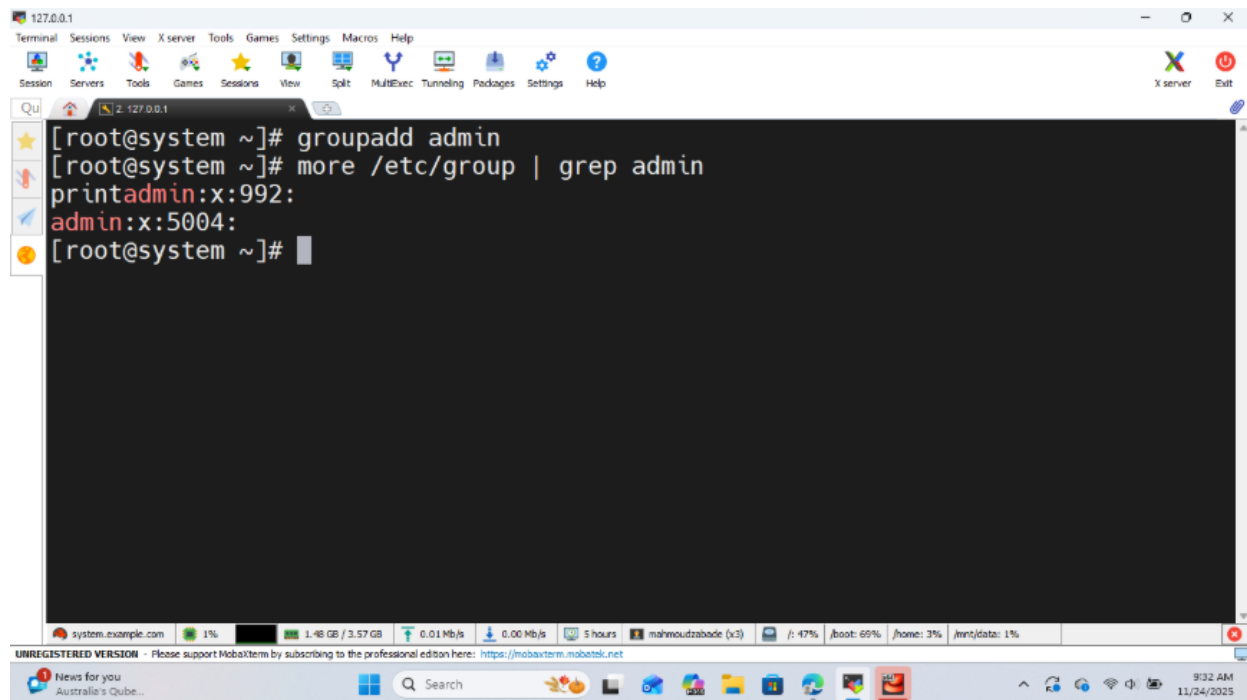
2- Create TrainingGroup and add user1 into it



A terminal window titled '127.0.0.1' showing the creation of a new group 'TrainingGroup' and adding 'user1' to it. The group is created with GID 5003. The user 'user1' is then added to the group. The terminal output is as follows:

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

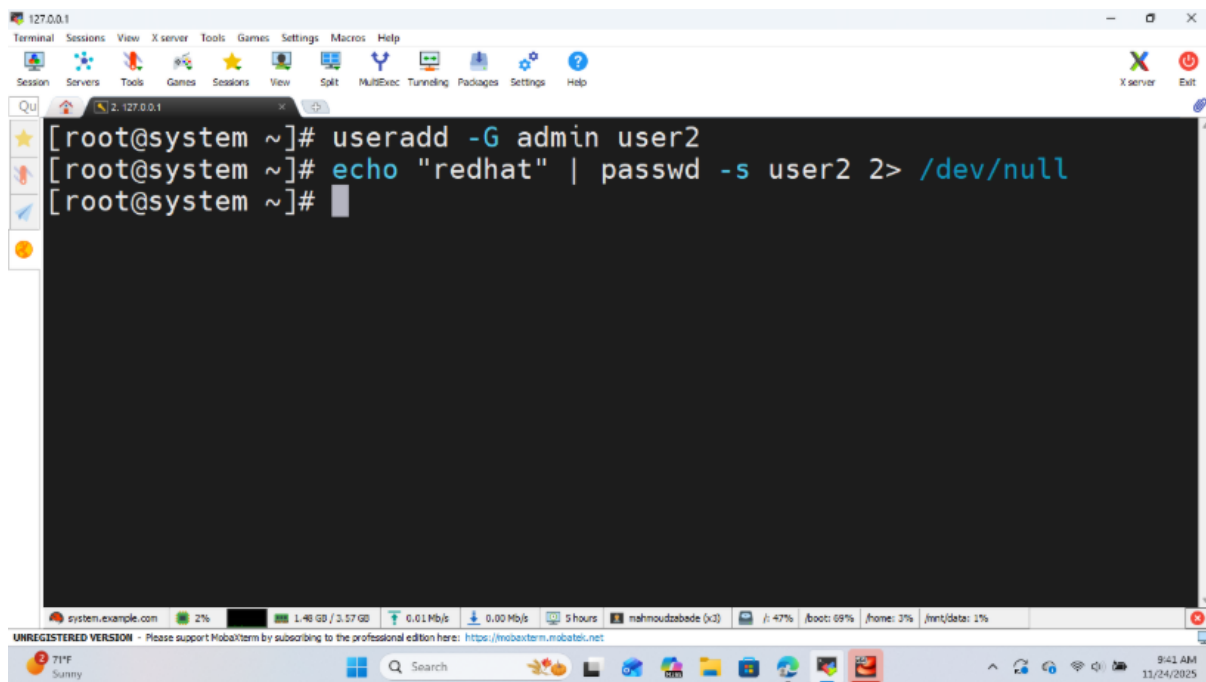
3- Create admin group



```
[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 within the Mobaxterm application. The terminal displays the execution of the `groupadd admin` command to create a new group. Subsequently, the command `more /etc/group | grep admin` is used to verify the group's creation, showing its entry in the `/etc/group` file. The terminal output confirms the group `admin` has been created with a password field `x` and a GID of `5004`. The Mobaxterm interface includes a menu bar, a toolbar, and a status bar at the bottom showing system resources and a warning for the unregistered version.

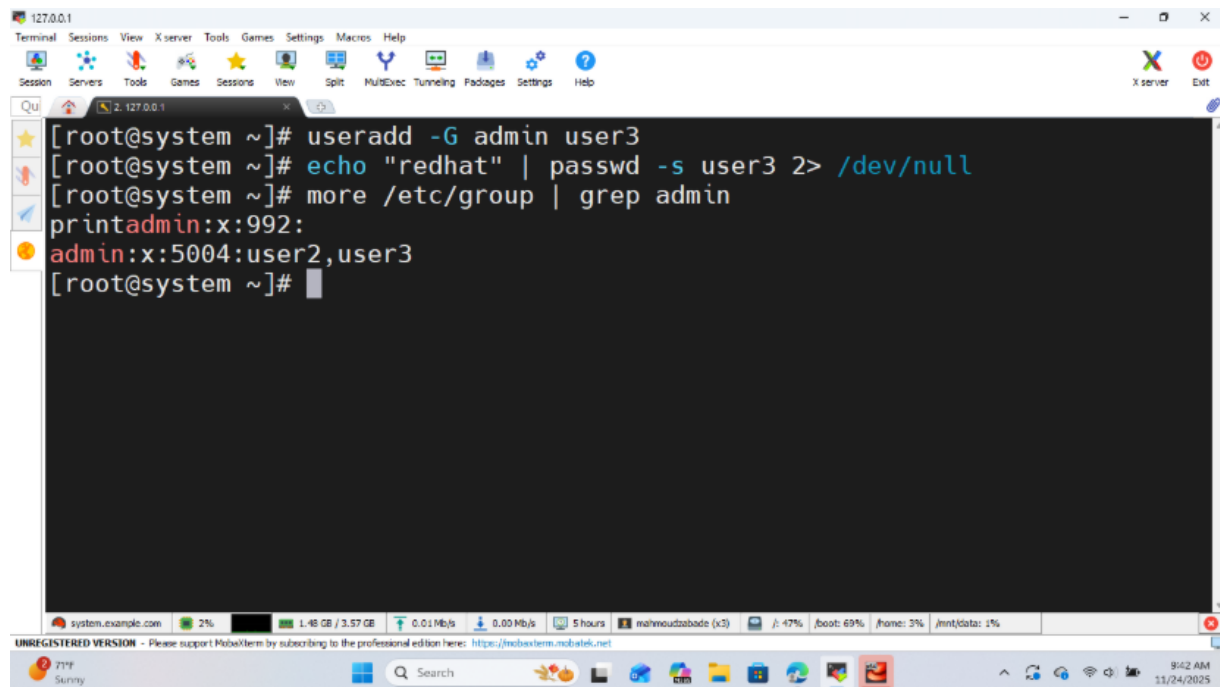
4- Create user2 and assign it to admin group



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

The screenshot shows a terminal window within the Mobaxterm application. The terminal displays the execution of the `useradd -G admin user2` command to create a new user named `user2` and assign it to the `admin` group. Subsequently, the command `echo "redhat" | passwd -s user2 2> /dev/null` is used to set the password for `user2` to `redhat`. The terminal output confirms the user has been created and the password has been set. The Mobaxterm interface includes a menu bar, a toolbar, and a status bar at the bottom showing system resources and a warning for the unregistered version.

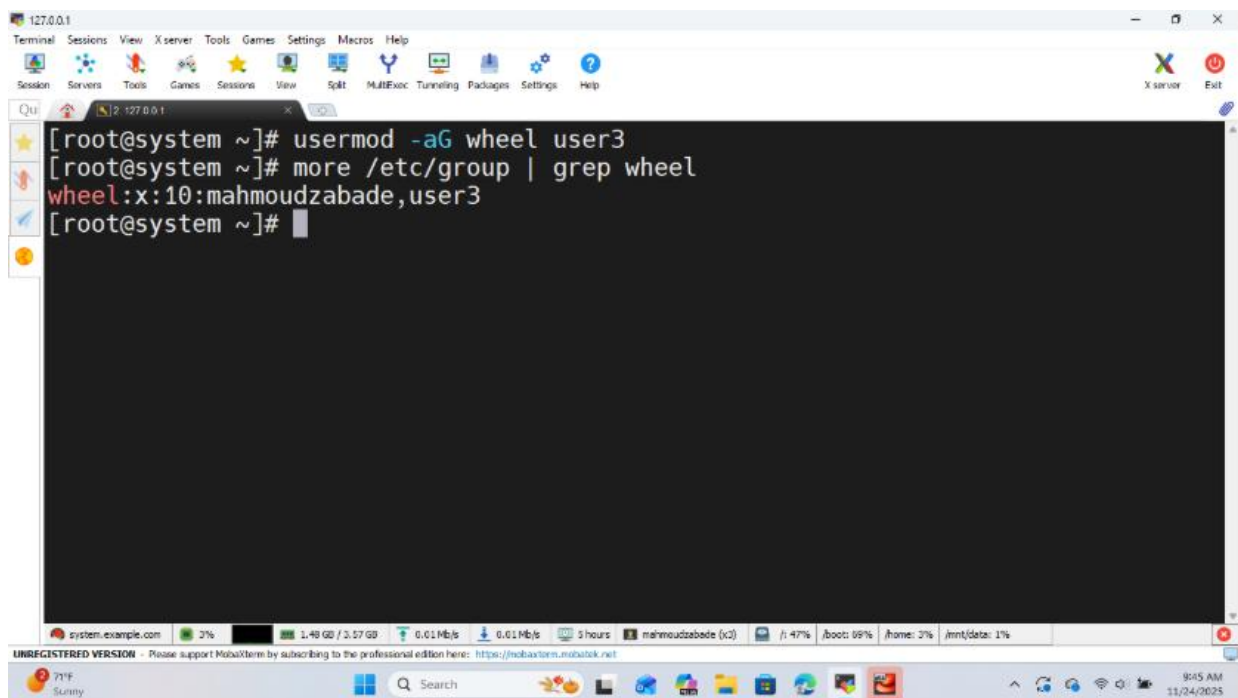
5- Create user3 and assign it to admin group



```
[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 '127.0.0.1' with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal displays the commands to create user3, set its password to 'redhat', and verify its group membership. The output shows user3 is a member of the 'admin' group. The window also shows system resource usage at the bottom.

6- Give user3 root permissions

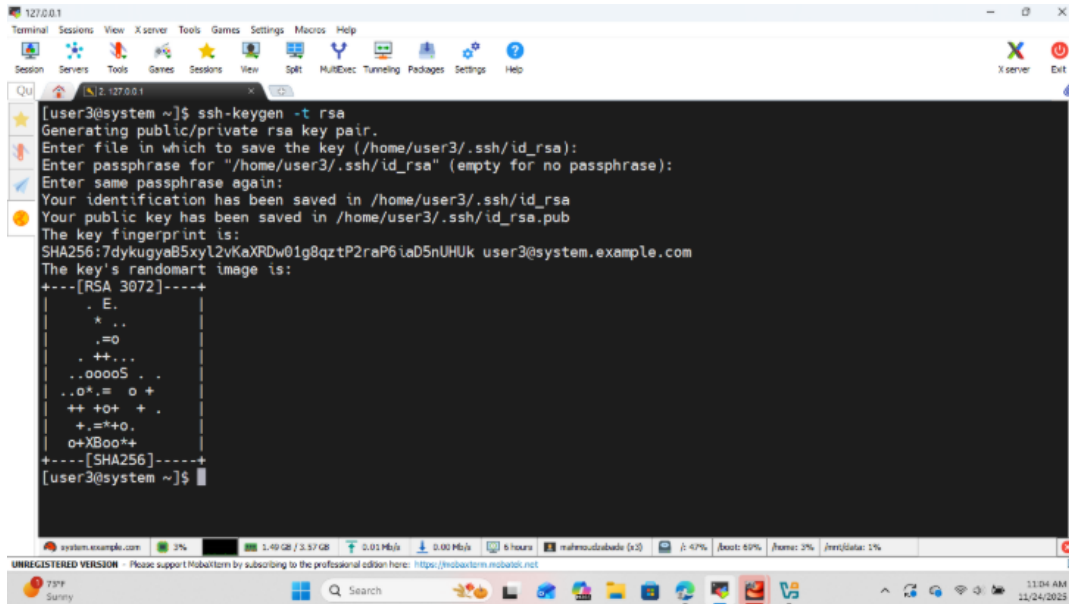


```
[root@system ~]# usermod -aG wheel user3
[root@system ~]# more /etc/group | grep wheel
wheel:x:10:mahmoudzabade,user3
[root@system ~]#
```

The screenshot shows a terminal window titled '127.0.0.1' with the same menu bar and toolbar as the previous image. The terminal displays the command to add user3 to the 'wheel' group and the resulting output from the group file. The window also shows system resource usage at the bottom.

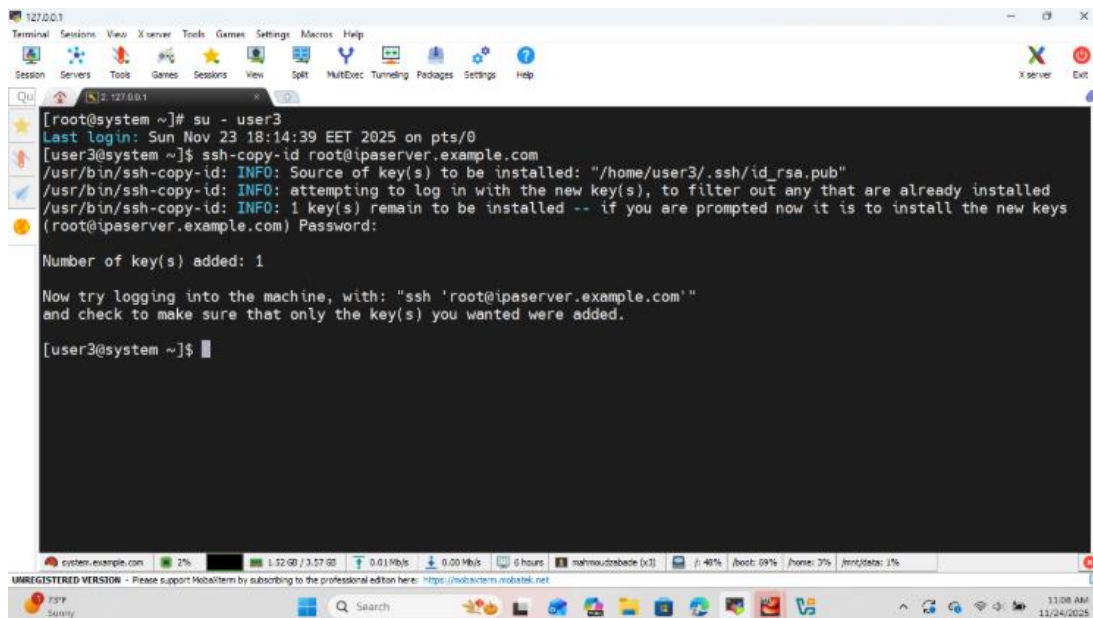
Part3: SSH

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.                  |
|  +..                 |
|  =0                  |
|  ++..               |
| ..ooooS .           |
|..O*,= o +           |
|++ +o+  + .          |
| +,=*+o.             |
|o+XBoo*+             |
+----[SHA256]-----+
[user3@system ~]$
```

2- Copy Public Key to Remote VM



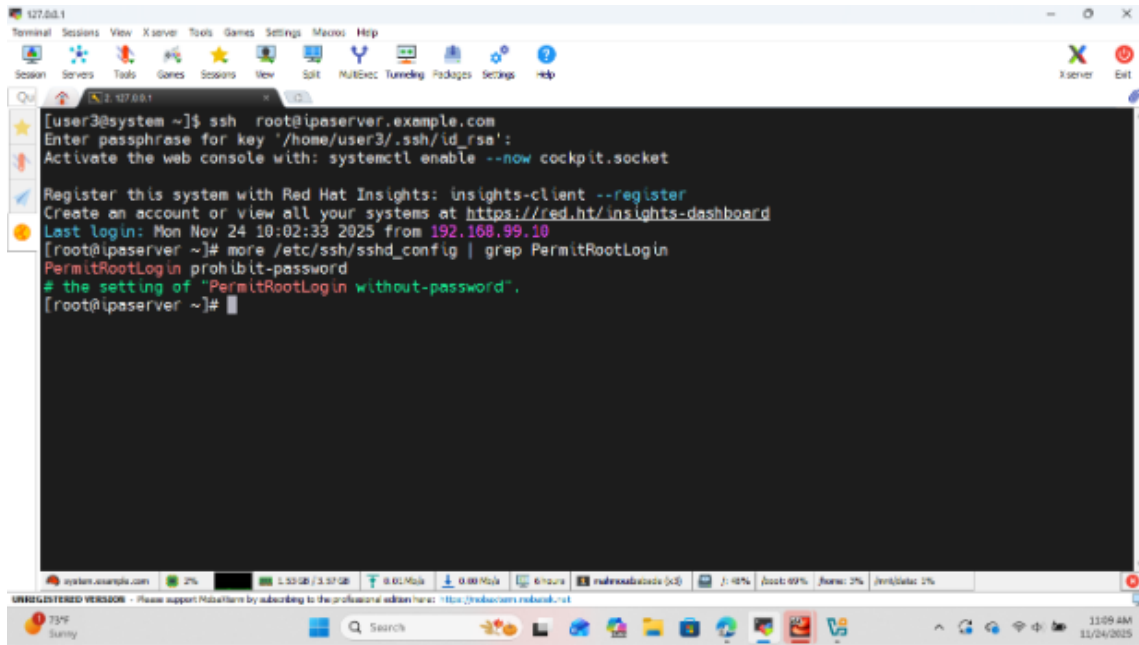
```
[root@system ~]# su - user3
Last login: Sun Nov 23 18:14:39 EET 2025 on pts/0
[user3@system ~]$ ssh-copy-id root@ipaserver.example.com
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/user3/.ssh/id_rsa.pub"
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), 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

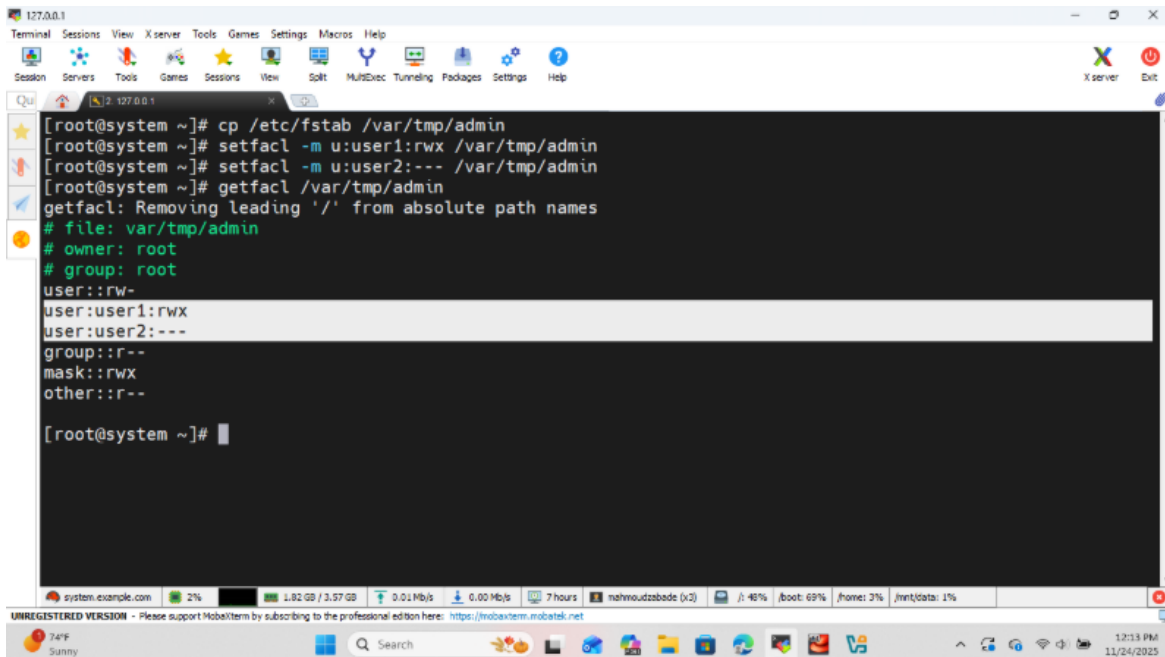


A screenshot of a terminal window titled "127.0.0.1" with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal shows an SSH session from user3@system to root@ipaserver.example.com. The user enters a passphrase and the system prompts to activate the web console. The user registers with Red Hat Insights. Then, the user runs `more /etc/ssh/sshd_config | grep PermitRootLogin`, showing the configuration `PermitRootLogin prohibit-password` and a comment about the setting. The terminal status bar at the bottom shows system resources and a notification for an unregistered version of the software.

```
[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 ~]#
```

Part4: Permissions



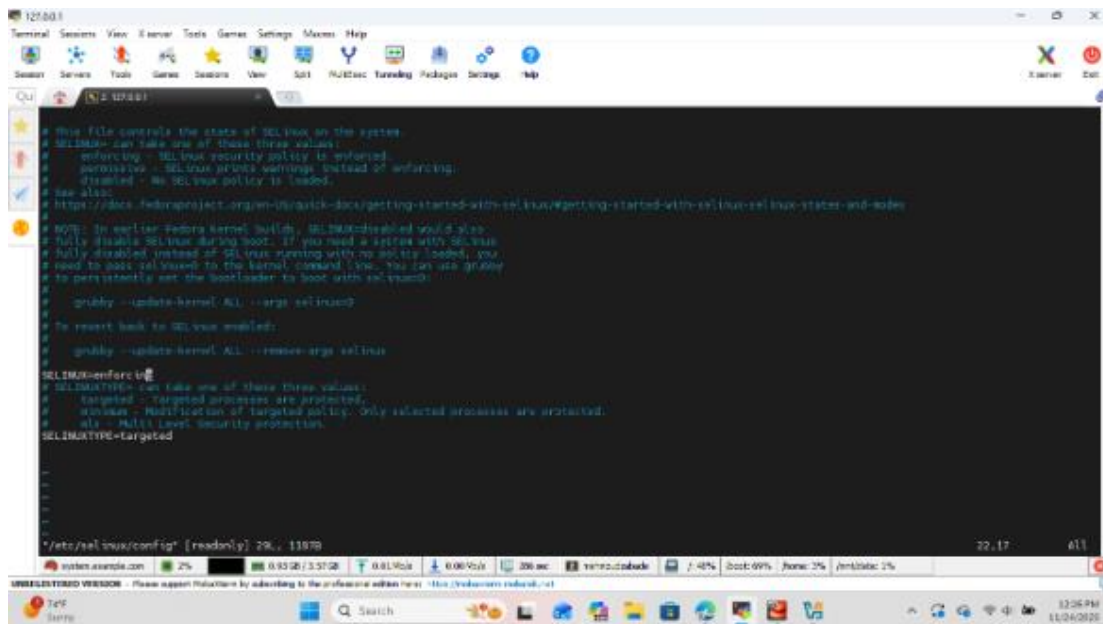
A screenshot of a terminal window titled "127.0.0.1" with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal shows a root user at system running commands to create a directory `/var/tmp/admin` and set permissions using `setfacl` for `user1` and `user2`. The user then runs `getfacl /var/tmp/admin`, displaying the resulting permissions: `user::rw-`, `user:user1:rw-`, `user:user2:---`, `group::r--`, `mask::rw-`, and `other::r--`. The terminal status bar at the bottom shows system resources and a notification for an unregistered version of the software.

```
[root@system ~]# cp /etc/fstab /var/tmp/admin
[root@system ~]# setfacl -m u:user1:rw- /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:rw-
user:user2:---
group::r--
mask::rw-
other::r--

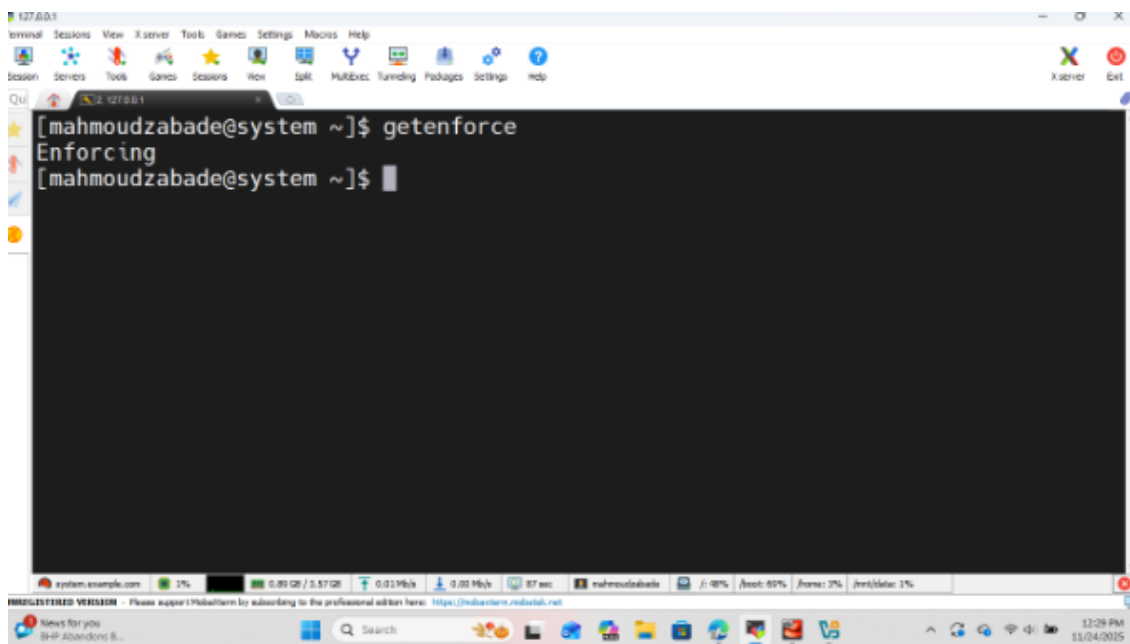
[root@system ~]#
```

Part 5: SELinux

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

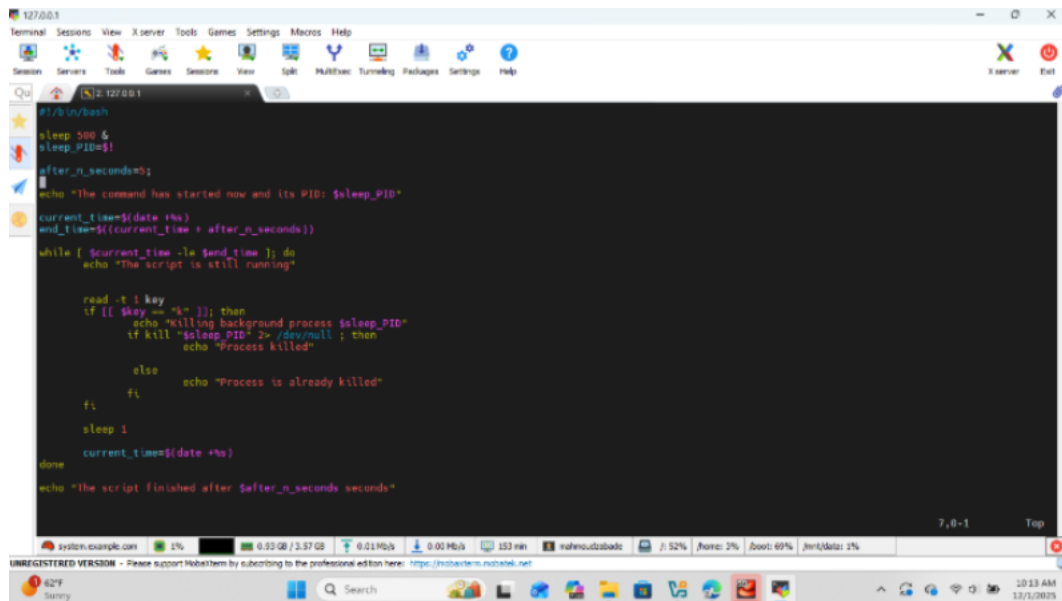


2- Reboot and check the SELinux mode



Part 6: bash script and processes

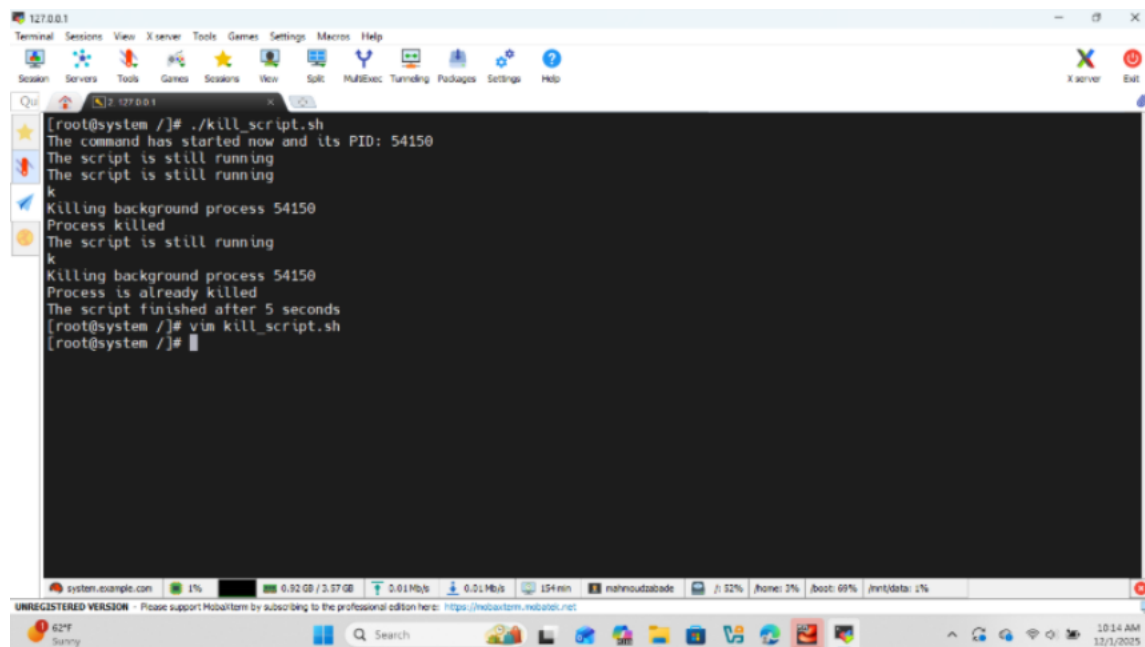
- 1- shell script that will run for n seconds and the process will be killed after the user enters 'k' character.



```
#!/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 -le $end_time ]; do
    echo "The script is still running"

    read -t 1 key
    if [[ $key == "k" ]]; then
        echo "Killing background process $sleep_PID"
        if kill $sleep_PID 2> /dev/null ; then
            echo "Process killed"
        else
            echo "Process is already killed"
        fi
    fi
    sleep 1
    current_time=$(date +%s)
done
echo "The script finished after $after_n_seconds seconds"
```

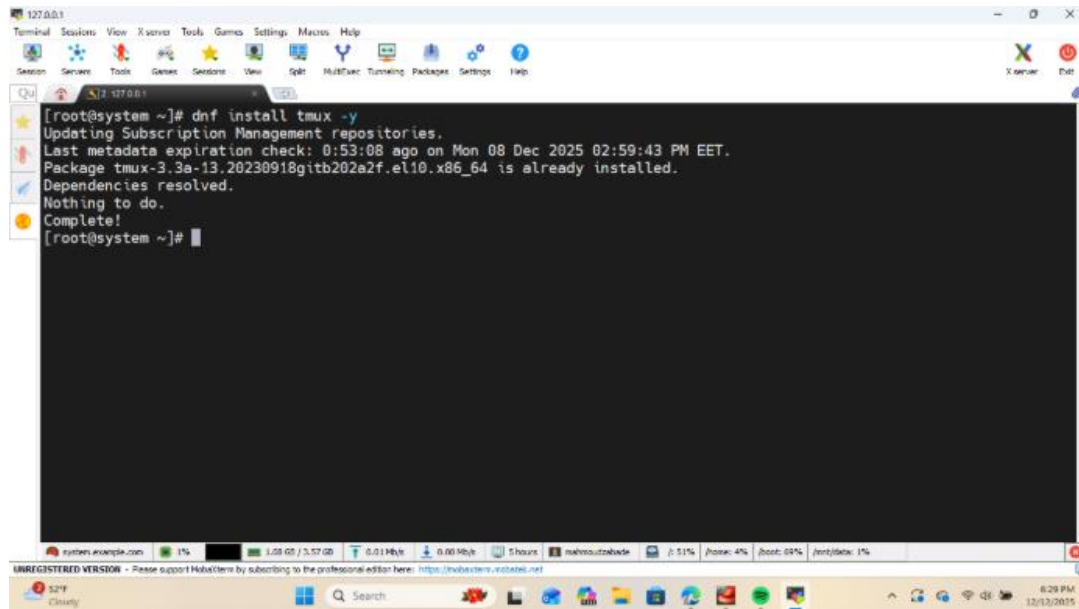
- 2- shell Run the script and check the results



```
[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 ~]#
```

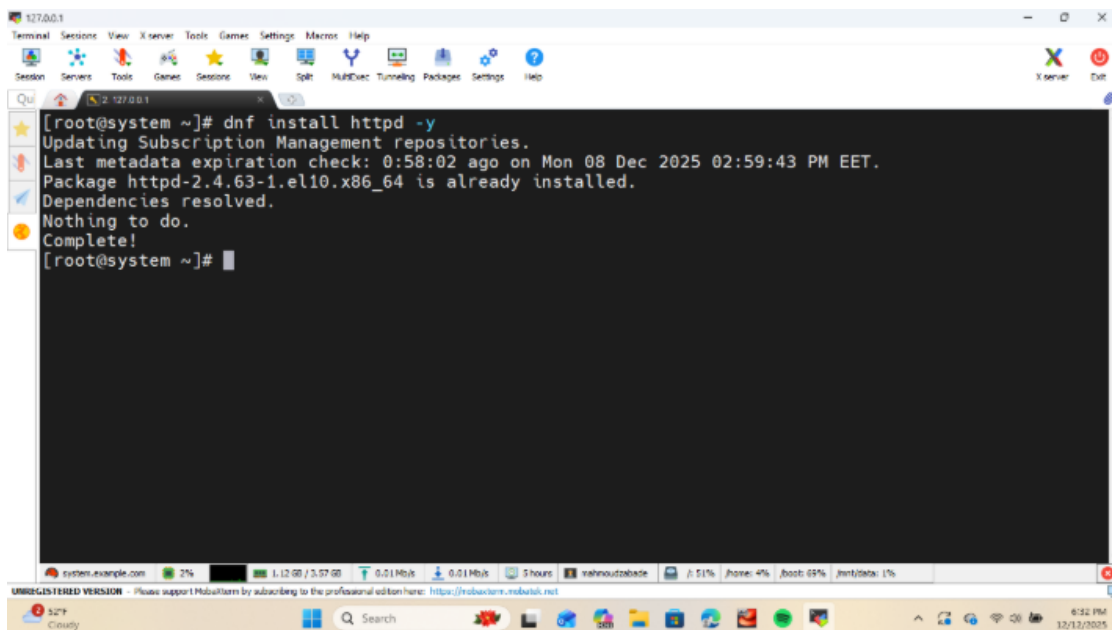
Part 7: Yum Repo

1- Install tmux

A screenshot of a terminal window titled '127.0.0.1' with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal shows the command '[root@system ~]# dnf install tmux -y' and its output: '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!', and '[root@system ~]#'. The bottom status bar shows system information like 'system.example.com', '1%', '1.28 GB / 3.57 GB', and network speeds. A 'UNREGISTERED VERSION' watermark is visible at the bottom.

```
[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 ~]#
```

2- Install Apache server

A screenshot of a terminal window titled '127.0.0.1' with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal shows the command '[root@system ~]# dnf install httpd -y' and its output: '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!', and '[root@system ~]#'. The bottom status bar shows system information like 'system.example.com', '2%', '1.12 GB / 3.57 GB', and network speeds. A 'UNREGISTERED VERSION' watermark is visible at the bottom.

```
[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 ~]#
```

3- Install MySQL

- install MySQL repository

```

[root@system ~]# dnf install https://repo.mysql.com/mysql80-community-release-el9.rpm
Updating Subscription Management repositories.
Last metadata expiration check: 1:00:00 ago on Mon 08 Dec 2025 02:59:43 PM EET.
mysql80-community-release-el9.rpm
dependencies resolved.
2.0 kB/s | 13 kB | 00:05
Package Architecture Version Repository Size
-----
Installing:
mysql80-community-release  x86_64  el9-5  downstreamline 13 kB
Transaction Summary
Install 1 Package
Total download: 13 kB
Installed size: 12 kB
Is this ok [y/N]: y
Downloading Packages:
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
Preparing :
Installing : mysql80-community-release-el9-5.x86_64 1/1
Installed products updated.
Installed:
mysql80-community-release-el9-5.x86_64
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

```
[root@system ~]# dnf install mysql-community-server -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:10:21 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
(tried to add '--allowrasing' to command line to replace conflicting packages or '--skip-broken' to skip uninstallable packages or '--nobest' to use not only best candidate packages)
[root@system ~]#
```

4- Install Zabbix packages

- Install Zabbix repo

```
[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.nbcBV: Header V4 RSA/SHA512 Signature, key ID b5333005: NOKEY
Verifying... ##### [100%]
Preparing... ##### [100%]
package zabbix-release-7.0-7.el10.noarch is already installed
[root@system ~]#
```

- Download (mirror) all the rpm files

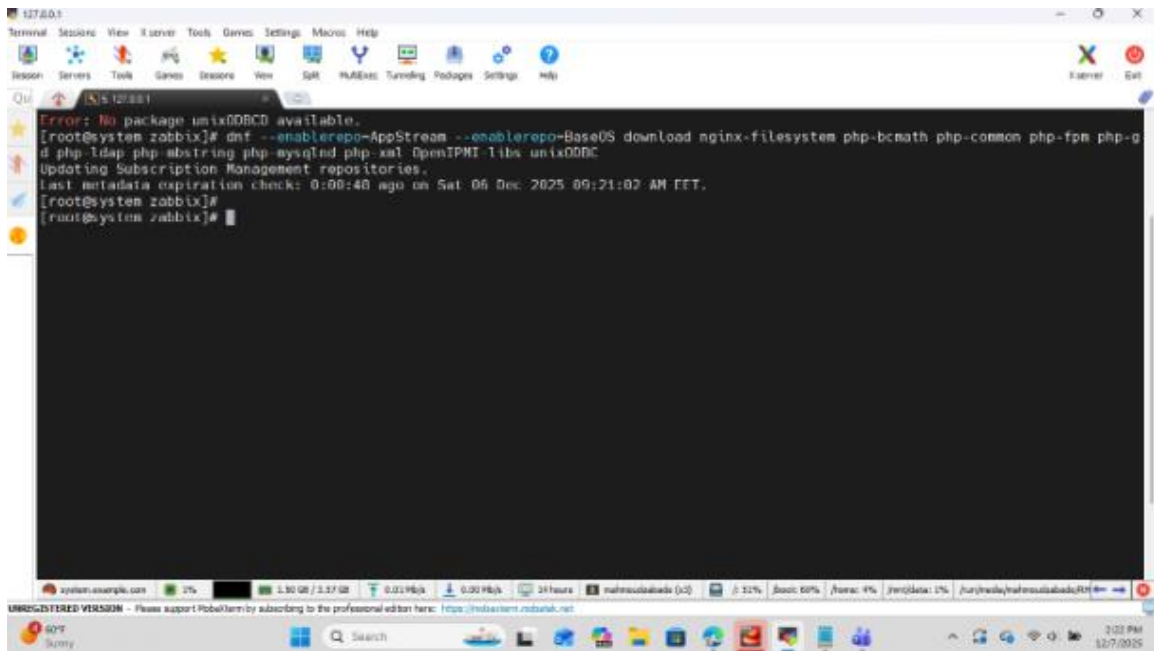

```
127.0.0.1
Terminal  System  View  Xterm  Tools  Games  Settings  Mouse  Help
[root@system zabbix]# sudo reposync -p /var/www/html/zabbix --re
pold-zabbix --download-metadata
Updating Subscription Management repositories.
Zabbix Official Repository - x86_62 8/s 3.8 kB 00:04
Zabbix Official Repository - x86_64 45 kB/s 585 kB 00:11
(1/251): zabbix-agent-7.0.14-rc 187 kB/s 620 kB 00:05
(2/251): zabbix-agent-7.0.15-rc 186 kB/s 620 kB 00:05
(3/251): zabbix-agent-7.0.16-rc 184 kB/s 620 kB 00:05
(4/251): zabbix-agent-7.0.17-rc 187 kB/s 631 kB 00:05
(5/251): zabbix-agent-7.0.18-rc 127 kB/s 622 kB 00:04
(6/251): zabbix-agent-7.0.18-rc 481 kB/s 631 kB 00:01
(7/251): zabbix-agent-7.0.19-rc 569 kB/s 635 kB 00:01
(8/251): zabbix-agent-7.0.20-rc 560 kB/s 635 kB 00:01
(9/251): zabbix-agent-7.0.21-rc 685 kB/s 635 kB 00:01
(10/251): zabbix-agent-7.0.21-rc 747 kB/s 636 kB 00:00
(11/251): zabbix-agent2-7.0.14- 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-agent2-7.0.18- 2.5 MB/s 6.3 MB 00:02
(15/251): zabbix-agent2-7.0.18- 2.0 MB/s 6.3 MB 00:02
(16/251): zabbix-agent2-7.0.19- 2.0 MB/s 6.3 MB 00:02
(17/251): zabbix-agent2-7.0.20- 2.3 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-agent2-7.0.21- 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 00:01
(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

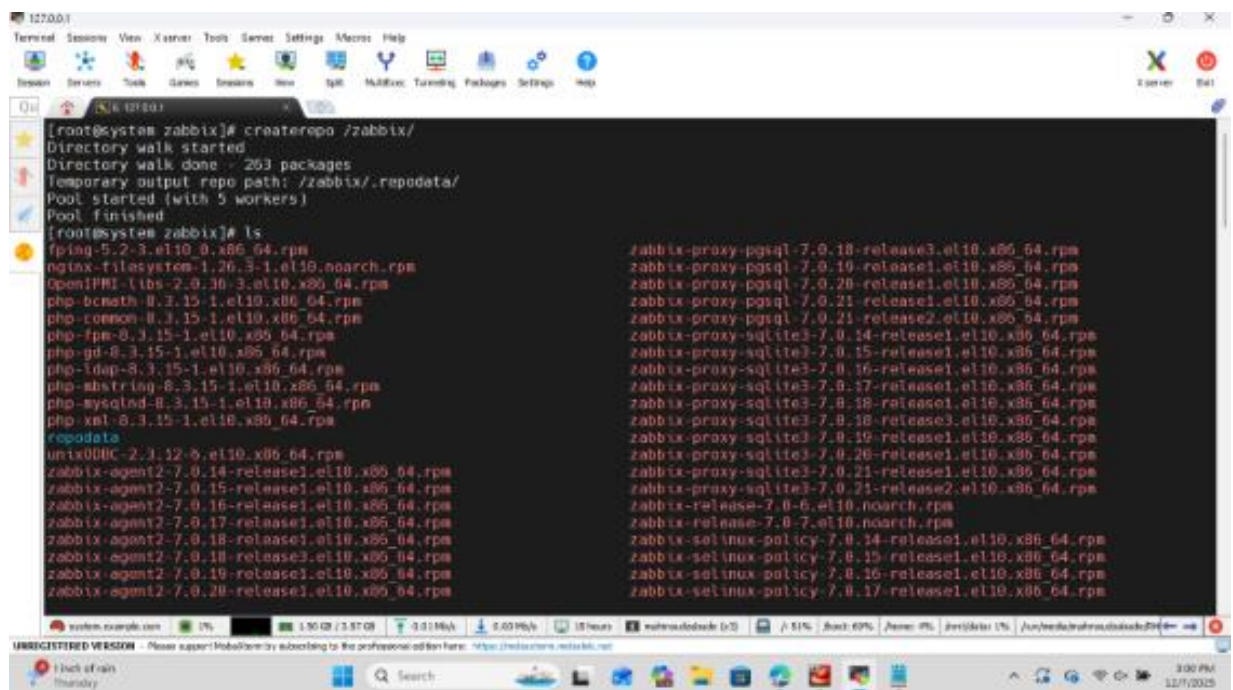
Here are all the dependencies needed for all the packages

```
127.0.0.1
Terminal  System  View  Xterm  Tools  Games  Settings  Mouse  Help
[root@system zabbix]# sudo dnf install zabbix-server-mysql zabbix-web-mysql zabbix-sql-scripts zabbix-agent --enablerepo=zabbix
Updating Subscription Management repositories.
Last metadata expiration check: 8:07:28 ago on Sat 06 Dec 2025 08:35:01 AM EST.
Package zabbix-server-mysql-7.0.21-release2.el10.x86_64 is already installed.
Package zabbix-agent-7.0.21-release2.el10.x86_64 is already installed.
Dependencies resolved.
Package                               Architecture Version                Repository              Size
Installing:
zabbix-sql-scripts                   x86_64          7.0.21-release2.el10  zabbix                  7.9 M
zabbix-web-mysql                     x86_64          7.0.21-release2.el10  zabbix                  12 K
Installing dependencies:
nginx-filesystem                     x86_64          1:1.26.3-1.el10       AppStream               14 K
php-common                           x86_64          8.3.15-1.el10         AppStream               70 K
php-fpm                              x86_64          8.3.15-1.el10         AppStream               1.0 M
php-gd                               x86_64          8.3.15-1.el10         AppStream               41 K
php-ldap                             x86_64          8.3.15-1.el10         AppStream               44 K
php-mbstring                         x86_64          8.3.15-1.el10         AppStream               517 K
php-mysqlnd                          x86_64          8.3.15-1.el10         AppStream               174 K
php-pdo                              x86_64          8.3.15-1.el10         AppStream               86 K
php-xml                              x86_64          8.3.15-1.el10         AppStream               141 K
zabbix-web-sops                      x86_64          7.0.21-release2.el10  zabbix                  13 K
Transaction Summary
Install 13 Packages
```

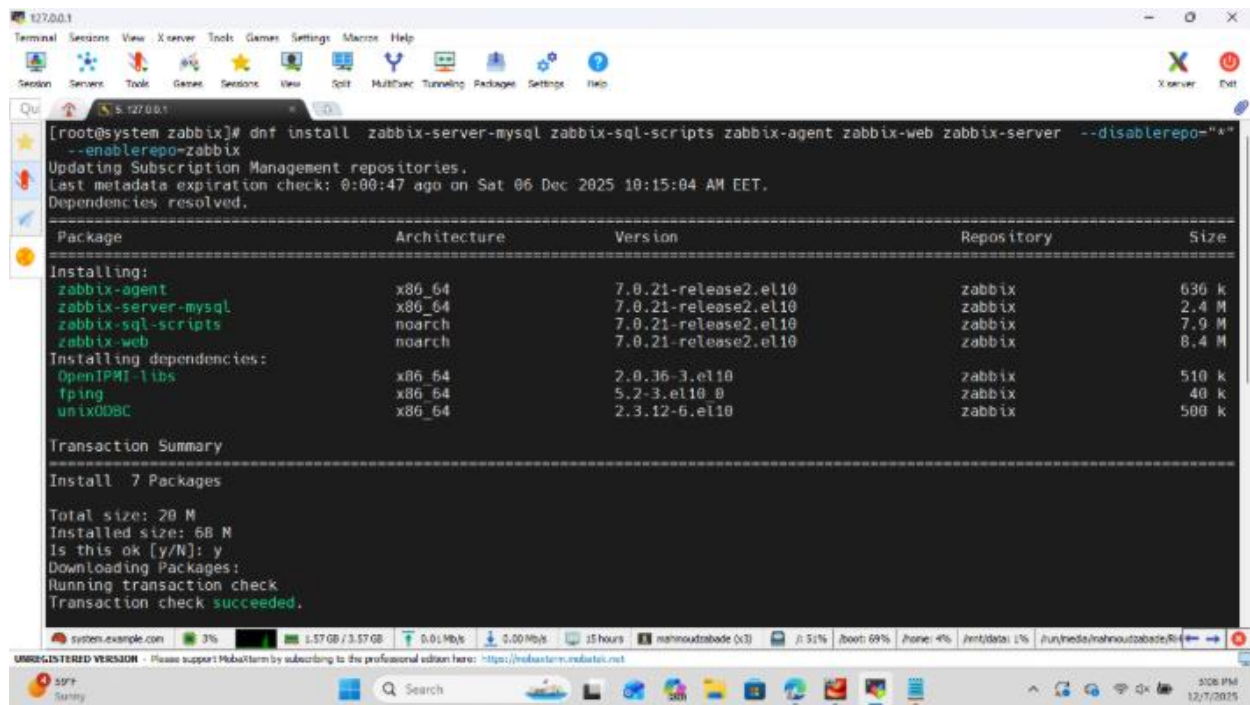
Download the dependencies



- Create the metadata file



- Install the packages

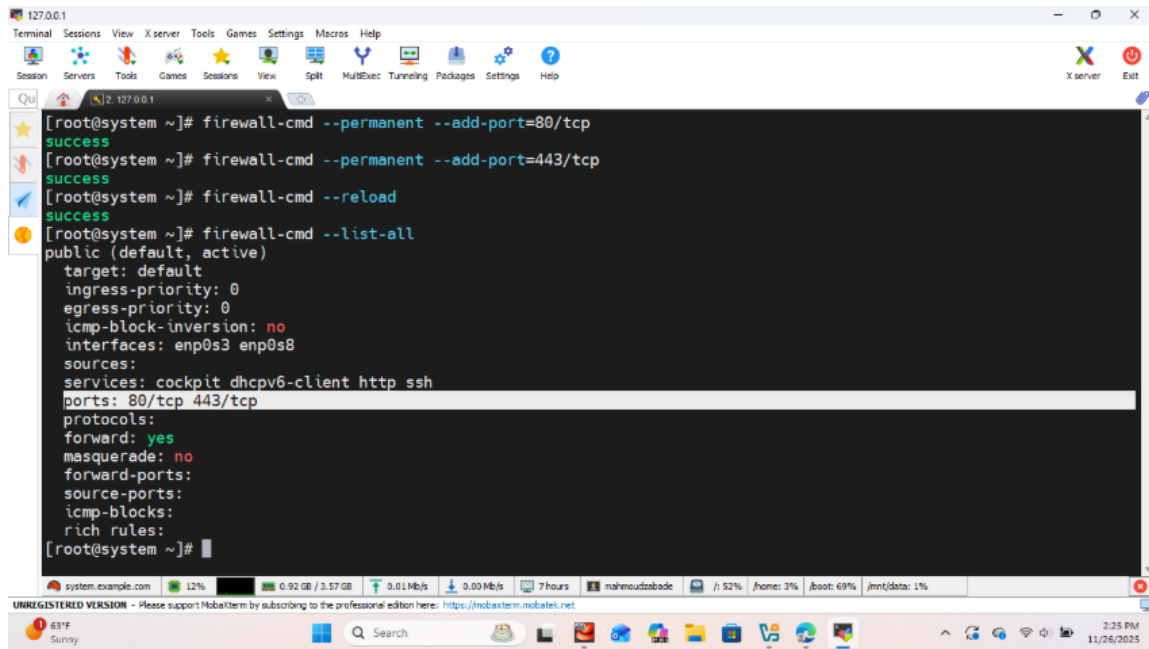


```
[root@system zabbix]# dnf install zabbix-server-mysql zabbix-sql-scripts zabbix-agent zabbix-web zabbix-server --disablerepo="*"
--enablerepo=zabbix
Updating Subscription Management repositories.
Last metadata expiration check: 0:00:47 ago on Sat 06 Dec 2025 10:15:04 AM EET.
Dependencies resolved.
=====
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
lping                                  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.
```

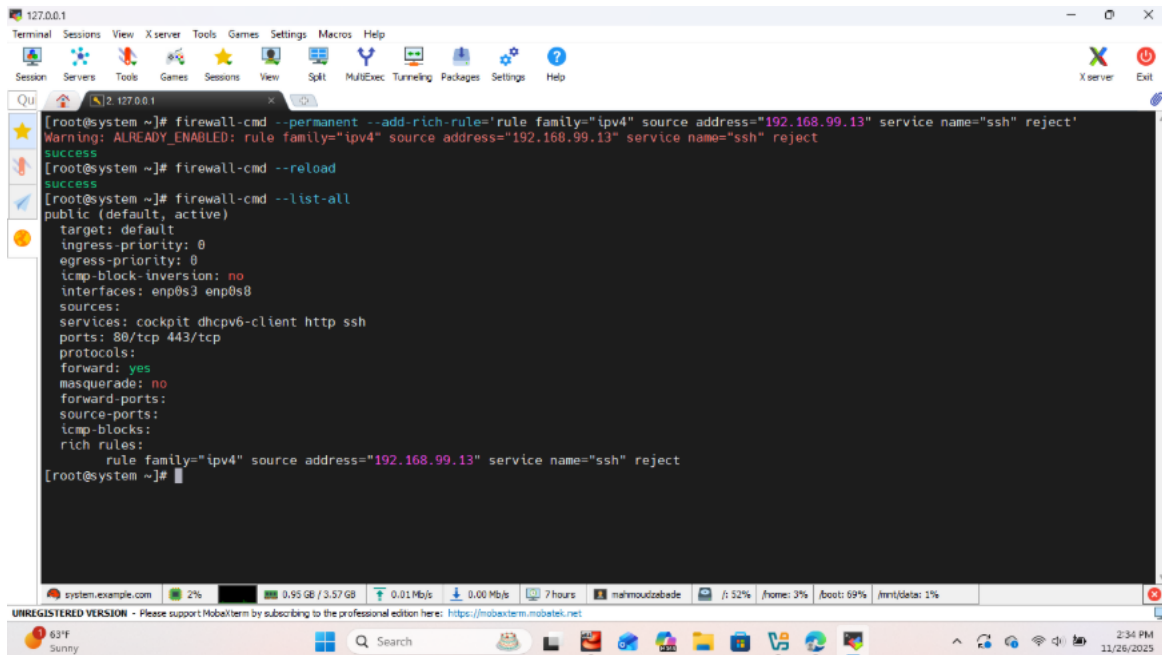
Part 8: Network management

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



```
127.0.0.1
Terminal Sessions View Xserver Tools Games Settings Macros Help
[Qu] 127.0.0.1
[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 ~]#
```

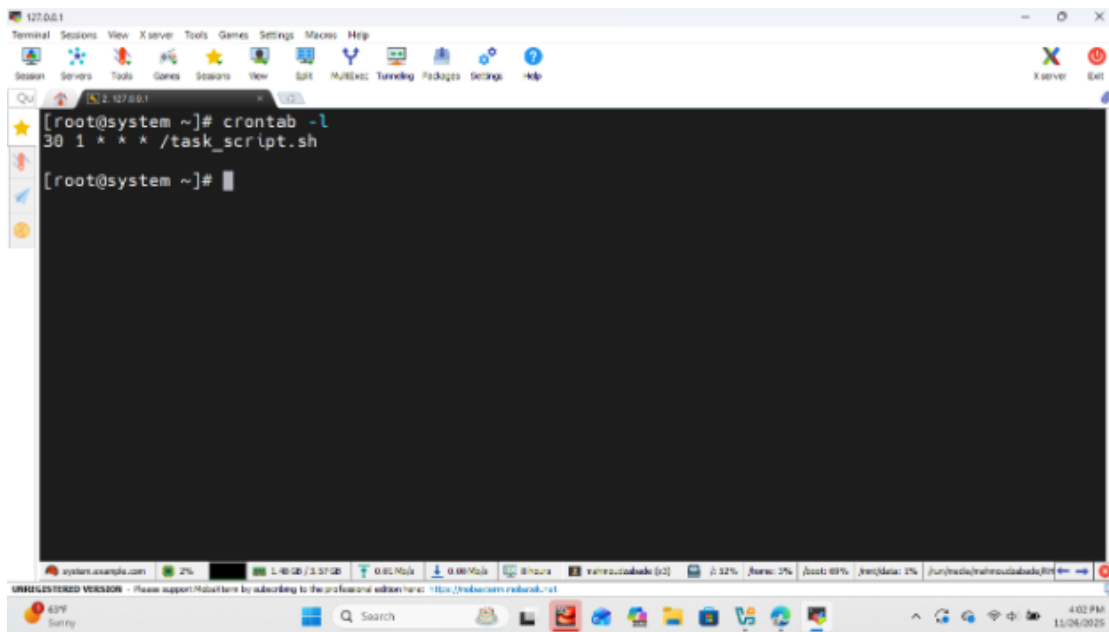
2- Add rich rule to prevent specific IP



```
127.0.0.1
Terminal Sessions View Xserver Tools Games Settings Macros Help
[Qu] 127.0.0.1
[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 ~]#
```

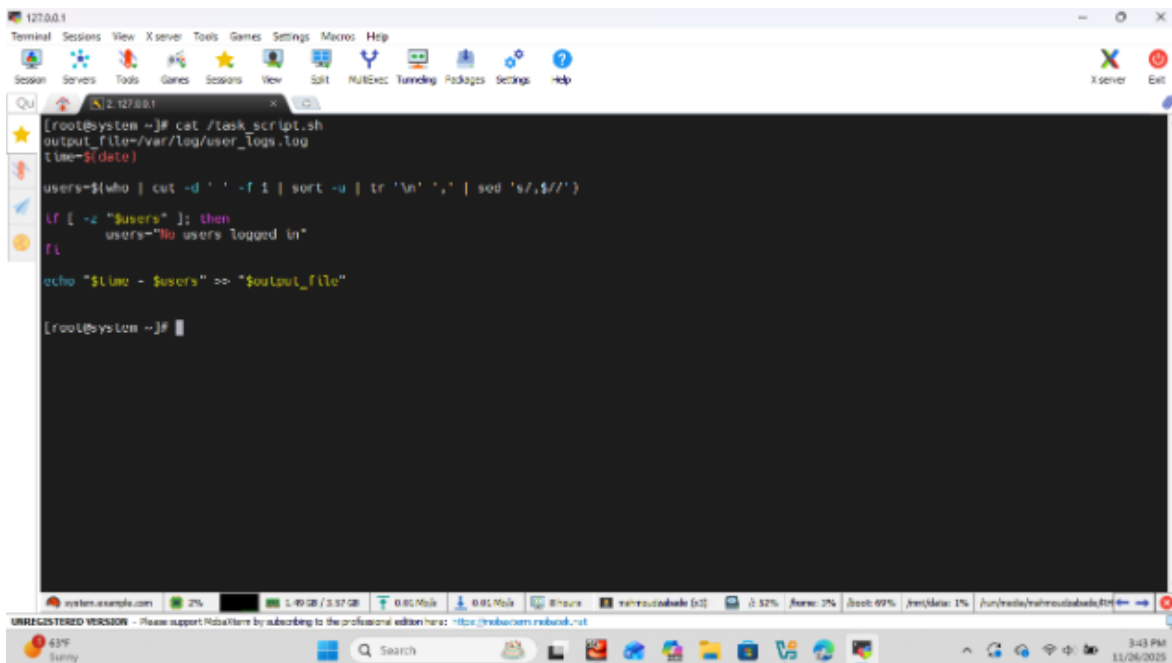
Part 9: Cronjob

1-Edit the crontab for the root user



```
127.0.0.1
Terminal Sessions View X server Tools Games Settings Macros Help
[root@system ~]# crontab -l
30 1 * * * /task_script.sh
[root@system ~]#
```

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

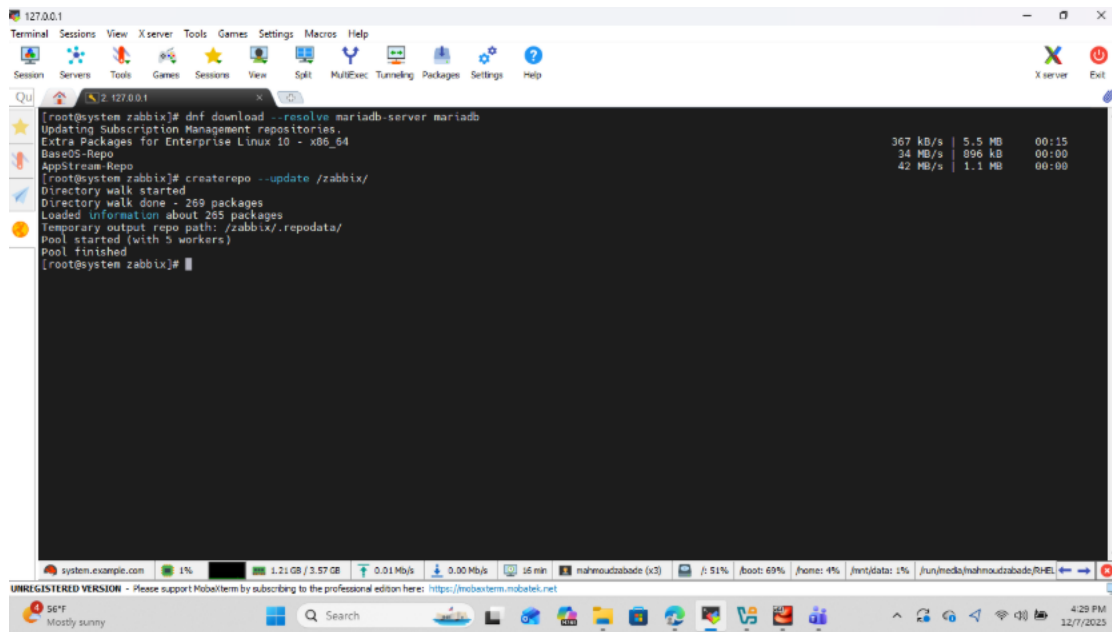


```
127.0.0.1
Terminal Sessions View X server Tools Games Settings Macros Help
[root@system ~]# cat /task_script.sh
output_file=/var/log/user_logs.log
time=$(date)
users=$(who | cut -d ' ' -f 1 | sort -u | tr '\n' ',' | sed 's/,,$//')
if [ -z "$users" ]; then
    users="No users logged in"
fi
echo "$time - $users" >> "$output_file"
[root@system ~]#
```

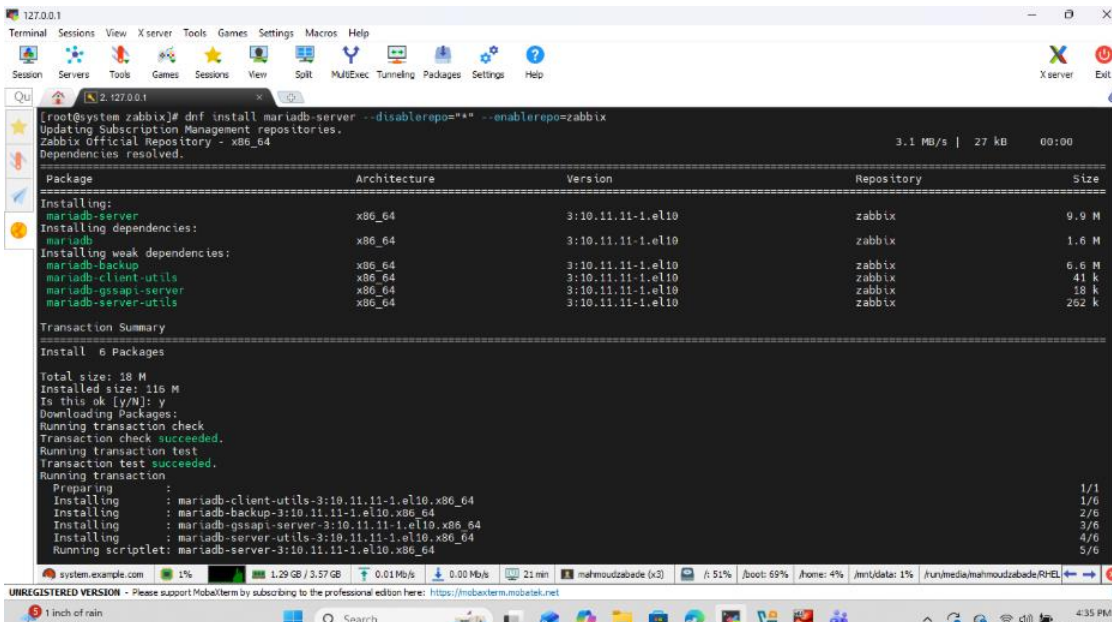
Part 10: MariaDB

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

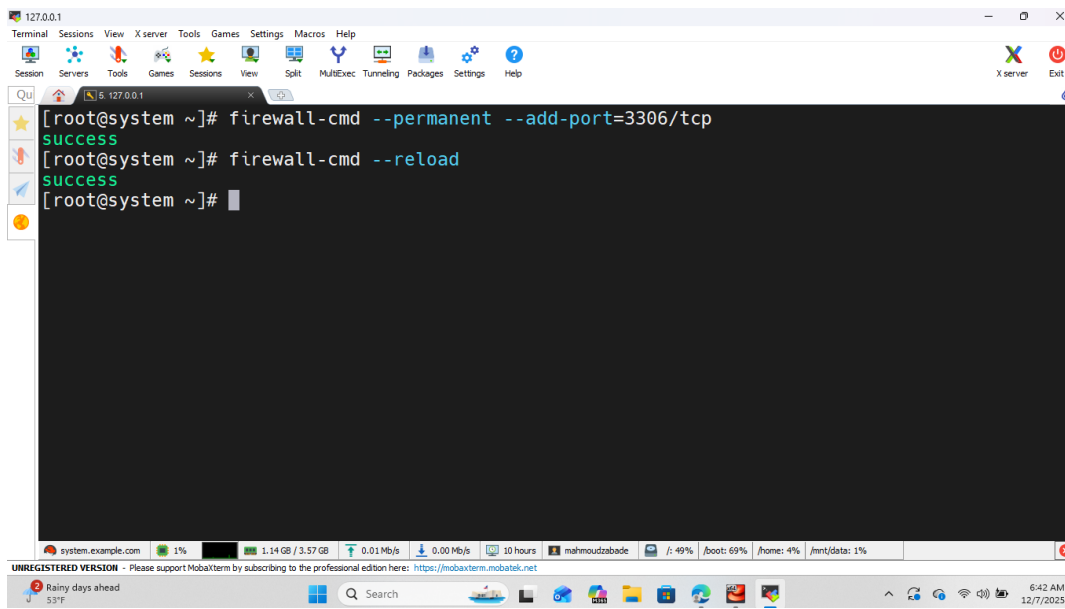
- Download MariaDB packages to the local repo



- Install MariaDB



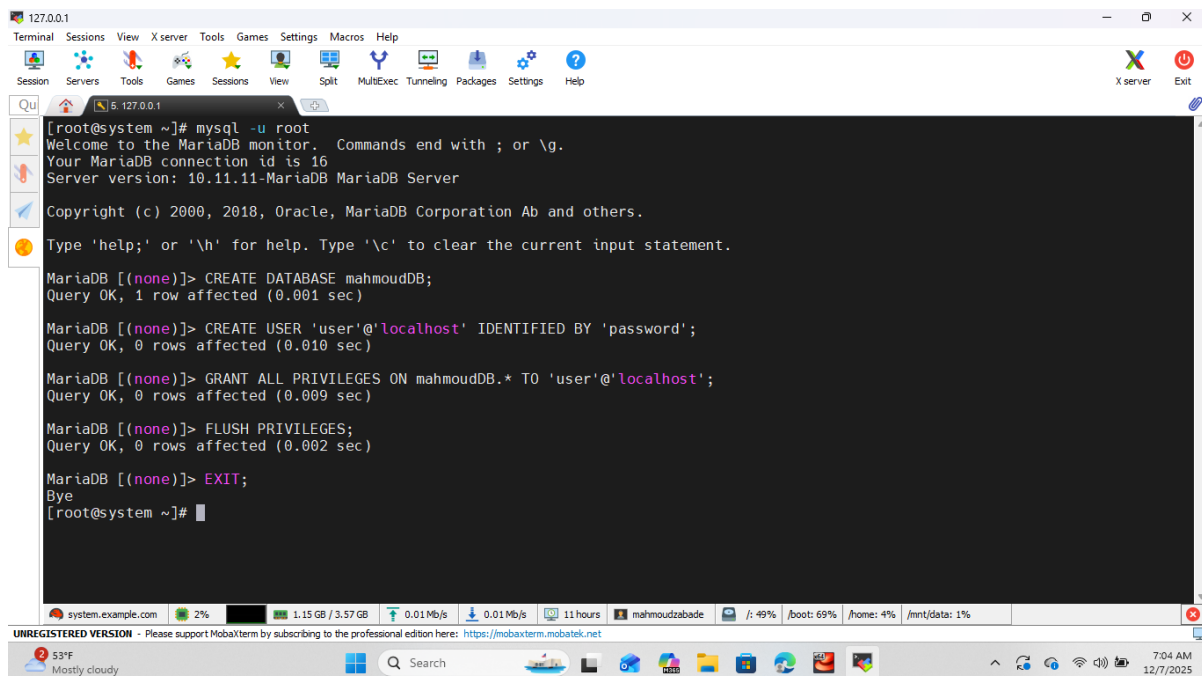
2- Open ports in the iptables from MariaDB.



A screenshot of a MobaXterm terminal window. The terminal shows a root user at a system prompt. The user enters the command `firewall-cmd --permanent --add-port=3306/tcp`, which returns `success`. Then, the user enters `firewall-cmd --reload`, which also returns `success`. The terminal window has a menu bar with options like Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, and Help. The status bar at the bottom shows system information like memory usage and network status.

```
[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).



A screenshot of a MobaXterm terminal window showing the MySQL command-line interface. The user is logged in as root. The terminal shows the following commands and their outputs: `CREATE DATABASE mahmoudDB;` (Query OK, 1 row affected), `CREATE USER 'user'@'localhost' IDENTIFIED BY 'password';` (Query OK, 0 rows affected), `GRANT ALL PRIVILEGES ON mahmoudDB.* TO 'user'@'localhost';` (Query OK, 0 rows affected), `FLUSH PRIVILEGES;` (Query OK, 0 rows affected), and `EXIT;` (Bye). The terminal window has a menu bar with options like Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, and Help. The status bar at the bottom shows system information like memory usage and network status.

```
[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)

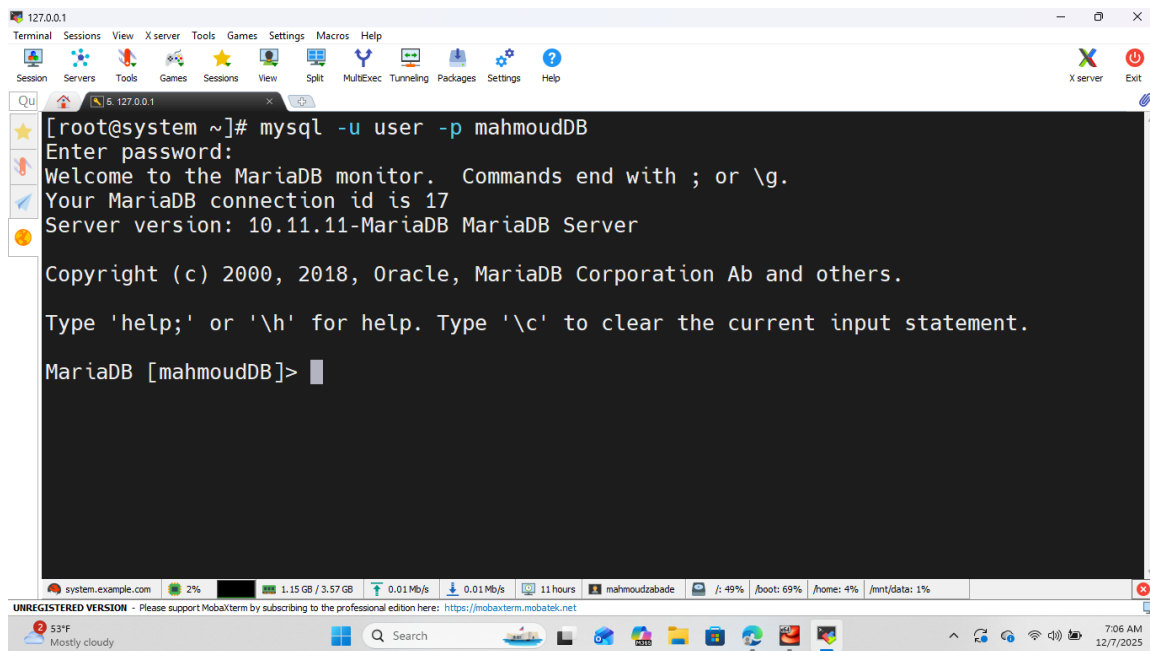
MariaDB [(none)]> CREATE USER 'user'@'localhost' IDENTIFIED BY 'password';
Query OK, 0 rows affected (0.010 sec)

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)



The screenshot shows a terminal window titled '127.0.0.1' with a menu bar (Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help) and a toolbar. The terminal content is as follows:

```
[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

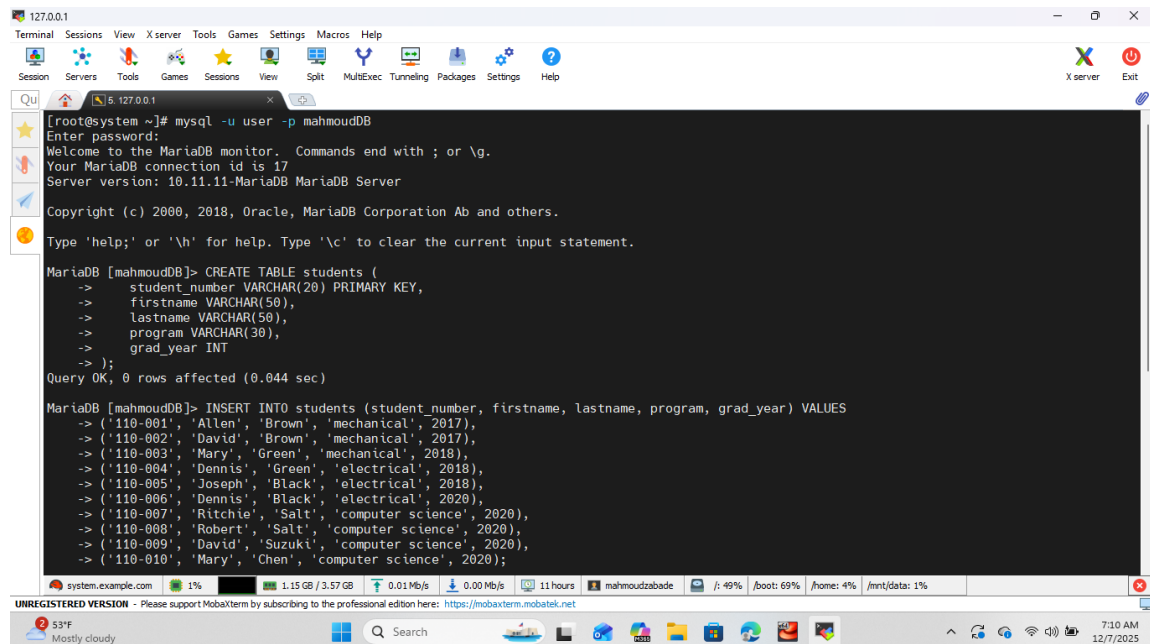
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [mahmoudDB]>
```

The bottom status bar shows system information: system.example.com, 2% CPU, 1.15 GB / 3.57 GB memory, 0.01 Mb/s network, 11 hours uptime, mahmoudzabade user, /boot: 69%, /home: 4%, /mnt/data: 1%.

5- Create a schema



The screenshot shows the same terminal window as before, but with additional commands and output:

```
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 bottom status bar now shows 1% CPU usage.

6- Verify that the schema is created successfully

127.0.0.1

TerminalSessionsViewX serverToolsGamesSettingsMacrosHelp

SessionServersToolsGamesSessionsViewSplitMultiExecTunnelingPackagesSettingsHelp

X serverExit

Qu

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.com1%1.16 GB / 3.57 GB0.01 Mb/s0.00 Mb/s11 hoursmahmoudzabade/ : 49% /boot: 69% /home: 4% /mnt/data: 1%

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53°F
Mostly cloudy

Search

7:12 AM
12/7/2025